



North Eastern Region VISION 2047

Second Draft Report

12th August, 2024



NORTH EASTERN COUNCIL
GOVT. OF INDIA



MINISTRY OF DEVELOPMENT OF
NORTH EASTERN REGION

Second Draft Report
12th August, 2024

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List of Abbreviations and Acronyms

ADB	Asian Development Bank
AEDA	Assam Energy Development Agency
AEGR	Annual Exponential Growth Rate
AICRP	All India Coordinated Research Project
AIIMS	All India Institute of Medical Sciences
AITP	Associate of the Institute of Town Planners
ALS	Area Licensing Scheme
ASEAN	Association of Southeast Asian Nations
ASS	Agriculture System Sustainability
ATMA	Agricultural Technology Management Agency
AUKH	Assam Urban Knowledge Hub
AYUSH	Ayurveda, Yoga & Naturopathy, Unani, Siddha, and Homeopathy
BBIN	Bangladesh, Bhutan, and Nepal
BCCI	Board of Control for Cricket in India
BIMSTEC	Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation
BPO	Business Process Outsourcing
BRI	Belt and Road Initiative
BSUP	Basic Service for Urban Poor
CAG	Comptroller and Auditor General
CAM	Computer Aided Manufacturing
CBO	Community Based Organization
CDMR	Centre for Disaster Management and Research
CDP	City Development Plan
CHCs	Community Health Centers
CIBIL	Credit Information Bureau (India) Limited
CMP	Comprehensive Mobility Plan
CNG	Compressed Natural Gas
CPCB	Central Pollution Control Board
CSIR	Council of Scientific & Industrial Research
CT	Census Town
DAE	Department of Atomic Energy
DARPG	Department of Administrative Reforms & Public Grievances
DBT	Direct Benefit Transfer
DDMAs	District Disaster Management Authorities
DFID	Department for International Development
DGH	Directorate General of Hydrocarbons
DICs	District Industries Centers
DPIIT	Department for Promotion of Industry and Internal Trade
DPIs	Digital Public Infrastructure
DRR	Disaster Risk Reduction
DST	Department of Science and Technology
DU	Dwelling Unit
E2PO	Energy Efficiency Programme Office
ECEC	East Coast Economic Corridor
ECGC	Export Credit Guarantee Corporation

ECS	Equivalent Car Space
EDB	Ease of Doing Business
EIA	Environmental Impact Assessments
ERP	Electronic Road Pricing
ESG	Environmental, Social and Governance
ETABS	Extended Three-Dimensional Analysis of Building Systems
FAO	Food and Agriculture Organization
FAR	Floor Area Ratio
FATF	Financial Action Task Force
FDI	Foreign Direct Investment
FEZs	Frontier Economic Zones
FFPOs	Fish Farmer Producer Organizations
FFS	Free Flow Speed
FPC	Farmer Producer Company
FRBM	Fiscal Responsibility and Budget Management
GAIL	Gas Authority of India Limited
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GER	Gross Enrollment Ratio
GGI	Good Governance Index
GoI	Government of India
GRIHA	Green Rating for Integrated Habitat Assessment
HDI	Human Development Index
HOV	High Occupancy Vehicle
HRIDAY	National Heritage City Development and Augmentation Yojana
ICBM	Indian Council of Bio-Medical
ICCR	Indian Council for Cultural Relations
ICED	International Centre for Economic Development
ICEE	International Conference on Environmental Engineering
ICFA	Indian Council of Food and Agriculture
ICMR	Indian Council of Medical Research
ICNR	Indian Council of Nuclear Research
ICPR	Indian Council of Philosophical Research
ICSID	International Centre for Settlement of Investment Disputes
ICSSR	Indian Council of Social Science Research
ICST	Indian Council of Science and Technology
ICT	Information and Communication Technology
IDA	International Development Association
IDI	Infrastructure Development Index
IDRM	Integrated Disaster Risk Management
IDSP	Integrated Disease Surveillance Programme
IFAD	International Fund for Agricultural Development
IFPI	International Federation of the Phonographic Industry
IFRS	International Financial Reporting Standards
IHDS-II	Indian Human Development Survey
IHR	International Health Regulations
IISER	Indian Institute of Science Education and Research
ILP	Inner Line Permit

IMF	International Monetary Fund
IMR	Infant Mortality Rate
IMTA	Integrated Multi-Trophic Aquaculture
INBAR	International Bamboo and Rattan Organisation
INSPIRE	Innovation in Science Pursuit for Inspired Research
INTACH	Indian National Trust for Art and Cultural Heritage
IOCL	Indian Oil Corporation Limited
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IPR	Intellectual Property Rights
IPT	Intermediate Public Transport
IRC	Indian Roads Congress
IRDAI	Insurance Regulatory and Development Authority of India
ISBT	Inter-State Bus Terminus
ISTT	Inter-State Truck Terminus
ITBP	Indo-Tibetan Border Police
ITS	Intelligent Transport System
IUP	Intelligent Urban Planning
IWAI	Inland Waterways Authority of India
JICA	Japan International Cooperation Agency
KPI	Key Performance Indicator
LDN	Land Degradation Neutrality
LEADS	Logistics Ease Across Different States
LTA	Land Transport Authority
MCTP	Master of Town and Country Planning
MIG	Middle Income Group
MMR	Maternal Mortality Ratio
MMTOE	Million Tonnes of Oil Equivalent
MNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MSK	Medvedev Sponheuer Karnik
MSW	Municipal Solid Waste
NABARD	National Bank for Agriculture and Rural Development
NCCS	National Conference of Chief Secretaries
NDC	Nationally Determined Contributions
NEA	National Environmental Authority
NEEDS	North East Entrepreneur Development Scheme
NFHS	National Family Health Survey
NGO	Non-Governmental Organization
NGT	National Green Tribunal
NITI	National Institution for Transforming India
NIUA	National Institute of Urban Affairs
NMT	Non-Motorised Transport/Non-Motorised Traffic
NSDMA	Nagaland State Disaster Management Authority
NSS	National Service Scheme
ODF	Open Defecation Free
ODOP	One District One Product
OECD	Organization for Economic Co-operation and Development
OKRs	Objectives and Key Results
ONGC	Oil and Natural Gas Corporation

PBS	Public Bicycle Sharing
PEL	Petroleum Exploration Licenses
PGCIL	Power Grid Corporation of India Limited
PHCs	Primary Health Centers
PHE	Public Health Engineering Department
PIB	Press Information Bureau
PLF	Plant Load Factor
PLI	Production Linked Incentive
PMAY	Pradhan Mantri Awas Yojana
PM-DevINE	Prime Minister's Development Initiative for North East Region
PPP	Public-Private Partnership
PRASHAD	Pilgrimage Rejuvenation and Spiritual, Heritage Augmentation Drive
PSL	Priority Sector Lending
PSUs	Public Sector Undertakings
QoL	Quality of Life
QTA	Quantum Technologies and Applications
RCEP	Regional Comprehensive Economic Partnership
RHE	Renewable Heat Energy
RIDF	Rural Infrastructure Development Fund
RKVY	Rashtriya Krishi Vikas Yojana
RS	Railways Station
SCM	Smart City Mission
SDG	Sustainable Development Goal
SDW	Source of Drinking Water
SEBI	Securities and Exchange Board of India
SECC	Socio-Economic Caste Census
SEM	Structural Equation Modelling
SEZs	Special Economic Zones
SIAM	Society of Indian Automobile Manufacturers
SMEs	Small and Medium-sized Enterprises
SRMC	Short Run Marginal Cost
SRS	Sample Registration System
ST	Statutory Town
TAIFUM	Tapta Institute of Fusion Music
TAZ	Traffic Analysis Zone
TDR	Transferable Development Rights
TEA-21	Transportation Equity Act for the Twenty-First Century
TMT	Traffic Management Technique
TNMFAU	Tamil Nadu Music and Fine Arts University
TO	Tourism Organisation
TOD	Transit Oriented Development
TRAI	Telecom Regulatory Authority of India
TRL	Technology Readiness Level
TSM	Transportation System Management
TVC	Town Vending Committee
UDAN	Ude Desh ka Aam Nagarik
UNDP	United Nations Development Programme

UNESCO	United Nations Educational, Scientific and Cultural Organization
USIDE	Unified District Information System for Education Plus
VAHAN	Vehicle Information and Registration System
VC	Volume Capacity
VET	Vocational and Technical Training
WHO	World Health Organization
WII	Wildlife Institute of India
WOAH	World Organization for Animal Health
WTTC	World Travel & Tourism Council
ZNE	Zero Net Energy

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Chapter 1

Five Strengths of the North East region:

Society, Economy, Natural Resources, National Security and Bridge Head to South East Asia

1.1. NER as the New Growth Pole of India and quadrangle of Eastern South Asia

1.2. NER as the Sub-Regional Connectivity Pivot in India's Act East Policy

1.1 Pre-Independence period

The North East region (NER) of India comprising 'Asthaxmi' of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura constitute 7.9 percent of India's total geographical area, 3.8 percent of population and 4.02 percent of GDP. The NER is a symbol of unparalleled diversity with over 200 ethnic groups, uniquely blended asymmetric history, magnificently endowed with natural and human resources and widely celebrated bio-diversity hotspot. Over 98 percent of the borders of the NER are with neighbouring countries including Bangladesh, Bhutan, China, Myanmar and Nepal.

In the pre-independence period, the NER had been one of the fastest growing and well connected-integrated economic geographies of India. However, once East Bengal separated from India as another country in 1947, there were severe dislocations of economic structures and sudden disruptions in connectivity. And for a prolonged period in the post-independent India, for various internal reasons, exogenous factors and physical constraints, the NER remained alienated from the rest of India confining itself as a development laggard.

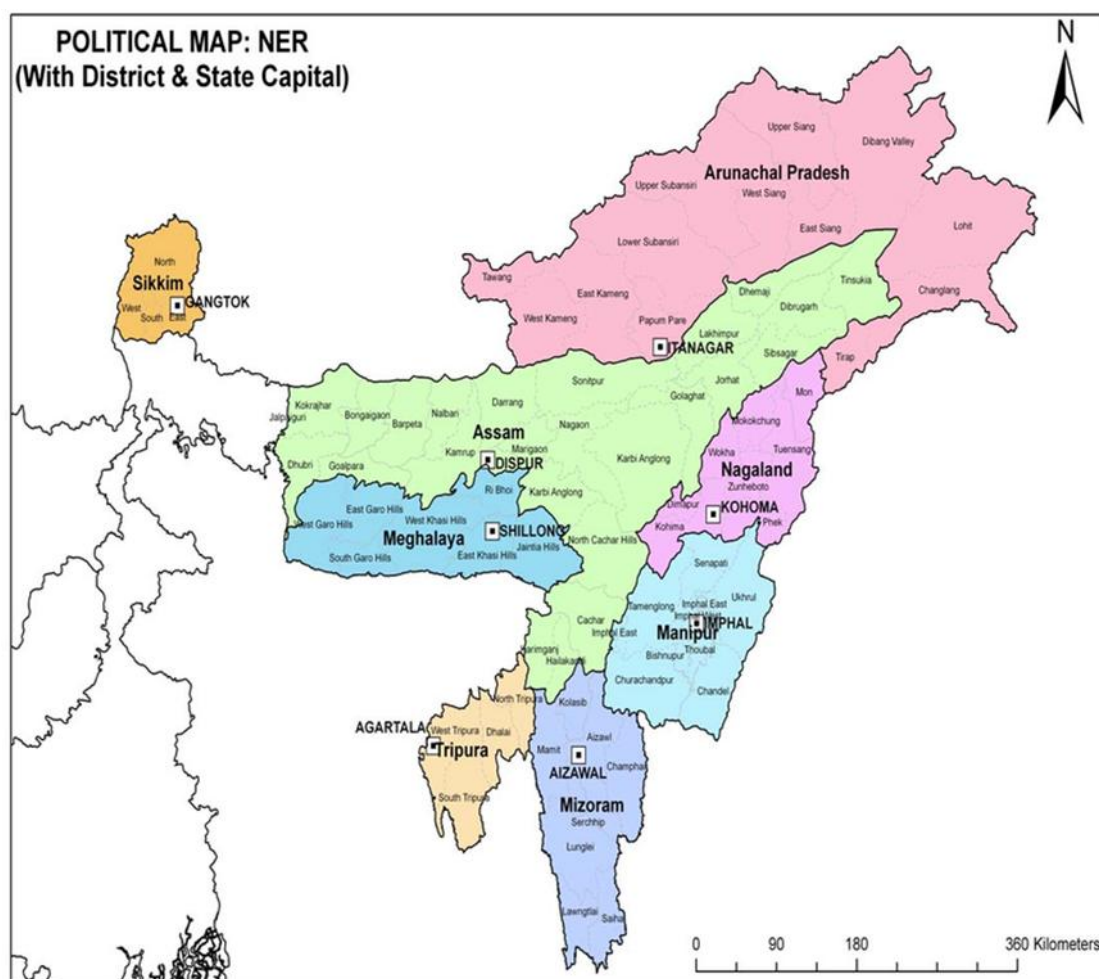
The per capita income of only three states i.e. Arunachal Pradesh (Rs 2,05,645), Mizoram (Rs 1,98,967) and Sikkim (Rs 4,63,509) is higher than the national average of Rs 1,48,524 in 2021-22. Within the NER, Sikkim with the highest per capita income in the country, is more than 5 times higher than that of the Manipur (Rs 91,560) and over 4 times than that of Assam (Rs 1,02,965) reflecting significant degree of skewness and distributive imbalances. At least three states Assam, Manipur and Meghalaya continue to be on the '10 lowest per capita income' basket of India which also includes Bihar, Uttar Pradesh, Jharkhand, Orissa and Jammu and Kashmir. However, a protracted set of newer interventions in the last three decades have made this region a potential bastion of prosperity and an example of re-emerging development pole.

1.2 Comprehensive Protection

The NER has been protected and promoted by some of the most effective, unique and progressive constitutional, financial, institutional and governance provisions including various provisions under Article 370 and also the Sixth Schedule of the Constitution. The special category states status from 1969 to 2014 along with setting up the North Eastern Council in 1971 which was restructured in 2004 to make it a regional planning agency provided substantive impetus to the development process in the NER. The Department of Development of North-Eastern Region was established at the national level in September 2001 and was upgraded to a full-fledged Ministry of Development of North-Eastern Region (MDoNER) in May 2004. This is the only Ministry with an exclusive territorial jurisdiction in

India. Both the Union Government and the State governments have come out with a range of reports that deal with various critical issues that beset the North-Eastern region.

Figure 1.1: NER at a Glance



Source: https://www.researchgate.net/figure/Political-Map-of-Northeastern-Region_fig1_258531927

Vision Document 2020, prepared and presented in 2008, was to a certain extent operationalized both at the national and state level. A range of regional and sector specific institutions like North East Development Finance Corporation (NEDFi) to Agricultural Marketing Corporation Ltd (NERAMAC) and North Eastern Electric Power Corporation Limited (NEEPCO) to North Eastern Handicrafts and Handlooms Development Corporation (NEHHDC) have triggered far reaching and broader space in the political economy of development in this region.

Focussed development strategies like Special Accelerated Road Development Programme (SARDP-NE- 2005) and National Highways and Infrastructure Development Corporation (2014) in infrastructure development; NEIP (1997), NEIPP (2007), NEIDS (2017) and UNNATI (2024) to promote industrial and other service sector ventures; setting aside 10 percent of the development budget of all the Ministries in Government of India as Non-Lapsable Central Pool of Resources (NLCPR -1996), introducing transforming infrastructure

development special purpose vehicles like North East Special Infrastructure Development Scheme (NESIDS - 2018) and Prime Minister's Development Initiative for North Eastern Region (PM-DevINE-2022), inducting multiple development partners including multilateral (like World Bank, Asian Development Bank, UNDP) and bilateral institutions (like JICA), private sector players and civil society organizations and opening several sectors for both investment and cross border trade, have brought visibly substantive changes and a new and promising development trajectory.

With all these provisions, interventions and federal devolution one would have expected the NER to be a 'growth pole' and the pivot in the Indian economic scenario. The 'take off' should have taken place at least two decades back. However, it did not happen. The region started well as evident from the fact that Assam was one of the fastest growing states in the pre-partition India with a much greater industrialization in areas like oil, gas, tea, timber triggered by huge infrastructural interventions like the railway network. The gross public investment in economic overheads (such as irrigation, power, roads and railways) amounted to about Rs 17,187 million during 1860-1947.

The North-Eastern region absorbed the largest proportion amounting to Rs 5,207 million or 30.3 percent of the gross public investment in economic overheads triggered by investment in railways which accounted for about 65 percent of the total. The East Indian railway was the largest single claimant. The expanded connectivity was necessitated by growth of tea plantations and harnessing of mineral resources like oil and gas. Tea plantation in Assam increased from a mere 1.88 thousand acres in 1850 to 20.46 thousand acres in 1901 and the tea production jumped from 21.6 thousand pounds to 72.38 lakh pounds respectively and exports rose from 2.89 lakh maunds in 1880 to 12.39 lakh maunds in 1900. A World Bank Strategy Report stated that, "Steamships moved along the bustling Brahmaputra and Barak waterways to Calcutta carrying Assam tea to London auctions. Coal was mined and Digboi still boasts of the oldest producing oil well and refinery in the world."

1.3 Changing Dynamics

In the last decade or so, three consciously designed historic interventions have started relocating the NER and repositioning its potentials in the national and sub-regional development map.

Firstly, the reconfiguration of India's Look East Policy (1991) as Act East Policy (2015) and upfront repositioning of the NER as the bridge between the burgeoning South East (SE) Asia and emerging Eastern South Asia (along with Bangladesh, Bhutan and Nepal – also known as BBIN) have put an onerous responsibility on the NER to be a hub of geo-economics. This injects a new dimension of inter-regionalism between Eastern South Asia and SE Asia and also in the sub-regional groupings like Greater Mekong Sub-region (GMS) and Mekong-Ganga Cooperation (MGC) and BBIN.

Secondly, "neighbourhood first policy" and reassertion of "cooperative and competitive federalism" propounded and practiced by the Union Government led by the Prime Minister Narendra Modi have galvanized the neighbourhood and the NER in both synergizing collective initiative and building a robust interdependence. The land border settlement, construction of national electricity grid interface and effective use of port facilities in Bangladesh; gigantic infrastructure projects including roads, railways, energy

interconnections, gas pipelines and waterways with Nepal and Bhutan; trilateral highways with Myanmar and Thailand and development of Sittwe port in Myanmar as a new option to access state like Mizoram and signing of Motor Vehicle Agreement among the BBIN countries and vast social infrastructure projects like universities, professional institutes, health facilities and sports stadia have forthrightly highlighted the criticality of the NER as a key actor in the emerging process of resilient new regionalism. Sports persons like Mary Kom, Mirabai Chanu, Dipa Karmakar, Anshu Jamsenpa, Hima Das, Lovelina Borgohain, Rai, Tarundeep Rai, Shiv Thapa, Bombayla Devi Laishram and many others have now become the symbols of globalization of locals.

And thirdly, building comprehensive connectivity at all four levels – within a state, between the states, between the NER and the rest of India and between the NER and the neighbouring countries- in a much speedier, accountable and sustained manner through special purpose vehicle has been steadily injecting an unprecedented dynamism.

These far-reaching initiatives have led to higher level of confidence, deeper trust and ever surpassing aspirations among the people in the NER. A new set of young and dynamic indigenous development actors and entrepreneurs is fast emerging. At the national level, the narrative about the NER is steadily transforming from a bastion of conflict, violence, instability and backwardness to a vibrant, peaceful and prolific destination for multiple layers of economic actions, growth ventures, social contacts and trans-border connections.

1.4 SWOT Features

Many of the reports and studies including those submitted to the Finance Commission, Planning Commission and NITI Aayog have also carried out the SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) of each of the member state of the NER wherein peace and harmony, natural resources endowment, indigenous creativity and skills, community living and practices, changing occupational pattern, demographic composition, talented youth population, burgeoning aspiration to leap frogging in development goals, burgeoning cross border opportunities and lead player in India's Act East Policy are identified as crucial strengths.

In the weaknesses front, issues related to infrastructure-institutional-connectivity-technological laggardness, limited and unconnected markets laced with high transaction cost, dominant narrative of conflict-ridden geographies, constricted space for development players, over dependence on the government, image of a periphery far away from the Centre and inability to capitalize on indigenous skills, knowledge and resources are very vital. The lacklustre performance of the governmental institutions and bureaucratic insensitivity and politicization of service institutions and delivery instruments and corruption and leakages laced with poor accountability and transparency and generation of class of political parasites are viewed as serious governance weaknesses.

Whereas, the opportunities front is agog with global recognition of the NER as a newly emerging venue of organic culture, traditional medicinal system, high value tourism, power generation and exports, climate change adaptations and promising sub-regionalism. This is supplemented by the conscious national strategy to make the NER as the bridgehead and launching pad of India's Act East policy interconnecting with the ASEAN and other neighbouring countries. The openness in induction of multiple development partners like

the private sector, multilateral and bilateral players and sub-regionalism initiatives are another growing space.

A new generation of fast learning and outward looking young and talented entrepreneurs, proliferation of higher education and professional institutions, determination of the communities to be flag bearers in sports, music, traditional medicinal systems, organic farming and energy production are the bright spots. The growing realization of the government to drastically shift to “minimum government, maximum governance” is another opportunity. Large number of youths from the NER are now located in various states in the country and also outside India acquiring skills, knowledge, adaptability, finance and emerging as new generation professionals. Some of them are returning as instruments of game changers and making a huge difference across various sectors and geographies. In other words, this is the beginning of proliferation of reverse integration in India.

The threats mainly emanate from the non-traditional sources like vulnerabilities to adverse impact of climate changes on water, natural resources, livelihood, disasters and even newer genre of diseases. The excessive dependence on the funds provided by the Central Government could confound the dependency syndrome. Resistance to newer thinking, technology, development partners and closing down of inter-state borders within the NER through ILPs, RAPs and other restrictions in the name of illegal migrants, infiltrators and outsiders could vitiate the hard won ‘opening up syndrome’. This could also provide the insurgents and other conflict triggering elements to inject instabilities. Similarly, destabilizing actions like that of China on river water flows and influencing the markets with their cheaply produced goods and by other neighbouring countries through providing support to insurgencies etc need also to be considered. The surreptitious in-country and cross-border activities related gene piracy, smuggling of rare flora and fauna and other manipulative technological invasions are also emerging as serious threats.

The NER and the communities all across the lowlands and highlands are now in a stage of what WW Rostow described as “take off”. It awaits what Rosenstein Rodan called the “big push” to transform itself into a sustainably robust economic entity, a resilient and resourceful connecting point to the South East Asian countries and the Far East Asia and a core player in the formation of comprehensively connected new regionalism-based integration venture. This is expected to solidly contribute to the national agenda of \$30 trillion economy by 2047.

1.5 Driving Factors

The core of the NER vision for next two decades or so is therefore, driven by four abiding national ambitions backed by regional aspirations (*kshetriya aakangsha*) viz., prosperity (*samridhi*), inclusiveness (*sarvodaya*), cleanliness (*swachhata*) and transparency, honesty & happiness (*saccha and sukhi*) and the far-reaching policies of ‘neighbourhood first’ and newer principles of cooperative federalism.

These goals are largely regional in nature, cut across sectors and geographies, harness the core competences and natural advantages of all the member states and highlight the roles of the communities and other stakeholders. These goals while recognizing India’s larger

strategic vision under Act East Policy also take into consideration the fast-changing nature of cross border contacts and exchanges triggered by deeper connectivity, changing cross regional environment and expanding market structure. It also upfront places the roles of regional institutions and the bilateral and regional arrangements that India has entered into.

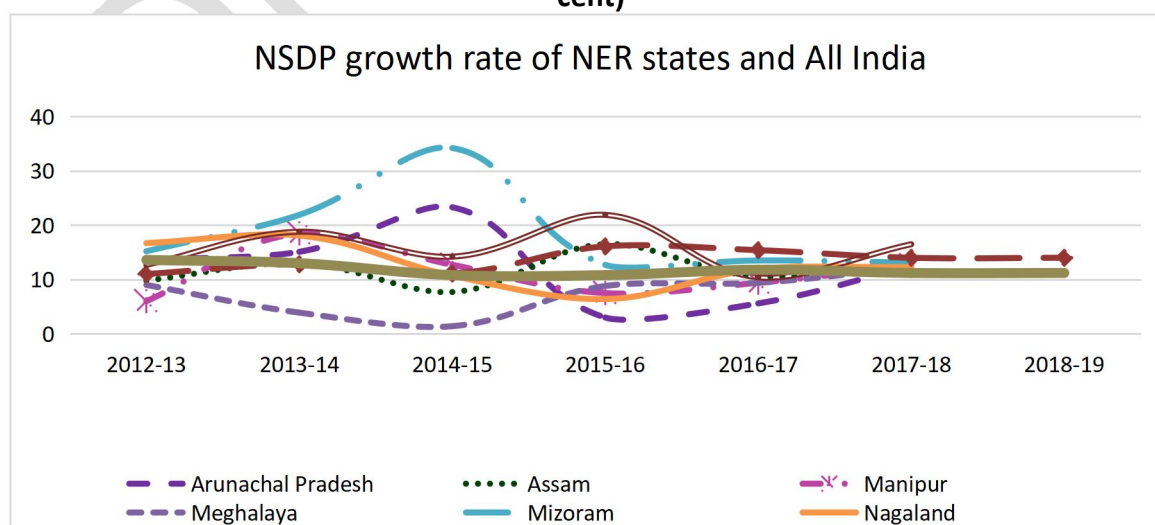
The implementation strategies are critical. These vision goals necessitate its translations into projects with definite targets, sector specific roles of the states and the regional institutions like the NEC, coordinated and cohesive action plans by various Central Ministries and designing and harmonization of efficient implementation instruments by NITI Aayog, MDoNER and the NEC.

Equally vital will be the allocation of adequate resources, budgetary and extra budgetary by the Central Government in innovative ways and revamping of other arrangements like the NLCPR/ NESIDS. The other pivots in the implementation phase will be the private sector and also the Foreign Direct Investors (FDIs). The global multilateral and bilateral institutions could be the central actors in terms of resources, technology and even management.

1.6 NER Growth Quadrangle (NERGQ)

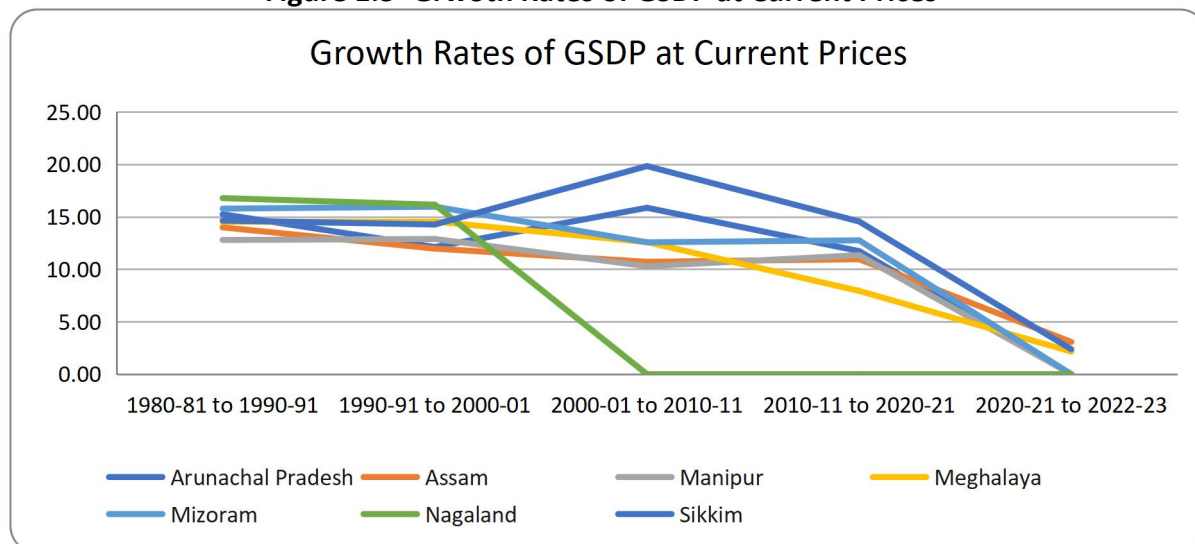
New Growth Pole in the Quadrangle of Eastern South Asia also known as NER Growth Quadrangle (NERGQ) to contribute 8 percent (US \$2.8 trillion) of the national GDP (US 30 trillion) by 2047. The per capita income of all the North East States would be doubly higher than the national average by 2047. Moving away from the existing protracted and relatively lower and erratic growth equilibrium trap and spurring growth from a multi-sectoral perspective triggered by newer growth instruments would be the driving force. (Figure 1.1 & 1.2). The 15th FC Report of the Year 2020-21 indicates that except Meghalaya (9.5 percent) most of the NE states have projected annual growth rate of the GSDP similar to all states average of 11 percent. There are visible structural differences in the composition of GDP across the region.

Figure 1.2- Growth of Net State Domestic Product at Current Prices (2011-2012 series) (per cent)



Source: Deduced from *Economic Survey 2019-2020*, Ministry of Finance, Government of India, p A28

Figure 1.3- Growth Rates of GSDP at Current Prices



Source: Authors own calculation based on <https://mospi.gov.in> data

Table 1.1-Growth Rates of Gross State Domestic Product at Factor Cost by Industry of Origin (At Current Prices)

(Rs. Lakhs)					
	1980-81 to 1990-91	1990-91 to 2000-01	2000-01 to 2010-11	2010-11 to 2020-21	2020-21 to 2022-23
Arunachal Pradesh	15.24	12.12	15.85	11.73	NA
Assam	13.99	11.96	10.71	10.96	3.07
Manipur	12.79	12.88	10.29	11.34	NA
Meghalaya	14.51	14.54	12.58	7.93	2.15
Mizoram	15.77	15.96	12.57	12.75	NA
Nagaland	16.78	16.15	NA	NA	NA
Sikkim	14.64	14.26	19.82	14.55	2.38
Tripura	12.37	16.44	11.31	10.48	2.82

Source: Authors own calculation based on <https://mospi.gov.in> data

If blended with modern scientific tools, indigenous knowledge based innovative organic skills, substantially improved ease of doing business matrices, carbon neutral practices and region-specific trade, investment and frontier technology policies the target of higher growth regime would not be farfetched. For instance, despite high core competence and comparative advantage in tourism sector, its contribution to GDP varies from 3 percent in

Meghalaya to 8 percent in Sikkim. By 2047, this will be enhanced to at least 10-15 percent by easing tourists' movement and promoting newer varieties of tourism including those focused on high value and longer stay segments like traditional herbal therapy, river cruise, war memorials, entertainment, ethnography food, tea, Buddhist circuit and wildlife and mountain to sea adventure tourism. Cinema shootings and filming in the scenic, folk and ethnic meandering settings of the NER will add another brand name.

1.7 Promise of Structural Changes

The structural composition of the states in the NER has undergone drastic changes in the last four decades or so. (Table 1.1) In the early 1980s, three states viz. Meghalaya, Mizoram and Nagaland, the share of primary sector (mainly agriculture) varied from 29 to 38 percent of their respective Gross State Domestic Product (GSDP), other five states had the predominant roles of the primary sectors varying from 45 percent in Arunachal Pradesh to over 52 percent in Tripura. Expectedly the share of secondary sectors (mainly industrial sectors) varied from a relatively low of 10 percent in Manipur and Tripura to 24 percent in Arunachal Pradesh. Even Assam with much advanced physical infrastructures and market connections had hardly 13 percent of its GDP emanating from the secondary sector. Notably, all the states had over 30 percent contributions coming from the tertiary sectors (mainly services and constructions) with Mizoram (50.30 percent) and Nagaland (54.24 percent) leading the pack and demonstrating the crucial roles of these sectors in their economies.

However, by early 2020s the structural composition of these states as percentage of their respective GSDP had sharply moved to the tertiary sectors that varied from almost 41 percent in Tripura to a high of 63 percent in Manipur. In case of Manipur, this rise in the share of tertiary sector has most been at the cost of diminishing contribution of the secondary sector whereas in case of Sikkim the fall in primary sector to low of 10 percent and tertiary sector to 28 percent are caused by a sharp increase (63 percent) in the secondary sector mainly triggered by a setting up of an over 56 pharmaceutical industries. In other states the share of secondary sectors in their respective GSDP continued to vary from a very low of 8 percent in Manipur to 26 percent in Mizoram with Assam (21 percent) and Tripura (12 percent). Thereby, this shows that the various industrial promotion schemes and incentives initiated in 1990s in the form of NEIPP and still continuing as NEIDS (2017-2022) could not make any major dent in their structural compositions.

Therefore, one of the most crucial interventions would be to steadily change the orientation and composition of these economies in the NER.

The outward looking orientation in terms of connectivity, trade, investment and service sector linkages with the ASEAN countries under the Act East Policy would add a new and dynamic dimension. In both the crucial indicators of credit-deposit ratio and ease of doing business, the NER has remained at the lowest echelons of national levels. (Table 1.2 and 1.3) Both these indicators have to undergo uninterrupted and sustained improvements. The inward-looking attitude, image of limited service providers and government centric actions of both public sector and private sector banks have to undergo drastic reorientations. Several reports (like Thorat Committee Report on Financial Sector Plan for NE Region, 2006)¹ have squarely pointed out these inefficiencies, indifference and laggardness of

¹Reserve Bank of India, *Report of the Committee on Financial Sector Plan for North Eastern Region*, July 2006

financial institutions ‘in terms of branch network, access to banking facilities, flow of credit, deposit growth, credit-deposit ratios and spectral deployment of credit’. The RBI could make the minimum floor C/D ratio of 60 percent for all the banks immediately and also put punitive action in case of non-compliance in priority lending. This metamorphosis in thinking and bold actions would provide level playing field for the new generation of entrepreneurs, encourage massive private sector participation and expand credit reach to farmers and communities engaged in micro businesses.

Social mobilization through further consolidating already acquired gender parity and widening of inclusiveness cutting across extreme topographies, sectors of the economy and societal composition would be another vanguard of development strategy. Ensuring food, energy and environmental securities would be the hallmark of development philosophy.

Table 1.2- State-Wise Credit-Deposit Ratio of Regional Rural Banks and Scheduled Commercial Banks (%)

States	1990		2000		2018	
	Rural	Commercial	Rural	Commercial	Rural	Commercial
Arunachal Pradesh	35.0	37.7	30.3	15.7	33.3	25
Assam	100.0	58.5	111.6	32.0	46.2	42.6
Manipur	200.0	74.1	27.3	37.4	33.3	44.6
Meghalaya	45.5	19.4	34.8	16.3	38.9	27.2
Mizoram	80.0	37.6	26.9	23.3	52.4	35.8
Nagaland	89.5	31.7	35.8	15.3	0.0	34.7
Tripura	148.9	91.5	29.6	25.7	40.7	40.7
Sikkim	-	32.6	-	15.1	-	26.6
NER	104.2	54.9	30.3	28.1	43.8	39.3
INDIA	83.7	60.7	40.9	56.0	65.2	76.7

Source : Deduced from RBI, Handbook of Statistics of Indian States, 2019

<https://www.rbi.org.in/Scripts/AnnualPublications.aspx?head=Handbook+of+Statistics+on+Indian+States>

Table 1.3- State-wise Ease of Doing Business Rank

STATE-WISE EASE OF DOING BUSINESS RANK#							
States	2015		2016		2017		2019
	Score	Rank	Score	Rank	Score	Rank	Rank
Arunachal Pradesh	1.23	32	0.30	31	-	34	29
Assam	14.48	22	14.29	24	84.75	17	20
Manipur	-	-	1.19	28	0.27	32	29

Meghalaya	4.38	30	0.30	31	-	34	29
Mizoram	6.37	28	0.89	29	3.66	30	25
Nagaland	3.41	31	1.49	26	14.16	28	29
Sikkim	7.23	27	0.60	30	0.14	33	29
Tripura	9.29	26	16.67	22	22.45	25	29
<p>Note: Ease of Doing Business Index is based on the implementation of the Business Reform Action Plan (BRAP) recommended by the Department of Industrial Policy and Promotion (DIPP) to all States and UTs.</p> <p># Rank is out of the total 36 States and Union Territories</p> <p>Source: Department of Industrial Policy and Promotion, Government of India and Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, 2020</p>							

1.8 Venturing a new Development Model

The economies of the NER have mostly followed a development model that has intrinsic and complex mechanisms of promoting the outflow of development multipliers. While defying and disproving most of the orthodox theoretical underpinnings of development, the region has unconsciously but visibly recorded a trend of siphoning off the cream of development mostly to the lowlands or the mainstream theatres. One can attribute this deleteriously unending phenomenon to the dominant development planning far away from the remote action centres. The agents involved in the process are primarily outsiders from other parts of India with a huge capital base, entrepreneurial history and market capture. The debate and policies at the national level are on the second-generation reforms whereas even the first-generation reforms are yet to reach some major spaces of the NER.

Several examples can be cited. Tea industry is a typical example of how the outflow of development gains has consistently occurred and been institutionalized. The very pattern of ownership, modes of the production system and linkages with the markets ensure that nothing remains in the region except low wages and fringe benefits to the workers. Most of the sales proceeds derived from both national and global markets get directed to metropolitans, consistently usurped by merchant capitalists and other intermediaries. Only a trickle flows down to the hapless workers who actually struggle for generations to recover their own savings of gratuity and provident funds. The much-celebrated new dictum of 'fair trading' has actually justifiably consolidated these outflows.

A more telling story has been that of the manufacturing sector like pharmaceuticals where some of the top brands of India have set up their factories in Sikkim, mostly attracted by and to avail of both NEIIPP and NEIDS. With manufacturing sector suddenly sharing 62 percent, the state gross output has galloped. However, its impact on state's revenue generation is very negligible as raw material; packaging amenities and carriers and warehousing are brought from and located outside Sikkim. It has added no backward and forward linkages. Except employment in the low skill segments, no major development benefits are retained in the state. Therefore, in reality what Sikkim gets is some funds under Corporate Social Responsibility (CSR) which are far offset by the burdens on the limited carrying capacity of

the State, pollution of all kinds and more seriously uncertainty of its continuance in case the liberal and varieties of incentives extended by the Central Government are withdrawn or discontinued.

These states have witnessed this vicious practice even in the process of operationalizing special development packages generously extended by the Central government like incentives laden NEIPP. Many of these participating entrepreneurs found the highlands suddenly fertile and productive, at least till these incentives remained. In this case, too, the cream of development flowed down to the lowlands. The failure of the respective state government to devise ways and means to monitor some of these 'fly by night operators', legally retain them for at least a few decades and institutionalize the participative process has led to a huge industrial development vacuum and credibility gap as reflected in increasing local resistance to such outside participation. This phenomenon is widely prevalent across the sectors and sub-sectors

The valuable cash crops cardamom, ginger, chilly, and fruits like pineapple have developed a value chain wherein farmers receive hardly 10 to 20 percent of total realizations as the suppliers. The rest of the value chain in cardamom, including the last critical segment of processed spices, ingredients in *pan parag* and pharmaceuticals, remains outside the state boundary and purview of the traditional farmers. The agents in value additions, merchants and partners in market disposal, usurp 80 to 90 percent of this value chain realisation. This sordid story abounds in haphazardly drawn contractual conditions and trading models with hydropower producers. As a result, even with an installed capacity of over 2,200 megawatts, Sikkim carries staggering debt burdens. Despite strong local sensitivity, an overwhelming portion of the hotel and concomitant businesses are leased out to management partners from outside. All these have tended to inject protests, imbibe sentiments of being exploited, nurture resource sub-nationalism and more seriously trigger prolonged conflicts.

All these have very serious impact on the economies of the NER. As the returns from the private economic activities are not ploughed back the generation of employment and income outside the government sector has been very dismal. The cream of development gets siphoned off to outside the State. This is how the NER states have been steadily losing what Keynes calls the multiplier effect as expressed below:

$$\Delta Y = \frac{1}{1 - c} \Delta I_0$$

Where ΔY is change in income; c is marginal propensity to consume and ΔI_0 is increase in investment, the value of multiplier (K) is:

$$\frac{1}{1 - c}$$

According to this theory of income determination, income will increase by an amount which is K times the increase in investment. Since, most of the returns on investment are not

ploughed back the multiplier will not be effective mainly because of the low income the marginal propensity to consume will be rather high.²

It is difficult to monitor and quantify the resource transfer from the NER states to other States or neighbouring countries mainly because of the nature of transfer, involvement of informal agencies and the poor level of economic activity wise database and information. The usual measure for which data are reliably available is the credit-deposit ratio in the banks. The NER has a relatively lower credit-deposit ratio which also shows that the grounds for investment in the region has not been congenial at all. These instances of contribution-benefit mismatch are amply found in almost all the conflict situations in the region.

Therefore, the Vision 2047 also involves a non-traditional responsibility of the policy makers to steadily reverting to a growth model that retains maximum generated development gains within the communities and geographies of the NER. Rebuilding a class of local entrepreneurs, injecting newer technology and skills, bringing a variety of national and international institutions, rejuvenating the rural economies, inducting global multilateral development and philanthropic organizations, up-skilling the youths for local-national-global employment market, promoting multiple stake holdings, reorienting the entire natural resources, commodity, hydro power and industrial policy and playing a key role in Prime Minister Narendra Modi's India's Act East Policy and Cooperative Federalism Mission and must adorn various State Government's agenda for next decade or so.

1.9 The New Growth Pole Target: Fivefold Strategy

To transform the NER from the present-day development laggard to a NEW Growth Pole regime by 2047, a fivefold strategy could be designed, adopted and operationalised.

Firstly, each state has to have a newer strategy of development planning based on comparative advantages, historical trends and emerging markets. This also includes drastically improving the Ease of Doing Business indices.

Secondly, these states have to undertake cross-state, cross-regional and cross-border supply and value chain projects to take advantage of the respective core competences, natural resources and social capital advantages and opportunities in the emerging sub-regional and cross regional markets in the neighbouring countries. For this to happen, a sound regional planning method, eco systems and instruments have to be put in place by regional national and regional institutions like the MDoNER and the NEC and other specific sector related institutions.

Thirdly, a new and diverse set of genuine investors from within and outside the country with modern systems and technologies have to be encouraged including through various attractive policies and incentives. This also means introducing newer and effective institutional mechanism to fast-track investments. For instance, the Japanese investors and industrial units leaving China and shifting to new bases like Vietnam and Thailand could be

² Mahendra P Lama, "Separatism and Armed Conflicts in North-East India" in *Conflict and Violence in South Asia*, edited by KM de Silva, International Centre for Ethnic Studies, Kandy, Sri Lanka, 2000

encouraged to relocate in the NER. Japanese investment organisations including JICA and JBIC which are already there in the NER along with the ADB, World Bank and UNESCAP have to be mobilised and given specific roles and targets. The India-Japan Act East Forum could be a major platform to initiate and carry out these projects. A number of established investors from CLMV-T countries (Cambodia, Laos, Myanmar, Vietnam-Thailand) have shown consistent interest in making durable investments in multiple fields. These new cross border actors and their projects in the NER could induct new production base and market access in the South East Asian countries.³

Fourthly, for at least next two decades the NER has to be brought under a special and exclusive regional policy regime within the broader national framework in crucial arenas like Foreign Direct Investment (FDI) policy, *Aatmanirbhar* packages, Production Linked Incentive (PLI) Scheme, investment opportunities under National Infrastructure Pipeline (NIP) and National Monetisation Pipeline (NMP), India Industrial Land Bank (IILB), Industrial Park Rating System (IPRS). The financial institutions located in the NER have to be reoriented, revamped and made more performance oriented.

And finally, the security issues, confidence building measures, creating friendly eco system for the entrepreneurs and investors and demolishing the negative narratives about the NER and replacing it by a win-win discourses is vital in injecting these structural changes that would make the NER a new Growth Pole in Eastern South Asia sub-region.

1.10 Borders as Opportunity

Borders have been the key issues in addressing interactions and exchanges with the neighborhood in India. India's physical borders with neighboring countries were mostly drawn by Durand, McMahon and Radcliff hastily, crudely and unscientifically. The colonial legacy made the region think of border purely as a geometric line. As borders became a bastion of orthodox military thinking, human security concerns received little attention. Such borders have had far-reaching implications for this region as in protracted border related conflicts, wars and political and diplomatic tug-of-war. The Act East Policy provides an opportunity to rethink, re-recognize and relocate these borders as borderlands where one can see intrinsic inter-play of natural resources, culture, societies, trade-commerce, tourism, water towers, technology, roads and communications. There is a need to reposition the NER straddled by five international borders and with a strong historical narrative on borderland. The moment we revive the borderland ideas, borders become softer and interactive. The deeper elements of resilience and sustainability will be re-inducted making economic integration and people-to-people contacts much more attractive and prolific.

For the North East Region with a border of 5437.15kms with four neighbouring countries (Bangladesh, Bhutan, China, Myanmar and Nepal) the borderlands stand as tremendous opportunities. In the borderland discourse, the core driving force has been connectivity. If India's burgeoning economic growth is to be shared by its neighboring partners and if inter-dependence is to be consolidated, it would materialize primarily through a variety of cross

³ NEDFi, *Strategic Roadmap for Bringing Investors from South East Asia (CLMV & Thailand) to North East India: A Seed Project Approach*, North Eastern Development Finance Corporation Ltd (NEDFi), Gauhati, 2021

border physical, virtual and community linkages. Transformation of physical borders into smart borders under which the borderlands among the European Union countries and also between China and South East Asian countries became locations for vibrant economic activities. Similarly, when India finally gives way to Bangladesh, Bhutan and Nepal to take advantage of India-Myanmar-Thailand trilateral highway under its Act East Policy and when Bangladesh-China-India-Myanmar (BCIM) Economic Corridor comes into fruition, the NER with its historic cross-border inter-connections become the central force of gravity, putting an end to 'connectivity black hole' syndrome that affected the NER all these decades.

Similarly, in all three conspicuously attractive trans-border projects like China-Pakistan Economic Corridor (CPEC) that links Gwadar Port with Karakoram highway and the western topography of China finally leading to integrating with Central Asia; India-Afghanistan-Iran project at Chabahar in Iran and in the ongoing inter-connection between Nepal's Rasuwagadhi and China's Geirung (Kerung) by Shanghai-Lhasa-Shigatshe railway lines and highways, the indications are quite clear that borderlands and not borders is going to be the theme of engagements. India's experience in cross border interconnections and the initiatives such as the reopening of once versatile Nathu La Trade route between Sikkim and Tibet Autonomous Region after 44 years in 2006 partly convince the sub-region about the prosperous criticality of reconnecting with the borderlands. Nathu La route with an annual trade exchange of Rs 48.28 crore in 2018-2019, is now widely used for Kailash Mansarovar pilgrimage yatra.

1.11 Acting East project of India: Basic Premises

Despite unfurling of a series of developments in the last decade or so and Act East becoming a flagship foreign policy agenda for the Government of India, there are questions that are frequently and vociferously raised. These are primarily related to a repositioning of the NER in India's larger national security, foreign policy and development dynamics.

Where does the NER figure in the Acting East project of India?

Why there is no clear official enunciation of Act (Look) East Policy and the role of the NER by the Government of India as yet on which deliberations could be done, strategies could be designed and concrete actions could be initiated.

How does one reorient the economies of the NER?

What interventions could bring a new paradigm of development where both domestic and foreign investments and other sectoral participation converge into this region? Could some of investment and industrial projects of Japan particularly traditional middle and low-end industries that are now shifting bases from China be inducted into this region?

What are the critical institutional interventions required?

What are the nuances of "cooperative federalism" of the Government that need to be practiced in the NER? Could the "Sub-State diplomacy" and "reimagined borders" strategies extend 'full stakeholders' status to NER?

Given that cooperation is a two-way practice, how do the ASEAN member countries perceive this Indian initiative? Do they have the political commitment and the requisite operational and institutional capabilities to move towards the west and finally integrate with the NER and rest of India?

What is the core geo-political issues?

What have been experiences of other sub-regional groupings that involve China and the immediate neighboring countries like ASEAN?

How could issue of energy, climate change, traditional knowledge, reopening of old roads and passes, war residues tourism, institutionalized gene pool marketing could be used as critical variables in the trans-border multimodal corridors?

1.12 NER as an emerging Lead

Under the new mode of reverse integration, the NER could take the lead in some crucial areas where it has the distinct comparative and natural advantages. For instance, as a gateway and multimodal corridor to the South East Asia for both India and its immediate eastern neighbors, NER along with Bhutan, Bangladesh, Myanmar and Nepal could actually be the power/electricity pool of South Asia in the Eastern junction. The surplus electricity generated in Bhutan, Nepal and NER could be pooled together to a sub-regional pool in the NER and distributed through cross border transmissions to South East Asia. The power exchange between Tripura in NER and Bangladesh triggered by 726 MW. Combined Cycle Gas Turbine (CCGT) at Palatana (Tripura) provides a new direction in terms of local integrative exchange. Besides catering to power deficit areas of NER this project exports 100 MW to Bangladesh (100 MW more is being agreed to by Tripura Government) mainly in lieu of the services provided by it in transporting the project-related equipment and goods and service through its waterways via Calcutta. About 2-3 MW is exported to Tamu town in Myanmar through a 11-kV transmission line from Moreh in Manipur. A new study on Energy in India's Act East Policy and the role of North-East Region in Economic Research Institute of ASEAN and East Asia (ERIA) in Jakarta shows how NER could be a critical player in the energy game in this sub-region.

For the NER to be a pivot in the Act East policy, it has to design and plan a four-way comprehensive connectography viz., within a state, between the states in the NER, with the rest of India and with the neighbouring countries. This quadrilateralism very much fits into what Prime Minister Modi has been advocating in terms of connecting the entire South Asian Region by HIT i.e., Highways, Information Technology and Transmission lines.

Further, if the NER has to be a gateway to the East, which used to be the case before 1947, there has to be a conscious and time bound effort to address and resolve major gaps like a) knowledge and information gaps; b) seed projects and start up gaps; c) match making, investment, technical facilitation, human resources and capacity gaps; d) policy coordination and institutional harmonization gaps; e) confidence gap and f) technology gap. These gaps are rampant across the NER that have prevented any meaningful economic actors and investors both from within and outside India to take part in sustained development projects.

1.13 Sub-Regional Connectivity Pivot

Sub-Regional Connectivity Pivot in India's Act East Policy will draw the neighbouring countries like Bangladesh, Bhutan, and Nepal in South Asia and Cambodia, Laos, Myanmar, Vietnam and Thailand (CLMV-T) from the South East Asian Countries in the sub-regional cooperation and integration process triggered by Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) and Bangladesh-Bhutan-India-Nepal (BBIN). The NER as a pivot facilitates four models of cooperation and integration viz, i) South Asia Growth Quadrangle (SAGQ/BBIN) with an eastward extension to Myanmar; ii) Bangladesh-China-India-Myanmar plus Japan (BCIM plus Japan); iii) ADB led South Asia Sub-Regional Economic cooperation (SASEC) and iv) inter-regional SAGQ and Greater Mekong Sub-region (GMS).

The infrastructure deficit remained a major physical constraint in the NER. Even a couple of years back the nearest railway station from the state capital varied from zero in Assam to 130 in Mizoram and 216 km in Imphal; the nearest airport it varied from 5 kms in Tripura and Manipur to 68 kms in Arunachal Pradesh and 74 kms in Nagaland. Out of the total national highways of 13658 kms in the whole of NER, Assam and Arunachal Pradesh constitute as high as 28 and 18 percent as against hardly 4 percent of Sikkim. And out of the total 2830 km of railway line Assam constitutes 90 percent and Tripura (9 percent) with literally negligible presence of railways in other states. Despite Pan-India projects like BharatNet connecting all the 11252 Gram Panchayats in the NER, it continues to have the lowest bandwidth speed in India.

As per the *Telecom Statistics – 2018*, the tele density in the NER is 64 percent as against India's 83.4 percent and broadband and internet connection are hardly 4.43 million and 11 million (2015-16) respectively which are about 3 percent of national total. In 2018 more than 8600 villages (22 percent of total 40000 villages) remained outside mobile connectivity.

Past two decades and more particularly in the last few years the NER has seen a huge surge in the physical infrastructure development and also participation of newer players like JICA under India-Japan Act East Forum (AEF) set up in 2017 and ADB. AEF-JICA has already entered into the Phase III of the North East Road Network Connectivity Improvement Project. Roads in the NER constitute over 10 percent of India's total roads of 46.90 lakh kms and almost 14 percent of the total national highways of 97.99 thousand kms. In the planned total road projects including East West corridor, two lane roads to the district headquarters and backward and remote areas over 3750 kms have been completed. A total of 3101 kms of highway was built during 2014-15 to 2018-19 at the cost of Rs 26,986 crore and another 4407 kms are likely to be added with an investment of Rs 47,476 crore.

A range of bridges including long pending 4.94 km Bogibeel (Rs 5,900 crore land and rail) was completed. 13 operational airports witnessed the 98.4 lakh passenger and 38094 tons of freight movement during 2018-19. There are upcoming mega projects like 1850 km frontier high way in Arunachal Pradesh and new bridges on Brahmaputra. Commissioning of and steady implementation of the 870.82 kms railway lines connecting all the state capitals of the NER at the cost of Rs 42,239 crore by 2022 are underway. All these projects could change the face of connectivity in the NER.

Connectivity to operationalise India's Act East Policy has recorded massive progress with alignment of Asian High Way 1 and 2 that connect India with Pakistan, Bangladesh and Myanmar and India with Nepal and Bangladesh which pass through the NER. This includes 834 km Moreh (Manipur) and terminate at Dawki (Meghalaya) on Indo Bangladesh border; 1360 km Trilateral Highway connecting Moreh (India) – Mandalay (Myanmar)- Yangon - Mae Sot district (Thailand); Kaladan Multi Modal Transport Project between India and Myanmar (697 km waterway Kolkata to Sittwe port in Myanmar and 220 km roadway Paletwa to Indo-Myanmar Border Zorinpui); connectivity with Bangladesh through Sabroom in Tripura and Tura in Meghalaya and proposed Bharatmala.

The UNESCAP study on Southern Asian Container Rail Corridor (2019) connecting Istanbul–Tehran–Islamabad– Delhi–Kolkata–Dhaka–Yangon (ITI–DKD–Y) refocuses on Eastern South Asia as a new cost-effective transport option.

To effectively utilize 3839 kms of total navigable water ways, a range of inland water ways including 891 km Sadiya-Dhubri (Bangladesh border) under NW-2 and 121 km Lakhimpur – Bhangra would bring new set of affordable transportation network.

A distinct economic corridor is emerging connecting border towns, trade centres, inland waterways, land and neighbouring sea ports around the NER. The core idea is to connect the connectivity and not leave them segmented under the water tight compartments of road, railways, waterways, airways, trade marts etc. This has to be supported by a strong inter-modal information network including passenger transports, ticketing, freights and cargoes movements, traffic and routing surveillance and security, transport research and technology innovations, and tag and toll systems and a series of facilitating conventions and agreements. Given the geography, the issues of truck efficiency, engines and cleaner fuels, quality all weather roads and hinterland and last mile connections have been of crucial importance.

All these profusely complement and consolidate five operational priorities under the SASEC operational plan 2016–2025 of the Asian Development Bank that primarily focus on this sub-region. By the end of 2018 since its inception in 2002, 52 ADB-financed projects worth \$11.36 billion had been committed (SASEC members and co-financiers contributed \$4.84 billion i.e. 42.6 percent) and also \$106.44 million in 81 technical assistance projects. (ADB 2020) in which infrastructure connectivity investments constituted (34 projects worth \$9.08 billion), with power generation, transmission, and cross-border electricity trade second (12 projects worth \$1.50 billion).

Further, the SASEC Operational Plan 2016–2025 (ADB 2016), the key project programme based on country ownership and partnership, has identified several countries driven potential regional projects layout in the eastern fringes of South Asia. A chain of these projects that connect with key ports, airports and other logistic centres are in the pipeline. (Table 1.4)

Newer all weather four lane roads like Uttara (West Sikkim) between Sikkim and Nepal at Chewabhanjyang and with Bhutan through Tawang district of Arunachal Pradesh and opening of passes like Pangsau Pass between Arunachal Pradesh and Myanmar could provide stronger integration opportunities for trade, tourism, energy and other services exchange, pilgrimage and strategic engagement.

The I-M-T trilateral highway besides provisioning physical connectivity, is meant to spread economic benefits. Therefore, when the highway is completed in the next couple of years a major concern is to use it effectively and sustainably. The key issues involved are how this highway could be given qualitatively multimodal contents (road, rail, electricity grids, gas pipeline, fibre optics, information ways and connections with ports and waterways) along with ancillary services like tourist amenities, security posts, banking, insurance and finance so that the cost-of-service links gets reduced substantially leading to trade cost reduction through infrastructural inefficiency. Ans also how this highway could be utilised by other partners of India in Eastern South Asia including Bangladesh, Bhutan and Nepal.

Table 1.4-SASEC: Projects in Pipeline (2016-2025)

Sector	Projects
Transport	i) Nepal-Kolkata Trade Corridor (ii) Bay of Bengal Highway (iii) India-ASEAN East-West Corridor (iv) Nepal-Bhutan-Bangladesh North-South Corridor (v) North Bangladesh-India Connector
Economic Corridor Development	i) East Coast Economic Corridor (ECEC) (India) (ii) Amritsar–Kolkata Industrial Corridor (India) (iii) Kathmandu–Kakarvitta (via Mid-Hill Highway) (Nepal) (iv) Kathmandu–Kakarvitta (via East-West Highway) (Nepal) (v) Banglabandha–Dhaka–Chittagong–Cox Bazar Economic Corridor (Bangladesh) (vi) Sylhet–Dhaka–Khulna Economic Corridor (Bangladesh)

Source: Asian Development Bank (2016), *South Asia Subregional Economic Cooperation Operational Plan 2016–2025*. Manila

Equally serious issue will be that of seamless movement of vehicles wherein an Indian container can pass through Myanmar and reach Thailand without any interruptions. For instance, even after steady liberalization, Bangladeshi and Indian trucks cannot enter into each other’s territory thereby bringing severe degree of transport inefficiency, customs delays, demurrage charges, regulatory and transaction costs.

In the investment front, a conscious shift towards participation of the CLMVT and other South East Asian countries will inject a powerful dimension. India not signing the RCEP agreement in 2020 has made it more essential. In this respect, the seed projects approach being adopted by the NEDFi could be a core demonstrative and replicable pathway. This involves creating a pipeline of High-Quality Seed Projects in the NER which has the potential of attracting investment from South East Asia (CLMV & Thailand). This will also provide strategic roadmap for realization of these seed projects on the ground and the required follow-up and facilitation.

It is found that despite several investment and trade marts, road shows and exhibitions and various investment promotion measures in India and SE Asia, the participation of the potential investors from the CLMV-T countries in the NER stands at pretty low level. Though such initiatives do generate interests, they are not generally taken to a logical end. In the

absence of concrete, scientifically designed and commercially attractive follow up measures, these interests and enthusiasm do not last long.

This has happened mainly because in the usually adopted top-down approach there are several gaps faced by these investors in their actual participation in investment activities in the NER. All these gaps make them apprehensive and sceptical. The NEDFi approach while providing a new, healthy and promising narrative and discourse about the NER, identifies and addresses all these gaps beforehand and also provide all varieties of facilitating information and interactive forums for these investors to invest in the NER. The interface for the real investors to meet and interact and actually participate in the projects and ventures is also created to enable match making of investors.

The foreign direct investment participation in various forms are envisaged including fully owned, joint ventures and in specific and exclusive areas like management, technology transfer, supplier of raw material, infrastructure like cold chains, professional participation and expertise provider, finance, marketing, value chain, research and development, and exclusive services like veterinary services, horticulture-floriculture nursery management, breeding and feed management, fashion and textile design interventions, travel agency inter-connections, institutional support etc.

The Vision 2047 promotes the idea of borderland and setting up of Frontier Economic Zones (FEZs) as developed by a Team of NEDFi under the Ministry of External Affairs, Government of India (2023) and Border Special Development Zones (BSDZs) as developed by UNESCAP (2016) This will largely supplement some of the major visions as enshrined in the NER Vision 2047. The FEZs and BSDZs will be geography and location specific along important existing border-crossing points with distinct emphasis on multiple cross border exchanges and also that galvanizes and synergizes the comparative advantages. Policies will be drawn and harmonized on a trans- border basis with a view to link it with broader sub-regional and regional exchanges and integrations. Many of the enabling provisions are already incorporated in various existing industrial and trade promotion policies of participating states. Besides minimizing trade costs and securing competitive advantages for sectors, these BSDZs will harness trade potential, trigger industrial diversification, provide greater market access and also attract private investment and technological interventions. There are four varieties of FEZs that are envisaged-

- i) Exclusive Production Supply zones;
- ii) Interconnected Production Supply zones (Raw materials and other inputs on a transborder basis);
- iii) Cross Regional Zones: Supply and value chains like tourism and
- iv) Trans-border Service exchanges Zones: Educational facilities, hospitals, communications and energy.

Similarly, the four BSDZs will be built in four quadrangular interconnecting border junctions at Manipur-Mizoram-Arunachal Pradesh- Myanmar; Arunachal Pradesh - Assam-Bhutan; Sikkim-Assam-Nepal and Assam-Meghalaya-Tripura -Bangladesh.

1.14 Reverse Integration

The orthodox model of expecting, enticing and engaging the NER joining the rest of India has largely failed. The reverse model has to be applied and practiced now. China practiced this

reverse integration in the entire sub-regional landscape of South West including Sichuan, Tibet, Yunnan, Xinjiang and Qinghai. The nation-state went to these relatively less developed frontiers after developing the coastal belt in the Southeast region. What needs to be emphasized now is how the Centre would integrate with the North East periphery rather than the erstwhile model of periphery merging with the core. The strategic community that continues to harp on the 'chicken neck' thought process and juxtapose the NER as a relatively small economy has to inevitably undergo a visible metamorphosis. We must have a relook at the political geography.

In the changing national and international context, it makes sense to view the NER as the chicken's head and the rest of India acts as its body. It leads to an awkward situation with inbuilt instability and inhibitions if the body guides and leads the head. The best way forward is to let the head lead the body so we come back to nature. The reverse integration unfurls development, creativity, innovations and inclusiveness.

Now, the NER is also displaying its prowess to globalise the locals through sports. Many sports personalities have emerged as new global brand ambassadors from the NER. Similarly, traditional medicinal systems, genetic affluence and bio-diversity, cross-cultural practices and also music, cinema and tourism corridors and climate change adaptations knowledge base in the region could be steadily branded and globalized.

Such a reverse integration happened in Darjeeling during both the pre and immediate post-independence period, globalizing the local tea, the cinchona, a toy train, school and colleges, and attracting millions of tourists, experts and professional from rest of India and the world to Darjeeling. This tiny strategically located district emerged as the core of Tea-Horse Route through Jelep la and Nathu La, produced many Olympic players and a host of valiant fighters in the defence forces, hosted several Bollywood films and actors, earned millions of hard currencies from tea, quinine and timber, and educated the top notches of civil servants and other professionals in its schools and colleges from India and its neighboring countries. As a brand name of "queen of the hills", Darjeeling became irreversibly globalized. Here the rest of India and the global world first came to Darjeeling, and it steadily got integrated with their systems. The NER has to learn from the Darjeeling experience.

The region is now steadily becoming outward looking. Thousands of youths from the NER are now harnessing their talents across various ventures and professions in nook and cranny of India and abroad. All these have moved the orthodox model of North East integration with the mainstream India to a refreshing and more realistic phenomenon of reverse integration where various geographical segments of India, institutions and people at large are getting attracted to this region for a variety of interactions. This has once again brought the special ethno-ecological traits, skills and knowledge of the people and communities of the NER to national and global platforms.

The vision for the North Eastern Region as a New Growth Pole of India and Quadrangle of Eastern South Asia is both ambitious and achievable. This transformation will be driven by newer growth instruments and a multi-sectoral growth strategy. The NER has long followed a development model that promotes the outflow of development multipliers, often benefiting lowlands or mainstream areas more than the region itself. To reverse this trend, the NER must leverage its comparative advantages, historical trends, and emerging markets

and make full use of “reverse integration”. The Act East Policy positions the NER as a bridge between South East Asia and Eastern South Asia, offering significant opportunities for regional connectivity and investment. The journey ahead requires coordinated efforts, innovative policies, and the active participation of all stakeholders to realize the full potential of this dynamic region.

Draft Report

Chapter 2 Cost of Conflicts and Dividends from Peace

Stability, Reverse Integration and their benefits

There are scores of reasons for the sordid and shallow post-independence development trajectory in the NER. Factors like abrupt physical disconnection in the post-partition period triggered by separation of East Pakistan (now Bangladesh); insurgency and violence led instability; acute mis-governance; lack of visions and national and global outlook among the local leaderships and serious institutional laggardness have protracted this backwardness. The bullock cart paced development of physical infrastructures and the widespread and endless identity politics added succour to this laggardness. The actors at the centre increasingly realized the failure of national policy makers to visit the region and inability to understand and accept the potentialities of the communities in the NER in the Centre. It was only recently that the NDA Government led by Prime Minister Narendra Modi issued a notification (dated 16 January 2015), asking the union ministers to tour the North-East region every fortnight. Prime Minister himself has visited the NER over 70 times during 2014-2024 thereby indicating both the seriousness of commitment and degree of engagement to transform the NER as a new growth pole of India.

2.1 Why Laggardness

Why despite all special constitutional, institutional and financial provisions and policy decisions the NER remained a relative laggard? This question is invariably asked. Besides the reasons mentioned in the above paragraph, the decision makers and implementing agencies in New Delhi view national security as the core concern for undertaking developmental activities in the region. Since independence all major development initiatives in the region had been overwhelmingly implemented and supervised by the national security related agencies and Ministries. The post-colonial official justification of these designs, approaches and strategies of development interventions with intrusive security parameters allowed the continuation of the time-tested colonial legacy, confining the NER in the boxes like “excluded area”, “partially excluded area”, “inner line permit”, “restricted area provisions” and exclusivity. In the immediate aftermath of independence, there were highly biased apprehensions about the nationalistic traits and misplaced perceptions about the very political orientation of the people of the North East Region. Sardar Vallabhbhai Patel, the then Home Minister of India in his letter dated to 7th November 1950 to Pandit Jawaharlal Nehru, the then Prime Minister of India wrote:

“Our northern and north-eastern approaches consist of Nepal, Bhutan, Sikkim, Darjeeling and the tribal areas in Assam, From the point of view of communication, there are weak spots. Continuous defensive lines do not exist. There is almost an unlimited scope for infiltration. Police protection is limited to a very small number of passes. There, too, our outposts do not seem to be fully manned. The contact of these areas with us is by no means close and intimate. The people inhabiting these portions have no established loyalty or devotion to India, Even Darjeeling and Kalimpong areas are not free from pro-Mongoloid prejudices, During the last three years, we have not been able to make any appreciable approaches to the Nagas and other hill tribes in Assam?”

This genre of thinking remained protracted for few decades to come.

A critical mass of political leadership, bureaucracy and even media in India nurtured the security centric acculturation perpetuating the idea that every experimentation and innovative development projects in the NER should be first tested in the laboratories of security institutions. All these contributed to the evolution of the national discourse that presented the NER as a region that is beset with violent conflicts, insurgencies and instability, and hence a 'no go' geography for the rest of India and also others from the foreign lands.

2.2 Conflicts and Instabilities

The conflict driven instabilities have been a reality in the NER. Once the entire Eastern frontier had been a zone of conflict and instability. If one stood in a place like Guwahati, within a 700 km perimeter one would find all varieties of conflicts. No single and compact geographical region has recorded such a variety of conflicts, wars, violence and instabilities possibly anywhere in the world as has been recorded by the NER. Except a nuclear war, one can name any genre of conflicts in the NER.

The North East region of India, home to numerous diverse communities and located strategically with borders with Bhutan, Tibet/China, Myanmar and Bangladesh, has seen much violence and bloodshed over the past few decades. These include insurgencies in the States of Nagaland, Mizoram, and Manipur, Tripura and Assam and the growth of militant groups in Meghalaya. In addition, there have been conflicts and confrontations over land use and control as well as issues of language, identity formation, demographic change and minority-majority relations.

In general, conflicts in the North East arises from the sense of alienation among its communities from the Indian state. These communities and ethnic groups aspire to assert their independent identities and the commitment to India. On the other hand, these social groups that have benefited from high levels of subsidies paid out by the Indian government (and are presumably reflected in the relatively low level of poverty in these states), at least according to official figures, and their relatively high levels of educational performance. These latter, however, also reflect the activities of Christian missionaries which probably account, in the main, for the fact that Mizoram has the highest levels of literacy in the country. It is likely, too, that some politicians and some insurgents stand to benefit from the persistence of conflict, which draws the central government in to spend substantial resources in the region. Tensions are also influenced by majority-minority and insider-outsider conflicts, as in Assam, cut across as they are by language issues¹.

In case of the NER there have not been any serious and systematic attempts to study the economic impact of conflicts, terrorism and insurgency despite the fact that this region has remained one of the most important theatres of terrorism, insurgency and other militant

¹ Harriss, John, DESTIN, LSE- Crisis States Programme; "*The State, Tradition, and Conflict in the North Eastern States of India*".

activities in the past. There are internal reports prepared by the Governmental agencies most of which remain outside the public access, deliberations and reviews. A number of institutions of late have been trying to put together economic costs.² Though these attempts also do not have any rigorous applications of economic method and techniques, they have largely brought forward data and information that could go a long way in providing inputs to any serious economic analysis.

2.3 The Fatalities and Deeper Scars

The amount of damage the conflicts in various states of the NER have done on its own human resources and social capital in the last three decades have been enormous. A glimpse of these killings and deeper scars are given below (Tables 2.1-2.6). Tables have been updated and arranged alphabetically.

Table 2.1: Arunachal Pradesh: Major Incidents and Fatalities (2000-2022)

Year	Civilians	Security Forces	Terrorists/Insurgents/Extremists	Total
2000	0	0	3	3
2001	4	6	6	16
2002	0	3	8	11
2003	0	1	5	6
2004	1	2	6	9
2005	0	1	2	3
2006	0	5	6	11
2007	6	5	21	32
2008	0	0	3	3
2009	0	0	9	9
2010	0	0	0	0
2011	0	0	41	41
2012	0	0	4	4
2013	0	0	4	4
2014	3	0	6	9
2015	2	4	4	10
2016	0	2	7	9
2017	0	0	6	6
2018	1	2	11	14
2019	11	3	3	17
2020	1	2	7	10
2021	0	1	7	8
2022	1	0	3	4

Source: <https://www.satp.org/>

² For example Delhi based *Institute for Conflict Management* has been able to disseminate a considerable amount of data and information on both the terrorist / insurgency violence and its large scale national and international ramifications. Similar efforts are made in the *South Asia Analysis Group in Madras*, *Institute of Policy Studies in Colombo* and *University of Karachi*.

Table 2.2: Assam: Annual Fatalities 2000-2022

Year	Civilians	Security Forces	Terrorists/Insurgents/Extremists	Total
2000*	267	37	223	527
2001	183	76	287	546
2002	111	41	298	450
2003	192	13	284	489
2004	179	26	146	351
2005	130	8	82	220
2006	86	33	43	162
2007	279	17	135	431
2008	216	16	132	364
2009	164	22	196	382
2010	45	12	97	154
2011	31	15	46	92
2012	43	4	55	102
2013	37	6	57	100
2014	184	5	117	306
2015	11	1	49	61
2016	33	4	50	87
2017	6	3	20	29
2018	10	1	11	22
2019	1	0	2	3
2020	3	0	5	8
2021	10	0	19	29
2022	3	0	3	6

Source: <https://www.satp.org/>

Table 2.3: Manipur: Annual Fatalities caused by the Conflicts 2000-2022

Year	Civilians	Security Forces	Terrorists/Insurgents/Extremists	Total
2000*	46	31	60	137
2001	48	16	101	165
2002	30	44	106	180
2003	23	23	153	199
2004	39	51	130	220
2005	140	51	135	326
2006	74	38	146	258
2007	130	58	240	428
2008	113	10	349	472
2009	76	19	329	424
2010	29	6	102	137
2011	23	9	31	63
2012	23	12	77	112
2013	21	6	28	55
2014	22	10	23	55
2015	18	24	52	94
2016	14	13	9	36

Year	Civilians	Security Forces	Terrorists/Insurgents/Extremists	Total
2017	23	9	22	54
2018	7	7	9	23
2019	4	0	5	9
2020	1	3	3	7
2021	8	5	14	27
2022	5	1	1	7

Source: <https://www.satp.org/>

Table 2.4: Mizoram: Fatalities in Insurgency-linked Violence: 2002-2022

Year	Civilians	Security Forces	Terrorists	Total
2000	2	7	0	9
2001	0	0	4	4
2002	0	0	0	0
2003	0	1	0	1
2004	0	1	3	4
2005	2	0	0	2
2006	0	0	0	0
2007	2	0	21	23
2008	0	4	13	17
2009	0	0	0	1
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0
2013	0	0	0	0
2014	0	0	0	0
2015	0	3	0	3
2016	0	0	0	0
2017	0	0	0	0
2018	0	0	0	0
2019	0	0	0	0
2020	0	0	0	0
2021	0	0	0	0
2022	3	0	0	3

Source: <https://www.satp.org/>

Table 2.5: Nagaland: Annual Fatalities in Terrorist Violence (2000-2022)

Year	Civilians	Security Force Personnel	Terrorists/Militants	Total
2000	13	4	84	101
2001	25	2	76	103
2002	5	2	29	36
2003	3	3	31	37

Year	Civilians	Security Force Personnel	Terrorists/Militants	Total
2004	35	1	22	58
2005	9	0	31	40
2006	10	1	81	92
2007	20	0	88	108
2008	42	2	101	145
2009	7	0	11	18
2010	0	0	3	3
2011	7	0	8	15
2012	6	0	52	58
2013	10	0	21	31
2014	11	0	5	16
2015	14	9	24	47
2016	4	0	2	6
2017	3	1	4	8
2018	0	3	4	7
2019	1	2	1	4
2020	0	0	2	2
2021	3	0	1	2
2022	0	0	0	0

Source: <https://www.satp.org/>

Table 2.6: Tripura: Insurgency related killings 2000-2022

Year	Civilians	Security Forces	Terrorists/Insurgents/Extremists	Total
2000	198	11	45	254
2001	83	23	47	153
2002	73	40	29	142
2003	224	46	61	331
2004	61	43	74	178
2005	25	11	26	62
2006	11	23	31	65
2007	7	5	21	33
2008	7	4	16	27
2009	10	1	1	12

Year	Civilians	Security Forces	Terrorists/Insurgents/Extremists	Total
2010	0	2	1	3
2011	1	0	0	1
2012	0	0	3	3
2013	0	0	0	0
2014	2	2	0	4
2015	0	0	0	0
2016	0	0	0	0
2017	1	0	0	1
2018	0	0	0	0
2019	0	0	0	0
2020	0	0	0	0
2021	0	2	0	2
2022	0	1	0	1

Source: <https://www.satp.org/>

2.4 Conflicts and Violence: Some Socio-Economic Attributes

The issue of deprivation in the form of Centre-Periphery debate very often appeared in the fulcrum of most of these conflicts. Equally critical has been the skewed distribution of the available natural resources and their unplanned exploitation. The regional disparity in all fronts have been blatant and conspicuous.

Though the spread of Net State Domestic Product (NSDP) at current prices across various states in India may not be a good index of the inequality in the distribution of the national income generation mainly on the ground of sharp variations in the sizes, natural resource endowments and infrastructural facilities in these states, one can still check this in terms of both growth rates in the NSDP and the geographical size-SDP performance in the total Indian context. However, regional imbalance has been a major cause of conflicts in India. This has in fact tended to increase gradually during the 1980s followed by a relatively steep increase in the early years of reforms period and got consolidated in the rest of 1990s. There are studies that clearly show inter-state inequality as measured by the Gini-coefficient has clearly increased.³

In India, regional distribution of natural reserves is uneven. In fact, the natural resource sharing has been the most significant issue in many of the conflict situations. A number of states have demanded their share in the development resources commensurate to their contributions in terms of production, their natural resources exploitations and overall contribution to the national income. The All Assam Students Union and also the ULFA have been highlighting the mismatch between this State's resource rich status with a huge reserve of minerals including oil, a large variety of forests and highly potential unharnessed economic sectors like water and its relatively a much backward state character.

³ MS Ahluwalia, "Economic Performance of States in Post Reforms Period," *Economic and Political Weekly*, Mumbai, May 6, 2000

It views that the resources have been exploited without adequately sharing the benefits with the State. The two major resource based industrial activities viz, oil and plantation have not really brought any substantive transformation in the State. The backward linkages of these industries are rather limited while their forward linkages are with industries located in the big metropolises elsewhere. The result has been the emergence of an enclave type economy, i.e. a few modern industries in the midst of traditional industries having very little or no interactions between the two.⁴ A hard hitting booklet named “Eclipse in the East” appearing at the height of the agitation in early 1980s remarked, “Assam had been treated nothing better than a colony the state has been fragmented beyond recognition ... The tea industry which produces 270 million kgs of tea worth over Rs. 400 crores every year, is controlled from Calcutta and London.”

Assam like other hill states has faced serious siphoning off its resources to outside the State. This is also reflected in the relatively lower credit-deposit ratio (Table 2.7).

Table 2.7: State-wise Credit-Deposit Ratio of Scheduled Commercial Banks

State	1997	2007	2017	2023
Arunachal Pradesh	10.8	28	24	27.3
Assam	51.4	42.8	40.3	52
Manipur	138.6	55.1	38.7	72.5
Meghalaya	25.7	35.7	25.9	37.5
Mizoram	29.2	53.8	36.4	47.1
Nagaland	46.1	29.1	31.5	49
Sikkim	18.5	52.8	27.4	42.8
Tripura	62.1	35.3	35.9	41.5

Source: RBI Handbook of statistics of Indian States

This has taken place mainly on four counts viz.,

- i. Returns on investment in the State including in transport, tourism, major manufacturing industries and other services have all been repatriated to other metropolis of India,
- ii. Most of the merchant capitalist doing trade in the State have always preferred to transfer their earnings to either their home States or to some other business activities outside the State,
- iii. A very limited portion of the bank deposits in the State have been released as credit to the locals. It may be purely because on the grounds of creditworthiness and
- iv. The very nature of natural resource exploitation including the crude oil makes the State transfer a huge chunk of resources to other States while Assam gets hardly a fraction in terms of royalty.

⁴ Atul, Sharma, “Development Strategies in the North East in the context of Globalisation”, An unpublished Seminar Paper, 1995 p. 12; PC Barua (ed) *Development Planning of North-East India*, Mittal, Delhi, 1990; PD Saikia & U Phukan, *Rural Development in North-East India*, B. R. Publishing Corporation, Delhi 1989

However, at the same time it is observed that the regions afflicted by one or other forms of armed conflicts, do not show any particular correlations with the state and extent of poverty prevailing in those regions. In other words, the popular belief that these conflicts could be associated with less poverty may not stand a full test. Some of the states where violence has been a strong feature like Assam, Nagaland and Bihar (33.76 percent in 2023) have the presence of a hefty percentage of people below poverty line. For instance, the latest National Multidimensional Poverty Index 2023 published by NITI Aayog, which takes into consideration three major variables health, education and standard of living (within these 10 specific measures including nutrition, child & adolescent mortality, maternal health, years of schooling, school attendance, cooking fuel, sanitation, drinking water, housing, electricity, assets and bank account) as measures to arrive at the poverty ratio for each state in rural and urban areas places some of the conflict prone states of the NER in the relatively higher poverty ratio baskets.

Among the NE states the intensity of poverty is very high in Meghalaya (27.79 percent), followed by Assam (19.35 percent) and Nagaland (15.35 percent). Their ranks among the 28 states of India are 26th, 23rd and 20th indicating that these states really have to make some transformative initiatives and interventions to be in the zero-poverty zone by 2047. At the same time, Sikkim with 4th least poverty ranked state - with a poverty ratio of 2.60 percent - is only below Kerala (0.55 percent), Goa (0.84 percent) and Tamil Nadu (2.20 percent) in the poverty indices ranking in India. (Table 2.8)

Table 2.8-Peace and Conflicts in NER: Multidimensional Poor Headcount Ratio 2023

States	Headcount Ratio (%)	National Position among 28 States
Arunachal Pradesh	13.76	18th
Assam	19.35	23rd
Manipur	8.10	13th
Meghalaya	27.79	26th
Mizoram	5.30	7th
Nagaland	15.43	20th
Sikkim	2.60	4th
Tripura	13.11	17th
India	14.96	

Source: NITI Aayog, India: National Multidimensional Poverty Index 2023

Whereas other conflict-ridden states (in varying degrees) like Andhra Pradesh (6.06 percent), Jammu and Kashmir (4.80 percent) and Punjab (4.75 percent) have comparatively much lesser percentage of people below poverty line. This makes us broadly conclude that both the situations of high and low levels of poverty tend to generate conflicts and violence, although the combinations of other causal factors could be in sharp variance.

2.5 Sustenance of Conflicts

An interplay of a large number of endogenous and exogenous factors has sustained these conflicts. Besides the funding by the diaspora communities and overt and covert assistance by the hostile neighbouring countries, the extent and implications of extortions and lootings have been enormous. In some cases, the strategy has been to displace the population

through violent actions so that in the short-run they are able to mobilize resources for instant use and acquired movable and immovable properties could be used for more violence in the long run. These have brought fortunes to the militants.

'Industry of terror' is what the victims call the entire complex matrix and intriguing modalities of abduction, extortion and looting. This has been the backbone of insurgency in all the theatres of militancy in the North East region. The insurgents have used diverse instruments and modus operandi in the perpetrations of crimes. These techniques are sometimes highly complex and sophisticated and to a large extent institutionalised (Table 2.9). They do it in the name of cleansing the system and to 'get rid of corruption' in the governments. Most of these incidents have taken place where there is marked decay in the political culture, steady erosion in the faith and confidence of the people on the systems of governance and when the emergence of the ultra-rich phenomenon among certain sections becomes very conspicuous.

The criticality of militants' operations in many parts is based on the tacit support, and complementary patronization of politicians and the sophisticated nexus between them and the militants.

Table 2.9: North East Region: Looting, Abduction and Extortion - Modes and Techniques

- ▶ Loot the banks and other public exchequers.
- ▶ Kidnap or abduct a person and ask for the ransom
- ▶ Serve notices to the companies and agencies for the contribution
- ▶ Establish a linkage with the contractors or profiteering agencies for a commission on deals and projects mainly related to the government
- ▶ Impose a tax on the movement of vehicles
- ▶ Threaten the households, politicians and professionals of extermination and demand for their contributions
- ▶ Raise the contributions from particular localities, communities and NGOs in the form of tolls, taxes, 'war taxes' and 'protection money', 'patriotic tax' and even development security.
- ▶ Practice an open extortion by making a gang and going around the town from shop to shop.

One of the key elements that sustain conflicts in a particular situation has been the role of external support. This has been widely discussed. There are growing knowledge base on these as the very nature of conflicts has grown into a massive conglomerate with intrinsic international network. There are genuine difficulties in measuring the extent and impact of outside support both because of the nature and mode of transactions.

People, institutions and agencies thrive in negative situations also. This is why over the years one finds a very conspicuous pre-existence of vested constituencies that promote violence and instability. This is true in all the theatres of protracted militancy and insurgency in many parts of India.

2.6 Misplaced Perceptions and Negative Narratives

These conflicts have been highlighted and projected in a manner as if the entire NER region protractedly remained engulfed in fire and violence. However, the fact remains that only a miniscule and a negligible minority (perhaps less than one percent of the total population) have been within the precincts of conflicts, insurgency and violence in this otherwise peaceful and community led abode of harmony and tranquility across the region. But the national and global discourse on the NER ignored and marginalized ninety-nine percent of the people and communities who have been outside this conflictual tug-of-war. It only highlighted the miniscule that were responsible for conflict. In doing so, some key actors and institutions gained while the nation and the people at large lost a lot including two to three younger generation. In the actual sense, the right policy practice should have been developed to make this 'over 99 percent' the real constituency and the focal point for peace, stability and development. The opportunity was grossly overlooked and missed too.

However, security continued to elude the people. A recent NITI Aayog Report mentioned that "perception of people in the border areas regarding security issues varied across States. 50 percent people of Manipur, 82 percent people of Tripura and 14 percent people of Nagaland settled in these areas said they do not feel secure. Similarly, 78 percent people of Sikkim said they do not feel secure living in border areas."

2.7 Cost of Conflicts

There are several economic parameters on the basis of which we can assess the impact of violent conflicts and terrorism. These include destruction of infrastructure, increase in security-defence expenditure, factories and standing crops, stoppage of economic activities, impact on tourism, and production and export of products, growth in GNP, balance-of-payment position, level of foreign exchange reserves and fiscal deficit. On the other hand, there are some factors which do indicate indirect costs of such situations such as general loss of confidence in the economy, consequent inability to attract foreign investment, brain drain, displacement and migration, high transaction costs and various kinds of economic distortions. Given these multi-dimensional facets of destructive and dislocating impact, there are expectedly serious methodological difficulties in assessing and determining their exact cost. Experts have found it difficult to exactly and quantitatively isolate terrorist factor in a chain of destructive actions.

A study⁵ revealed that livelihoods had been affected in a number of short and long-term ways as a consequence of prolonged exposure to armed violence. Some of the impacts noted across many case studies, included:

- Fear, anxiety, suspicion and insecurity;
- Forcible and voluntary displacement;
- Changes in occupation;
- Changes in expenditure patterns;

⁵ Dipankar Banerjee and Robert Muggah, *Small Arms and Human Insecurity*, Regional Centre for Strategic Studies, Colombo, 2002.

- Contribution to the polarisation along ethnic and political lines;
- Impacts on the quality, delivery and sustainability of developmental activities; and,
- Systematic erosion of the credibility of municipal and national governance

The lower economic performance of conflict affected areas was observed in different case studies. Also, it has been noted that social conflicts and their management played a major role in transmitting the effects of external shocks on to economic performance. According to a heuristic model, the effect of shocks on growth is larger than greater the latent social conflict in an economy and the weaker its institutions of conflict management.

Conflicts often destroy and damage social infrastructure like schools and hospitals. Health services and educational institutions are often explicit targets of conflicting groups. Death or displacement of personnel due to conflict is another cause of socioeconomic deterioration. The other cause is the access issue. It is due to destituteness, lack of appropriate documentation and sometimes language barrier, especially, of displaced people. Afflicted people lack sufficient food to maintain good health and unable to afford essential medicine even when they can access health services. Surveys have revealed that malnutrition is a serious problem in conflict-affected countries. It was observed that external or internal relief aids do not always improve the situation because of security concerns, remoteness of communities, conditions of physical infrastructure, etc. It is interesting to observe that, unlike other conflict affected regions, northeast states are better performing with respect to basic education and health⁶.

There are several costs that the State has to bear as a consequence of conflicts and militancy. In some cases, the entire face and contents of governance has had to undergo transformation in order to face the challenges posed by violence. Some of the governments not only had to make special legislative interventions but also change the very format and contents of the constitution and also the forms of governments. The states were forced to create and support a parallel apparatus other than the routine institution of internal and external security. Some of the internal security functions have the certain dimensions which need to be addressed. Though the costs involved in these are fairly direct and to a large extent measurable, there are several areas where cost analysis become complex and enormous. This is more so when some of these costs are spread over a longer period of time.

These costs are, besides the loss of human lives, destruction of public properties and disruption of productive activities in the state and more importantly the overall health of the society and economy in the long run. It has been the people who have had to suffer from both sides of the state and the terrorists. It is extremely arduous and methodologically challenging to measure the real socio-economic, politico-strategic and environment-cultural impacts of conflicts and violence and responses of the states both in terms of physical parameters and inter-generation adversities. Some of the dimensions of internal security functions are:

- i. intelligence gathering

⁶ Das, Tuhin K., Gupta Das, Ivy, Haldar, Sushil K., Mitra, Sudakhina - *Conflicts and Socioeconomic Consequences in Northeast India*

- ii. protection of political leaders,
- iii. guarding vital locations,
- iv. screening people at airports, and hardening target⁷
- v. frequent security checks and road blocks have created long delays and loss of productivity
- vi. deployment of forces in the terrorist hit areas
- vii. fighting a war against a terrorist group including buying arms, maintaining the forces and paying compensations packages to the killed security personnel.

No literature is easily available on how much valuable time and effort have been lost in tackling these conflicts. More pertinently, in the face of massive onslaughts on the institutions of law and governance, most of the States do ignore the fact that if the time devoted to tackling militancy and insurgency had been used instead to pursue development arena, there would have been much improvement in the socio-economic indicators and other development parameters.

Similarly, if conflict-led violence had not existed how much the society and economy would have progressed?

What has been more conspicuous has been that these states are finding it increasingly difficult to match the changing tactics, transformed linkages, diverse strategies and convoluted instruments that are found among the terrorist groups in the region.

The very impact of violent conflicts is both dynamic and varying. In many cases, there are serious time lags in the manifestations of the actual deleterious impact of such a violent situation. There are variables and parameters which would start expressing the magnitude of impact only in long run when the pressures and pulls put their full exert on them. There are instances where the States have played down the impact by both statistical manipulations and also by not releasing detail information.

2.8 Economic Costs: Some Instances

Though not many studies have been carried out in the NER to assess and determine the costs of militancy and conflicts and related responses by the State, the attempts are now being made to rigorously and empirically examine diverse macro-economic impacts that are at least are easily perceptible and largely measurable.

There are competitive or action-reaction based impacts also.

i. Macro Situations: The Impact Assessment

The implications of extortions have been many and varying. Firstly, it has shaken the business confidence of the people. Investment has gone down drastically and the private sector has literally withdrawn from the development participation process. Development efforts have become exclusive to the government. Further, businesses have either stayed away or moved to safer areas. Secondly, most of the government's contractors are also

⁷ Besides the physical inconvenience and loss of time, the cost of such screenings has been enormous. A study estimated the costs of mandatory screening in the US at \$ 194.2 million for the period 1973-76, WM Landes, 'An Economic Study of US Aircraft Hijacking, 1961-1971', *Journal of Law and Economics*, 1978, No. 21, pp. 1-31; Another study estimated the cost of \$ 3.24 million to \$ 9.25 million to deter a single hijacking, Grant Wardlaw, *Political Terrorism: Theory, Tactics, and Counter-Measures*, Cambridge University Press, New York, 1989

affected by the extortion of substantial proportion of funds by the extremists. This has directly affected the quality of public works. A very critical dimension of the recurrence of terrorist violence is de-concentration of and the diversion of the systems of governance from the core development dynamics. This contributes significantly to the persistence of the general level of backwardness in the region.

Though the annual growth in most of the States in the North East affected by militancy and insurgency have generally remained lower than the national average, there has been no exact trend and pattern to show that the adverse impact of such instabilities in the growth process. (Table 2.10)

ii. **Impact on Defence Expenditure**

As the tactics and instruments of terrorism become more sophisticated and advance the terrorist groups require heavy funding in order to acquire new techniques and technologies. Besides the standard terrorist tools like AK rifles and car bombs, the newer elements like jet aircraft, weapons of mass destruction including chemical, biological and radiological materials are increasingly used by them. Government forces and machineries have to not only match this but to pre-empt them. This has severe implications on the defence and internal security spending.

Table 2.10: Gross State Domestic Product at Current Prices; Base year 2011-12(% Growth over previous year)

State\UT	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
2012-13	13.4	9.6	6.4	9.8	15.2	16.0	10.5	12.8
2013-14	16.2	13.3	17.7	4.9	23.1	17.6	12.3	18.1
2014-15	23.2	10.1	12.0	1.3	31.2	10.8	11.1	15.4
2015-16	3.1	16.5	7.7	8.1	12.1	6.1	17.1	21.7
2016-17	7.5	11.6	9.0	9.2	13.6	11.3	14.7	9.9
2017-18	12.9	11.3	21.1	7.5	12.8	12.3	25.5	10.7
2018-19	12.7	9.2	6.2	9.0	13.0	8.8	9.4	14.0
2019-20	18.5	12.1	8.9	8.1	14.0	12.0	10.7	8.7
2020-21	1.7	-2.0	-0.1	-2.9	-4.3	0.4	5.0	-1.2
2021-22	13.9	21.1	22.9	14.8	16.3	4.0	13.7	16.9
2022-23	14.0	19.9	NA	10.1	NA	16.3	13.8	16.1
2023-24	NA	14.6	NA	11.0	NA	NA	NA	NA

Though the overall defence budget of India does indicate the general trend in the security situation as perceived by the national government, it actual does not give any clear-cut indications about the actual outlay and expenditure earmarked to deal with situations

caused by terrorism, militancy and insurgency. However, one could get much deeper insights from the

- i. security budget of a particular terrorism affected state government,
- ii. allocations made by the special commissions like the Finance Commission on maintaining law and order
- iii. the grants extended by the Union government to the affected states for relief and compensation and as special development package.

On top of this, the modernization of their police forces with emphasis on supply of (i) Arms and Ammunition (ii) Vehicles (iii) Communication Equipment and (iv) other essential equipment have cost the Union Government over Rs 284 crore during the same period. (Table 2.11). The same amounted to Rs 166.93 crore in the last 5 years. (Table 2.12)

Table 2.11: India: Central Assistance for Modernization of Police Forces in North Eastern States (Rs.Crore)

State	1997-98	198-98-99	1999-00	2000-01	2001-02	Total
Assam	17.10	6.64	22.72	22.45	18.21	102.73
Nagaland	6.16	1.08	4.52	6.51	5.93	40.08
Manipur	6.26	.98	5.54	6.51	3.62	34.40
Tripura	6.11	1.33	6.06	13.81	8.32	45.99
Meghalaya		1.22	4.74	6.35	3.25	20.44
Mizoram		.67	3.46	4.36	3.65	20.05
Arunachal Pradesh		.56	3.86	5.38		15.97
Sikkim				2.06	.89	4.69
Total :	35.63	12.48	50.90	67.43	44.63	284.35

Source: Ministry of Home Affairs, *Annual Report 2002-2003*, Government of India, New Delhi 2003.

Table 2.12: India: Central Assistance for Modernization of Police Forces in North Eastern States (2018-23)

State	2018-19	2019-20	2020-21	2021-22	2022-23	Total
Assam	5.67	0	0	9.36	0	15.03
Nagaland	18.89	17.29	0	17.03	0	53.21
Manipur	5.99	10.75		0	0	16.74
Tripura	7.08	4.97	5.72	6.75	0	24.52

Meghalaya	3.66	6.63		0	0	10.29
Mizoram	8.38	34.63	1.37	0	0	44.38
Arunachal Pradesh	1.03	0	0	0	0	1.03
Sikkim	0.36	0	0	1.37	0	1.73
Total:	51.06	74.27	7.09	34.51	0	166.93

Source: Ministry of Home Affairs, Annual Report 2023, Government of India,

iii. Impact on Tourism

Militancy, insurgency and violence have always had very substantive impact on tourism in the NER. This incurred huge losses for the numerous businesses involved in tourism including hotels, restaurants, entertainment spots, travel agencies and street vendors.

Equally serious has been the gross underutilization of the tourism infrastructure in the country including travel agencies, hotels and restaurants, parks and recreations. The impact on the forward and backward linkages segments of the tourism industry including transports communication, markets, handicrafts has been widespread and very critical. A large section of the people attached to the tourism industry have remained out of jobs for last few years now. Its social implications are well known.

iv. Withdrawal Syndrome

One of the major fall outs of conflicts and violence has been the withdrawal of development agencies both national and international from the affected areas. The development programmes have been disrupted and dislocated. In every developmental project or any business transaction, the militants have their lion's share and the amount left for development is so meagre. A large number of development projects have been either suspended or totally terminated half way through causing the state exchequers a loss of millions of Rupees. After the NSCN-IM served an extortion note of Rs. 6 million on Oil India Limited (OIL), work at the Khumsai oil-well in the Changlang District of Arunachal Pradesh was suspended, resulting in a loss of Rupees 200 to 300 million annually. The Border Road Task Force (BRTF) in Nagaland decided to indefinitely suspend work in Wokha-Bokajan sector of the State following extortion and threats from 'armed miscreants'.

2.9 Illegal Immigrants

Illegal foreign immigrants are another issue of concern to the region. If the staggering number of illegal foreign immigrants found by the NRC in Assam is to be believed, it also seriously calls into question the working of state and national level institutions. The most fundamental question is how and when these staggering numbers entered Assam, settled down for decades together with no punitive action against them. Which institutions are responsible, which officials are accountable and more seriously which are the exact border

crossing points that have been infringed upon and violated. It reflects comprehensive failure including constitutional, institutional, official, security, legal-administrative and governance

All these years the failure of state machineries and institutions to check illegal migration was literally swept under the carpet. And now some institutions and machineries who themselves were responsible in preventing and preempting movement of illegal foreign immigrants at the border points, are again involved in the tedious, costly and near impossible process of detecting, determining and deporting the illegal immigrants. This lapse brings forth the importance of border management and emphasizes the need to understand what exactly attracts the international migrants to cross over to Assam and the NER. It also brings forth the essentiality of legislating a comprehensive in-migration laws and policies including that related to refugees who cross the international border that actually never happened in the post-independence India.

Health Dam for the Immigrants

Borderland Health Campus: Two countries and a shared hospital

This hospital will be right at the Indian side of the border say in Dawki in Meghalaya (catering to Bangladeshi nationals), Pangsau in Changlang in Arunachal Pradesh (for Myanmarese nationals), Kokrajhar in Assam (for Bhutanese nationals). This state-of-the-art hospital will be connected to India's neighbourhood connectivity projects including land, railway, airports, waterways.

A securitised-dedicated corridor would be laid out from the other countries border to the hospital premises where the foreign nationals would enter from their side of the border and return through the same corridor after the treatment. They will not get access to any places in India except this borderland hospital. This means it will be a single entry-exit point corridor for both Indian and foreign nationals.

It will be a hospital campus with the following basic features:

- i. All the facilities including treatment, recuperating centres, residential complex, restaurants, hotels, banking, parking, petrol pumps, shopping complex, temples, churches, monasteries and mosques, cultural centres, sports amenities will be available
- ii. Doctors, nurses will be from both sides of the borders so that cultural and language assimilations happen.
- iii. The facilities could be availed by the Indian nationals also
- iv. Training facilities will be available
- v. It will be a visa free entry with passports (for Myanmarese and Bangladeshis) and permitted Identity proofs for Nepalese and Bhutanese nationals
- vi. It will be common currency hospital where the Indian Rupee will be available for conversion from the national currency of other countries.
- vii. Banks will issue Indian debit cards for exclusive use in the hospital campus

The possible impact of this borderland hospital:

- i. Easy access to the state-of-the art Indian hospital and medical facilities
- ii. Affordable and comfortable options than going to major cities in India like Mumbai, Delhi, Chennai, Kolkata and countries abroad like Thailand, Singapore, China, London and US
- iii. Smooth Cultural and Social assimilations
- iv. Huge confidence and trust building project with the neighbouring countries
- v. Economic and social integration at the bilateral and subregional levels
- vi. Goodwill for the Governments and the private sector
- vii. Steady decline in illegal migrations
- viii. Optimal use of connectivity projects
- ix. Major new source of income and employment
- x. A sharp decline in the Indian visa applicants in a country like Bangladesh
- xi) Growth of new connectivity projects

2.10 Debilitating Issues

In the process five core debilitating issues emerged which resulted in severe impairment of human security, a sharp erosion in governance practices, a newer variety of development disconnections and leakages, dislocation of political objectivity, shrinking of democratic space, displacement of the larger social-community ethos and literal fragmentation of the rich culture of cross-border exchanges.

First, the national discourse about the NER became hegemonic where it was made to believe that NER is a region of conflict, violence, insurgency and instability; a region of rugged terrains and low self-sustaining capacity and ultimately a development laggard. This kept all the potential development partners including the private sector, global multilateral agencies and non-state actors away from any meaningful participation in the development process.

Second, the building of pivots and critical educational, professional, development and political institutions were de-prioritised and made secondary fiddles. In the absence of the institutions that connected the communities with the rest of India and the global world and that trained, built capacities and empowered the huge mass of talented youths in the region, a major opportunity was lost to galvanise the people's participation in the national development and integration process. Money was poured incessantly but no investment was made on social capital formation and reconnecting the region with the vast newly industrializing countries (NICs) in the South East and East Asia. While the neighboring South East Asia was declared as the "flying geese", the NER in India still celebrated the backwardness and alienation. The aspirations of youths got derailed and impregnated with the feeling of powerlessness.

Third, the NER as a geography and community started alienating from the overwhelming matrices of 'national mainstream'. Communities became inward looking; identity politics

became much more diabolical and newer forms of protests and resistance emerged. Some of them even got prolonged support, training and habitat facilities in alien neighbouring countries that were against India's national sovereignty interests. On the other hand, "We vs Them" theme steadily mesmerized the psyche of dominant players in the "Centre" and satiated political leaderships in the "periphery". Despite the creation of several states and their own governance machineries, the level of confidence at the federal level on the ability and reach of the locals to manage the political economy of the region remained relatively low. This was blatantly witnessed in parallel running of several security measures, policies and institutions. This crisis of confidence and trust deficit has been the biggest bottleneck in the development leap forward of the NER. Barring a few initiatives by astute politicians, talented bureaucrats and sagacious civil society members, no collective and convincing initiatives could be taken up by the actors and institutions in the NER.

Fourthly, the borders which remained a witness to large-scale interactions in the pre-independence period gradually became a 'no go' zone. And finally, the political leadership in most of the NER states lost the larger vision, national and global horizon and the democratic institutions started losing their maneuverability. While the nation celebrated the second-generation reforms, the NER remained only in the periphery of even the first-generation reforms. Institutions and actors in governance got entangled in the dilemma of what first between the development dynamics and the security compulsions. More so they became solidly acutely dependent on federal funding and political dictates therein. Its region-ness as what Hettne described as a wholesome geographical unit; as a social system; as an organized cooperation; as a civil society and as an acting subject with a distinct identity gradually got eroded. The entire development discourse became Government centric. This made the citizens too dependent on the state. This definitely had visibly adverse impact on the competitiveness, creativity, innovativeness and outward looking attitude in the society and economy and more serious among the youth population. This story and psyche of marginalization of periphery remained and ruled for full five to six decades after independence.

2.11 Acting North East

All these syndromes and practices that made the NER a periphery have to be corrected now. NER Vision 2047 exactly aims at this. Act East (Look East of early 1990s) initiated by Prime Minister Modi has to be essentially based on Acting North East. This is partly because India-South East Asia integration very much intersects with local integration in the NER.

This has four-way effects:

First, it will reactivate and reorient the development process within the NER and strengthen crucial inter-connections among the NER states.

Second, it will help to connect the rest of India with the NER and more vigorously open up and use transit facilities to the NER provided by Bangladesh.

Third, it will help in realising the larger goals of Act East Policy of India by opening and also merging these physical, virtual, commercial and socio-cultural connectivity with the

countries of South East and East Asia. Here the North East becomes the real connecting cultural ecology and not a symbolic flyover.

And fourthly, it will attract Bangladesh, Nepal, Bhutan and Myanmar to join this Eastward sojourn further fostering the emerging Bangladesh, Bhutan, Indian and Nepal (BBIN) and Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) ventures.

2.12 Huge State Income as Peace Dividend

Even in the NER there are adequate instances that show how the peaceful eco system, stability in law-and-order situation and strong politico-democratic regimes and people-oriented governance have contributed to income, growth and to a large extent gross state happiness too. Sikkim, Mizoram and Tripura are some of the shining examples in the NER. There has been a positive correlation between peace-stability-tranquillity and the income and growth pattern as shown in Table 15.

Sikkim which has remained one of the most peaceful states in the NER and the country contributed hardly 1.5 percent of the total GSDP of the NER in 1980-81 and today it contributes almost 7 percent. Similarly, Mizoram otherwise a highly insurgent prone state in 1980-81 and contributed hardly 2 percent of the GSDP of the NER and today it contributes over 4 percent. Mizoram after the Mizo Accord of 1985 returned to a peaceful period. Tripura which once remained a violent state with a range of insurgency activities contributed hardly 8 percent of GSDP of the NER in 1980-81 and today it contributes almost 12 percent.

On the other hand, the contributions of conflicts ridden states like Assam, Manipur, Nagaland and even Meghalaya in the total GSDP of the NER have either gone down or remained stagnant in the last four decades or so.

In absolute terms also, Sikkim with a land area of hardly 3 percent of the NER total geographical area increased its GDP from Rs 52.07 crore in 1980-81 to Rs 42756 crore in 2022-23 (821 fold increase) whereas during the same period Manipur with 8.5 percent geographical area increased its GDP from Rs 218 crore to Rs 29776 crore (137 fold increase) and Nagaland with 6.3 percent geographical area recorded a GDP increase from Rs 119 Crore to Rs 29832 crore (250 fold increase) and Assam with 29.9 percent geographical area witnessed an increase in GDP from Rs 2516 crore in 1980-81 to Rs 493867 crore in 2022-23 (196 fold increase)

Table 2.13-GSDP at Factor Cost at Current Prices (Rs Crore)

State	2000-01	2010-11	2020-21	2022-23	Geographical Area (sq km) and share of the in the total NER	
Arunachal Pradesh	1787 -3.12	9021 (5.09)	30547.81 -5.2	NA	83,743	31.9
Assam	36814.16 -64.22	112688 -63.63	353605.4 -60.14	493166.6 -75.73	78,438	29.9
Manipur	3111.7 -5.43	9137 -5.16	29776.09 -5.06	NA	22,327	8.5
Meghalaya	3960.94 -6.91	14583 -8.23	33776.16 -5.74	42697.08 -6.56	22,429	8.6
Mizoram	1737.42 -3.03	6388 -3.61	23922.94 -4.07	NA	21,081	8
Nagaland	3399.3 -5.93	NA	29831.64 -5.07	NA	16,579	6.3
Sikkim	1013.69 -1.77	7412 -4.19	33017.83 -5.62	42756.17 -6.57	7,096	2.7
Tripura	5499.19 -9.59	17868 -10.09	53504.12 -9.1	72635.62 -11.15	10,491	4
Total	57323.87	177096.3	587982	651255.5	2,62,184	100

Source: <https://mospi.gov.in/data>, <https://databank.nedfi.com/>

Table 2.14

GROSS STATE DOMESTIC PRODUCT AT FACTOR COST

State	1980 - 81				1990 - 91				2000-01				2010-11				2020-21				2022-23			
	Primary Sector	Secondary Sector	Tertiary Sector	Total	Primary Sector	Secondary Sector	Tertiary Sector	Total	Primary Sector	Secondary Sector	Tertiary Sector	Total	Primary Sector	Secondary Sector	Tertiary Sector	Total	Primary Sector	Secondary Sector	Tertiary Sector	Total	Primary Sector	Secondary Sector	Tertiary Sector	Total
Arunachal Pradesh	44.57	24.42	31.01	100	219.72 (43.28)	103.51 (20.39)	184.46 (36.33)	100	671.72 (37.58)	302.8 (16.94)	812.95 (45.48)	100	3839.05 (42.55)	2355.35 (26.11)	2827.04 (31.34)	100	11668.5 (40.82)	5205.3 (18.21)	11711.83 (40.97)	100				
Assam	1195 (47.49)	317.42 (12.61)	1003.84 (39.89)	100	5147.88 (48.47)	2023.98 (19.06)	3448.88 (32.47)	100	14644.88 (39.78)	4613.72 (12.53)	17555.56 (47.69)	100	35851.35 (31.81)	21351.84 (18.95)	55484.77 (49.24)	100	112354.3 (434.89)	66679.52 (20.71)	142962.8 (444.40)	100	157347.4 (635.25)	86221.57 (19.32)	202755.4 (45.43)	100
Manipur	100.98 (46.23)	22.7 (10.39)	94.74 (43.38)	100	301.19 (36.7)	119.29 (14.54)	400.11 (48.47)	100	919.76 (29.56)	672.97 (21.63)	1518.97 (48.81)	100	2222.21 (24.32)	2280.9 (24.96)	4634.08 (50.72)	100	8013.94 (28.17)	2388.28 (8.40)	18042.93 (63.43)	100				
Meghalaya	77.01 (38.44)	35.44 (17.69)	87.87 (43.86)	100	283.71 (31.9)	153.25 (17.23)	452.55 (50.88)	100	1256.5 (31.72)	609.65 (15.39)	2094.79 (52.89)	100	3500.01 (24.00)	3490.44 (23.94)	7592.11 (52.06)	100	7586.29 (24.18)	5180.22 (16.51)	18606.51 (59.31)	100	9543.55 (23.29)	7296.59 (17.80)	24141.24 (58.91)	100
Mizoram	20.63 (30.31)	13.2 (19.39)	34.24 (50.30)	100	103.53 (30.37)	65.12 (19.11)	172.19 (50.52)	100	352.81 (20.32)	269.62 (15.52)	1114.99 (64.17)	100	1300.02 (20.35)	1086.35 (17.01)	4001.51 (62.64)	100	6184.86 (26.54)	6125.04 (26.29)	10991.81 (47.17)	100				
Nagaland	35.11 (29.51)	19.33 (16.25)	64.53 (54.24)	100	186.5 (28.47)	94(14.35)	374.57 (57.18)	100	1078.34 (31.72)	453.55 (13.34)	1867.41 (54.94)	100					9136.35 (31.89)	2869.93 (10.02)	16639.3 (58.09)	100				
Sikkim	25.47 (48.50)	11.22 (21.36)	15.83 (30.14)	100	100.24 (42.85)	33.98 (14.53)	99.72 (42.63)	100	220.5 (21.76)	235.16 (23.19)	558.04 (55.05)	100	616.05 (8.31)	4520.38 (60.99)	2275.14 (30.70)	100	3033.56 (9.60)	19871.95 (62.89)	8694.65 (27.51)	100	3600.76 (8.83)	25528.99 (62.60)	11654.4 (28.58)	100
Tripura	150 (52.47)	28.75 (10.06)	107.11 (37.47)	100	448 (43.45)	99.47 (9.65)	483.51 (46.90)	100	1424.97 (25.91)	1147.37 (20.86)	2926.85 (53.22)	100	4525.02 (25.33)	3377.4 (18.90)	9965.31 (55.77)	100	23669.27 (46.27)	6025.56 (11.78)	21460.96 (41.95)	100	30956.45 (44.35)	7332.45 (10.50)	31516.29 (45.15)	

Source 1980 - 2014: MOSPI, 2015 - 2023: NER Databank

Table 2.15 Growth Rate of Gross State Domestic Product at Factor Cost

GROWTH RATES OF GROSS STATE DOMESTIC PRODUCT AT FACTOR COST BY INDUSTRY OF ORIGIN At current prices (Rs. Lakhs)					
State	1980-81 to 1990-91	1990-91 to 2000- 01	2000-01 to 2010- 11	2010-11 to 2020- 21	2020-21 to 2022-23
Arunachal Pradesh	15.24	12.12	15.85	11.73	NA
Assam	13.99	11.96	10.71	10.96	3.07
Manipur	12.79	12.88	10.29	11.34	NA
Meghalaya	14.51	14.54	12.58	7.93	2.15
Mizoram	15.77	15.96	12.57	12.75	NA
Nagaland	16.78	16.15	NA	NA	NA
Sikkim	14.64	14.26	19.82	14.55	2.38
Tripura	12.37	16.44	11.31	10.48	2.82

Source: Own calculation from MOSPI data

Table 2.16-GROSS STATE DOMESTIC PRODUCT AT FACTOR COST

GROSS STATE DOMESTIC PRODUCT AT FACTOR COST BY INDUSTRY OF ORIGIN At current prices (Rs. Lakhs)						
State	1980-81	1990-91	2000-01	2010-11	2020-21	2022-23
Arunachal Pradesh	10668	50769	178747	902144	3054781	NA
Assam	251626	1062066	3681416	11268796	35360542	49316660
Manipur	21842	82059	311170	913719	2977609	NA
Meghalaya	20032	88951	396094	1458256	3377616	4269708
Mizoram	6807	34084	173742	638788	2392294	NA
Nagaland	11897	65507	339930	NA	2983164	NA
Sikkim	5207	23394	101369	741157	3301783	4275617
Tripura	28586	103098	549919	1786773	5350412	7263562

Source 1980 - 2014: MOSPI, 2015 - 2023: NER Databank

2.13 The Newer Outlook and Firm Commitments

It started with the mandatory fortnightly visits by the Union Ministers to the NER as announced by the Government of India in 2015.⁸ This brought a new dimension to the connectivity projects in the NER in terms of completing the old projects, designing and

⁸ [http://pib.nic.in/newsite/ PrintRelease.aspx?relid=114721](http://pib.nic.in/newsite/PrintRelease.aspx?relid=114721)

sanctioning new projects, bringing the new development partners like the ADB, World Bank and JICA, monitoring the ongoing projects and evaluating the impacts of the connectivity projects.

The frequent visits by Narendra Modi, Prime Minister and other Ministers have changed the landscapes of cross border projects too. It has now boiled down to what the Prime Minister declared **'Act Fast for Northeast'** and **'Act First for Northeast.'**⁹ and "villages in the border areas as the first village of the country"¹⁰

"In last 8 years, number of airports in the region has jumped from 9 to 16, and the number of flights has increased from about 900 before 2014 to around 1900. Many North Eastern states have come to the Railway map for the first time and efforts are being done to expand the waterways also. The length of national highways has increased by 50% since 2014 in the region." Foreign Minister S Jaishankar's visits have given clarity and highlighted the criticality of connectivity projects.

Regular visit by the senior bureaucrats, diplomats located in Delhi have further galvanized a new variety of professional commitment and accountability in various borderland connectivity projects. On the other hand, the Union Government officials are also acquiring firsthand accounts and field based real time experimentations.

PM Gati Shakti¹¹ is another pathbreaking venture that brought forth a National Master Plan for Multi-modal Connectivity, essentially a digital platform to bring 16 Ministries including Railways and Roadways together for integrated planning and coordinated implementation of infrastructure connectivity projects. This multi-modal connectivity will provide integrated and seamless connectivity for movement of people, goods and services from one mode of transport to another. It will facilitate the last mile connectivity of infrastructure and also reduce travel time for people. It incorporates the infrastructure schemes of various Ministries and State Governments like Bharatmala, Sagarmala, inland waterways, dry/land ports, UDAN etc. Economic Zones like textile clusters, pharmaceutical clusters, defence corridors, electronic parks, industrial corridors, fishing clusters, Agri-zones will be covered to improve connectivity & make Indian businesses more competitive. Based on six pillars of Comprehensiveness, Prioritization, Optimization, Synchronization, Analytical and Dynamic this initiative could bring massive transformation in the borderland connectivity with the neighbouring countries.

The Vibrant Village Programme announced in the Union Budget 2022-23 (to 2025-26) has added another fast-pacing dimension. It aims at comprehensive development of the select villages in mission mode and through multi-pronged strategy, by identification and development of key economic drivers based on local, natural, human and other resources.

10 identified focussed areas of interventions relate to Economic Growth - Livelihood generation, Road Connectivity, Housing & Village infrastructure, Energy including renewable energy through Solar and Wind power, Television and Telecom Connectivity including setting up of IT enabled Common Service Centre in the village, Regeneration of

⁹ Golden Jubilee of the North Eastern Council, December 2022 https://www.pmindia.gov.in/en/news_updates/pm-addresses-meeting-of-north-eastern-council-in-shillong/

¹⁰ <https://www.pib.gov.in/PressReleasePage.aspx?PRID=1877228>

¹¹ <https://www.india.gov.in/spotlight/pm-gati-shakti-national-master-plan-multi-modal-connectivity>

eco-system, Promotion of Tourism & culture, Financial inclusion, Skill development & entrepreneurship and Development of co-operative societies for managing livelihood opportunities including agriculture/horticulture, cultivation of medicinal plants/herbs etc. This Centrally sponsored scheme covers the border areas of Himachal Pradesh, Uttarakhand, Arunachal Pradesh, Sikkim and Ladakh. It will cover 2,967 villages in 46 blocks of 19 districts with 662 villages of them to be covered in the first phase. The Action Plans will be created by the district administration with the help of Gram Panchayats and there will be no overlap Border Area Development Programme. Home Minister Amit Shah launched this programme in the border village of Kibithoo, Arunachal Pradesh.

2.14 Prosperous and Insurgency Free North East¹²

The NDA Government led by Prime Minister Narendra Modi (since May 2014) while highlighting the aspects of security in the NER aims to end all disputes in the Northeast and usher in a new era of peace and development in the Northeast. The emphasis has been to establish peace by enriching the dignity, culture, language, literature and music of the Northeast.

Conflicts and Violence: The Waning Syndrome

Significantly, the GoI has signed at least nine peace and border related agreements in different states in the Northeast over the past five years, to end extremism and bring peace to the this long-troubled region. The other principal agreements with Assam-based groups included:

- The Bodo Accord was signed on January 27, 2020, to resolve the five-decade-old Bodo issue, resulting in the surrender of 1,615 cadres, with a huge cache of arms and ammunition, at Guwahati, on January 30, 2020.
- To resolve the long-running dispute in the Karbi regions of Assam, the Karbi Anglong Agreement was signed on September 4, 2021, and more than 1,000 armed cadres renounced violence and joined the mainstream of society.
- An agreement was signed on March 29, 2022, to settle the dispute over six areas out of a total of twelve, where an interstate boundary dispute between the states of Assam and Meghalaya existed.
- A Memorandum of Understanding (MoU) was signed between Chief Ministers of Assam and Arunachal Pradesh in the presence of UHM Amit Shah on April 20, 2023, over disputed areas along the 800-km shared boundary.

During these five years, around 7,000 insurgents have surrendered in Assam.

These developments have certainly impacted the security situation in the state. According to partial data compiled by the South Asia Terrorism Portal (SATP) overall fatalities have declined from 783 (531 civilians, 72 Security Force personnel and 180 insurgents) in 1998, to eight (three civilians and five insurgents) in 2023. Indeed, overall fatalities have remained in single digit since 2019, with an aberration in 2021, at 29 (10 civilians and 19 insurgents). Overall fatalities were in two digits between 2015 and 2018. Between 1992 and

¹² <https://static.pib.gov.in/WriteReadData/specificdocs/documents/2021/sep/doc20219421.pdf>

2014, annual fatalities remained continuously in three digits.

Source: South Asia Terrorism Portal, New Delhi

It is against this backdrop the Union Home Ministry has set forth three objectives in the NER viz,

- i. preserving and protecting its dialects, languages, dance, music, food, culture and to create attraction for it all across India;
- ii. ending all disputes in the Northeast and make it a peaceful region and
- iii. making the Northeast a developed region and try to bring it back at par with the level of contribution made in pre-independence GDP.

It further mentions that:

“there was a time when agitations, and disputes were the norm in the Northeast. In the last few years, we have successfully set the narrative that development requires cooperation and hard work, not agitation or controversy. Many agreements made by previous governments were catching dust on shelves. But the Union Home Minister (Amit Shah) made efforts to establish new parameters of development by providing permanent solution to long-standing problems, such as NLFT Agreement (Tripura), Bru Refugee Rehabilitation Agreement and the Bodo Peace Accord.....A historic agreement has been reached to establish peace in the Karbi-Anglong region.... the result of extensive efforts made by the Union Home Minister Shri Amit Shah..... has set a target of resolving all the disputes of the Northeast in a given time frame, (including) NLFT Tripura Agreement... signed on 10 August 2019.... Bru Accord signed on 16.01.2020.... Bodo Peace Accord signed on 27.01.2020”

There were 824 incidents of violence in the Northeast in 2014 in which 212 innocent civilians were killed, it has reduced to only 162 such incidents in 2020, in which only 2 civilians were killed. In comparison to 2014, there has been an 80 percent reduction in insurgency incidents in the year 2020. Similarly, in this period, the number of casualties in security forces has decreased by 75 percent and civilian casualties by 99 percent.

In the last 2 years, 3922 militants have surrendered with 873 weapons. The year 2019 and 2020 saw the lowest number of insurgency related incidents and casualties of civilians and security forces during the last two decades. The security situation in the North-Eastern states has greatly improved since 2014.

Chapter 3

Art, Culture and Natural Heritage

3.1 Brief Background:

Each state of NER has multiple ethnic tribes with unique culture and heritage. These weave an exquisite cultural tapestry in the region which is rarely witnessed elsewhere. It is essential to envision a sustainable global cultural policy for NER India that intersects with political, economic, and socio-cultural dynamics at all levels recognizing. The role art and culture play in knitting the cultural heterogeneity and ethnicity for peace, progress and inter-dependence so as to uniquely position them in global context for conflict management.

The NER is home to more than 200 ethnic and tribal communities. The Patkai range, dividing the riverine tropical land of Myanmar from the Brahmaputra Valley, has nurtured tribes spanning the Patkai as well as the Trans Patkai movement.

Over 2000 years of interface between the *Ahoms* and the *Burmans* of the Irrawaddy basin resulted in close ties between these entities. Also, there had been close ties that developed at the interface of the *Ahoms* and the *Burmans* of Myanmar. Each of these diverse communities have preserved their unique culture, rituals, dialects, social systems, customs, dress, festivals, songs, dances, myths, and beliefs.

The proximity with the Southeast Asian countries offers robust opportunities for the NER to emerge as a rich economic zone for the ASEAN region. Historical records indicate that throughout the ancient and the medieval period, there was hectic commercial activity in the North-eastern region. Therefore, as it propels its development trajectory, Northeast India assumes a central role as a regional epicentre of economics, culture, and security. Its contributions across sectors such as tea production, and handloom and handicrafts highlight its significance in South Asia, Southeast Asia, and East Asia, reflecting its promise as a harbinger of progress and cooperation in the global arena. The art, culture and natural heritage of NER are so rich that they can easily attract customers from the whole world either as tourists or as buyers of artefacts and music of NER. However, there has been negligible participation of NER in any international trade fairs in other counties.

3.2 Arts, Literature and Performing Arts

The art of the NER reflects the region's rich history and diverse culture. It showcases the creativity, skill, and talent of artists and serves as a record of the region's cultural traditions and values. The art of NER can help to foster a sense of regional and national identity and pride among

3.2 Arts, Literature and Performing Arts

The art of the NER reflects the region's rich history and diverse culture. It showcases the creativity, skill, and talent of artists and serves as a record of the region's cultural traditions and values. The art of NER can help to foster a sense of regional and national identity and pride among the people of the region. This aspect is of special importance in the context of the locational sensitivity of the region and the national security concerns being in close proximity to several foreign countries. The unique and rich cultural heritage of the region constitutes potent tools for soft power diplomacy.

Ancient epics and modern works of literature have a rich cultural legacy and disseminated globally through translations and literary festivals, such literature promotes Northeast India's soft power and cultural relations. The unique and enormous contribution of the saint Srimanta Sankar Deb of Assam in the 15th- 16th century brought together the warring tribes and the people of that time is a part of the cultural history of Assam which still provides a cultural identity and sustenance to the Assamese people. Bhupen Hazarika's contribution to national development and integration through his songs is unique and goes a long way to prove that music is a definite mode of promoting soft power diplomacy in the region. Sachin Deb Barman and his son Rahul Deb Barman, scion of the royal family of Tripura were the iconic maestros of modern Indian film music.

The famous *Hazagiri* dance of the *Reang* tribe of Tripura, the Bamboo Dance of the Mizos and the *Nongkrem* Dance of the *Khasis* are well known performing arts that bear the cultural signatures of the respective states mentioned. The myriad traditional art forms of each of the tribes of the northeast together with many intangible forms of the cultural heritage are invaluable assets.

3.3 Natural and Cultural Heritage

Economic development through art and culture and natural heritage contributes significantly to employment and GDP of a country. With global revenue of US\$ 2,250 billion, and employing around 30 million people, tourism is one of the fastest growing sectors across the world. The NER of India, sharing 99 percent of its geographical boundary with as many as five different countries (China, Myanmar, Bangladesh, Nepal, and Bhutan), strategically, is the most important region of India. The art, cultural and natural heritage of this region bear close affinity with these neighbouring countries placing this region in a unique and important position for the country. The historic environment is a proven source of benefit to local economies, particularly when promoted through tourism. Each heritage site is a potential hub for economic activity. The art forms, cultures, and natural heritage makes this region the most diverse and the richest region of India in terms of heritage, and these assets hold the potential of being an engine of growth for India.

In addition to tourism, an attractive heritage can attract external investment as well as maintain existing businesses. Heritage places are an excellent educational resource for people of all ages.

World Heritage properties also harbour options for society to mitigate and adapt to climate change through ecosystem health management and conservation.

Recognising and acknowledging the contribution of tangible and intangible indigenous heritage as an integral part of development and economy of a region is critically important. Processes and actions of colonisation have resulted in disruptions to the referencing, practice, transmission, and provenance of tangible and intangible indigenous cultural heritage. Similarly, intangible cultural heritage has often been poorly understood or disregarded as “too difficult” to properly acknowledge or record in terms of its context, purpose or the persons or places from where it first became known.

Indigenous peoples and communities of the northeast have internal processes and customary laws for determining ownership and rights about tangible and intangible cultural heritage processes and practices. Being given the consent to utilise or draw upon cultural heritage resources or its content is seen by many as an act of deep trust or respect and carries with it the responsibility to ensure that agreements for its use or acknowledgement of its ownership, for example, to elders as knowledge holders is explicitly carried out.

Therefore, the elements of art, culture and natural heritage of the region can be identified as being:

- 1) Traditional dance forms
- 2) Traditional theatres and puppetry, and the props and other elements used for these performances.
- 3) Traditional music and musical instruments
- 4) Traditional folksongs
- 5) Traditional methods and motifs of drawings, paintings and the medium used for them.
- 6) Folklores
- 7) Traditional food and culinary methods
- 8) Traditional literary style and language and the implements used for writing.
- 9) Traditional art & craft and the tools and implements used.
- 10) Traditional weaving and jewelry
- 11) Traditional dress
- 12) Traditional festivals
- 13) Monuments, museums, and sculptures
- 14) Dwellings
- 15) Natural heritage.
- 16) Built heritage or archaeological heritage.

3.4 Present Status

Nationally, and globally the art, cultural and natural heritage of NER occupies a unique position. However, many of the traditional art forms, cultures and natural heritage are in a state of neglect and are paid little attention by the governments and other agencies/institutions of the

respective states. The absence of an integrated policy for the development of the cultural assets looms large.

a) Importance of UNESCO Heritage Sites

Undoubtedly the process of UNESCO nomination will bring greater opportunities to showcase the uniqueness of the state. One of the key benefits of the World Heritage status is that it will focus the cultures on the global map and give a fillip to the promotion of art culture and heritage of the region. Heritage sites will get greater appreciation all over the world for its uniqueness as compared to other sites. Unfortunately, the number of Heritage sites we have are very few.

Out of a total of forty-three UNESCO heritage sites which exist in India, only four are from NER which includes one cultural heritage site i.e. Charaideo Maidam and the following natural heritage sites:

1. Kaziranga National Park in Assam
2. Manas National Park in Assam
3. Khangchendzonga National Park in Sikkim

Interestingly out of thirty-four biodiversity hotspots of the world, only four are located in India. One of them is designated as the Himalayas where the biodiversity rich NER occupies 73.6 percent of geographical area.

List of Tentative UNESCO heritage sites of NER:

Of fifty-seven tentative sites in India claiming to be declared as UNESCO heritage sites, ten are from the NER, namely:

1. River Island of Majuli,
2. Namdapha National Park,
3. Sualkuchi weaving cluster,
4. Apatani Cultural Landscape,
5. Thembang Fortified Village,
6. KeibulLamjao Conservation Area,
7. Garo Hills Conservation Area (GHCA),
8. Jingkiengjri: Living Root Bridge Cultural Landscapes,
9. Rock-cut Sculptures and Reliefs of the Unakoti.
10. (nominated by the Government of India for UNESCO Heritage Site)

Other art, cultural and natural heritage assets of NER:

Additionally, there are several other heritage assets in NER which need to be identified, listed, and documented. (Indicated in Appendix I)

b) Cultural Opulence yet why laggard syndrome?

Despite unparalleled and diverse cultural opulence, rich natural endowments and strong community-based conservations practices, many aspects of this unique heritage are fast

eroding and also vanishing. Some of the crucial reasons for this laggard syndrome are listed below.

Lack of a structured policy – Except for a Cultural Policy of the Government of Assam (2006), no other state of NER has a cultural policy on public domain. However, in this case also there is no evidence of programme implementation.

Lack of government funding – No separate budget provision has been allocated for promotion of art and culture exclusively. The amount allocated for art, culture, and heritage is clubbed with the heads of Education, sports, and culture, which is on an average 22% of the total sectoral budget of the NER states. Of this not more than 1% of state budget may be spent on art, culture, and heritage.

Decaying culture of oral history – oral history as the most convenient and popular tool of inter-generational transmission of knowledge, traditions and practices used to be the core instrument of cultural conservations of history, social ethos, natural resource management, disaster forecast and mitigation, traditions, folk literature, medical systems, agricultural and livelihood practices which unfortunately is decaying. Community institutions both formal and informal and families used to play a critical role in the making of oral history. However, the ideas of documentations were never promoted and institutionalized by any of the governmental agencies and the practice of oral history has become peripheral.

Lack of research for identification and evaluation of assets—Though several research projects on art and culture have been carried out in most of the states, there is no record of the findings or suggestions being evaluated and implemented for the development of art and culture of the states. (There is no record part needs To be confirmed once again)

Inadequate initiative to embrace professionalism and expertise for conservation, maintenance, management, and monetization of the assets.

Inadequate documentation, digitization, and preservation--Conducting regular field visits, surveys, and interviews with community elders, women, youth leaders, priests, farmers, and other groups to understand the significance of cultural expressions from among different communities, transformations observed over time, and challenges faced by the community culture bearers.

Inadequate public-private partnership to promote the sector. Lack of incentives, training facilities and forums for professionals and entrepreneurs in the field of art, cultural and natural heritage--- To improve and maintain internationally acclaimed standards, establishment of training institutes for crafts which offer professional courses like the *Indian National Trust for Art and Cultural Heritage (INTACH)* is a must. At the state level an example is the *Buddhist Art Institute* in Sikkim which endeavors to preserve the Tibetan scroll-banner painting art, Thangka, by imparting training to young monks or the *Srimanta Sankaradeva Kalakshetra* in Assam which strives to showcase the diversity and uniqueness of the state's cultural mosaic.

The institutional drawbacks inhibiting the growth and development of heritage assets are numerous. e.g. budgetary constraints, economic constraints, cultural constraints, design

constraints, environmental constraints, ethical constraints, external constraints, financial constraints, fiscal constraints, funding constraints.

While there are at least 20 governmental and non-governmental institutions in India for archaeology, art, literature, manuscripts, museums, cultural relations, there is no single overseeing agency for art, cultural and natural heritage.

- Since there is no world class government institutions for heritage conservation in the NER, step needs to be taken to set up a world-class institute for Human Studies with focus on holistic development of Art and Culture of NER independently. The purpose, policy, and strategy for that rethinking need to be aligned with the NEP 2020 for transforming higher education in India. Building and strengthening the institutional mechanism for unearthing all such stories and building up a repository of such accounts for each community/region is a sine qua non for this to happen.
- Heritage education is not incorporated in university level syllabus although heritage has been incorporated at the middle level through RMSA (Rashtriya Madhyamik Siksha Abhiyan) by the Government of India.
- Lack of trained teaching staff on heritage is another major drawback.

Whereas dynamic governance is a *sine-qua-non* for the healthy development, management, and preservation of the multifarious art, culture, and natural heritage spread across the NER, there appears to be an absolute lack of governance dynamics on the part of the government or on the part of any other stakeholder. The widespread dispersal of cultural assets in remote and far-reaching geographical locations, coupled with the complex milieu of land tenure systems, customary laws and governance models makes the task difficult to come to a semblance with respect to documentation and synthesis of information for inscription and for maintaining the site's integrity in the long run.

Moreover, the customary laws, even in the matrilineal state of Meghalaya, create hurdles in making women a party to natural resource management and conservation and ensuring their inclusive participation, though some attempts are being made to include women in the decision making and in the conservation process.

Because of the complexities arising out of different attitudes amongst the tribes and different forms of management, if at all there is any, it is imperative to evolve a form of dynamic governance with a Body to oversee the whole of NER, in addition to forming state level bodies for each state.

The challenge is to developing public awareness about the social, economic, and political values and potential of art, cultural and natural heritage. For the public, performing arts, folklores, traditional literature both, oral and written, are mere forms of entertainment, and the natural

heritage assets are natural beauty. The potential and political value of such assets has not yet been understood and hence their social, economic, and political values and potential is beyond comprehension for most people. This results in neglect and loss of many of the traditional art and cultural practices and of destruction of natural heritage assets. Bringing about public awareness on encasing the socio-economic gain hidden in conservation and transformation of the Art and Culture of the region shall definitely pay rich dividend in the form of improved livelihood security and knitting the South East Asian countries.

Modern technology has a huge impact on art and crafts. Integrating digital tools such as 3D printing and CAD/CAM can revolutionize design creation, prototyping, and production. Artisans can leverage these technologies to streamline their workflow, improve product quality, and cater to evolving customer demands.

While promoting handicrafts, attention must be directed to the development of new products. To achieve this end relevant technical and managerial input for communities must be provided on all fronts. e.g. training of tour guides, training in the production of high-quality craft items and formal hospitality training for front-line contact personnel in the tourism industry like taxi and bus drivers.

Training for identification and preservation of antiques and archaeological sites must be provided along with identification of more festivals and promotion of cultural tours.

The strategic objectives of these Vision Goals are as follows.

- Support sustainable investment--: Support sustainable investment in programmes and infrastructure. Create and provide investment opportunities for businesses and organizations. Focus on visitor benefits to the NER economy, connecting the value of tourism with art culture, heritage, pilgrimage, music and other entertainments.
- Enable leadership and collaboration--: Foster leadership through partnership development, advocacy, and networking and capacity-building initiatives for artists and organizations.
- Celebrate regional identity and community distinctiveness--: Support the delivery and promotion of community identity and distinctiveness through iconic events, places, and spaces. This would involve supporting the delivery of original, imaginative, and high-quality arts and cultural events and experiences.
- Increase visibility of arts, heritage, and culture--: Increase the visibility of the arts and crafts by providing platforms and conditions for artists and arts groups to exhibit their works to the community in both national and global platforms.
- Connecting cross border community through arts, heritage, and culture---: Connect with the cross border community through arts, heritage, and culture by creating opportunities for NER's diverse communities to exchange, celebrate, engage and participate in cross border cultural life.

3.5 Vision Goals- 2047

1 Mission 10: World Heritage List

It is essential to make policies, set up special institutions exclusively devoted to research on heritage items/spots and undertake national and global lobbies to put 10 items/spots (at least 1 from all the NER states) in the World Heritage List of UNESCO by 2047.

2 Mission 25 : National and Global Awards

To work towards bringing home 25 National and Global Awards by 2047 in Literature, Art, Music, Theatres, Dance, Designs, Cinema, Architecture, Archives, Museum, Heritage management and other areas of creativity.

3 To build and establish Art and Culture as a thriving Industry by branding, patenting, monetizing and marketing some of the unique both the tangible and in-tangible genres of the North Eastern Regions' Literature, Art, Music, Theatres, Dance, Designs, Cinema, Architecture, Archives, Museum, Heritage management and other areas of creativity.

4 Bringing the core offices and branches of national and global literary, cultural, art, music, dance, theatre, designs, architecture, Archives, Museum and heritage academies and institutions to the NE region and utilizing these institutions as the critical platforms for nurturing, training, capacity, skill building and financing centres. Among others these could include Sahitya Academy, Sangeet Natak economy, National Archives, National Museum, National School of Drama, Films and Television Institute, Sangeet Natak Economy, Indian Council of Cultural Relations, National Book Trust, UNESCO, UNICEF and UNEP. These institutions will be the advocate of the conservation and promotion of dying indigenous languages, vanishing artefacts and folk practices.

5 Inclusion of 8 regional including tribal languages spoken in the Sixth Schedule areas and other autonomous councils in the Eighth Schedule of the Constitution of India

6 To enhance the annual budget allocations to art, culture, music, literature and other forms of tangible and intangible the Governments and 20 percent of the total CSR funding by various corporate heritage thereby reaching at least 8 percent of the total annual budgetary allocations of houses in all the 8 member states of the NER.

7 Establishment of a vibrant international NER-South-East Asia Art-Culture-Heritage Corridor to connect, promote, commercialize and integrate with other activities like education, health, tourism, pilgrimage of the South East Asian countries under India's Act East Policy. This Corridor will be a major item that will flow through and exchange in all the physical connectivity projects with all the neighbouring countries.

8 Setting up of an inter ministerial institution (consisting of External Affairs, Home, Culture, Environment, Youth-Sports Affairs Ministries') known as NER National Institute of Soft

Power Promotion. This Institute will be instrumental in deploying the exquisite and unique heritage of the northeast as a political and diplomatic tool to resolve the conflicts and tensions among the communities of the NER and with the rest of the country.

The Directorate of Cultural Affairs of the State Government of Assam has spelt out its cultural policy in very clear terms in relation to possibilities, potentials and promises wherein the targets for the Directorate of Cultural Affairs, Srimanta Sankaradeva Kalakshetra, Jyoti Chitraban (Film Studio) Society, The Assam State Film (Finance & Development) Corporation, The Directorate of Library Services, The Directorate of Archaeology & 'The Assam State Museum' have been indicated very clearly. The *Department of Indigenous and Tribal Faith and Culture (2021)* has been created by the Government of Assam to act as the Nodal Department for the promotion, formulation, and implementation of policies and programs for the welfare and all-round development of the people of Assam. However, in case of the remaining North-eastern States, it was not possible to locate any such policy relating to promotion of culture. The Assam model with other state specific adaptations would be a major transformative action for all other NER States as a Vision 2047 action.

3.6 Qualitative Measures and Monitoring

- i) Qualitative data analysis of the heritage assets will have to be carried out by using qualitative data analytics (QDA) software for building up strong database, information systems, promotional and conservation actions and institutionalised monitoring and evaluation on the following critical parameters and indicators. This has to be done at the state level, inter-state-level within North East Region and cross-border level with other neighbouring countries.
- ii) Promote awareness of NER rich culture by way of holding shows and lecture demonstrations outside the state in conjunction with organisations like SNA, NEZCC, EZCC, ICCR, national level public institutions and private cultural trusts
- iii) Assist NGO's, Youth Clubs, Rural Libraries, and cultural organizations in spreading a cultural environment for promotion of integration, communal amity, aesthetics, awareness of cultural heritage etc.
- iv) Honour the doyens of NER culture in various media, through Annual Awards, cultural pensions etc.,
- v) Art Galleries are to be set up to make them the hub for promotion and presentation of traditional and folk art and crafts of the state. A directory of the cultural luminaries of the NER states could be compiled and published.

- vi) Integration of NER cultural tourism with the tourism activities of the Eastern South Asia (including Bangladesh, Bhutan and Nepal) and South East Asia (including Thailand, Cambodia, Laos, Vietnam, Malaysia, Myanmar and Singapore) in terms of policy harmonization, easy flows of tourists, regional packages and programmes, institutional coordination, bilateral agreements, physical connections and other incentives.
- vi) Exchange of information between researchers, designers and indigenous peoples and communities regarding cultural heritage should be transacted with consent, acknowledged, and recorded and the key information should be reported, to ensure that the information is transparent.
- vii) Use of Digital technology for digital recording and preservation of cultural and heritage assets and 3D printing and CAD/CAM could revolutionize design creation, prototyping, and production. Artisans can leverage these technologies to streamline their workflow, improve product quality, and cater to evolving customer tastes and demands. Establishing digital connectivity at all levels of management down to the block level across educational and training institutes of art, culture, and natural heritage with the proposed HGB will enable real time data collection, analysis and policy measures.
- viii) Build theatres, exhibition halls and community performance platforms in each town, city and rural vicinities.
- ix) Respect and protect the traditional ownership concept of heritage properties or objects etc. in the Sixth Schedule and other tribal areas by bringing more effective legislations.
- x) At least 10 % of the non-lapsable fund provided to NER by Central government should be earmarked for art, cultural, and natural heritage.
- xi) The multilateral agencies like the World Bank Group, Asian Development Bank (ADB), International Fund for Agricultural Development (IFAD), Global Environment Facility (GEF) etc. provide an excellent forum for the propagation of NER's art, cultural and natural heritage, and opening exports of NER's art and cultural heritage items.

CHAPTER 4

The Green Perspectives: Water, Agriculture, Forests, Animal Husbandry, Fisheries and Traditional Medicines

- 4.1. Water Resources: A Benevolent Natural Endowment
- 4.2. Agricultural Heritage and Practices
- 4.3. Horticulture: Commercializing Advantages
- 4.4. Supply and Value Chains
- 4.5. Animal Husbandry: Unharnessed Opportunities
- 4.6. Fisheries and Aquaculture- New Horizon in Food Security
- 4.7. Forestry and Wild Life
- 4.8. Traditional Medicine and Medical Tourism hub of India
- 4.9. Green and Organic NER

4.1 Water Resources: A Benevolent Natural Endowment

With only 5 percent of the country's area, the NER accounts for 30 percent of national water resources of 1869 BCM which means the region has around 570 BCM of water resource. Of this, around 53 percent (302 BCM) shall be lost through evaporation and another 20 percent (114 BCM) through water drain off leaving thereby only 160 BCM of usable water. With this resource, water availability per person (5.18 crore population) is around 3096 cubic meter which is more than double the availability of the country's 1340 cubic meter in 2025. If this availability is retained with appropriate technology and logistic support by the government and water community, the region can become a water provider to the water stressed areas of the country through river linking and other means (T Long Kumar 20). The NER contains 5 major river basins:

Table 4.1.1 River Basins in NER

River Basins	Drainage Area	Length	Principal Tributaries
The Brahmaputra	165,000 sq. km	918 kms in India (2880 km total)	109 tributaries including Subansiri, Ronganadi, Dikrong, Buroi, Borgong, Jiabharali, Dhansiri (North)
The Barak	520000 sq. km	525 kms in NER (900 km total)	Jiri, Dhaleswari, Singla, Longai, Sonaiand Katakhal
The Chindwin Drainage	24000 sq. km	840-kilometre	Tizu, Yu and Manipur River
The Kaladan Drainage	7000 sq. km	450 km	Mangpui Lui and Tuichongare
The Karnaphuli	4000 sq.km	270 km	Thega, Tuichawng and Phairuang River

Source: Author's compilation

Table 4.1.2 Ramsar Sites

Ramsar Site	Area	Flora and Fauna
Loktak Lake, Manipur	287 sq. km	Aquatic animals, deer and birds.
Deepor Beel, Assam	40.14 sq.km	Asiatic wild elephants, migratory and domestic birds; Reptiles and Amphibians, around 50 species of Fish; medicinal plants and Giant Water Lily.
Rudrasagar Lake, Tripura	2.4 sq. km	Turtle and other aquatic and faunal species.
The Pala Wetland, Mizoram	1.5 sq. km	7 species of mammals, 222 birds, 11 amphibians and 21 reptiles and many freshwater fishes

4.1.2 Drying Springs

A NITI Aayog report said (Akshit Sangomla, Down to Earth, 2021) that “With climate and rising temperatures, rise in rainfall intensity and reduction in its temporal spread as well as a marked decline in winter rain, the problem of drying springs is being increasingly felt across the Indian Himalayan Region”. This points to a grim situation for all mountainous regions of the North East to meet their water needs. In Sikkim, over 94 per cent villages have mountain springs. In Meghalaya, Mizoram and Manipur, 55.7, 54.6 and 54.4 per cent villages have them. Nagaland and Arunachal Pradesh have 44.7 and 37.3 per cent villages with springs. The springs contribute a large share to the base flow of the large Himalayan Rivers such as the Brahmaputra. As many as 200 mountain springs, direct primary sources of water for mountainous villages in the state, have dried up due to a decrease in rainfall, Arunachal Pradesh environment minister had said in 2018.

The groundwater levels are closely related to the flow of water in the Brahmaputra. This is because the change in Brahmaputra’s altitude is only 90 meters between its entry into the plains in Pasighat (Arunachal) and its forming of a delta (in Bangladesh). This means that the difference between the river flow levels and the ground water levels is less. So, if there is little rainfall in the catchments it will affect the flow of the rivers and along with that the ground water levels will also be impacted.

The main sources of water are the river basins including their tributaries, the wetland and the beels, the Ramsar sites, different dams and reservoirs like Umium Lake at Barapani, Meghalaya, the mountain streams and others. However, most of these sources are gradually drying up. For example, the river Brahmaputra and Barak in Assam as well as other rivers in the region do not have their water holding capacity as before due to massive siltation and related problems.

Currently each state of the region has water resource departments. Additionally, the region has two institutions- college of engineering at Sikkim and NERILM at Tezpur Assam devoted to producing quality human resources and development of water management technologies respectively. Considering the vast water resource of the region through the hills and mountains, the presently available institutional support is not enough to ensure the projected tapping of the water resource and its utilization.

NITI Aayog in its New India report, 2018 suggested that each rural and urban person needs to be provided with 40 litres and 135 litres of safe drinking water respectively and water for livestock by 2022-23 for which missions like Jal Jivan Missions were launched. It also had the goal of providing irrigation to all farms with improved on-farm water use efficiency; water to industries specially through recycled/ treated water ensuring zero discharge of untreated effluents; ensure Nirmal Dhara in the Ganga and other rivers with tributaries; to create additional water storage capacity for full utilization of surface water of 690 BCM; ensure long term sustainability of finite water resource through the operation and maintenance of water infrastructure and to promote R & D to develop and use latest technologies in water sector.

Based on this and other similar concerns, the vision for water security in NE Region is placed below:

4.1.3 Vision 2047:

Overarching Vision: To ensure water sustainability in the NER above the critical level for all lives and their related activities

4.1.4 Vision (I): Capture at least 50 percent of the water resource of 570 BCM that the region receives.

In order to do so the following measures may be undertaken:

- a) Assess the **Water Footprints** of the region for perspective planning and water security.
- b) Dredging the rivers, managing the Ramsar sites, Command areas, *beels*, reservoirs and improved ground water recharging technique.
- c) Involve communities/ Panchayats in pond water harvesting and aquaculture.
- d) Make the use of treated wastewater mandatory in the industries and households particularly for urban gardening, toilet flushing, and car cleaning etc. through rain / roof water harvesting.
- e) Create additional water harvesting structures including Command Area Development program and *jalkund* concept of water harvesting particularly in hill areas.
- f) Create more number of artificially created Lakes for recognition as Ramsar Sites for water aid services to nearby villages while addressing the problems in the existing four.
- g) Restore the existing irrigation infrastructure and create new ones.
- h) Terracing the Mid Hill areas of the region with up to 40-50 percent slopes so as to break the intensity of water flow downstream, better use of water in the terraces for agriculture with possibly multiple water sheds at the foothills.
- i) Map the water stressed and water abundant areas using latest technologies like GPS, Satellite Imageries, Drones and Sensors so as to develop ways to link water plenty areas to water scanty areas.
- j) Implement in a participatory extension mode the already available technologies for increasing the water use efficiency, ground water recharge and water pollutants management options.

- k) Further research on cloud/ monsoon shifts from place A to B as per the need may be thought of.

Following issues may be addressed on water quality targets.

- Create water quality testing facilities in each block/ district.
- Heavy metal free water including arsenic, fluoride etc. free water.
- Create water treatment plants in all the major tanks/ reservoirs.
- App based ground water quality testing facilities.
- Water testing facilities in catchment areas, wherever feasible.

4.1.5 Vision (II):

Clean river Brahmaputra project to restore the capacity back. Brahmaputra and Barak with an area of 6300 sq.km in Assam are dug and desilted by 10 feet, the increased water storability and the availability could be traded with the neighbouring states. This single intervention with 4 fold benefits will definitely justify one time massive investment will benefit human being, livestock, fish, crops and industries.

The quantum of crops saved otherwise lost annually due to flood by these rivers would be huge.

The conserved water could be used for supplementary *kharif* irrigation during periodic droughts as well as from growing additional *Rabi* crops.

Lesser impact on soil erosion in the principle of deeper the rivers lesser is the water outflow from it and equally less the water related erosion.

4.1.6 Vision (III):

Breaking the intensity of upstream water flow from the hills which otherwise also removes the soil nutrient containing top soils in the upstream ecosystem, in addition to depriving those ecosystems people from accessing the water for their use.

The strategy for this will be massive terracing of mid hill areas like in countries like Vietnam and others, creation of multiple *jalkund* concept of water harvesting atop the hills and establishment of medium to large watersheds connecting the catchment areas. Similar to watersheds, the concept and technology for Spring-shed management shall be applied for managing the drying up streams with appropriate check-dams/ gully bunds etc.

4.1.7 Vision (IV):

Water Security Assessment and evaluation of the state of water security in the NE region, considering fresh drinking water, groundwater, and river water. Examining the availability, affordability, and acceptability of drinking water along with mapping of rural and urban geographies based on water sufficiency levels are crucial. Identifying interventions required for each state and projecting water demand for 2047 and implications for GDP growth are other critical issues.

The climate change and other challenges to water resources such as river diversions, glacier erosion, hydel projects in the upper riparian in China, access to river ports like in Sittway and their impact on water resources have to be examined.

Policy Interventions and Technological Needs that would examine the government initiatives promoting various waterways, including their impact on regional connectivity and neighboring countries and projecting the impact of these projects by 2047.

4.1.8 Vision (V):

Site specific ground water recharge technologies to be injected to strengthen the aquifers together with treating the heavy metal containing water pockets for sewage and clean ground water.

4.1.9 Vision (VI):

Water Footprints and Conservation: Gradually shift cropping pattern from rice centric to Millet and other water friendly crop.

Use of treated wastewater (like bathroom wastewater/ industry/ animal farm cleaning or marginal water) mandatory in the industries and households particularly for urban gardening, toilet flushing, and car cleaning etc through rain / roof water harvesting.

Implement the rain and roof water harvesting option for multiple and diverse non-drinking purpose use.

4.1.10 Vision (VII):

Inter-governmental Committees among India- Bangladesh- China on Brahmaputra and between India and Myanmar on Chindwin and Kaladan drainage basin and India and Bhutan on water ways and resources management. Sharing of hydrological and environmental flows on Trans Boundary Rivers, eco-system management and early warning information and disaster mitigations.

Estimated costs: **Rs. 5.00 lakhs crore for 5 years** for increasing the water storage capacity in the rivers **and Rs. 5.00 lakhs crore for terracing** and other activities

4.2 Agricultural Heritage and Practices

4.2 .1 The Region and its Agriculture:

Out of the total geographical area of 262180 Km² about 35% area in the region is plain excepting Assam where plains account for 84.44% of its total geographical area. Net sown area is highest in Assam (34.12%) followed by Tripura (23.48%). Arunachal Pradesh has lowest net sown area in the region. Cropping intensity is highest in Tripura (156.5%) followed by Manipur (152.1%), Assam (147%), Mizoram (136.36%) and about 1.4 million hectare area is under shifting cultivation in NE region. Out of around 4.5 million hectare net sown area of the region, roughly 1.3 million hectare suffers from serious soil erosion problem.

The region receives an annual average rainfall of 2000mm accounting for around 30% of the country's total precipitation of 4000 BCM. The soil of the region is acidic to strongly acidic in reaction. The low pH of the soil is basically due to the leaching of the bases under the influence of high rainfall. The soils are, however, rich in organic matter. The depth of the soil varies from shallow in inceptisols and antisols to very deep in alluvial soils. Total forest cover in the region is 14.2 million ha, which is about 77.1% of the geographical area as against the national average of 19.39%.

The region, by and large, is characterized by fragility, marginality, inaccessibility, cultural heterogeneity, ethnicity and rich biodiversity. Rural population is around 82%. In the absence of major industries excepting in the state of Assam, the society is largely agrarian and depend on agriculture and allied sector for livelihood and other support. The region has 6 Agro-Climatic Zones, namely –

- (i) Alpine zone: More than 3500 msl
- (ii) Temperate and sub-alpine zone: 1500 – 3500 msl
- (iii) Sub- Tropical hill zone: 1000 -1500 msl
- (iv) Sub- Tropical plain zone: 400 – 1000 msl
- (v) Mild-Tropical hill zone: 200 – 800 msl and
- (vi) Mild- Tropical plain zone: 0 – 200 msl

Physiography of North East India can be divided into three regions viz. Meghalaya Plateau, the North eastern Hill and basin of the Brahmaputra Valley. The first two accounts for 78% of the region. Based on the topography, rainfall and temperature, the region has been divided into following three categories:

- 1) Himalayan Hills comprising of Sikkim and Darjeeling district of West Bengal.
- 2) NE Hills and plains comprising of Arunachal Pradesh, Hill districts of Assam, Meghalaya and Nagaland.
- 3) Southern hills and valleys comprising of Manipur, Mizoram and Tripura.

4.2.2 Livelihood

Agriculture and allied activities are the main source of livelihood for the people of NE region and any attempt to reduce poverty as well as to place the region in developmental

paradigm shall have to have a base on system wide and eco-regional planning of agriculture sector development. While planning this, the strength of farming system approach to judicious utilization and conservation of natural resources of the region with concurrent policy and research back up to increase production, add value to the produce and their disposal /sale management shall be of paramount importance.

The rich cultural heritage and traditional farming practices of North East India can be leveraged to promote indigenous crops, heritage varieties, and sustainable agro-ecological methods, attracting attention and support from both domestic and international markets.

Around 56% of the area is under low altitude, 33% mid altitude and the rest (11%) under high altitude. Agricultural production system is, by and large is characterized by low cropping intensity, subsistence level and mono-cropping. Average landholding is 1.5 ha compared to national average of 0.69 ha. However the entire holding cannot be used for agricultural purposes due to topographical disadvantages. Land use pattern is relatively faulty for which annual loss of top soil is much higher than all India average of 16 ton/ha. Similarly, due to lack of proper water harvesting measures, only 0.88 mhm out of 42.5 mhm water is used.

According to MoA & FW, Gol (2018), the total number of operational holdings in NER under all size groups figures at 41.65 lakh of which 34.41 lakh belonged to small and marginal category. Thus, about 82.62% of the farmers in the NE region represent small (less than 1.44 ha) and marginal (less than 0.40 ha) category. They are encircled by a wide spectrum of constraints that hinder pursuing horticulture in business mode primarily due to their unorganized existence. Lack of organized production and marketing, inadequate exposure to technology, insufficiency in skill, sub- optimum infrastructure, inadequate post- harvest management and deficiency in total value chain management are the key factors behind the laggard syndrome pertaining to the horticulture sector in NER. The movement for organizing the small & marginal farmers into producers' collectives is still experiencing its infancy. For example, the number of producers organizations listed so far in Assam is about 450 only.

4.2.3 Irrigation

There is no reliable assessment of total irrigated area. Record gathered from different sources indicates that around 20.74% area is irrigated out of which 18.78% is irrigated through surface flow, 1.82% through surface lift and 0.14% through groundwater lift irrigation. Farmers also use an indigenous technique called bamboo drip irrigation particularly for less water demanding crops. Fertilizer consumption in the region is also very low and stands at around 11 kg/ha ranging from as low as 2.7 kg/ha in Arunachal Pradesh to a high of around 84 kg/ha in Manipur.

4.2.4 Food Production

Farming is predominantly rice-based with little exception in the state of Sikkim where maize is a dominating crop. Mixed farming system is the order as most of the farmers want to produce his household food and nutritional need without having to depend on outside sources. The system, therefore, supports a large horticulture and animal husbandry base partly due to benefiting from the complementarities and partly due to

meeting their animal protein requirement as most of the population (almost 100% tribal) is non-vegetarian. With this production practices, the region produces a total of 8.0 million ton of food grain against a requirement of around 9.6 million tons. (Table %%)

The deficiency is, therefore, around 1.6 million tons of food grain. Similarly, in spite of a desired aptitude towards animal husbandry practices, per capita availability of milk, meat, egg and fish per annum is also very low.

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**Table 4.2.1 Food Production scenario in NER up to 2021-22
(‘000 tonnes)**

State	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Arunachal Pradesh	409.0	327.5	343.3	359.1	365.2	373.2	377.1	388.2
Assam	5458.8	5358.6	4952.5	5525.9	5465.9	5236.4	5487.5	4677.7
Manipur	429.3	435.7	525.1	706.5	495.0	421.4	697.1	655.2
Meghalaya	353.8	357.7	260.1	361.8	260.7	360.8	353.3	355.0
Mizoram	75.3	77.4	75.2	74.2	76.9	76.5	80.7	77.9
Nagaland	649.6	515.8	536.9	552.3	558.1	565.4	570.2	253.4
Sikkim	102.2	94.1	101.3	93.9	92.0	92.1	91.8	91.3
Tripura	761.5	818.3	859.6	855.4	836.4	853.3	867.6	870.9
NER Total	8239.5	7985.1	7654.0	8529.1	8150.2	7979.1	8525.3	7369.6
NER Share (%)	3.3	3.2	2.8	3.0	2.9	2.7	2.7	2.3
ALL INDIA	252676.5	251540.0	275111.9	285013.5	285209.3	297504.5	310741.7	315615.8

Source: Handbook of Statistics on Indian States 2022-23, Reserve Bank of India.

If the production of around 80.00 lac tons from Assam is added, total production is around 106.84 lac tons.

India has witnessed a transformatory agriculture since 1950s with quantum jump in food production from 50.82 million Tons (MT) in 1950-51 to 329 MT in 2023. With rice and wheat production rise from 20.58 to 130.5 MT and 6.46 to 122.74 MT respectively during the period. In horticulture sector, the production increase was a hopping 342.33 MT in 2020-21 from only 96.0 MT in 1990-91. This growth trajectory has been considered phenomenal globally as India's export of food-grain also recorded the figure of Rs. 2529 billion (12% of total national export), and net trade surplus has been Rs 1476 billion in 2020-21 Such a growth was possible for technology-policy-development and farmers participation.

4.2.5. Why and what the NER Lacks?

Following specific constraints are yet to be mitigated:

A. Environmental Constraint

Acidic soil- low availability of P. Also has high concentration of Fe and Al and low Zn. High rainfall and humidity- Harbors pests, diseases and weeds. (Appropriate control measures). Shifting cultivation- Both a strength as well as weakness. (Specific program is needed). Land tenure system- Lack of sense of belongingness to the land due basically to absentee land ownership as well as allotment of land for cultivation on time scale basis.

B. Technical Constraint

- i. Seed and planting material. (Still large-scale deficit)
- ii. Disease and pest management.
- iii. Farm mechanization.
- iv. Constraints of Various Kinds in Transfer of Technology.

C. Physical Constraints

Infrastructural-Road and communication, procurement and distribution, processing and storage, value addition and marketing. Undulating Topography- Leads to inaccessibility with resultant constraints in service delivery. Inadequate market, cold chain etc infrastructure.

D. Economic Constraints

Lack of commercialization- Due to small and medium scale production system. Limited credit flow - The farmers do not have easy access to credit flow as yet for which they are, many a times, compelled to continue small scale cultivation practices.

4.2.6 Why a Laggard Syndrome?

NER has been facing a laggard syndrome in agricultural development which is attributed to various factors. Limited access to modern technology, inadequate infrastructure, fragmented land holdings, and insufficient institutional support contribute to the region lagging behind in agricultural productivity. Challenges related to socio-economic

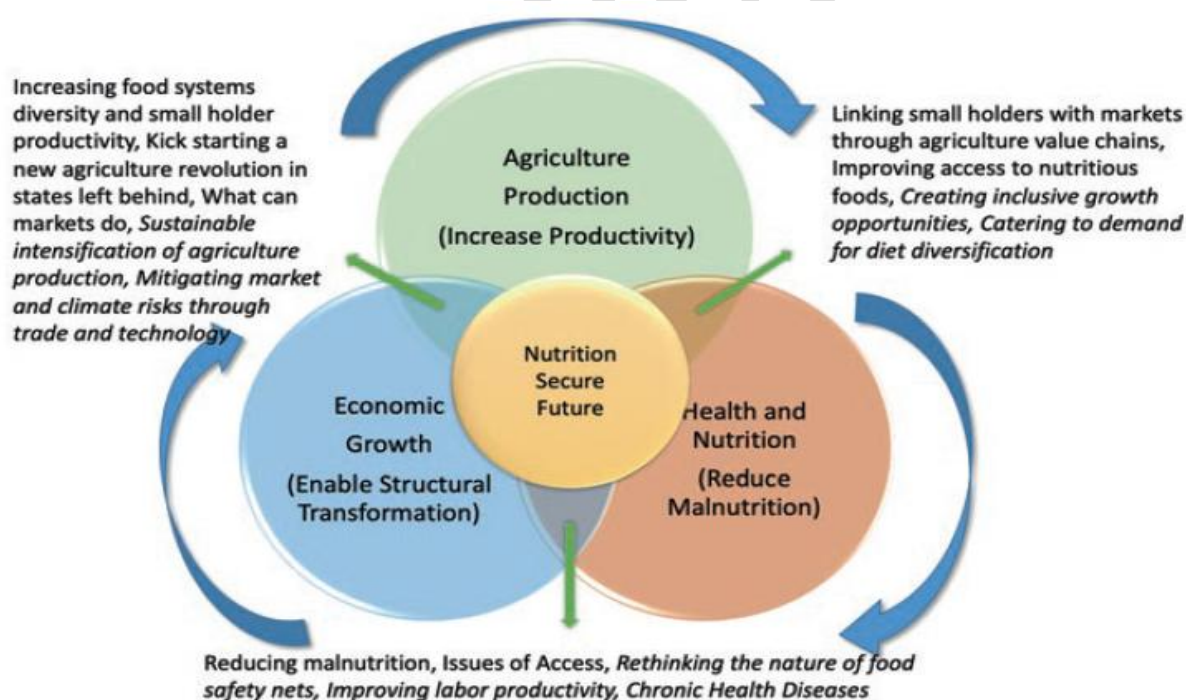
disparities, historical neglect, and geographical remoteness also play a role in hindering progress. Institutional drawbacks including a lack of robust extension services, inadequate farmer training programs, and limited coordination between research institutions, producers and industry have been a major drawback. The farmers' collectives/ FPOs are nascent in terms of institutional structures and, with a weak credit support system; it has further hampered the region's agricultural growth.

Although there are a number of public and private institutions involved in capacity building of the stakeholders, the 21st century skills that cover technology led agriculture renaissance is not happening much. Farmers/ entrepreneur category wise skills like skills on pre-preproduction methods, during production, post production-processing-value addition, Startup skills on secondary agriculture, ICT and AI based agriculture, Marketing skills, innovative extension methods etc are to be injected in a mission mode.

4.2.8 Vision 2047:

“Pursuing the concept of “Jaha hei gyani – ooha hei bhabish ki kheti” (Future agriculture will be science and knowledge based), the vision is to transform NER agriculture from deficiency to sufficiency and surplus focusing basically on its niche area crops (local for vocal to global) utilizing scientifically its natural and human resource base while injecting time relevant technologies at each touch point from food production and consumption value chain”.

Figure 4.2 .1Overall Approaches



Multisectoral approach for food system transformation (Indian food systems towards 2050 – P. Pingali, et al | 2019)

➤ **Vision I : Food Secure Region by 2047**

2 fold increase in food production from the current level of around 10.0 million tons to 20 million tonnes by 2047

The strategies involve:

- Input optimization and cutting age technology application.
 - Seed and planting material sufficiency.
 - Bringing around 40 percent crop areas under irrigation.
 - Promotion of Start Up companies in each State of the region in different domains of agriculture
 - Establishment of one regional agricultural skill council with satellite units in each State.
 - Human resource (scientists, officers, educated unemployed youth/ agri-entrepreneurs) development in frontier areas and innovative agriculture @ 500 persons per year till 2030.
 - Farm tools and machineries for each medium and large farm and produce procurement conveyance on Custom Hiring basis and linking it to processing units and markets including e-NAM.
 - Production support for organic inputs in each agriculture concentrated areas and establishment of one Organic University in the region.
 - Grain storage facilitates in each district.
 - State of the Art post-harvest facilities in each State.
 - Establishment of Tissue Culture facilities with trained manpower therein for production of disease-free planting materials
 - GPS and RS (Remote Sensing) technologies shall be used to map the gross cropped area of the region, explore the scope of increasing net sown area and also assess land holding wise soil nutrient and water contents for precision agriculture.
 - Installation of improved weather stations in every village to constantly monitor and analyze micro- environment for impending climate related vulnerability and concurrent decision support systems for climate smart agriculture.
 - Strengthening and establishing state of the art bio- nano technology research base for gene prospecting in the bio-resources (both over and underground biota) of the region for stress tolerance, productivity increase and developing gene therapies.
 - Strategies to digitize all aspects of agriculture
 - Establishment of State wise facilities to handle and process food after harvesting so as to minimize loss and optimize profit.
 - Filling up at least 25 percent of vacant positions per annum in agriculture departments, teaching and research universities and institutions including the extension scientists and officers.
 - Prepare Green Commandos as Rapid Action Force to aid and assist in agricultural disaster management like the flood, pest and disease attacks, and pandemic type situations.

4.2.9 Critical Areas of Policy Interventions:

- Seed self sufficiency
- Rice-fallow Management
- Sustainable Use of Floodplain Wetlands
- Scaling Up Water Productivity
- Agro-forestry Interventions
- Conservation Agriculture
- Harnessing Green Energy
- Farm Mechanization
- Biotechnological exploration of the region's genetic stock and Enhancing productivity through gene revolution
- Climate resilient agriculture
- Contribution towards zero carbon commitment:
- Use of Disruptive Agricultural Technologies (DATs)
- Physical Infrastructure
- Technological Inputs

➤ Vision II : Net Food Exporter by 2047

The NER could be a net food exporter to immediate neighbouring countries including Bangladesh, Bhutan, Myanmar and Nepal as indicated by their import pattern of goods from India in the last 2-3 decades. Food items have always been a key item in their import list.

There is a huge scope of entering into processed food market through various food supply and value chains in the neighbouring countries in Eastern South Asia and South East Asia. This will be facilitated by a range of bilateral agreements and industrial activities that will be promoted in the Frontier Economic Zones in the borderlands of NER and the neighbouring countries. Where trans-national companies from both ASEAN and other countries could invest and diversify and enhance the production base.

4.2.9 The costs of not doing/ achieving the Vision Target could be:

- Large scale migration of able-bodied persons from the rural to urban and other geographies of India and other countries.
- Serious structural imbalances may emerge in the economies and societies of the NER thereby triggering huge unemployment, livelihood and income problems. This could lead to social and political instability and make the region violence prone.
- Investments and entrepreneurs from outside the region may shy away and also could lead to capital flights.
- Continued dependence on outside the region States for food security.
- Missing the opportunity to leverage the benefit from policies like Act East.
- Mission poverty alleviation through Agri centric option would doubly suffer.

4.2.10 Whereas the benefits and dividends from achieving the vision goals are diverse and far reaching:

- Food self-sufficiency and surplus production to strengthen national food basket as well as to enter into food trade.
- Creation of massive employment opportunity from production to consumption value chain including promotion of Start Ups and technology partners.
- Cross border agriculture trade with the food deficit neighbouring countries will pick up
- All the three sectors primary, secondary and tertiary will have stronger roots
- Private investment and diverse entrepreneurial activities will steadily grow.
- The composition of export baskets of the NER will be diversified.

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4.3. Horticulture: Commercializing Advantages

4.3.1 Brief Background

The NER is endowed with a diversified climatic condition right from mild tropical to sub-tropical to temperate to alpine creating a vast scope for cultivation of a wide range of horticultural crops. It is the unique geographical region in the country where one can witness cultivation of tropical crops like pineapple to temperate crops like apple. History depicts long standing association of horticulture with the agrarian mainstay of NER. For example, the sector received royal patronage in ancient Assam in 16th century during the reign of the *Ahom* dynasty when a movement on the development of horti-centric homestead gardens had become a part of imperial agenda. Beginning with that, Assam is now endowed with a mammoth 27 lakh homestead gardens presenting a robust production system with a wide array of horticultural resources having a direct bearing on nutrition and livelihood of rural mass.

Noteworthy is the fact that horticulture in NER has long been adopted in subsistence mode by the farmers primarily to cater to the family need for protective foods without having commercial orientation despite having sky-high potential. It is also interesting to note that though agriculture had been the backbone of NER's economy, the impact of Green Revolution had not been that vivid in this region compared to the other parts of the country. Probably that is why the then Planning Commission of India coined NER as the "*Sleeping Giant of Indian Agriculture*". M. S. Swaminathan had also once stated that "*NER is green, but there is no Green Revolution rather experiencing poverty amidst plenty*".

In an attempt to unlock the hidden potential of horticulture in the north east region of the country, a mission mode approach (*Technology Mission for Integrated Development of Horticulture in North East Region: TM-IDH-NER*) was launched by Ministry of Agriculture & Cooperation, Govt. of India in early 2000s which continues in form of HMNEH- MIDH. This mission has been instrumental in pushing forward the regional horticultural sector. However, the mission has not been able to unleash developmental potentials fully. (Ghosh *et al.*, 2023). This mission was allocated Rs. 1392.45 crore in 2021-22 in which the NER received Rs. 203.60 crore (14 percent). There is ample scope to start-up companies in this sector right from seed and planting production, APP based service delivery, application of drone and other devices etc for which provision for specially designated cell within the Skill development Ministry is required besides increased number of horticulture based Incubation Centers.

This warrants schematic support continuation of incentives and dissemination of technology for boosting up the quantum of production through both horizontal and vertical expansion. (Kumar and Kaul, 2023).

4.3.2 Present Status: Where does NER Region stand?

i) Unorganized Farming and Shifting Cultivation

Shifting cultivation also known as *Jhuming* is widely prevalent in North Eastern states of India. *Jhuming* cycle which was extended to 15-20 years earlier has now been shortened to 2-3 years because of increased population pressure on land, decrease in productivity leading to utilization of more area under *Jhuming*. At present, about 1.6 million hectare area is

under shifting cultivation. This system has caused large-scale deforestation, soil degradation/erosion, (loss of nutrient rich top soil) and depletion of resource base (Ghosh *et al.*, 2023).

ii) Low Productivity and Fewer Shares in National Horticulture

As of now, the NER states collectively register an area of 14.05 lakh ha under horticulture in four major domains, *i.e.*, homestead gardens, winter paddy vacated lands, riverine tracts and hill farms with an annual production of 124.71 lakh MT of diverse horticultural commodities embracing fruits & nuts, vegetables, spices, ornamentals and MAPs (DA&FW, 2021-22). However, the region is yet to find a place within the circle of horticulturally advanced states of the country despite having a vast inherent potential. Today, NER’s share in country’s horticultural production is measurably low figuring 5.1% in fruits and 4.5% in vegetables and 9.0% in spices (Table 4.3.1).

Table 4.3.1. National and Global Comparison: NER Productivity (MT/hac) of total fruits and vegetables (2021-22)

Crops	NER	National	World	Highest in World
Fruits	10.63	15.22	13.68	25.51 (Indonesia)
Vegetables	11.96	18.39	19.70	39.02 (USA)

It is also so in terms of major fruits like Banana, Pineapple & Orange; major vegetables like Tomato and Brinjal and major spice like Ginger (Table 4.3.2).

Table 4.3.2. National and Global Comparison: NER Productivity (MT per ha) of selected fruits, vegetables & spices (2021-22)

Crops	NER	National	Highest in India	World	Highest in World
Banana	15.72	35.87	68.83 (Gujarat)	23.03	51.74 (Indonesia)
Pineapple	13.21	17.06	56.46 (Karnataka)	25.81	127.29(Indonesia)
Orange	6.31	13.88	35.08 (Chhattisgarh)	19.43	38.10 (Indonesia)
Tomato	19.18	24.56	41.21 (Himachal Pradesh)	36.98	110.72 (USA)
Brinjal	16.95	18.92	42.57 (Kerala)	30.17	76.27 (Spain)
Ginger	7.56	11.92	21.88 (Gujrat)	10.60	30.38 (USA)
Black pepper	0.63	0.34	1.40 (Puducherry)	1.02	10.00 (Thailand)

Source: Hort. Stat. Dvn., DA&FW, MA&FW, Gol

iii) Rainfed Horticulture

The NER is still witnessing its horticulture to be basically Rainfed. As per report of DE&S, MA&FW, Gol (2018-19), the net irrigated area in the region is 8.30 lakh ha which figures at only 1.16% of the total net irrigated area of 715.55 lakh ha in the country. Mehta *et al.* (2024) reported that the penetration of micro-irrigation systems is still very low in NER, *e.g.*, Meghalaya (615 ha) and Tripura (2095 ha) compared to states like Karnataka (2.09 Mha), Rajasthan (2.01 Mha), Maharashtra (1.92 Mha), Andhra Pradesh (1.90 Mha) and Gujarat (1.63 Mha).

iv) Inadequate Accredited Sources for Quality Planting Material

The quantum of production of quality planting material of horticultural crops in the region is contrastingly low since only a few accredited production sources are in existence. As per report of CIH, Nagaland, Govt. of India, only 46 accredited nurseries are in operation in NER (Arunachal Pradesh 3, Assam 17, Nagaland 6, Manipur 2, Meghalaya 10, Mizoram 7 and Tripura 1) for production and supply of quality planting material of horticultural crops.

v) Low Availability of Farm Power Impeding Mechanization

The availability of farm power in NER is significantly lower for the agricultural operations as compared to other parts of India. All of the north eastern states, viz., Tripura (1.63 kW/ha), Assam (1.20 kW/ha), Mizoram (0.69 kW/ha), Sikkim (0.69 kW/ha), Manipur (0.65 kW/ha), Nagaland (0.61kW/ha), Arunachal (0.58 kW/ha) and Meghalaya (0.37 kW/ha) have considerably lower availability of farm power compared to national average of 2.50 kW/ha and crawl far behind the states like Punjab (6.0 kW/ha) and Haryana (5.5 kW/ha). This may be attributed to the low density of tractors and other mechanized devices and has become a major impediment for successful Agri- horticultural mechanization in the region (Mehta *et al.*, 2024).

vi) Under-Utilization of Cultivable Area and Low Value of Output

The magnitude of utilization of cultivable area in the NER (62.04%) is less than the national average of 73.05% (De, 2017). The value of output of total horticulture in NER covering all the 8 states in 2019- 20 (at current price) was only Rs. 40304.25 crore while, the state of Madhya Pradesh alone had the total horticultural output value of Rs. 110361.47 crore. (Ministry of Statistics and Programme Implementation, Govt. of India) the

vii) Insufficient Infrastructure for Post Production Handling of Perishable Horticultural Produces and Processing for Value Addition

As per report of NHM- HMNEH, MA&FW, GoI, only 3908 pack houses (both on- farm & integrated) have been established in the entire NER for 8 states till 2021 while, the states of Karnataka and Andhra Pradesh individually had 5771 and 5352 units of this facility, respectively. Likewise, the entire NER has been facilities with only 46 cold chain units with a capacity of 2.38 lakh MT till 2021 while; state like Uttar Pradesh alone had 1787 such units with the total capacity of 99.31 lakh MT. Only, 70 cold storage units with 2.66 lakh MT capacity have been established in NER under different central sector schemes till 2021 while, Uttar Pradesh alone has been endowed with 2422 units with 148.07 lakh MT capacity. Even the nearby state of West Bengal has 514 cold storage units with an installed capacity of 59.47 lakh MT. The entire NER has only 1655 registered industries for processing of food products while; state like Andhra Pradesh alone has 5468 such units. (Ministry of Statistics & Programme Implementation, GoI (2019-20)). Therefore it warrants for a massive expansion such infrastructure both to achieving post- harvest loss reduction from the present level of 15% and development of value added products.

viii) Low Magnitude and Unstable Trend of Export

In 2020-21, NER exported only a meagre 2.43 thousand MT of fresh fruits valued at Rs. 661.15 lakh indicating the region's share of only 0.28% in the country's total fruit export by quantity and 0.14% by value (Dasgupta and Dey, 2024). In the same year, the region exported hardly 2.14 thousand MT of fresh vegetables worth Rs. 434.00 lakh i.e. a share of hardly 0.09% (quantity) and 0.08% (value) in the country's total vegetables exports. Though the export of fresh fruits and vegetables from NER has been growing at an annual rate of 19.90 & 48% respectively by quantity and 39.10 & 60% by value during the period from 2010-11 to 2020-21, but, the same has been observed to be highly unstable over the years.

The region exported only a paltry of 233.36 MT of fruit- based and 147.22 MT of vegetable- based processed products valued at Rs. 171.45 and 165.27 lakh respectively in 2020-21. In contrast, an impressive per annum growth rates have been recorded in the case of processed vegetables at 26.20% and 37.60% for quantity exported and export earnings, respectively. The absence of special drive on export- oriented farming and processing in horticulture is highlighted here.

ix) Inadequate Infrastructure in Regulated Market System

All the north eastern states have regulated market system. For example, so far Assam operates 20 Principal Market Yards and 206 Sub Market Yards under 24 Regulated Market Committees (Assam Agricultural Marketing Board). Likewise, Tripura has 21 Regulated markets, 84 Wholesale markets and 470 Primary markets under Tripura- APMC. However, the markets under different states of the region are not fully equipped with infrastructural amenities like cold storage, go- down, auction platform, e- trading unit etc. It is worth mentioning that the marketing system of NER is not integrated with e-NAM till date (Hazari *et al.*, 2022).

x) Institutional Drawbacks and Governance Dynamics

Inadequacy in synergy and convergence is observed among the institutes/ organizations of the region having the identical goal of economic empowerment of farming community engaged in horticulture. Institutes/ organizations are found to function in isolation and there is no system of multi- organizational participation for supporting and capacity building of a particular target group like FPO/ FPC for management of different issues in an End- to- End approach. The region lacks a common platform where farmers, academia, industry and policy makers can sit together for working out short, medium and long terms strategies for devising technology- driven & market- oriented production and processing ventures.

xi) Limits of Resources, Skills, Capacities, Geography and Connectivity

Resource poorness on larger part of farming community is the root cause for slothful development and commercialization of horticultural sector in NER. Inability to afford qualitative inputs, modern systems & services, insufficiency in knowledge & skill and poor risk bearing capacity are the core elements observed in the circle of constraints. Difficult terrain and connectivity give birth to high cost of transportation to markets enhancing vulnerability on part of the growers to be played by the unscrupulous middlemen. As per

report of Transport Research Wing, MRT &H, GoI (2018), the average road density in entire NE region covering 8 states was only 2258.57 Km per 1000 sq. km as compared to 6690.30 Km in Kerala and 22567.24 Km per 1000 sq. Km in Chandigarh.

xii) Low Quantum of Flow of Institutional Credit to NER

Compared to other parts of the country, the magnitude of flow of institutional credit to NER is significantly lower (Taloh and Kumar, 2021). Because of wide presence of traditional farming, absence of a proper land leasing framework & lack of land records, community ownership of land, the small & marginal farmers including the landless labourers, sharecroppers, tenant farmers, and oral lessees face enormous difficulty in accessing institutional credit. The region is trapped in a vicious circle where one disadvantage generates another that keeps the region agriculturally underdeveloped and remains deficient in institutional credit.

According to NABARD, the north eastern region had a share of only 0.85% (@ Rs. 18406.00 per ha of gross sown area) in the country's total institutional credit flow in 2019-20 while, the southern region registered the highest of 43.95% (@Rs. 1, 84,575.00 per ha of gross sown area). Similarly, the number of operative KCC was only 11.43 lakh (1.75% of country's total KCC) in NER while, the central region accounted for 185.84 lakh (28.47% of country's total KCC). Low recovery rate, dismal credit-deposit ratio, rainfed farming with low irrigation coverage, subsistence agriculture and community ownership of land have been identified as the major impediments to the flow of institutional credit to NER.

xiii) Stumpy Penetration of ICT in Agri- Horticultural Extension in NER

A significant portion of the manpower involved in Agri- horticultural extension in NER is yet to have adequate exposure to skill development programs in ICT (Baruah and Ganesan, 2022). There is still a lot to be done in integrating ICT into extension activities for strengthening the linkage between extension functionaries and farmers including transformation of conventional Agri- horticultural extension facilitates in order to foster effective extension activities in NER. The extension functionaries are facing constraints such as high cost of ICT tools, inadequacy in ICT infrastructure, insufficient financial resources, lack of expertise in handling various ICT tools, shortage of qualified ICT master trainer etc.

xiv) Budding Connect of New-Gen Technology nascent

Continuous technological innovation and its smart deployment being driven by automation and precision farming remains a major intervention in pipeline in the NER. Digital technologies such as robotics, drones, artificial intelligence (AI), the internet of things (IoT), big data, block chain, remote sensing, GIS etc. are transforming agri-horticultural cultural value chains world-wide. The new technologies cut costs, improve efficiency, help reduce wastage of crops and food, create more opportunities in the value chain, and are environmentally sustainable.

The mammoth horticultural potential of NER could be meaningfully tapped for economic prosperity of the region by strategizing and implementing action agenda within the framework of sustainable development. Vast land resources hovering over homestead gardens, paddy- based cropping system, riverine tracts, hill farming system and small tea

gardens stand as a big opportunity for vertical and horizontal expansion of horticultural sector (conventional, indigenous and exotic components under fruits, vegetables, spices, flowers & MAPs) to generate qualitative produces for domestic and overseas markets as well.

The 50 districts located in the mid hills of eight NE states, have sizable area with favourable soil-climate conditions for expansion of area under Mandarin Orange. High hills of West Kameng, Tawang, and part of East Kameng, Upper Subansiri, Upper Dibang Valley, Upper Anjaw and Upper Siang have big scope for expansion of area under Apple. Nagaland has emerged as another potential area after Arunachal Pradesh for proliferation of area under Kiwi fruit. After Sikkim, the states of Arunachal Pradesh and Nagaland have been found to be prospective area for expansion of Large Cardamom. Avocado, Cashew nut and Cocoa may also be promoted in the region due to prevalence of suitable agro-climate. Special attention needs to be paid for conversion of *Jhum* cycle area for fruit farming or multi-tier horticulture land use system for reaping the benefits of both eco-system sustainability and livelihood improvement of small holder tribal farmer of NER. It is worth stating that as compared to rest of the country, the record of crop diversification is favourable in the NER. More than 67 per cent of the farmers in NER regularly practice multiple cropping in combination with dairy, fishery and poultry in their farms (Baruah, 2007).

The Sathguru Management Consultants Group in their “*Comprehensive Master Plan for Tapping the Export Potential of North Eastern States*” submitted to APEDA has emphasised on organization of production & processing sector, capacity building of stakeholders, prioritization of commodities, infrastructure creation, delineation of demand- driven export plan, quality assurance and setting of investment climate could be considered for paving out the way forward to make a quantum jump in this sector.

Positioning NER as a “Look Forward To” horticultural destination of the country and the region through a strategy-policy-action agenda driven approach including increasing the area under horti-crops; increasing productivity with technology and developmental service delivery; establishing food processing industries; linking the produce to market; leveraging the benefit of niche area crops ranging from king chilly to large cardamom etc. Yet another strategic thinking is to reap the benefit of topographical advantages of the region that permits production of varieties of horticultural crops including organically and naturally grown ones.

4.3.3 Vision Targets 2047

Transformation of NER from “Consumer Region” to “Producer Region” in horticulture produces by the following measures

- Increase horticulture area from the present level of 14.05 lac ha to 18.00 lac ha by 2047
- Increase fruits productivity from 10.63 MT/ ha to 20.00 MT/ha and vegetables from 11.96 to 25.00 MT/ ha
- Increase total horticulture production from the current 124.71 lac MT to 150.00 lac MT by 2047

- Increase NER share to the country's horticulture kitty from 5.1 percent in fruits to 10 percent; 4.5 percent in vegetables to 9.00 percent and 9.00 percent of spices to 16 percent.
- Establishment of supply chain in fruits, vegetables and spices processing factories, one each on pineapple, local lemon, tomato, king chilly, turmeric and zinger in a hub and spoke model.
- Enhancement of area under horticultural crops by 25 % over existing areas.
- Bringing at least 50% of the small & marginal farmers of NER under organized platforms like producers' collectives
- Enhancing the number of accredited nurseries to the tune of 500 units for gearing up the process of generating quality planting material
- Reducing post-harvest loss by 50% from the existing 15% level
- Achieving farm power availability to the tune of 2.5 kW/ ha or more to be in the Category I states in the country thereby furthering mechanized horticulture
- Provisioning Soil Health Card for all operational holdings to the extent of 41.65 lakh
- 3- fold increase in existing irrigated area to bring 25 lakh ha under assured irrigation
- Increase in cold storage capacity to the extent of 50 lakh MT in the region
- 10- fold increase in the number of pack house to the tune of 40000 units
- 3 – fold increase in the number of food processing industry to the extent of 5000 units
- 10- fold increase in the export of fruits to register 3% share in country's total fruits export basket and 20- fold increase in vegetables export to list 2% share in national vegetables export.

Quality Mantra to drive the emerging Producer Region Status

- Pesticide/ heavy metal etc residues in its products to remain within MRL values using a combination of traditional and modern technologies.
- Incorporation of recommended level vitamin, mineral and TSS etc contents in the fruits and vegetables including perfection in look and quality of packed products as per national and international standards
- Prime focus on furtherance of organic, GAP and natural farming certified production system
- Conservation and commercialization of native horticultural bio- resources including comprehensive drive for obtaining GI tag for unique indigenous items
- Capacity building on part of small & marginal farmers to main global standard and competitiveness.
- Accelerated participation of private sector in critical areas in horticultural value chain management
- Development of horticultural flora- based carbon sink and conservation of soil health

4.3.4. NER as the Organic and Sustainable Production Destination of India

This ambitious vision to be carried out by **North East Organic Value Chain Corporation (NEOVCC)** is mainly based on globalization of organic culture, healthier life style and slow food of high nutritional values and distinctive flavour. This is topped by ethical-wellness loaded-near to mountains and rich agriculture and horticulture produces. Organic food based market stood at \$ 90 billion in 2016 (Assocham and Ernst & Young, 2018).

India itself is likely to have Rs 120 billion market by 2020. The six agro-climatic zones of the NER, besides being the citrus depository, constituted Kiwi (97 percent), pineapple (46 percent), strawberry (40 percent), passion fruits (over 85 percent) and jackfruit (28 percent), cabbage and radish (10 percent), cinnamon/tejpatta (over 95 percent), ginger (20 percent) and large cardamom (over 88 percent) of the total national domestic supplies.

There are spices and other produces that are endemic to the NER including ginger of Karbi Anglong, Maroi Nakupi condiment of Manipur, Lakadong turmeric of Meghalaya, Nagaland's *raja mircha* , Sikkim and adjoining Darjeeling's large cardamom and *dalle khursani* and Assam's dried pepper long and bird's eye chili flakes and Joha rice. Many of them are widely used for medicinal purposes and have been accorded Geographical Indication (GI) tags.

The estimated 422 fish species (133 genera and 38 families) and over 120 ornamental fish varieties, organic fresh water fishery and indigenous varieties of rice, barley, pulses, maize and range of fruits and vegetables are other emerging crucial farming sub-sectors. The food habits of various ethnic groups in the NER are strikingly similar to the communities of the ASEAN countries as reflected in prominent fermented fish consumed like Shidal, Lonailish, Ngari and Hentak.

Figure 4.3: Focus Agriculture/Horticulture produce for export in NER



Source: MOTT Report 2018, NEDFi, Guwahati

These produces like spices, in order to acquire 'clean labels' and 'sustained trusts' will undergo a global certification and audit, compliance with the Sanitary (for protection of human and animal health) and Phytosanitary (for protection of plant health) Measures (SPS) and Technical Barriers to Trade (TBT) measures and also intellectual property rights (IPR) and other patenting for national, regional and global access. This would also include

ethical manufacturing practices leading to cross-state production network to harness economies of scale and specific comparative advantages.

The grand idea is to make organic farming consumer-driven and farmer-powered and a major constituent of the functional food that would ultimately trigger transformation in the rural economies by inter-connecting the production clusters that remain largely segregated and disconnected today.

The present level of NPK consumption though less than half (61.77 kg per hectare) of the national average (128 kg per hectare) will be reduced to zero to transform most of the agriculture production system to organic culture and also pooling the *jhum* land under the organic regime. However, fertiliser subsidies these states have foregone will be *pari passu* transferred as incentives to organic farming. The strategy has to go deep down to the Farmer Producer Organisation (Company) level with organic seed bank, technology dissemination, provisions of 'green credit', high yielding specie identification, value chain participation and market access. The value chain has to address post harvest infrastructure, pack-houses including for sorting and grading, cold chains and transportation to markets.

The NER will be in the centre stage of this high growth sector driven by "growing environmental concerns and shifting cultural status symbols and conscious millenials" and facilitated by digital platforms and e commerce players, producers and sales outlet like Myantra, Nyakka, Khadi Gramodyog, Ethicus etc. To promote and facilitate aggregation of organic farming related activities, make technical and technological interventions and create a niche market **North East Organic Value Chain Corporation (NEOVCC) will be set up in the PPP mode.**

This idea consolidates the Mission Organic Value Chain Development of the NER (MOVCDNER) of Ministry of Agriculture which aims to develop a holistic organic farming ecosystem starting from inputs, seeds, certification and creation of facilities, aggregation, processing and marketing.

4.3.5 Critical Policy Intervention

- Integrated development of horticulture for both production and export
- Funding basic, strategic, applied and anticipatory research.
- Creating a common *North East Regional Apex Platform* for Farmers, Academia, Industry and Policy makers.
- Furtherance of complementary, supplementary and specialty horticulture in NER in the domain of crop and seed/ planting material production.
- Moving towards organizing the farm sector into producers' collectives and inter-state integration of such organized bodies to form Federation of Collectives to deal with critical issues of volume generation, quality assurance and supply consistence
- Transformation of homestead gardens into micro horti- business entity
- Pilot Testing Technology Park cum Incubation Centre at the leading academic and R&D functionaries.

Infrastructure for logistic support to horticulture sector right from establishing certified nurseries; procurement, processing and packaging; road and communication and air connectivity to improvement in local huts (market) to value chain.

- High tech horticulture including hydro - Aero- Aqua ponics technologies
- Traditional and upfront technologies for pest and disease management
- Technology to produce disease free planting material
- Development/ validation of gene editing technologies applicable to horticulture including self life enhancement by gene silencing and related OMIC technologies
- Knitting the small holder producers, through ICT mode for efficient delivery of technology and information.
- Development of region- specific protocol for application of new-age technology options like Robotics, Drones, Artificial Intelligence & Machine Learning, Internet of Things, Big Data, Block chain, Remote Sensing, GIS, Virtual Reality, Augmented Reality, Edge Computing, Cloud Computing etc. for bolstering horticultural production and improving post- harvest management.

Enhanced convergence of different players like Agricultural Universities, Research Organizations, Extension Functionaries, Development Agencies, Financial Institutions, Social Bodies and Environmental Groups for harnessing the collective strength.

It is essential to have an inter-ministerial coordination committee involving Ministry of Agriculture & FW, Ministry of Food processing Industries, Ministry of Tribal Affairs, Ministry of Commerce, Ministry of Science & Technology and DONER ministry for provisioning holistic guidance and financial assistance in order to usher in a quantum jump in the development of horticulture in the north east.

4.4. Supply and Value Chains

4.4.1. Brief Background:

NER as a Core Partner in the Trans-border Value Chain in tourism, horticulture, floriculture, mineral and forest resources, tea, sericulture, rubber, bamboo, pharmaceutical, textiles to fully harness the advantages of the India-ASEAN Free Trade, SAARC Free trade and BIMSTEC market and other bilateral and regional agreements. This will bring a new face to trade in the Act East Policy and trade preferences would become a catalytic aid. Presently final goods sector contributes over 70 percent of NER global exports where primary commodities also constitute 18 percent and intermediate products 10 percent. The objective is to sharply increase the share of NER in the national agriculture and allied activities from 4 in 2017-18 to 6 percent by 2047 so that value chain becomes a possibility.

For instance, every member state in the NER provides a different variety of tourism outlet and each of them could be

Figure 4.4 :Niche Tourism



Source: MOTT Report, 2018, NEDFi, Guwahati

developed as specialized niche activity and linked to global tourism market. Several specific circuits like Buddhism, World War, the river water, border trade, the mountain, biodiversity, wellness, cinema and films, adventure and ethnography circuits are unique to the NER. These could be a key to harnessing trade in services agreement with the ASEAN and SAARC and other provisions.

On the other hand, using its huge command over primary commodities, the trans-border value chain could significantly transform the entire trade and investment matrices in the region. Several reports (World Development Report 2020, World Bank 2020, ICRIER 2020, NEDFi 2020, UNCTAD 2012, Kyaw & Lwin 2016) have studied and gathered a range of success stories about value chains at the sub-regional, regional and global levels.

The World Development Report 2020 identifies geography, factor endowments, institutions and market size as the essence that actually become the starting point of value chain. Then the border crossing emerges. The next line of action is policies, openness, connectivity and cooperation leading to firm-to-firm relationship, knowledge and technology flows and harnessing of hyper-specialisation therein. The final outcome is income growth, employment creation, reduction in poverty and inequality, environmental protection and more pertinently a fresh and advanced technological induction and exposure. In the process, expansion has been 'revolutionary for many poorer countries, which boosted growth by joining a global value chain, thereby eliminating the need to build whole industries from scratch'. And by 2008, GVCs peaked at 52 percent of global trade. It was clear that it pays to specialize.

Nearby Vietnam's electronics sector is a lucid example which has emerged as the second-largest smartphone exporter, 'producing 40 percent of Samsung's global mobile phone products and employing 35 percent of its global staff'. What contributed to reaching this pedestal? A favourable investment climate, and a large pool of low-cost labor, geographical proximity to regional suppliers of electronics parts and components such as China, Japan, South Korea, and Thailand helped foreign investors gain access to high-quality inputs from abroad and improved connectivity enabled Vietnam to import and export in a timely manner. (WDR, 2020, p 37)

NEDFi (2020) study demonstrates as how the NER would be the starting point for value chain. Several state centric flagship projects like Food processing in Tripura, Jackfruit mission in Meghalaya, Integrated and Intensive Bivoltine Sericulture Development Projects covering Mulberry, Eri and Muga/Oak Tasar silk in Assam, Orchid Centres, NER Textile Promotion Scheme, NE Regional Bamboo Mission and Cane, Bamboo-technology Centre and National Institute of Fashion Technology, Shillong and the National Institute of Design, Jorhat would be scientifically integrated.

NER produced 5494 MT silk in 2015-17 (18-19% of India's total silk production), majorly Eri silk (5002 MT). Muga silk is unique in terms of durability and golden tint is reared only in Assam with a GI tag. Almost 48 % of the total 2.6 million weavers in India enumerated by the Handloom Census of 2019-2020 are located in the North East. With its unique craft traditions spread over several and diverse tribes and communities like Adi, Apatani and Mishmi of Arunachal and Bodo, Karbi, Mising and Rabha tribes in Assam and Lepcha, Bhutia and Nepalis of Sikkim and Angami and Konyak of Nagaland, the NER could be a major player in textile and fashion designs value chain of Asia. The geometric designs with intricate zig-zag and angular patterns, puan like motifs inspired by nature, Moirang-Wangkhei Phee textile fabrics with specific designs and Naga motifs that hold symbolic meaning are distinctly sophisticated designs and crafting that can be adapted with in-depth research and use of Computer-aided design (CAD) and Computer-aided manufacture (CAM)

The World Bank (2020), studied fruits and vegetables, spices, bamboo and related products, and medical tourism mainly focusing on demand patterns, reorientation of production and supply, value chain analysis, intermediaries and processors, and market integration and technology induction with Bangladesh. It examined Mizoram, Tripura and Assam vis-à-vis Bangladesh and Myanmar. Connectivity and logistics, and product

standards and quality infrastructure are the two cross-cutting constraints that were encountered across all sectors in NER.

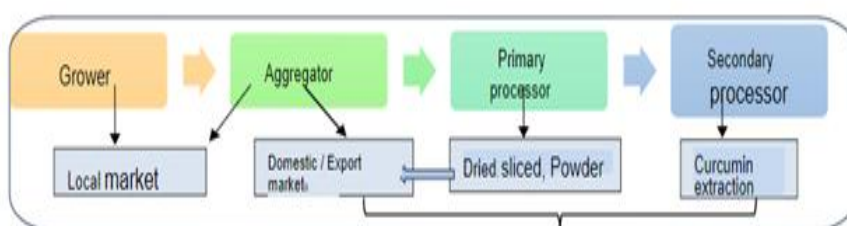
Three models of value chain are envisaged. First within the NER, where the entire primary commodities will be gathered from across the states to put them in a specialized production process in one of the states of single production system and finally transported to the national market. Here the border matrix and crossing would be truly internal. Second, it will be interlinked with the production process in other parts of India and thirdly, it would also be linked with the chains of production and marketing process in the ASAEN countries. Here the border matrix changes to external dimension. Besides the firms, a multinational company could be a lead actor in areas like pharmaceutical, textiles, food processing and flowers.

For instance, NER alone respectively produces over 46 % percent, 20 % and 6 % of total annual pineapple (1.678 million tons), ginger (1.583 million tons) and turmeric (3.68 million tons) production of India. From Orchids to Anthurium and Gerbera to Lilium production, the NER could enter into value chain of trading of cut flowers, production of planting material and alternate uses like dried flowers to the entire South, South East and East Asia.

4.4.2.Value Chain Example: Turmeric

•**Value Addition at Farm Level:** The Majority of the farmers carry out washing, drying, and slicing of the turmeric rhizomes after harvesting. From 1 MT of fresh turmeric, only 150 to 200 kg of dry turmeric is obtained. The selling price of fresh turmeric varies from 15-18 per kg, while dried rhizome sells at a higher price of Rs 150-180 per kg, Turmeric Powder is sold at Rs 200-250 per kg.

Suggested export-oriented extended value chain for Turmeric



The market for curcumin is expected to reach approximately 100 million dollars by 2024. The setting up of a plant in East Jaintia Hills in Meghalaya would ensure a consistent supply of raw materials from the district as well as the neighbouring districts. Another advantage is the presence of proximity to Dawki LCS as it borders Bangladesh. Other locations may be in Karbi Anglong in Assam, Lunglei in Mizoram and in North Sikkim.

4.5. .Animal Husbandry: Unharnessed Opportunities

Vision 2047:

'To position the NER Livestock and Poultry sector as Animal Source Food (ASF), Technology and Business hub encompassing both traditional and frontier science technologies as has emerged and as will be emerging while tightening the stakeholders and investors capacity and skill value chain from production to consumption so as to realize the hitherto unexplored economic and employment benefits from the sector while contributing handsomely to the ASF basket of the country for global trade and commerce and thus be an important partner in achieving the Country's Amrit Kal and SDG goals as well as leveraging the benefit from the 'Act East' policy ensuring alongside the upward growth of the Nation's GDP with the livestock and poultry sector of the region as one of the drivers of this growth'.

4.5.1 Brief Background:

Animal agriculture, if strategically pursued, can definitely improve the livelihood opportunity and thus reduce or eliminate poverty in regions like North East India where agriculture perhaps cannot be thought of without the integration of livestock/ poultry sub-sector in it. So far however, all livestock sector discussion/ seminars conducted in and outside the region are full with papers lamenting the deficiencies in milk, meat and egg sector which hovers around 50 per cent for milk and meat and a hooping 65-75 per cent for egg. As the years are rolling by, there appears to be a wider deficiency trend- may be due to the increase in human population on one hand and pursuance of subsistence level of animal farming on the other. Even if one wants to enter into this otherwise lucrative business, he/she is confronted with many 'have not's - ranging from non-availability of improved/quality germplasm to feed to health protection measures and so on. How then this sector of gainful employment could be injected with technology, policy and strategy based developmental plans is the issue. Experiences have shown that the ad-hoc approaches taken from time to time have not been able to narrow down the deficiency gap calling therefore, a strategic approach in a business mode taking into consideration the ground realities and explore-able opportunities.

4.5.2 Present Status:

A. National Scenario:

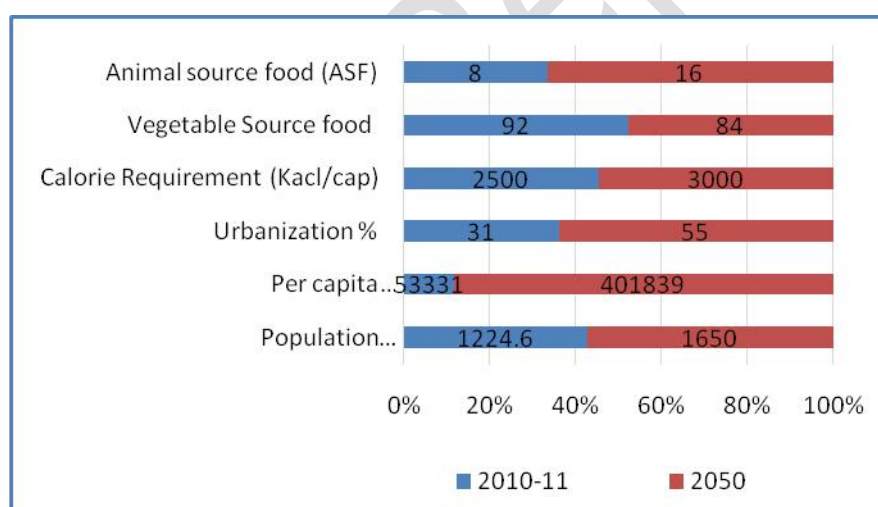
Nationally, livestock and poultry sector has been transformed from a deficiency to a near sufficiency status. As of 2023, India ranks first in milk production in the world with 230 million ton of production which is 11 times higher than the production in 1951 and per capita milk consumption has also significantly increased from 113g/day to 459 g/day during the period. The country also ranked 3rd in egg production with around 138 billion eggs per annum with a record 50 times increase; 5th in broiler production with 4.20 million ton and 8th in total meat production with around 9.77 million tonne¹ Such growth in livestock sector

¹ (Deptt of Animal Husbandry, Gol, 2022-23).

in the country has been possible with the injection technology – policy – public and private players combine capsule.

By 2050, India's population is projected to reach 1.65 billion², indicating a 16% increase from the current figure of 1.43 billion. This growth will be accompanied by a continued and accelerated process of urbanization, with approximately 55% of the population residing in urban areas which will increase the demand for ASF. Furthermore, income levels are expected to rise significantly, reaching around 401,839 INR per capita in 2050, a substantial increase from the 53,331 INR per capita recorded in 2010-11. Demographic and economic shifts in India will result in a growing need for calorie consumption. However, the proportion of calories derived from vegetable sources is projected to decrease to 84%, while the contribution from animal sources will double to 16%. The demand for meat, fish, and eggs is projected to surge from 11.64 million ton to 35.52 million ton (by 2050 %)³ Moreover, the demand for milk and its products is expected to grow 3.7 times faster than that of food grains⁴. India holds a prominent position among the top twenty agricultural exporters globally, with a 2.1% share in global agricultural exports. The nation ranks as the 4th largest exporter of buffalo meat and holds the top position as exporter of *sheep and goat*⁵ and additionally, it makes significant exports of poultry and dairy products⁶ These numbers underscore the significant contribution of India's livestock sector to global food security, in addition to meeting its domestic demand.

Figure 4.5.1: Drivers of Food Demand & Projections for the Year 2050



² World Population Review, 2023, <https://worldpopulationreview.com/countries/india-population>

³ NITI Aayog, 2018 -Demand & supply projections towards 2033 crops, livestock, fisheries and agricultural inputs the working group report. <https://www.niti.gov.in/sites/default/files/2019-07/WG-Report-issued-for-printing.pdf>

⁴ Retrieved May 30, 2023, from <https://www.niti.gov.in/sites/default/files/2019-07/WG-Report-issued-for-printing.pdf>

⁵ May30meat2023 https://apeda.gov.in/apedawebsite/SubHead_Products/Buffalo_Meat.htm#:~:text=India%20is%20the%20fourth%20largest,%2C%20Malaysia%2C%20Egypt%20and%20Indonesia

⁶ APEDA, 2021, Dairy Products. https://apeda.gov.in/apedawebsite/SubHead_Products/Dairy_Products.htm and APEDA, 2021, Poultry Products. https://apeda.gov.in/apedawebsite/SubHead_Products/Poultry_Products.htm.

Figure 4.5.2 Food Demand Projections To 2050

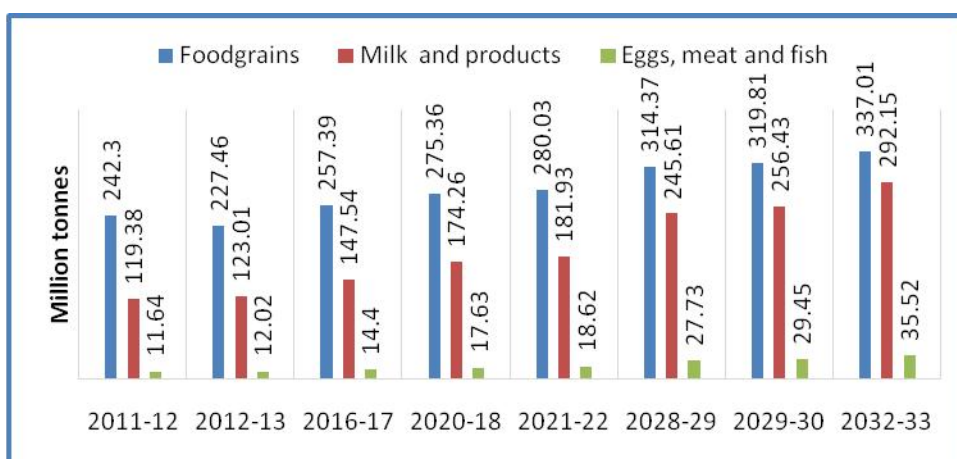
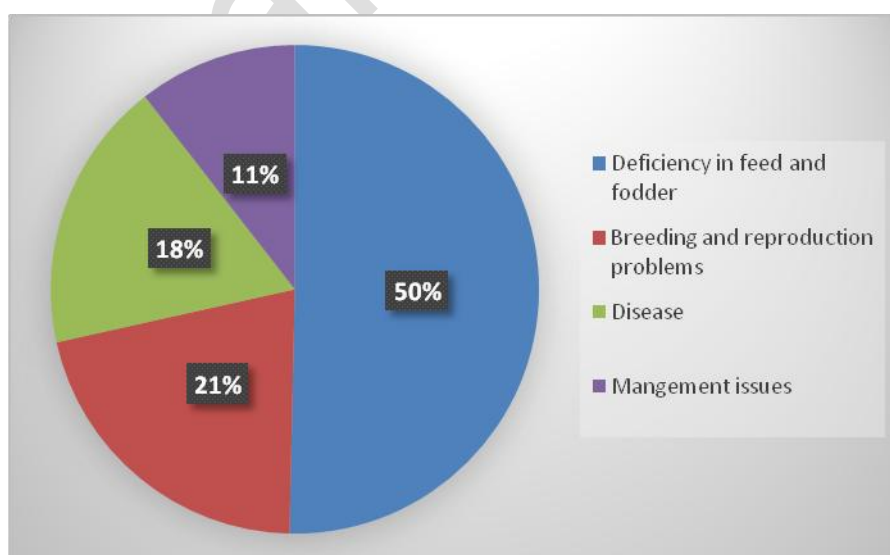


Figure 4.5.1 & 4.5.2: Food Demand Projections to 2050
(Abhijit Mitra et.al, 2023 in Agri Science Congress at CMFRI, Cochin, Kerala)

Considering the difficulties, changing economy and population trend and the rising need for ASFs; it is important to transform the Indian Livestock sector to align with the SDGs and *Amrit Kal* goals. To achieve sustainable and efficient production in the Indian Livestock sector; it is crucial to address constraints such as feeding, breeding, health, and management issues. Currently, Indian animals have lower average yields of milk and meat compared to the global average by 20-60%. Among the factors affecting productivity, the deficiency of feed and fodder contributes to 50.2% of the total loss, followed by breeding and reproduction problems (21.1%), diseases (17.9%), and management issues (10.5%)⁷. These challenges must be systematically addressed to improve productivity and ensure sustainable production.

Figure 4.5.3: Factors Affecting Livestock Productivity and their Contribution to Total Loss



B. Global Perspective:

⁷ (Abhijit Mitra et.al, 2023, Agricultural Science Congress, CMFRI, Cochin, Kerala)

India's position in world livestock food product share has been given above. In so far as NER is concerned, its primary responsibility is to ensure that the country capability to capture still higher ranks (other than milk where it is already first) is enhanced through the region's share of contribution. For this, the region, in addition to developing effective partnership and linkages with the national players, will have to develop collaboration, both developmental and technological, with global entities and bodies like:

- One Health – Global Agenda for Sustainable Livestock Development (GASL)
- Livestock Environmental Assessment and Performance (LEAP)
- Global Pastoralists Knowledge Hub, Multi stakeholder Feed Safety Partnership.
- Tripartite Partnership of FAO, World Health Organization (WHO) and World Organization for Animal Health (WOAH) – erstwhile referred to as OIE.
- Global Alliance for Livestock Veterinary Medicine (GALVmed).
- Livestock Global Alliance, Dairy Asia
- World Bank
- Asian Development bank etc.

C. NER Scenario:

The growth of the sector in NER is, however, not that rosy as the Tables below will indicate (Table4.5.1)

Draft Report

Table 4.5.1: State Wise Livestock Population (Lakh), Products ('000 Ton) and availability per person (20th Livestock Census, 2019, Gol with author's own estimate)

Animal/Bird/Product	Indicator	STATES										
		ArP	Assam	MN	MG	MZ	NL	SK	TR	Total NER	Total India	% NE
Cattle + Buffalo	Population	3.45	114.21	2.60	9.19	4.07	7.23	1.49	7.56	149.80	1934.63	13.83
Their product	Milk	0.46	982.02	75.55	90.23	24.59	61.07	86.52	216.98	1557.42	22100.00	2.11
-Do-	Availability	82.00	77.00	65.00	75.00	55.00	76.00	350.00	146.00	109.50	459.00	23.85
-Do-	Meat*	0.13	0.032	0.13	0.21	0.07	0.11	0.012	-	0.70	192.20	0.36
Goat + Sheep	Population	15.83	43.48	0.45	4.12	0.15	0.32	0.92	3.65	68.92	2231.45	3.10
Their product	Meat*	2.42	18.88	1.43	1.11	0.17	0.52	0.12	2.20	26.93	2226.16	1.20
Pig	Population	2.71	20.90	2.35	7.06	2.92	4.04	2.73	2.06	44.77	90.55	49.44
	Meat*	5.37	21.43	6.25	12.31	5.81	12.57	0.86	16.00	80.60	365.63	22.04
Mithun	Population	3.50	-	0.09	-	0.04	0.23	-	-	3.86	3.86	100.00
Yak	Population	24.75	-	-	-	-	-	0.05	-	24.80	57.57	43.07
Poultry	Population	15.99	462.12	58.97	53.79	20.47	28.38	58.08	41.68	744.48	8518.09	8.73
	Egg(Lac No)	658	5590	1216	1128	397	355	98	3280	12722	1383763	0.92
	Egg availability	43	16	38	34	32	16	14	80	34	101	34
	Total Meat Availability (g/day)	38.46	4.5	24.73	30.23	32.90	27.66	11.10	35.69	25.50	19.45	+31.1

ArP: Arunachal Pradesh; MN: Manipur; MG: Meghalaya; MZ: Mizoram; NL: Nagaland; SK: Sikkim; TR: Tripura. Source AH statistics, Gol

As the Table will indicate, the availability of milk per person is only 109 g against Indian average of 459g – a whopping 350g difference. Although the meat availability in the region as a whole is higher than the Country's average, the availability in States like Assam (4.5g) and Sikkim (11.10g) is extremely low. Similar is the scenario with respect to egg availability which is only 34 eggs against All India average availability of 101 eggs and ICMR recommendation of 180 eggs. The scenario calls for a full proof perspective planning.

4.5.3 Why and what we lack?

The region basically lacks a proactively charged determined mindset of the facilitators of livestock sector growth and the economy that revolves round the sector, in addition to grossly inadequate allocation of growth supporting financial resources. The sector is heavily dependent on central assistance which alone is not enough to effect transformation. The result of this approach is that the region lacks quality animal breeds/ varieties, feed and its supplements, vaccines and diagnostics, animal slaughter facility, processing and value addition of livestock products, commercial/ industrial mode of farming and a channelized market linkage. Further, the region also lacks a desirable policy-strategy-technology-extension approach in the sector.

4.5.4 Institutional drawback:

Most institutions responsible for steering the livestock sector growth engine adopt, by and large, ad-hoc rather than a policy backed approach with the resultant result of the scenario indicated above. The institutions do not have a sound animal seed (semen, kids, piglet etc) production policy – the seminal requirement to push up production and productivity growth curve. They also lack a feed and fodder mission – the vital raw material for production and also animal health managing diagnostics and vaccines. Livestock production infrastructure (farms, labs) is grossly inadequate and so also the manpower. Unlike the Rabi/kharif planning in agriculture, the institutions also lack half yearly or yearly planning system and so on.

4.5.5 Governance dynamics:

Present governance is top down which has to be shifted to a bottom up approach targeting G2CG (Government-to-Citizen- to- government), G2B (Government-to-Business), G2FG (Government to Farmers and back to Government), G2G (Government-to-Government for convergence and cross departmental linkages), G2ES (Government to Employees and Service conditions), G2O (Government to other stakeholders including NGOs, Financial Houses, Policy Team). Effective governance at each level through a designated team shall be the key to success and/ or failure of expected output outcome. In today's digital era, the governance ought to be totally ICT based with level 5 leadership scales for which massive capacity building of the players in governance shall be crucial and vital.

4.5.6 Limits of resources:

Currently there are visibly visible resource crunch in the sector which ranges from:

- Manpower including super skilled HR.
- Farm including product processing Infrastructure.
- High producing animal and poultry germplasm.

- Feed and Fodder resources and their conservation support base.
- Animal vaccine and State of the Art diagnostic facility.
- Time relevant skilling and capacity building centers.
- Financial

4.5.7 Skill and capacities:

Skill and capacities hold the key to transformative animal agriculture in NER as the ‘Business as Usual’ approach will only keep the sector where it is today. As in other sectors, animal husbandry sector also needs manpower with adequate level of skills on using digital tools and techniques, methods and methodologies to use IoT, App and sensor based management of production system besides Block chain technique for traceability of products etc for ensuring food safety protocols. Skill injection needs to be planned separately under 3 heads- (a) Skilling the skilled (b) Skilling the semi-skilled and (c) Skilling the Unskilled as the skill requirement of the 3 groups are different. For both on and off site skilling, either virtual mode or animated video aids ought to be used in addition to Hands on skilling. Accordingly the skilling facilities will have to be created centering on the upcoming Skill University in Assam.

4.5.8 Quantitative target:

The anticipated requirement of Animal Source Food (ASF) in NER by 2051, based on decadal human population growth, is presented in Table (2) below:

Table 4.5.2: Physical target of livestock product in NER by 2051

Milk(Lakh Ton)				Meat(Lakh Ton)				Egg (Lakh Ton)			
2021	2031	2041	2051	2021	2031	2041	2051	2021	2031	2041	2051
16.32	32.90	36.18	39.79	2.59	6.10	6.70	7.40	12859	54090	59490	66330

Human population at 10% decadal growth; Milk and egg at 50% of ICMR recommendation i.e. 150 g and 90 eggs and Meat at 10 Kg/annum/Person

4.5.9 Qualitative targets:

While quantitative targets are measurable through SMART (Specific, Measurable, Achievable, Rewarding and Time bound) analysis, qualitative targets are subjective and not much measurable. However, using quantitative objectives as a milestone to reach qualitative objectives is the way to grow. The qualitative targets therefore will be Branding of the livestock products produced following the GMP (Good Management Practices) norms with product traceability and preparation record, adhering to national and international requirement for trading, enlisting specific quality parameters like protein, fat, mineral, nutraceutical property etc contents in the ASF. Anti-Microbial Residue analysis shall be an important area for food safety.

4.5.10 Potential and possibilities:

- a) **Potential:** Animal husbandry and poultry sector of NER is a very high potential area for economic stability and self employment growth. The current low productivity can be doubled through policy-technology intervention. The dairy sector, for example, has the potential of more than doubling the milk yield from the current level of 16 lakh ton to 39 lakh ton targeting only 1.5 liter increase in milk yield per day per animal through input optimization and managerial skills. Similar is the case with pig, goat and poultry. Average egg production per annum per bird presently varies between 80 and 120 eggs while the country has breeds that yield up-to 320 eggs per bird. The region thus has the potential to scale up egg production at least up to 220 numbers per bird.
- b) **Possibilities:** Through appropriate breeding and management planning supported by matching infrastructure, feed and health inputs, there is possibility of achieving the targets mentioned in Table below.

4.5.11 Formidable challenges and possible pull factors:

The sector does have challenges which, however, are not formidable but mitigate-able. Some of the challenges are:

Challenges	Pull out factors
Provisioning of improved animal seeds for higher production	Establishment of animal seed banks preferably at each district head quarter. To begin with, Sex sorted semen production bank, embryo production centers etc. Revamping of State animal seed farms (pig, goat, poultry etc) to achieve a set target.
Establishment of Regional animal vaccine production Center.	Private industries engaged in vaccine production in the country may be invited to establish such a center with needed incentives like a procurement agreement etc.
Developing and launching a regional feed and fodder security mission in the line of National food security mission.	Launching of the mission and working on the same by the department – university – NGOs – farmers’ organization.
Infrastructure modernization	Modernizations of hospitals, labs, colleges, animal farms, feed factories etc under Programs like National Livestock Mission, NABARD etc schemes.
Checking of trans-boundary diseases	Joint action by SAARC countries through Ministry of DoNER, GoI. Quarantine and primary animal health check up facilities at each border entry points. No animal movement zones within 10 KMs of the borders to check entry of exotic virus strains.
Inter and intra State transport of animals and products	An administrative issue especially with Home Departments.
Mandatory slaughter of animals in certified slaughter houses	Establishment of this facility may be mini and portable ones, at each block for meat safety and

	hygiene with strict HACCP norms.
Establishment of livestock specific Farm Science Centers in the line of KVVKs for extension and distress services.	Considering the growing importance and focus on livestock, creation of Livestock Farm Science Centers in each district has become highly essential. A scheme on this may be launched by the Ministry of Fisheries, AH and Dairying, Gol or the individual States of the region may consider this from State budget.
Animal Identification through molecular chips etc linking the animals with the ADHAR cards of the owner to centrally monitor the health and performance status of the animals.	This can be done under the mission digital of Gol both for identification, performance recording and linking each animal with the Artificial Intelligence technologies.

4.5.12 Benefit of achieving the vision target:

- Non-dependence on States outside the region for ASF
- Conversion of backyard/ subsistence level of farming to semi-commercial to commercial mode with district level primary industry connected to satellite producer units across the district.
- Opening up of animal byproduct based industries like meat/ bone meal production, therapeutic protein extraction from poultry feathers, brush making industry from pig hair etc. besides huge production and marketing of bio-inputs like bio-fertilizer and bio-pesticides to support organic/ natural farming in the region.
- Livelihood means for unemployed and overall economic progression.

4.5.13 Cost of not doing/ reaching the targets:

As per information gathered, currently around Rs. 1200/ crore per annum is drained off from NER in meeting its Animal Source Food items including live animals. From the year 2024 to 2047, this figure will be around Rs. 30,000/ crore at current rate which is likely to be more than double by 2047 with price escalation. Further the employment scope, both in primary and secondary sectors, will have to compromise with if the targets are not achieved. In addition, the region will not be able to benefit from the Act East policy centric ASF trade and commerce.

4.5.14 Strategic moves and policy interventions to achieve the 2047 vision:

• **What strategic thinking:**

1. **Egg sector:** Present availability of egg per person per annum in the region is 34 against All India average of 101 and WHO recommendation of 180 eggs. Now if we take an immediate target of reaching half the number of WHO recommendation of 90 eggs, the region will have to attempt to add up to its egg basket another 56 (90-34) eggs per person. Considering a population of around 4.42 crore (total population minus 10% infants and 95% of remaining 90 per cent as eggitarian), this increase will mean an additional production of 247 crore eggs annually. In order to achieve this target, the region will have to establish 2573 number of layer farms with 320 number of egg laying capacity (per bird per annum) bird strength of 3000 numbers in each farm. Out of this

number of 2573 farms, 50 per cent could be established with central assistance and 50 per cent in a PPP mode thereby opening up self employment scope.

A time table of 10 years could be earmarked to reach the number and financial resources planned accordingly. A buy back arrangement of the eggs so produced is to be put in place by establishing Poultry Corporation at each of the States so that the production units feed the corporation which will operate in a hub and spoke model across the States and the corporation in turn feeds the retailers and consumers. Employment avenues in this sector of product procurement and delivery also could be imagined. Other deliverables like feed and health cover aspects have been dealt with separately as common strategy together with meat sector. NER being a hub for rural poultry, focused research and development plans will have to be framed to develop rural poultry layer breeds/ strains to enhance the rural poultry egg basket for higher economic and health benefits.

2. **Meat sector:** As per available information furnished in Table 1, the region appears to be in a better position with respect to meat availability which is around 9.12Kg per annum against the All India average of 6.93 kg and ICMR recommendation of 10.65 kg. However, the availability of meat in two States i.e. Assam (1.64Kg) and Sikkim (4.00Kg) is far below than even the NER average of 9.12Kg. These two States need a focused strategy to bring up the availability level to at least the country's level of 6.93Kg which means an increase in production by 5.29Kg for Assam (6.93-1.64) and 2.93Kg for Sikkim (6.93-4.0) per person. Considering a non-vegetarian population of 2.72 crore (80% of 3.4 crore) in Assam, the meat production will have to be scaled up to 99.00 crore kg out of which around 1.25 crore kg could be met from the sale of spent hens after egg laying. A strategy for the production of remaining 97.00 crore kg is therefore needed.

The meat sources of the region are from pig, sheep and goat and the broiler poultry. Meat from other sources like mithuns has not been considered here. A reasonable strategy to produce 9700 lakh kg of meat will be to target 30 per cent production from pig, 40 per cent from poultry and 30 per cent from goat and sheep i.e. 3000, 4000 and 3000 lakh kg respectively.

Since this target is for 2047, a yearly planning for scaling up will be done to reach the targets over remaining 25 years.

3. **3000 lakh kg from pig :** If we target a carcass weight of 75 kg per pig, Assam will need around 40 lakh number of pigs to produce 3000 lakh kg of pork (3000 divided by 75) for which 8000 numbers of pig farms with 500 pigs in each will have to be established. By this analogy, the number of farms to be established appears to be higher and therefore, the responsibility of establishing 500 farms in each of the remaining 6 States (excepting Sikkim) is proposed for complementary and supplementary pork business with Assam. In Assam also, there will be around 25 lakh farmers rearing 3-4 pigs and if supported with right type of pigs for rearing backed by technology and other deliverables, Assam alone can produce the needed number to capture the pork trade in a systematic manner. The sector is very much paying. Considering a net profit of Rs. 25/per kg of pork (pork price is high in the region), the profit from 3000 lakh kg of pork is going to be as hooping as Rs. 750.00 crore annually. Right area for investors with a ready market.

4. **4000 lakh kg from Broiler poultry:** Considering an average weight of 2.0 kg per broiler chicken at marketable age, the region will need 20.0 crore broilers to produce 3000 lakh kg of poultry meat. With a farm unit size of 5000 birds X 6 batches per year, the number of farms required shall be 62,000. A well laid out marketing plan shall provide the needed incentives to the unemployed youth besides alluring the corporate houses to establish industrial broiler farms. Yet another business opportunity lies in production of day old broiler birds to support the small and satellite farmers.
5. **3000 lakh kg from Goat and sheep:** At an average carcass weight of 8 kg per goat and sheep, the State will need 375 lakh sheep and goats to produce 3000 lakh kg of meat for which the State will require 1.87 lakh farms with 200 capacities in each. However, if the attempt is made under contract farming involving around 10.0 lakh small farmers with 10 goats per farmer, they can produce 100 lakh numbers or 800 lakh Kg of chevron.
6. **Milk Sector:** As the Table 1 will indicate, milk availability in NER (109.5g) is only 23.85 percent of the country's availability (459 g) and this availability has to be scaled up at least up to 50 percent of the country's availability i.e 230 g/day. This will mean an additional production of 168.28 lakh ton or more of milk in NER by 2047. This will call for an increase in average milk yield per cow per day to at least 5 liter from the current average of around 2 liter which can be achieved through technologies like the use of sex sorted semen from elite parents to increase the numbers of animals in milk by around 60 percent. Other technologies like embryo transfer taking the indigenous animals as recipients, ration balancing and appropriate disease control measures together with milk chilling and processing infrastructure will have to backstop this effort. Each State of the region will also have to be supported with at least one sexed semen production centre with a target of 2 lakh doses production capacity in each.

4.5.15 Feeding and Nutrition:

Feeding and nutrition is the key to realize near potential productivity growth from the methodologically bred and developed livestock population. Unfortunately this aspect of livestock production, despite decade's long research and technology generation, has remained a cause of concern. The past decades have seen lot of researches on trying to find location specific livestock feeding system but this has not worked for mainly two reasons – one, even though the finding is positive, the location specific feed resource is available only in limited quantities, many a times, even to prepare a ton of feed with its incorporation and secondly, there was no attempt to increase acreage for the identified crop. Therefore, more concentration will be required for technological support to commercially produce animal feed and mass adoption of methods like hydroponics/ aeroponic modes (with precision and quality testing) of fodder production at household and commercial farm level.

Research on bio-fortified feed and fodder specially to address hidden hunger will be yet another area to focus on. Redressal of this issue shall also demand effective collaboration with institutions like ICAR-IGFRI (Indian Grassland and Fodder Research Institute, Jhansi), NIANP (National Institute on Animal Nutrition and Physiology, Bangalore), All India Coordinated Project on forage crops, Ministry of Environment and Forests and other such institutions. Funding

support from GoI schemes like National Livestock Mission, Animal Husbandry Infrastructure Development Fund etc may be explored inviting their participation in the program. Fodder production in NER is envisioned to be taken up on commercial mode, utilizing the proposed Natural Farming areas, to trade the access production with States like Punjab and Haryana as other agricultural commodities are procured from these States.

4.5.16 Health and Welfare:

We all know that the application of innovative diagnostic tools and techniques, methods and methodologies, process and procedures are very vital and crucial for the detection of animal pathogens at an early stage so that it does not lead to epidemic or pandemic form to negatively impact animal and human health and farmers' economy. It is a matter of pride that after successfully using the PCR and ELISA technologies for detection of animal diseases, several serological and molecular technologies like lateral flow assays, biosensors, loop-mediated isothermal amplification, polymerase chain amplification, and molecular platforms for field-level detection of animal pathogens have been developed to achieve higher sensitivity and point-of-care (PoC) detection of animal pathogens. Furthermore, animal disease diagnostics need to be updated regularly to capture new, emerging and divergent infectious pathogens, and biotechnological innovations are helpful in fulfilling the rising demand for such diagnostics for the welfare of the society. Accordingly, in order to achieve our research goal of developing PoC diagnostics and vaccines, we have to develop and deploy large scale genome resources like reference genome, pangenome, genetic marker, candidate genes, superior haplotype, genotyping platform and molecular diagnosis, gene editing and functional genomics and bioinformatics tools and technologies. Containment and management of zoonotic diseases to achieve the 'One Health' goal shall be very important in coming years. Search for animal disease resistance conferring genes in the 'over and underground' biota including those in the rumen shall have to be a focused area of research under overall micro biome research. Similarly, identification of disease resistant genes in wild relatives (wild pig, fowl etc) through challenge study will be an interesting area of research. The animal science institutes/ university in the region will have to be adequately supported to pursue 21st century animal health research in a team mode with development departments under the GoI scheme like Livestock Health & Disease Control Programme (LHDCP), Animal Health System Support for One Health (AHSSOH) and the Animal Pandemic Preparedness Initiative (APPI) and others. The overall target by 2047 will be to have animal disease threat countering technologies and packages for safer food, environment and human-animal-soil health continuum.

4.5.17 Animal By-Product Sector:

As the animal husbandry sector is envisioned to be more organized from around 2030, a substantial quantity of animal wastes in the form of manure and other biomass including hides / skins and poultry feathers and offal are likely to be available for conversion of these wastes into wealth (circular economy). Vet voltaic like photovoltaic will also be an area for pursuing solar energy conversion into electrical energy using animal and fodder farms for additional income while promoting renewable energy drive.

Exploring newer livestock centric science and economic opportunities:

- a) Animals as bioreactors/ pharmaco-farming for production of therapeutic proteins for human.
- b) Animals for xeno transplantation – organ donors for human.
- c) Animals as a walking factory for food and nutrition.
- d) Animals as bio fertilizer and pesticide factory for natural/ organic farming.
- e) Animals as power generating factory- biogas.
- f) Animal farms as fodder tree/ agro-forestry factory with the provision of capturing and cultivating solar power (Vet voltaic) as the 3rd crop for internal use and sale to power grids.

4.5.18 Critical Policy Decisions:

- Policies on livestock and poultry breeding and animal seed production across NER States;
 - Regional animal feed Mission Policy covering marginal lands, shifting cultivation belts, vertical fodder production in Green/ Shed net houses, hydroponic and aeroponic mode of fodder production including quality silage making.
 - Vaccine and disease diagnostic policy with regional vaccine production centers for known diseases and enhancing diagnostic capabilities in the State biological centers and agricultural/ veterinary universities and colleges. ;
 - Policy on livestock insurance;
 - Animal slaughter policy including utilization of their wastes into protein powders and skins for multiple uses.
 - Digital animal production and management policy including linking the animal owners and the animals through Animal AADHAR cards;
 - Policy on developing climate friendly animal housing designs with farm automation;
 - Policy on animal farm waste centric circular economy generation;
 - Policy on Methane emission control due to enteric fermentation and accordingly achieves equivalent carbon emission reduction.
 - Policy on livestock and poultry products marketing with traceability and quality parameters.
 - Livestock credit policy and a policy on product marketing and food safety.
 - Policy on conservation and utilization of indigenous animal germplasm of the region.
 - Policy on matching financial resource sharing for animal husbandry particularly for fund like RKVY from the central government.

4.5.19 Physical Infrastructure:

Here, it has been indicated under strategic thinking above.

Table 4.5.3: Technology Inputs

Technologies	Requirement	Targets (Centers)		
		2030	2040	2047
Sex sorted semen	30 production centers in Assam and 6 each for other NE States with 50,000 to 1.0 lac doses production capacity each per year	10	32	30
Transferable embryo production	10 embryo production clinics in Assam and 2 each for other 7 States with 20, 40 and 60 percent embryo production per breed able cattle population per year	04	10	10
Marker aided selection of animals of high genetic merits	Using molecular genetics technique	100 percent use of MAS and genome editing techniques by 2047		
Hydroponic and Aeroponic technology for animal feed production	Size & capacity – As per farm size and numbers	50 percent fodder requirement to be met from this technology.		
DNA vaccine production facility including provisions for production and use of molecular disease diagnostic kits;	One large scale central facility in NER for production of Cell cultured animal vaccine with facilities for DNA vaccine targets against the known infectious diseases. Similarly, the veterinary Biologicals and University systems to be empowered for development/ validation of disease diagnostic kits.	Central facility by 2030 DNA vaccine by 2040 Diagnostics and biological by 2030.		
Methane mitigation technology	Use of <i>Harit Dhara</i> and ration balancing program for emission reduction up to 30 percent.	30 percent mitigation by 2030 Another 30 percent by 2040 Close to 90 percent by 2070		
Technology for production of cholesterol free ghee, designer eggs and meats	Zero cholesterol meat/ ghee etc and high omega-3 fatty acid content eggs.	Injection of these technologies @ 30 percent each up to 2030, 2040 and 2047.		
Producing animals as bio-reactors to	Use of goat/ cattle udder for production of therapeutic protein for	20 percent of low milk producing cattle udder to be used for this		

produce therapeutic proteins for human	human drug preparation.	purpose or as per the need of such protein.
Use of animals like pig for production of organs like liver, kidney etc for human;	Animals for xeno transplantation	Existing institution in the region at Sonapur, Guwahati needs to be promoted for this activity.
Animal cloning technology etc.	Particularly for high yielding animals	Technology to be perfected by 2030.

4.5.20 Institutional Support:

Framing the needed policies; Creating designated teams for each species of animal and poultry; incentives to investors for ‘ease of doing business’ and accessing market; feed, vaccine, slaughter supporting strategy formulation; Technology accessing and injection team with a separate team for flagship program implementation, PPP and institutional/ outside funding guidelines; manpower strengthening in the institutions.

4.5.21 Legal and constitutional linkages:

Legal sanction for mandatory animal slaughter at the designated abattoirs to be established by the departments so that the consumers get safe and certified animal products; legal support for animal and their product movement within and across the region; legal support for State land use policy (SLUP) for feed and fodder and also to restrict animal movements through the international borders other than the identified routes with health check points at the international borders, animal welfare issue.

4.5.22 Finance and resource mobilization including domestic and foreign investment:

As of now, there is a central provision to invest 10 percent of its allocation to each ministry in NER. This allocation in 2023-24 fiscal was Rs. 45.13 lakh crore, 10 percent of which is 4.50 lakh crore. If 10 percent of this amount i.e. Rs. 45,000/ crore is earmarked for total agriculture sector with a share of 10 percent out of this, to animal husbandry sector, the sector gets around Rs. 4,500/ crore per annum which itself will be good enough to push the strategic path outlined above. Additionally, project based support from international funding bodies like World Bank, Asian Development Bank; Bill Gates Foundation etc will be explored. Investment by corporate houses and garnering CSR fund support shall be yet another agenda.

4.5.25 Cross boarder interconnection:

Since the NER is bounded by 5 International borders with programs like ‘Act East Policy’ there will be significant cross border connection in complementing and supplementing livestock product trades and commerce in entire South East Asian region and for this upcoming opportunity also investment in animal husbandry sector is crucial and vital.

4.5.23 Governance reorientation and restructuring:

Livestock is no more to be seen and considered as a means of livelihood for poor and marginalized class only but as a highly paying industry for NER particularly considering the food habit of its people and accordingly there has to be a paradigm shift in governance orientation and the needed restructuring there for. Comparison, competition, competitiveness, content, capacity, communication and digitalization will be the hallmark of this shift.

4.5.26 Centre-state dynamics:

India’s potential growth over the coming decades is expected to be shaped by its diverse States and their alignment with the constitutionally elected strong central government. Center-state relations in the coming years are likely to be characterized more by “competitive federalism,” over ‘cooperative federalism’ where central and state governments shall try for investment opportunities and the chance to create jobs. The present document envisions exploring both investment opportunities and employment avenues for building a strong India with economically sound NER States.

4.5.27 Role of multilateral and bilateral agencies:

The role of bilateral agencies like between NER-India and China, NER India and Bangladesh, NER India and Nepal etc will be to achieve together the SDG goals of say zero hunger and zero poverty through Animal Source Food capitalizing on Act East Policy, Steel well Route and Chicken neck etc as well as to build a stronger SAARC. GI tagged and PPVFRA registered Genetic materials, Technology and expertise etc exchange bilaterally might strengthen each others’ capacity to capture global ASF market,

Role of multilateral agencies like FAO (Food and Agriculture Organization, Rome), WHO (World Health Organization), USDA (United States Department of Agriculture) etc will be to facilitate the program technologically and partly financially specially in the areas of ‘One Health’ and support to South East Asian Nations.

4.5.28 Way ahead:

Separate task forces (sector-wise) need to be constituted to work out the minute details with anticipated budgetary allocation identifying institutions and partners for each touch point from animal source food production to consumption.

4.6. Fisheries and Aquaculture - New Horizon in Food Security

4.6 .1. Brief Background

Fisheries and aquaculture are referred to as "underwater agriculture" and also as "Sunrise Sector". Globally, this sector played a significant role in providing food and nutritional and economic security and, employment for fishers/ traders/ dealers, and livelihood support among rural people. Aquaculture contributes more than 49 percent of global fish food consumption and is the fastest growing profitable food producing sector. This sector is a silver bullet to mitigate hunger & malnutrition

The growth of this sector in India has been phenomenal over the decades raising fish production from a mere 2.5 Mil Ton to around 15 Mil ton today providing livelihood to over 28 million fishers and fish farmers at the primary level and twice the number along the value chain. The demand of fish in the country is steadily increasing because of its multifaceted health benefits.

Some of the significant supports to the sector by the central government are:

1. Fisheries and Aquaculture Infrastructure Development Fund (FIDF)- INR 7522.48 Cr.
2. Pradhan Mantri Matsya Sampada Yojana (PMMSY)- INR 20,050 Cr.
3. Production Linked Incentive Scheme for Food Processing Industry- INR 10,900 Cr.
4. Foreign Direct Investments (FDI) Policy- 100%
5. FDI allowed through automatic route in Pisciculture and Aquaculture Pradhan Mantri Matsya Kisan Samridhi Sah-Yojana (PM-MKSSY) a new sub-scheme under PMMSY, announced with targeted investment of INR 6,000 crore to further enhance the livelihood of the stakeholders engaged in the fisheries sector.

4.6.2.National Scenario

India has already become 1st in Inland capture fish production, 2nd largest aquaculture country accounting for 8% of Global production, 3rd largest overall fish producer, and 4th largest exporter of fish and fisheries products.

The fishing and aquaculture industry made up about Rs 1.59 trillion in gross valued added (GVA) to agriculture across India in financial year 2021. The GVA increased consistently since 2012 from this sector. Its contribution is 1.3% to GDP and 7.28% to agricultural GDP of the country. After the "Green" and "White Revolution", India is currently witnessing a "Blue Revolution" to exploit the huge potential in this sector for sustaining food and nutritional requirements as well as meeting export demand. According to National Council of Applied Economic Research (NCAER, 2023), the estimated future demand for fish in India under three (3) scenarios (Business as Usual; Moderately Optimistic or Highly Optimistic), the total availability of fish which was around 15 million tons in 2022, is expected to reach 26, 30 or 35 million tons respectively by 2031.

4.6.3. NER: Aquatic Resources and Production

NER region is a part of two of the 34 biodiversity hotspots listed by Conservation International, the Himalayas, and Indo-Burma (Roach, 2005) and blessed with unique aquatic resources that have the potential to contribute significantly to the region's economic development. These resources comprised 42,692 km of rivers and canals, 18,259 ha of reservoirs, 1,83,705 ha of wetlands/beels/swamps/lakes, 1,50,423 ha of ponds and tanks and 5,30,610 ha of low-lying fields, forest water bodies and others (Handbook of Fishery Statistics, 2020). Of these, wetlands are the supermarket of bio-diversity which accounts for almost 5% of the wetlands in the country and plays a vital role in maintaining the ecological balance and supporting biodiversity conservation in the NER.

There are **7,731 major wetlands** in the NE states. In addition, **11,736 small and very small wetlands** also exist in the region of which Arunachal Pradesh has 806, Assam 11,178 (major – 5,097, small – 6,081), Manipur 167, Meghalaya 135, Mizoram 88, Nagaland 267, Sikkim 160, and Tripura 432. Out of **80 Ramsar sites** in India, four (4) of them are in the northeast – Loktak lake (266 sq km) in Manipur (designated on 23 March 1990), Deepor Beel (40 sq km) in Assam (designated on 19 August 2002), Rudrasagar (2.4 sq km) in Tripura (designated on 8 November 2005), and Pala Wetland (18.5 sq. km) in Mizoram (designated on 31 August 2021). All the four **Ramsar wetland sites** in NER are under severe ecological threats and degradation. As per the latest data, India's 38.16% of wetlands & derelict water bodies, and 55.09% of water bodies other than rivers and canals (forest water bodies, inundated lands, etc.) are most underutilized resources present in the northeast region.

The region has diverse aquatic resources starting from cold to warm water, tropical to semi-tropical to temperate fish species. Previous study on fish diversity of NEH recorded 422 species belonging to 133 genera and 38 families from the region. However, recent studies conducted in the past 9-10 years by College of Fisheries, CAU, Tripura under FAB-COE project revealed that there are only 303 species available in the region at present. Most of the water bodies sustain high productivity throughout the year, in some places of Tripura and Assam, the average fish productivity is $>3 \text{ MTha}^{-1}\text{y}^{-1}$ despite low-input management, indicating scopes for further improvement in the production of fish through intensifications. Further, NER is a hub for 'high-value fish' such as Pabda, Tengra, Pengba, Chital, Mahseer, Scampi, etc. for development of ventures of commercial importance.

More than 26.3 lakh people of the region are associated with fisheries and aquaculture for their livelihood. Despite these enormous resources northeast India has not been able to fully exploit and manage its aquatic wealth resulting in insufficient fish production to meet the growing local demand. The average fish productivity of NE India is estimated to be $1.5 \text{ MT ha}^{-1} \text{ y}^{-1}$ which is below the national average of $3 \text{ MT ha}^{-1} \text{ y}^{-1}$. The demand for fish is very high in NE India as more than 95% of populations are active fish eaters. Further the tendency of the people to consume fish more than nutritional requirement ($12 \text{ kg capita}^{-1} \text{ annum}^{-1}$) is a great challenge for the sector to overcome. Thus, lakhs of tonnes of fish are imported annually from other states as well as from the neighbouring countries like Bangladesh and Myanmar. Unexplored aquatic resources along with the current demand for aqua products have made this region suitable for entrepreneurship development in this sector.

Discovery of hypophysation technique has revolutionized the aquaculture industry producing surplus fish seed for most of the cultivable species and no longer dependent on riverine seed collection. However, availability of quality fish seed in the northeast, especially of improved strains such as Jayanti Rohu, Amur common carp, Monosex GIFT etc. is limiting with only one certified multiplier unit existing in Assam which cannot meet the demand for the entire northeast region.

Tripura has the highest per capita fish consumption (25.53 kg) State in India (excluding the Andaman and Nicobar Islands), while Manipur (18.25 kg) and Assam (11.89 kg) also has higher per capita fish consumption than the national average of 6.31 kg. However, per unit area fish productivity in the region is much below the national average. Though aquaculture technologies for production of 15 tonnes per hectare have been developed and widely adopted in mainland India, the northeast farmers are slow in adopting due to numerous issues such as lack of awareness, short favorable culture duration, uncertainty and high cost of quality fish feed, lack of working capital etc. On the other hand, many exotic species are illegally imported and entering the aquaculture sector without any quarantine measures nor environmental impact assessment study thereby endangering the rich biodiversity of the region. Moreover, bio-security measures in the farms and hatcheries are non-existent thereby compounding the threat of disease outbreaks and spread.

Table 4.6.1 Inland Fish production, per capita fish consumption and Fish seed production of NER States

State	Fish production 2021-22 (tonnes)	Per capita fish consumption (kg)	Fish seed production in 2020-21 (lakh fry)
Arunachal Pradesh	5,000	3.65	80.00
Assam	4,17,000	11.89	98,860.00
Manipur	33,000	18.25	2,788.00
Meghalaya	18,000	9.00	137.90
Mizoram	5,000	3.38	200.00
Nagaland	9,000	6.06	798.00
Sikkim	0.00	1.16	14.05
Tripura	82,000	25.53	4,350.00
North East	5,69,000	-	1,07,228
All India	1,21,21,000	6.31	5,40,690.00

Source: Handbook on Fisheries Statistics, 2022

**Table 4.6.2 Fish consumption details by North Eastern states of India during 2019–2021
(% of population)**

States	Fish consumption (% population)	% Change in fish consumption from 2005-06 to 2019–2021	Frequency of fish consumption (% of population)			Non-fish-eating population (%)
			Weekly	Daily	Occasionally	
Arunachal Pradesh	99.05	15.00	65.25	04.20	29.60	00.95
Assam	99.10	01.55	69.00	13.10	17.00	00.90
Manipur	99.25	00.70	46.65	19.70	32.90	00.75
Meghalaya	98.50	00.85	54.25	06.35	37.90	01.50
Mizoram	96.95	01.65	38.35	01.90	56.70	03.05
Nagaland	98.85	00.50	42.50	01.45	54.90	01.15
Sikkim	89.30	06.70	54.55	05.35	29.40	10.70
Tripura	99.35	00.45	69.00	11.50	18.85	00.65
Northeast (average)	97.54	03.43	54.94	07.94	34.66	02.46
India	72.10	06.10	34.80	05.95	31.35	27.90

In **Sikkim**, **trout** such as rainbow trout and brown trout; **exotic carps** such as grass carp, common carps and silver carps have been culturing for the purpose of food and sport. **Mahaseer** is the important game fish available in the foothills of rivers of Teesta and Ra

4.6.4. Why a Laggard:

Though the NE India is considered as one of the global hotspots for aquatic biodiversity with >265 endemic fish species but the stark reality is in the effort of increasing fish production of the region, major R & D is focused on fast-growing only 10-12 species, less emphasis is upon bringing the multitudes of other locally available fishes in the form of Medium Carps, Minor Carps, Catfish, Notopterids, Murrels, etc. into the mainstream aquaculture and commercialization. Further, here aquaculture means culture of fish in pond or tank ecosystem, no emphasis over open water aquaculture.

- Little emphasis over the development of capture fisheries and capture-based culture fisheries such as cage culture, pen culture, as a result, the average fish productivity of capture fisheries in NE India is $<250 \text{ kg ha}^{-1} \text{ y}^{-1}$ whereas in inland and maritime states it is $500\text{-}1000 \text{ kg ha}^{-1} \text{ y}^{-1}$.
- Lack of family approach in education with focus on women. Aquaculture is more women friendly and several of the activities like fertilization, feeding, marketing of fish, etc. are best done and managed by women. This is an area where major changes can be brought to farming by involving and empowering women on a massive scale.
- Poor organizational and communication skills, lack of development of entrepreneurship or public-private-partnership (PPP), as a result, formation of fishery-based cooperatives or farmers' producers' organization (FPOs) is less in the region.
- No proper marketing infrastructures, cold chains facilities for fish; in some states like Arunachal Pradesh, Nagaland, Meghalaya, not a single dedicated market exist for fish, they are disposed from same outlets of agriculture commodities. Further, there is no standard floor price and market intelligence for selling fish.
- Limited awareness over sustainable and responsible fisheries, conservation aquaculture, resource mapping, etc. Most of the fishery ponds are seasonal and backyard in type with no proper inlet and outlet facility, contour and basin configuration, primary and secondary dikes, crests, berm, freeboards, side slopes, etc; further in most of the cases, tank resources are confused with pond resources.
- Lack of location-specific R & D and promotion of need-based interventions; inappropriate allocation of scarce resources and improper technological innovations underestimate the fishery potential of the region.
- No contingency plan and adaptive measures, secondary livelihood creation to cope with increased climate-induced perturbations.
- Lack of quality fish seeds and quality fish feeds at affordable prices. Further there are high transportation costs in the far-flung areas due to poor accessibility and seed mortality due to transportation stress.
- No proper seed policy is in existence.
- Lack of skilled manpower and those who have earned skills, they migrate to inland States in search of better opportunities.
- As more than 87% farmers are marginal and small in category, their purchasing capacity is low, they assume scientific farming is capital-intensive and energy expensive.
- Lack of mechanization and modernization in resource utilization; use of traditional fishing gears and crafts underestimate the potential of fisheries production.
- Practice of destructive fishing methods like stupefying the fish using dynamites, piscicides, electric shocks, etc. The effective population size (E_n), maximum sustainable yield (MSY), maximum economic yield (MEY), catch per unit effort (CPUE), catch per unit area (CPUA), etc. are not known for many commercially important fishes in their natural habitats, thus the need of their stock enhancement or replenishment by ranching as is poorly known. In absence of aquaculture enhancement, fishing pressure has been increased over the wild stocks to meet the increased market demand and it is depleting their stock day by day and endangering the livelihoods of the region associated with the capture fisheries.
- Post harvest management and value additional sector is poorly development.

- Most of the technology transfer wings of State departments, Central departments are running shortage of staff; each Fishery Officer or Subject Matter Specialist of KVKs are overburdened with works with no staff, vehicle and other facilities, as a result, there is dereliction of duties. State Dept. put more emphasis over implementation of Govt. schemes rather assessing the actual needs in the local condition.
- Increased dependency of farmers over Govt. schemes. In most of the cases, it is found that if Govt. supports, fish production increase, but once it is sacked, fish production drop downs.
- Increased occurrence of diseases, lack of proper facilities and infrastructure for disease diagnosis, water and soil analysis, etc.
- Absence of knowledge resource centers, custom hiring services, etc.
- High input cost and most importantly lack of availability of inputs at the appropriate times,
- Poor lease policy.

Inaccessibility to bank finance and crop insurance for the fish farmers of the region are major drawbacks for fisheries and aquaculture development in the region.

Only two professional Fisheries Colleges, one each located in Assam and Tripura, caters to the fisheries education needs for the eight (8) states of northeast with only one regional centre fisheries research institute, ICAR-CIFRI, at Guwahati. However, ICAR research centre for NEH region headquartered at Umiam, Meghalaya has centres in all NE states except Assam but only with one scientist in each centre.

Despite the availability of professionally qualified fisheries graduates and post-graduates (many with specialized Doctoral degrees), some states in the northeast continue to recruit non-professional technical staff in the state fisheries department and then these in-service fresh recruits are sent for short term certificate courses at government expenses thus compromising the competence of the human resources of the department. This in turn also affects the policy planning and execution of the various government policies and schemes at the grassroot level.

Due to the difficult hilly terrain of the northeast states poor road and rail connectivity still remains a bottleneck for growth in aquaculture sector in the region. Timely availability of aquaculture inputs particularly quality fish seed and commercial fish feed is essential to sustain the rapid expansion and growth of aquaculture sector. The rail tracts and highways are prone to frequent landslides and flooding during the monsoon, cutting off the region from the mainland and disrupting supply of essential goods and commodities.

However it is proven by various on farm trials (OFTs) or frontline demonstrations (FLDs) that fish farming in NER is a highly profitable enterprise with benefit-cost ratios that varies from 1.5 to 4.0 and has the potential to address issues like livelihood insecurity, unemployment, etc. Given the amount of rainfall the region receives and its water resource with a sizeable number of farmers in the fish trade, the region has the potential to increase fish productivity per ha from 1.5 ton to 5.0 ton and total fish production from 6.0 lac ton to 10.0 lac ton by 2047 and thus become a fish surplus region saving thereby the fishes from outside the region for export purposes.

4.6.4 Aquatic Resources Vision 2047

➤ Vision I: Producer and Exporter

The anticipated requirement of fish production as per nutritional point of view i.e., @12 kg per capita per annum (ICMR) in NE India by 2051, based on the projected human population report submitted by PFI and PRB (2007) and also calculated total fish-eating population is furnished in Table 3 below:

Table 4.6.3 Projected Human Population of NE India, 2021-2051*and Anticipated Fish Requirement

States	Fish Eating Population (lakh Nos)			Fish Requirement (Tons)		
	2031	2041	2051	2031	2041	2051
Arunachal Pradesh	19.56 25.14		22.38	23,475	25,475	30,167
Assam	393.65 458.65	428.87		4,72,386 5,50,386	4,72,386	
Manipur	28.88 31.08	30.29		34,658	34,658	37,302
Meghalaya	38.71 46.78	43.06		46,453	46,453	56,145
Mizoram	12.96 14.93	14.06		15,555	15,555	17,916
Nagaland	30.80 35.38	33.53		36,962 42,454	36,962	
Sikkim	7.72 9.48	8.64		9,269 11,380	9,269	
Tripura	44.36 50.55	47.77		53,238	53,238	60,659
Northeast	568.86 662.90	620.17		682637 795587	682637	

**Source: PFI and PRB (2007). Population Foundation of India and Population Reference Bureau- The Future POPULATION of India: A Long-range Demographic View, pp. 19.*

4.6.5 Strategies and Policy Interventions

Following strategies have been formulated for different freshwater aquatic resources of capture fisheries, culture-based fisheries and culture fisheries of the NE Region:

Surface Water Resources of NER States	Strategies to achieve the 2047 vision
<p>Rivers/ Canals (42,691.67 km; 16.91% of India)</p>	<ul style="list-style-type: none"> • River ranching programme • Conservation programme of respective State fishes in their natural habitat • Mass/ community Awareness programme regarding the importance of rivers, biodiversity and also the impact of illegal fishing • Rejuvenation/ revival programme of the dead or seasonal rivers • Implementation of 'Pen culture system' in rivers and canals wherever possible • Revival of landing centers with all infrastructural facilities Processing Centers/Units for grading, handling, processing, icing, and packaging of fresh fishes as well as value added fish products; Ice factories; Cold storage; Insulated vehicle; Wholesale Fish Market, etc. nearby the landing centers • Application of AI and Automation to strengthen the riverine fisheries i.e., Capture fisheries • Establishment of 'Fish Breeding Farm' nearby breeding grounds with all facilities of egg and spawn rearing of naturally breed fishes to produce quality seeds • Proper management of watershed areas/ catchment areas of streams and rivers • State Riverine Fisheries Legislation for proper implementation of different programmes • State Fisheries & Aquaculture Board for proper monitoring and execution of the different programmes
<p>Reservoirs/ Big Lakes (18,258.87 ha; 0.45% of India)</p>	<ul style="list-style-type: none"> • Reservoir ranching programme • Conservation programme of respective State fishes in the reservoirs • Mass/ community Awareness programme regarding the importance of aquatic biodiversity and the impact of illegal fishing • Implementation close season/ mesh size regulation during breeding season • Implementation of 'Pen culture system' in rivers and canals wherever possible • Implementation of floating and well as submerge 'Cage culture system' in reservoirs wherever possible • Implementation of Aqua-eco Tourism in and around the reservoirs wherever possible

Surface Water Resources of NER States	Strategies to achieve the 2047 vision
	<ul style="list-style-type: none"> • Revival of landing centers with all infrastructural facilities Processing Centers/Units for grading, handling, processing, icing, and packaging of fresh fishes as well as value added fish products; Ice factories; Cold storage; Insulated vehicle; Wholesale Fish Market, etc. nearby the reservoirs/ landing centers • Application of AI and Automation to strengthen the reservoir fisheries i.e., Culture based fisheries • Establishment of ‘Fish Breeding Farm’ nearby the reservoir with all facilities to collect the natural brood fishes from reservoirs for breeding matured fishes and rearing of egg and spawn to get quality seeds • Implementation of ‘Smart Floating Farms’ which encourages and embodies “a highly productive floating ecosystem.” • Housing complex of fisher flock with all basic amenities • Insurance facilities to be implemented for the fisher flock • State Reservoir Fisheries Legislation for proper implementation of different programmes • State Fisheries & Aquaculture Board for proper monitoring and execution of the different programmes
<p>Ponds and Tanks (1,50,422.5 ha; 1.63% of India)</p>	<ul style="list-style-type: none"> • Water areas expansion to increase the production and productivity of ponds and tanks • Insurance facilities to be implemented for the standing crops • Hi-tech/ Climate-SMART Aquaculture Systems viz., RAS, Biofloc, Aquaponics, Artificial Intelligence (AI), and IOT (Internet of Things) Technology based aquaculture systems etc. • Supply chain of ‘One-Stop Aqua Shop (OAS)’ for aqua-inputs like quality fish seed, quality fish feed, quality lime, manures/ biofertilizers/ vermicompost/ vermi-wash, low regulatory medicines/ chemicals, probiotics/ prebiotics, and farm implements/ machineries/ mechanization etc. • Revitalization of the underutilized ponds and tanks with proper scientific interventions • Horizontal Expansion of Composite Fish Culture Farms and intensification of the farming practices of existing farmers through adoption of modern aquaculture technologies • Adoption of Extensive to Semi-intensive fish farming (aquaculture) for small and marginal farmers • Adoption of Semi-intensive to Intensive fish farming (aquaculture) by the marginal and large farmers • Adoption of 3- Tier Fish-based Integrated Farming System models of A5 or A4 or A3 or A2 where the farmers having the land of hills/ small hillocks/ till/ fallow as well as with valley

Surface Water Resources of NER States	Strategies to achieve the 2047 vision
	<p>(lunga)</p> <ul style="list-style-type: none"> • Implementation of Integrated Fish Farming and Irrigation (IFFI) Process • IMTA • Implementation of ‘Sustainable aquaculture’ through blending of Indigenous Technological/ Technical Knowledge (ITKs) with Modern Scientific Aquaculture Technologies/ Techniques. • Adoption of Good Management Practices (GMPs) or Best Management Practices (BMPs) • Establishment of Fish Health Care Centre, Soil-Water Analysis Laboratory, Advisory Service Centre • Air-breathing fish (Magur, Singhi, Koi, Channa, Eel etc.) farming in wetlands. • Introduction of genetically improved carps (<i>Jayanti Rohu</i>, Amur carp) for Sustainable Aquaculture Production. • Popularization of ‘Periphyton-based Aquaculture System’ for increasing per unit production. • Promotion of ornamental fish farming in backyard, particularly in rural areas • State Fisheries & Aquaculture Board for proper monitoring and execution of the different programmes • State Fish Seed Certification Authority
<p>Wetlands/Beels/Jheel (1,83,704.8 ha; 38.16% of India)</p>	<ul style="list-style-type: none"> • Wetlands/Beels/Jheel ranching programme • Conservation programme of aquatic biodiversity in the Wetlands/ Beels/ Jheel • Mass/ community Awareness programme regarding the importance of aquatic biodiversity and the impact of illegal fishing • Implementation close season/ mesh size regulation during breeding season • Implementation of ‘Pen culture system’ in wetlands/ Beels etc. underutilized water bodies, wherever possible • Implementation of floating and well as submerge ‘Cage culture system’ in underutilized water bodies, wherever possible • Implementation of Aqua-eco Tourism in and around the wetlands/ Beels etc., wherever possible • Revival of landing centers with all infrastructural facilities Processing Centers/Units for grading, handling, processing, icing, and packaging of fresh fishes as well as value added fish products; Ice factories; Cold storage; Insulated vehicle; Wholesale Fish Market, etc. nearby the wetlands/ Beels etc. / landing centers

Surface Water Resources of NER States	Strategies to achieve the 2047 vision
	<ul style="list-style-type: none"> • Application of AI and Automation to strengthen the wetlands/ Beels etc. fisheries i.e., Culture based fisheries • Establishment of ‘Fish Breeding Farm’ nearby the wetlands/ Beels etc. with all facilities to collect the natural brood fishes from reservoirs for breeding matured fishes and rearing of egg and spawn to get quality seeds • Implementation of ‘Smart Floating Farms’ which encourages and embodies “a highly productive floating ecosystem.” • Housing complex of fisher flock with all basic amenities • Insurance facilities to be implemented for the fisher flock • State wetlands/ Beels Fisheries Legislation for proper implementation of different programmes

For organizing effective training and demonstration programmes for proper dissemination of location-specific technology to the farmers, state fisheries extension functionaries have to be reformed with convergence with other development departments and application of ICT in the dissemination of new technology/forecasting etc.

Marketing support system should be created to attract and encourage young entrepreneurs to start aquaculture venture and on the other hand, it will provide better market price realization.

It is necessary from respective state governments to impress upon the leaseholder so that they not only exploit the harvest but also maintain and manage the water bodies and rivers.

A consortium mode of governance encompassing all public-private and farmer stakeholders is necessary with focussed action plans separately for riverine fishery, pond and tank fishery, beels and reservoirs etc with a quarterly monitoring mechanism preferably in presence of a 3rd party which could be a Consultancy group with expertise in fishery. The financial allocations received from central funding agencies needs to be put on line with its utilization plan and periodic status of development.

Owing to the high demand for locally produced fish and huge gap in the demand and supply, there is ample scope of market for fish in the northeast. Also, there is local as well as export market potential for the native/endemic fishes including **ornamentals** of the region.

Modern hi-tech aquaculture technologies such as Biofloc, Recirculating Aquaculture System (RAS) and Aquaponics aided with artificial intelligence and automation may be taken up by the enterprising educated youths in urban and peri urban areas. Other scientific aquaculture technologies such as semi-intensive fish farming, fish based integrated farming system, integrated multi trophic aquaculture (IMTA) etc. may be adopted by the existing farmers in the rural areas to enhance farm productivity and sustainability.

There is need for promoting the Cage culture and Pen culture in the reservoirs, lakes and wetlands of the region. There is ample scope for promoting riverine and coldwater fisheries in the Himalayan range in the region. Potential for the recreational or sport fisheries too can

be tapped. Concept of aqua-tourism can be popularised in larger farms by creating facilities for angling, home stay, restaurant with live fishes etc. There is lack of cold chain, modern fish outlets/market and post-harvest processing industry in the region. These facilities need to be developed for seamless distribution and export of high value species. Commercial Fish feed mills may be established in each state with government incentives in order to speed up diffusion and adoption of modern aquaculture technologies.

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4.7 Forestry and Wildlife

4.7.1 Background

The NER region is identified as one of the world's biodiversity hotspots, hosting species-rich tropical rainforests and supporting diverse flora and fauna, including several crop species. The altitudinal variation and rainfall patterns of the southwest and northeast monsoon play a significant role in the development of ecological niches in this region of India. The forest cover in the region constitutes 64.66 percent of its total geographical area against national average of 21.7 percent. It has 51 forest types, broadly classified into six major types – tropical moist deciduous forests, tropical semi-evergreen forests, tropical wet evergreen forests, subtropical forests, temperate forests, and alpine forests. The forests in this region harbour 8,000 out of 15,000 species of flowering plants, with the highest diversity reported from the states of Arunachal Pradesh (5000 species) and Sikkim (4500 species). The NER harbours well over 50 percent of the Indian flora and over 6500 species are used medicinally in the country in which the share of NER has been over 60 percent.

Northeast India forms part of three geographical sub regions; the Himalayan, the Indian, and the Indo-Chinese, falling broadly within the Oriental Zoogeographic region, now called Indo-Malayan region. However, the Himalayan sub region is also transitional to the Palearctic region, and a number of Palaeolithic taxa occurred in the area. Northeast India has the highest mammalian and avian diversity in India, with around 250 and 900 species, respectively. While the reptile and amphibian diversity are also very high, many of these are the chain of the 11 critically endangered species of mammals listed in India, with 7 recorded in this region. Of the 57 vulnerable species of birds in India, 42 were recorded in the north-eastern region.

According to the *Indian Red Data Book*, published by the Botanical Survey of India, 10 per cent of the flowering plants in the country are endangered. Of the 1500 endangered floral species, 800 are reported from Northeast India. Most of the Northeastern states have more than 60 percent of their area under forest cover, a minimum suggested coverage for the hill states in the country in order to protect from erosion. Northeast India is a part of Indo-Burma hotspot. This hotspot is the second largest in the world, next only to the Mediterranean Basin, with an area 2,206,000 square kilometres (852,000 sq. mi) among the 25 identified.

In 8 percent of India's geographical areas in the northeast, 60 percent of the endangered species of the country reside, indicating the rich biodiversity of this region. More preserves should be created to cover as much habitat as possible for long-term conservation and adequate protection of endangered species. The existing protected areas should be adequately protected, as many of them are not at present. Conservation, education, awareness, eco-tourism, and other such activities that may help locals and provide extra income should also be given priority as long-term conservation strategies.

The Forestry and Wildlife sector in the North-Eastern Region is of paramount importance due to its ecological significance and the cultural ties that many indigenous communities have with the region's flora and fauna.

4.7.2 NER Forest Resources: Present status

This section delas with the present status of forest resources in the NER.

Table 4.7.1 Forest cover in Northeastern States

Table 2.10 Forest Cover in North Eastern States (in sq km)											
2021 Assessment											
State	Geo-Graphical Area	VDF	Per-centage of VDF	MDF	Per-centage of MDF	OF	Per-centage of OF	Total	Per-centage of Forest Cover to GA	Change in forest cover wrt ISFR 2019	Scrub
Arunachal Pradesh	83,743	21,058	25.15	30,176	36.03	15,197	18.15	66,431	79.33	-257	797
Assam	78,438	3,017	3.85	9,991	12.74	15,304	19.51	28,312	36.09	-15	228
Manipur	22,327	905	4.05	6,228	27.90	9,465	42.39	16,598	74.34	-249	1,215
Meghalaya	22,429	560	2.50	9,160	40.84	7,326	32.66	17,046	76.00	-73	663
Mizoram	21,081	157	0.74	5,715	27.11	11,948	56.68	17,820	84.53	-186	1
Nagaland	16,579	1,272	7.67	4,449	26.84	6,530	39.39	12,251	73.90	-235	824
Sikkim	7,096	1,102	15.53	1,551	21.86	688	9.69	3,341	47.08	-1	296
Tripura	10,486	647	6.17	5,212	49.70	1,863	17.77	7,722	73.64	-4	33
Total	2,62,179	28,718	10.95	72,482	27.65	68,321	26.06	1,69,521	64.66	-1,020	4,057

(Source: ISFR 2021)

4.7.3 Quality of Forests:

Total Forest cover in the North-Eastern region is 64.66 percent of its geographical area, out of which 10.95 percent of total geographical area is covered by very dense forest, 27.65 percent area is covered by medium dense forest, and 26.06 percent area is covered under open forest. This extensive forest cover contributes to the region's diverse ecosystems, encompassing tropical evergreen, bamboo, montane, and wetland/riparian forests, along with grasslands. This diverse mosaic supports a rich biodiversity, making the region a global hotspot with numerous endemic species.

4.7.4 Key Features of the Wildlife Sector in Northeast India:

- i. Biodiversity Hotspot
- ii. Unique Fauna and Flora
- iii. Indigenous Communities and Wildlife Conservation
- iv. Tourism Potential
- v. Research and Monitoring
- vi. Cross-Border Conservation

The future of the wildlife sector in Northeast India requires a holistic approach that balances conservation with sustainable development, involves local communities in conservation efforts, and addresses the various threats to the region's unique biodiversity.

4.7.3 Vision Goals 2047

- **Goal 1- Quantum Jump in Forest Cover**

Achieving the committed targets of GDP growth through strategic planning for enhancement of forest cover in two phases.

Forest Class	Phase	Percentage Increase/Decrease (%)	Remarks
Very Dense Forest	2024-2035	-	During the first phase i.e. 12 years, monitoring and evaluation showing increasing trend
	2035-2047	Increase by 1%	Increase of forest cover up to 1.05% Increase VDF to 12% (Existing 10.95%)
Moderately Dense Forest	2023-2035	Increase by 1%	Increase of forest cover up to 28.5% (Existing 27.65%)
	2035-2047	Increase by 1%	Increase of forest cover up to 29.5%
Open Forest	2023-2035	Decrease by 1%	Decrease of forest cover up to 25% (Existing 26.06%)
	2035-2047	Decrease by 1.5-2%	Decrease of forest cover up to 23.16% This concludes that more open area under forest cover needs to be converted into Medium and Dense Forest

- **Goal 2-Indigenous Community Rights**

Manage the economic aspects of the forestry sector to support the livelihoods of fringe area indigenous communities against the backdrop of the Forest Rights Act (FRA) 2006. This involves recognition of indigenous rights, emphasis on capacity building through state and central schemes, focus on sustainable production of non-conventional high-value items like medicinal and aromatic plants, bamboo, cane, and horticulture-floriculture; involving indigenous people to implementing sustainable forest management practices; and strengthening of Indigenous Cultural Institutions (ICIs), like village councils or community-based organizations (CBO). This can be achieved in phases:

Phase	Remarks
2024-2025	Constituting state-level monitoring committee with civil society, community and experts and professionals participation to monitor the process of recognition of these rights or if their rights are being impacted by new policies such as FCA 2023
2026-2047	Regular monitoring

- **Goal 3- Adherence to Green Practices:**

Forest certification identifies land that is managed with a goal of sustainability. Generally, certified forests appear more environmentally friendly than conventionally managed ones. However, there is lack of awareness among the small land holder operators, traders and officials regarding the benefits that a certification offers.

Sustainable Forest Management and Trees outside Forests Certification schemes, particularly beneficial for small landholders, can serve a dual purpose: boosting revenue for farmers and showcasing India's commitment to environmental responsibility on the global stage.

Phase	Area Target	Village and Landholders
2024-2025	Webinars, workshops for creating awareness and close interaction of certification organizations with land holders and officials at district level	Target Different villagers at different time period at district level including women and youth
2025- 2030	Implementing the certification and monitor the progress in terms of revenue generation and global recognition considering up to 2 ha. of area	Consider at least 500 landholders from each district
2030-2047	Certifying at least 50% of the forests of NER	50% target of Group and individual certification separately

- **Goal 4- Traditional Knowledge in the backdrop of rich heritage of NWFP including MAP:**

NER is a huge reservoir of non-wood forest produce (NWFP) like wax, resin, honey, dyes, canes, lacs, broom grass, gums and wildlife fruits which carry intense commercial, nutritional and medicinal value. People in the Northeast region have shown strength in dealing with changes to their traditional ways of life. They've adapted to unusual events and their bad effects by using their traditional knowledge and collective wisdom. This has led to discussions about better ways to handle shocks and adapt to changes.

However, this valuable knowledge is mostly known in the Northeast and hasn't been shared globally. Some NER states have even prepared State Action Plan on Climate Change [Assam 2015 and others]. However, no institutions exist at the regional level, and no scientific and strategic planning is seen to grapple with the much wider and more deleterious impact of climate variability and change.

Approach to Utilize and Enhance Traditional Knowledge	How to Achieve This Approach
Recording Knowledge	Document the healing methods and knowledge used by indigenous people.
Checking with Science by Partnering with Organizations	Conduct laboratory tests to scientifically validate traditional practices and also set up a (Traditional Medicine Systems) TMS research unit in India as offered by WHO
Creating a Group (EMTC)	Establish the Ethno-Medicine and Tourism Commission (EMTC) to coordinate efforts.
Encourage Commercialization of Medicinal Plants	Support the commercialization of medicinal plants by fostering partnerships with pharmaceutical, cosmetic, and herbal product industries.
Document and Prioritize Medicinal Plants for Promotion	Prioritize medicinal plants for promotion based on their commercial, nutritional, and medicinal values. Collaborate with organizations like the National Medicinal Plants Board (NMPB).
Taking Care of Nature	Implement sustainable practices to ensure environmental and community well-being.
Protecting from Stealing	Obtain patents and rights to prevent unauthorized use of traditional knowledge.
Having Rules in Place	Adhere to international agreements and protocols, such as the Nagoya Protocol.

- **Goal 5- Modern technological inputs**

Geospatial technology can help land managers and conservationists to visualize spatial and temporal patterns and changes in the ecosystem services. They can even estimate the potential impact from projected changes in land use or management or climatic conditions by digitizing forest areas. It enhances awareness among both the officials and indigenous people, and promotes compliance with various regulations.

Phase	Target
2024-2030	Digitization of all the Reserved and Protected Forests and initiate the development of Regional IT institutes
2025- 2030	Constituting Unclassed forests into Reserved forests
2030-2047	Digitization of whole forest cover in NER and regional institute for IT sector to carry out tracking works related to forests and wildlife

- **Goal 6- Carbon Storage Enhancement Program**

Enhancing tree cover outside Forests Scheme in the region can lead to achieving additional carbon sink including by growing species such as *Acacia mangium* on farmland that can sequester up to 66tc/ha with 625 trees. This requires empowering communities through education and awareness program at organizational level.

Phase	Target
2024-2035	Enhancement of Trees outside Forests for achieving additional carbon sink of at least 20% region of Northeast by targeting areas at district level in each state and pilot testing at least 5 or 6 districts of each state
2035-2047	Monitoring and enhancement of Trees outside Forests for achieving additional carbon sink of at least 50% region of Northeast

- **Goal 7- Individual Protection Force and physical infrastructures:**

It's impractical for the forest department alone to monitor and protect the vast and hard-to-reach forest areas. To tackle this, it is proposed to allocate individual forest protection forces in each state, actively engaging communities in conservation efforts to address poaching, illegal logging, and encroachment on a larger scale. Additionally, the establishment of research centres dedicated to preserving and advancing traditional medicinal practices is recommended, and also facilitating the concerned stakeholders in Carbon Finance Projects. The regional institute of WII (Wildlife Institute of India) is exclusively required for wildlife conservation, research, management handling various issues such as wildlife health, wildlife habitat, illegal trade and poaching and providing capacity building to wildlife personnels and communities involved in wildlife protection.

Phase	Target
2024-2035	Provide Basic logistics to task force such as commercial trucks, delivery vans, vehicles, and protection instruments and Development of Regional IT Institutes
2035-2047	Monitoring and enhancement of Trees outside Forests for achieving additional carbon sink of at least 50% region of North East

• **Goal 8- Centre-State and Interstate Dynamics, and Engagement of Multilateral Agencies:**

Due to international commitments on environmental issues, the primary responsibility of the central government involves negotiating payments for environmental services with international organizations. This payment would recognize the efforts of the north-eastern states in protecting water, biodiversity, landscape beauty, and achieving carbon sequestration. State-level management plans should be formulated to compensate or reward practices conducive to environmental conservation, such as community-conserved areas, energetic conservation of natural resources, well-developed agroforestry, and villages managed on ecological principles.

Phase	Target
2024-2035	Development of Regional Office and North Eastern Council (NEC) for handling the matter which are beyond the state government Also monitoring the success rate of acts such as FCA 2023 every 2 nd or 3 rd year
2024-2047	

4.7.4 Policies, Strategies and Instruments to achieve the Vision Goals:

Physical infrastructure:

- a) Infrastructures for commercial plantation
- b) Consolidation of Reserved/Protected Forests and settlement of claims thereof;
- c) Complete digitization of forest (all types) boundaries
- d) Complete inventory (for all types data necessary for planning and management)
- e) Wildlife corridors across fragmented forest landscapes
- f) Adequate Infrastructure, connectivity (Establishment of Forest Protection Force)

Legal intervention:

- a) Adequate regulations over unclassified forests
- b) Harmony derived among the Laws/Acts/Rules (in conflict) with customs of the tribe/people
- c) Harmonized conservation efforts and livelihood needs of the local people

- d) Removal of encroachment vis-à-vis implementation of FRA 2006
- e) Regulation of all illegal quarries in forest areas
- f) Regulated timber movement across international borders
- g) Ease of trade of forest and wildlife products from unclassed forests

Finance and resource mobilization:

- a) Value of Ecosystem Services and climate change concerns to be adequately realized in the planning and management of all forests
- b) Adopting natural resources accounting procedures to include Ecosystem services from forest and wildlife areas including PAs, carbon sequestration projects and generation/restoration of carbon credits and Production forestry during estimation of GSDP
- c) Public investments prioritized to Forestry Sector;
- d) Microfinance for women empowerment and NTFP based livelihood generation

Technological inputs:

- a) Well-equipped GIS cells and trained staffs in all FDs
- b) E-marketing platform + IT based communication models including developing web applications for transit of forest produce and prevention of illegal movement.

Institutional support:

- a) Extension of SFM and Sustainable Management of NTFPs to all stakeholders
- b) Certification of Forests, Trees Outside Forests (ToF), Protected Areas (PAs) and Wetlands including management of Wetlands
- c) 100% utilization of raw materials into development of value-added products
- d) Agroforestry and farm forestry, MAPs (medicinal and aromatic plants)
- e) Documentation of Natural Resources including scientific data of plants, herbs and natural substances including good folk practices, mechanism to Patents and IPR to these practices
- f) Development of supply chain and market linkages for forest products
- g) Development of eco-tourism: Nature tourism, adventure tourism, cultural tourism
- h) Extensive integrated bamboo development programmes
- i) Net carbon neutrality
- j) Mechanism for carbon trading at farmers level
- k) Development of out of the box strategy for income generation from wildlife products such as trophies, skin, bones, etc. as per the rules and regulations under relevant Acts- Policy Intervention
- l) Trade and marketing of major commercial species such as Teak, Sal, Acacia etc and development of specific trade zone in the line of SEZ

Biodiversity conservation:

- a) Improvement in Forest and Tree Cover- Qualitative and Quantitative
- b) Massive commercial afforestation (with suitable native species) on wastelands and degraded lands to make NER land degradation neutral (devoted funds; suitable AGF and farm forestry model)
- c) Maintenance and improvement of existing gene pool (including migratory species)
- d) Elimination of Invasive alien species (IAS)

- e) Captive breeding programmes for RET species

Capacity building:

- a) State of the art- State Forest Colleges
- b) Regional Wildlife Institute- Centre for Excellence- RandD, Wildlife Trade and control of Poaching
- c) Capacity building for all stakeholders.
- d) Adequate equipment for forest protection made available to the front-line staffs
- e) Incorporating nature and environment conservation practices in education syllabus.

4.7.6 Other Policy Interventions

A. Strengthening and Improving the Protected Area Network and wildlife conservation:

- Settle rights within tiger reserves and protected areas as per legislative frameworks.
- Define boundaries for key landscapes; identify vital corridors, and detail land use, ecological features, and administrative divisions.
- Address risks posed by animals like dogs and cats to promote a robust and integrated approach to wildlife conservation.

B. Implementing a comprehensive approach to wildlife conservation at the landscape level

In the realm of wildlife conservation, a comprehensive strategy is essential, encompassing various facets.

- Firstly, it is imperative to define and set boundaries for key landscapes, identify vital corridors, and furnish comprehensive information about land use, ecological features, and administrative divisions within the specified area.
- Prioritizing the protection of large mammals, particularly in terms of securing corridors crucial for their movement, is fundamental.

C. Conservation of threatened species:

- Develop and expedite time-bound recovery plans for high-priority species.
- Enhance ex-situ conservation capacity to preserve and multiply threatened taxa outside their natural habitats.

D. Control of Poaching and Illegal Trade in Wildlife:

- Establish special courts or benches dedicated to forest and wildlife crimes for swift legal intervention.

E. Wildlife Health Management:

- Integrate disease surveillance into routine monitoring in Tiger Reserves, Protected Areas, and forests.
- Enhance veterinarians' capabilities in State Forest and Animal Husbandry Departments for effective wildlife health management.

F. Mitigation of Human-Wildlife Conflict:

- Identify and document conflicts, establish regional and state databases to track frequencies, casualties, and fatalities.
- Create a skilled workforce in State Forest Departments to manage on-site HWC situations, especially with large, hazardous mammals.

G. Integrating Climate Change in Wildlife Planning:

- Promote focused research on climate change, including long-term monitoring of vegetation shifts, species, and functional processes.
- Conduct vulnerability mapping for habitats and address factors like fires and epidemics.
- Integrate Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) into management planning.
- Initiate programs for anticipatory or assisted planting and regeneration along ecological gradients to mitigate climate change impacts.

H. Management of Tourism in Wildlife Areas:

- Identify potential areas like zoos and safari parks and develop sustainable ecotourism plans for Tiger Reserves, Protected Areas, and mountain ecosystems.
- Recognize ecotourism as a thrust industry, especially in the NER.
- Strengthen infrastructure to attract tourists, establish standards to protect wildlife and habitats, involve communities as trained guides, and reinvest tourism revenue for managing reserves and local eco-development.

I. Conservation Awareness and Outreach:

- Build and promote infrastructure and capacity for Conservation Education, Nature Interpretation, and Outreach initiatives.

J. Development of Human Resources:

- Review and update existing systems for hiring, training, and career advancement of wildlife managers.
- Build capacity and promote the welfare of frontline staff and their families.

4.8. Traditional Medicine and Medical Tourism hub of India

4.8.1. Background

India is well known for its traditional Medicine system- Ayurveda, Siddha, Unani and Yoga, Naturopathy and Homeopathy. NER still follows the age-old traditional healing systems based on Ayurveda, Unani and other allied traditional practices. Each state is having its own dialect, plant and animal resources for meeting out the requirements including health facilities.

The ethnic diversity in NER manifests itself in multiple ways, including traditional types of drugs used by various tribes or communities within their range of linguistic groups. Traditionally practised medical systems present a rich tapestry in North East India, with different schools offering varieties based on their respective philosophies concerning health care practice as well as cure methods employed by different communities for treatment purposes, such as magic, spirits, etc. Ayurveda, one of the world's oldest medical systems, has a strong presence in the area, with quite a good number of Ayurvedic hospitals and clinics that serve the local population. Assam and Manipur practice Unani medicine that originated from Greco-Arabic traditions.

Also referred to as tribal medicine, it is a large part of the health care landscape in North East India because it relies on medicinal plants and shamanistic ceremonies. Traditional medicines in North East India are based on indigenous knowledge systems transmitted through oral tradition experience for many generations. Published by the National Medicinal Plants Board," The Encyclopaedia of Tribal Medicines in India" illustrates how extensive the region's knowledge concerning medicinal plants and healing practices is among tribes. To uplift and safeguard traditional medicine in north-east India, the Indian government has initiated some measures. Traditional medicine research and development have been effectively supported by the North Eastern Council (NEC). The council has sponsored several projects on traditional medicine through NEC data, such as documenting medicinal flora, training healers and supporting traditional medical tourism. Moreover, the AYUSH ministry has established multiple research centres and regional institutes for advancement in traditional Eastern medicine.

Even though this country embraces its ancestral methods of healing, they have yet to be widely accepted because of limited access to medical services throughout rural regions. National Health Profile 2020 revealed that there were few doctors in relation to people residing in north-eastern provinces compared with the rest parts of India. Furthermore, the failure to create standardized training and certification for traditional healers is detrimental to the amalgamation of traditional medicine into the conventional healthcare system.

This proves that traditional medicine thrives because of its diversity and wisdom among indigenous people of North East India. Our research has been based on statistical data as well as qualitative insights about the importance and magnitude of traditional medicine in the area, bringing out different healing traditions, local knowledge systems and Government initiatives.

4.8.2. Biodiversity and Botanical Richness

With a wide variety of ecological zones, such as tropical rainforests, mountainous, forests, wetlands and alpine meadows, each contributing to floral diversity in unique ways, NER possesses an enviable wealth of Medicinal and Aromatic Plant (MAP) diversity.

North East India also acts as a bio-geographical transition zone between the Indo-Malayan and Indo-Chinese bioregions — two distinct worlds where tropical, subtropical, and temperate flora

coexist. The region is famously known for its high levels of plant endemism, hosting plant species that have made their home nowhere else on earth. More than 1,500 plant species endemic to North East India were identified in a study published by the Journal of Threatened Taxa; among them, *Nepenthes khasiana* and *Dendrobium chrysotoxum* hold their place as rare and threatened taxa, respectively. These unique plants are specific to certain environments like high-altitude cloud forests or limestone caves, which limit their population and threaten them with habitat loss. Biodiversity in North East India is yet to be fully understood— however, scientific research can help us conserve what remains undisclosed while protecting it from harm. The Botanical Survey of India (BSI) and North Eastern Hill University (NEHU) are some of the organizations, along with research institutes and NGOs that actively document and study the flora in North East India.

NER is home to unlimited traditional and herbal medicinal resources that now enter into the national and global market largely surreptitiously as nutraceuticals, herbal extract and cosmetics, pharmaceutical and perfumes. The huge reservoir of non-timber forest produces like canes, fodder, leaves and roots, broom grass gums, waxes, dyes, honey, lac, nuts, wild fruits etc carry in them intense commercial, nutritional and medicinal value. In India alone, medicinal plants sector grew by over 550 percent (Rs 1069 crore to Rs 6985 crore) during 2005-06 to 2014-15 wherein the exports constituted 33 to 48 percent. There is an emerging market of 'naturally driven beauty solutions' especially in skin care and wellness as widely harnessed by South Korea. This organic skin care partly emanates from the herbs and roots of the rich biodiversity of the NER.

The NE region harbours well over 50 percent of Indian flora and over 6500 species are used medicinally in the country in which the share of the NER has been over 60 percent. Meghalaya alone possesses 1200 medicinal herbal plants. A perusal of the prioritised medicinal plants for promotion by NMPB reveals that over 80 percent of the listed plants exist in the region. There are a large number of unique, narrowly distributed, and endemic species like *Coptis teeta*, *Aquilaria malaccensis*, *Homalomena aromatica*, *Clerodendrum colebrookianum*, *Elaeocarous sphaericus*, *Illicium griffithii*, *Rubia cordifolia*, *Cinnamomum tamala*, etc and several high altitude species like *Kutki*, *Taxus*, *Aconitum*, *Berberis*, *Rubia*, *Podophyllum*, *Swertia*, *Gymnadenia*, *Dendrobium*, *Paris* and *Valeriana*. The current trend is to harvest them from wild and trade it elsewhere. They move as raw material (Haridasan, 2015).

The NER also has been a reservoir of faith healers and folk medicine practitioners. Primitive tribes safeguard their institutions of treasure of traditional healing as diviners, herbalists, ritual providers and faith healers. The bumthings, nyibus, donyipolo, bathou, seng khasi, sanamahi, garia all adorn the rugged terrains and highlands of the NER. The plethora of indigenous tribes also located in various autonomous councils set up under the provision of the Sixth Schedule of the Indian Constitution have started facing 'war of faiths' as more and more invasive cultural practices is gaining ground.

The TMS is strikingly the most prolific comparative advantage of the NER and core to the faith, biodiversity management and indigenous healing practices. It carries in it a rich pool of knowledge base to connect and cater to the global market. However, very little concerted effort has been made in terms of documenting the knowledge, scientifically validating and promoting it for commercial purposes and sustainably harnessing the community and environmental ingredients. The pandemic like Coronavirus has brought forward more demands for immunity

enhancing natural sources like herbs, roots, flowers, leaves, shrubs and creepers. The WHO has already offered to set up a TMS research unit in India.

Most of the medicinal plants in North-East India are available in the forest hills. According to variation of climatic zones, medicinal plants vary for their occurrence in different hills. Some of the medicinal plants are distributed in high potential whereas certain others go on depleting from their Natural habitat. This depletion is due to high pressure for their unsystematic exploitation through shifting cultivation, expansion of urbanization, agricultural land and road development as well as some natural calamities like land sliding etc. (Shankar and Rawat, 2013). There are few areas in the North-Eastern states, which cultivates medicinal plants as provided in Table 4.8.1.

Table 4.8.1 State-wise area and production of Aromatic and medicinal plants in North-East

Sl. no.	States/UTs	A= 000' ha								P= 000' MT	
		2013-14		2014-15		2015-16		2016-17		2017-18	
		A	P	A	P	A	P	A	P	A	P
1	Arunachal Pradesh	5.15	109.18	5.15	109.18	0.46	0.99	0.46	0.99	0.2	0.2
2	Assam	4.35	0.16	4.99	0.16	4.4	0.17	4.43	0.17	4.4	0.2
3	Manipur									0.2	2.4
4	Meghalaya									0	0
5	Mizoram	1.11	0.9	1.1	0.95	1.75	0.69	0.93	0.9	0.8	0.8
6	Nagaland					0.11	0.47	0.11	0.49	0.1	0.5
7	Sikkim									0	0
8	Tripura									0	0

A= Area. P = Production. Source: (Department of Agriculture, 2018)

There has been sharp erosion and staggering loss of indigenous and traditional knowledge and practices and a remarkable increase in illegal harnessing and surreptitious knowledge piracy by pharmaceutical companies and neighbouring countries. It has been a loss of national heritage and wealth and also erosion of national soft power. National AYUSH Mission, State Medicinal Plants Boards and private houses like Dabur and Imami have injected some initial dynamism that requires a big push.

The scientific reviews and taxonomic studies published in peer-reviewed journals provide information on where plant species are distributed, their ecology, and conservation status, among other important details. On another note, various conservation initiatives like establishment of protected areas or community-based conservation projects play a role in preserving the biodiversity within North East India. Some medicinal plants found only in North East India, like *Taxus baccata*, *Rauvolfia serpentina* and *Aconitum ferox*, are used in traditional

medicine systems and have commercial value in pharmaceutical and herbal industries. The biodiversity as well as the botanical richness present in North East India hold their place within the ecological integrity, cultural heritage, and socio-economic development of this region; justifies a check on bio-piracy and conservation and utilization for future generations.

4.8.3. Traditional Medicine

Many people of North East India rely on traditional medicine, particularly those living in rural and remote areas. Traditional healing practices in North East India are still popular even with the encroachment and influence of the modern era. The ethnic and tribal communities of this region are deeply linked with the environment and medicinal plant species available in their surroundings. Folk healers use different formulations and mainly herbal medicine for various health-related conditions, including common cuts and wounds, to manage and treat infectious epidemics, cure reproductive problems, and improve immunity. Recognition and integration of such medicine in formal healthcare systems as per WHO Strategy 2024 for affordable healthcare for all would play a vital role.

4.8.4. Medicinal Plant for Vikshit North East India

Speaking globally, the market for medicinal plants and their derivatives was worth an impressive \$33 billion in 2014, and it was estimated that there will be a huge boom to \$5 trillion per year by 2050 if the sector is strategically supported, NER State wise, with production of high-quality raw materials, advanced growing techniques applying latest High Tech and AI based technologies, processing and drug formulation industrial facilities, linkage with pharma companies for markets etc. Although the current export value is a meagre around 1 percent, 37 medicinal plant species from North East India have been recognized and accepted for their vital role in the national and international medicinal plant trade and these are to be technically and commercially pursued. There has also been a notable surge in the global demand for plant materials across medicinal, cosmetic, and nutraceutical sectors, leading to the establishment of numerous businesses focused on trading medicinal plants and their derivatives. India’s herbal market reached to Rs. 515.50 billion in 2021 and is expected to rise to Rs. 1536.9 billion by 2027 at a CAGR of 19.78 percent (Asim et al., 2023; J of Natural Products and Resources, Vol 14(2)). 50 percent of the additional target of Rs. 1000 billion is envisioned to be met from the MAP resources of NER with a strategic approach.

Table 4.8.2 Among some of the highly traded medicinal plants of the country, the NER has ample strength in:

Sl. No.	Common Name	Botanical Name
1	Arjun	<i>Terminalia arjuna</i>
2	Ashok	<i>Saraca asoca</i>
3	Ashwagandha	<i>Withania Somnifera</i>
4	Bach	<i>Acorus calamus</i>
5	Bhomora	<i>Terminalia belerica</i>
6	Brahmi	<i>Bacopa monnieri</i>
7	Gankochu (Sugandhmantri)	<i>Homalomena aromatica</i>

Sl. No.	Common Name	Botanical Name
8	Ghritkumari	<i>Aloe vera</i>
9	Kalmegh	<i>Andrographis paniculata</i>
10	Pipalli	<i>Piper longum</i>
11	Sarpagandha	<i>Rouwolfia serpentina</i>
12	Silikha	<i>Terminalia chebula</i>
13	Bael	<i>Aegele marmalos</i>
14	Brahmi	<i>Bacopa monerri</i>
15	Banslosan	<i>Bamboosa bambos</i>
16	Naga King Chilli	<i>Capsicum chinense</i>
17	Dalcheni	<i>Cinnamomum verum</i>
18	Haldi	<i>Curcuma longa</i>
19	Therker)	<i>Garcinia Sp</i>
20	Ginger	<i>Zingiber officinale</i>

Some Recent Government Initiatives:

- Opening 1000 Health and Wellness Centre’s (HWC) and 100 new AYUSH dispensaries across North Eastern states to bolster AYUSH schemes.
- Establishment of new Ayurvedic College.
- Providing a financial grant to develop the Ayurvedic College in Guwahati, Assam, into a Centre of Excellence.
- Establishing a facilitation Centre for Semi Processing of raw materials in the North East.
- Creating a Regional Raw Drug Repository (RRDR) in collaboration with the National Institute of Bio-Resources and Sustainable Development in Imphal, Manipur, under the Department of Biotechnology.

4.7.5 Vision 2047

Vision Goal I- Leveraging the health and economic benefit from the hitherto untapped potential of NER Medicinal and Aromatic Plants wealth for public and environmental good.

Table 4.8.2: Quantitative Targets

Indicators	Targets		
	2031	2041	2051
Area supported under MAP in NER by AYUSH in 2021-22 was around 1300 ha which could record a growth rate of CAGR 10 percent. (In Ha)	2000	4000	8000
Mass production of above listed 20 Nos of medicinal plants in first phase in a consortium mode @ 1.2 ton / ha (metric tons).	2400	4800	9600
Inclusion of other 15-20 MAP in the 2 nd phase with increased area. (MT)	1500	2500	7500
Generation of digital database of producers, infrastructure and products (%).	30	70	100

Promote public and private institutions for drug manufacturing within NER with statutory license (Nos)	---	01	--
Sourcing, producing Quality planting material from diverse agro-climatic zones, their conservation and multiplication through stakeholders. (%)	30	40	100
Capacity building and skill development of major players in different area domain (%)	40	40	100

4.7.6 Vision Goal II- 200 tribes and faith healers as Actors in MAP Harnessing

It is aimed at achieving the target of 1700MT of MAP by 2047 from the current level - a quantum jump which will vindicate the strength of the region in this sector and benefit the world community with quality herbal drugs.

Potential	Possibilities
To economically transform the livelihood of more than 200 tribes and MAP farmers of NER who are the custodian and possessor of traditional medicine wisdom and thus be active contributor to <i>Ayushman Bharat</i> .	Knit the MAP owners digitally, engage them in contract farming of MAP, institutionally validate and improve the ITKs (Indigenous technical knowledge), bring awareness and skills.
Capture around 25-30 percent of national MAP market share for global trade.	Once the quantitative targets given above are achieved, this potential of 30 percent contribution will stand realized.
The MAP sector of NER as positive contributor to One Health Program	Since One Health is a global program aimed at protecting and promoting the health of the earth and the populations it supports, the MAP from NER will be a sought-after resource.
MAP for bio-fortification of food staff and address hidden hunger.	The use of unprocessed and raw MAPs in the diet has already proved to be the bio-fortifiers and needs to be included in the diet.

4.8.6 Vision Goal III- Traditional Medicine and Medical Tourism hub of India:

India ratified the Nagoya Protocol (2002) on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (NP) in October 2012. This Protocol also aims at ensuring access to and transfer of technologies, recognizing the role of traditional knowledge with informed participation of local and indigenous communities in decision making processes. A number of NER states have started repositioning themselves in this huge commercial space. There has been rush from the United States, Slovenia, Germany and other countries to avail of these herbal medicines and treatments. Therefore, the Ethno Medicine and Tourism Commission (EMTC) will be autonomously set up at the regional level under PPP mode exclusively for commercializing the ethno-medicinal practices and extending further to promote wellness and medical tourism. The AYUSH Ministry, Central Universities in the NER, North Eastern Institute of Folk Medicine at Pasighat and the MDoNER could coordinate the entire architecture and building of the EMTC.

4.8.7 STRATEGIC MOVES and POLICY INTERVENTIONS

EMTC will galvanize confluence of seven critical elements in a single regional platform.

- i. Folk medicine practices: mobilization of faith healers and their knowledge bases
- ii. Natural resources including scientific data base of plants, herbs and other natural substances
- iii. Bringing the TMS practices and testing them in the laboratories of the University and Research Institutes by the researches and experts
- iv. Providing Patents and IPRs to these practices and knowledge base designs
- v. Taking cognizance and adoption of these ideas by industrial and corporate houses leading to commercial scale production
- vi. Commercial marketing at the national, regional and global markets and
- vii. Payment back to the faith healers, communities and the states.

Each horizontal and vertical integration generates connection with communities, local resources and leadership, reintegration with nature and conservation, imagination and innovation, harnessing of institutional synergy, exclusive brand and market, income and growth and employment and inclusiveness

No institutions exist at the regional level, and no scientific and strategic planning is seen to grapple with the much wider and more deleterious impact of climate variability and change.

Approaches to Achieve the Vision Goal	Instruments and Methods
Recording Knowledge	Document the healing methods and knowledge used by indigenous people.
Checking with Science by Partnering with Organizations	Conduct laboratory tests to scientifically validate traditional practices and also set up a (Traditional Medicine Systems) TMS research unit in India as offered by WHO
Creating a Group (EMTC)	Establish the Ethno Medicine and Tourism Commission (EMTC) to coordinate efforts.
Encourage Commercialization of Medicinal Plants	Support the commercialization of medicinal plants by fostering partnerships with pharmaceutical, cosmetic, and herbal product industries.
Document and Prioritize Medicinal Plants for Promotion	Prioritize medicinal plants for promotion based on their commercial, nutritional, and medicinal values. Collaborate with organizations like the National Medicinal Plants Board (NMPB).
Taking Care of Nature	Implement sustainable practices to ensure environmental and community well-being.
Protecting from Stealing	Obtain patents and rights to prevent unauthorized use of traditional knowledge.

<p>Having Rules in Place</p>	<p>Adhere to international agreements and protocols, such as the Nagoya Protocol.</p>
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Mapping and Selection of potential areas for MAP and identification of MAP State wise, vulnerability wise (Threatened/ Endangered/ Extinct) and market demand wise and reserving these areas for MAP cultivation, conservation and use.

- Methodically approaching people’s participation, governments and private sectors’ involvement, input planning, capacity building and implementation scheduling.
- Initial tie up on technical, infrastructural and man power support with the 11 AYUSH institutions across the country, State or regional colleges and institutions on MAP and then moving upwards to create the needed infrastructure and institutions locally in the region with required certifications from regulatory authorities.
- Since around 80 percent of the MAP are accessed from wild sources and this source is being vulnerable, each State may plan organized cultivation of important MAPs in cluster mode – may be under contract farming
- Digital literature on MAP cultivation, processing and marketing ‘Know How’ and ‘Do How’ including pilot scale extraction of their photochemical and isolation of bioactive marker compounds to control the quality.
- Development of ICT based Decision Support Systems on MAP linking the producers through ADHAR cards, WhatsApp group creation and other channels of communications.
- Empowering the State Medicinal Boards and the Forest departments including the Biodiversity Committees to undertake selective scientific cultivation of MAPs in forest areas.
- Establish Post harvest processing, quality screening and grading facilities within reasonable reach limits from production sites.
- Create a data base on Indigenous Technical Knowledge (ITK) concerning MAP use to treat various diseases (both man and animals), validate the ITKs at Institution level with the intention of refining the age old ITKs to present day relevance either singly or in a hybrid mode with Allopathy.
- Promote MAP centered village tourism and wellness centers with herbal treatment facilities like Decoctions and Infusions with *tulsi (Ocimum tenuiflorum)*, Herbal powders and pills like a blend of powder ginger (*Zingiber officinale*) with turmeric (*Curcuma longa*) administered with honey, Herbal Teas and Tonics, Herbal Oils and Salves for massage etc.
- Protect traditional knowledge through robust IPR frameworks, educate communities on IPR and achieve at least 70% of traditional medicinal knowledge under IPR by 2030.
- Screen the MAP biodiversity biotechnologically, genome editing technology for providing climate resilience genes while following green practices along the production to product preparation value chain.
- Analyze the collected data using Big data analytics, algorithms for machine learning and precision farming with sensor-based input applications and drone monitoring of pest etc.
- Production of quality planting materials inside greenhouses preferably.
- Development of site or State specific package of production practices including harvesting and post-harvest handling.

- Advanced plants and machineries for quality maintenance at various stages of production including extraction of therapeutic bio-molecules and their use.
- Drone for crop monitoring and input spray, ICT devices and digital framework for knitting the producers, processors and marketers, use of robots at a later stage for weeding, harvesting, processing, blockchain technology for traceability and quality assurance.
- Capacity building of the cross-border security personals, airport, and seaport staff to detect even the gene piracy of MAP shall be an important step.

Draft Report

4.9 Green and Organic NER

4.9.1. Brief Background

While efforts are on to negate the cascading negative impact of chemo-centred agriculture in the Green Revolution (GR) belt, the NER today is considered a blessed region for not being a passenger in the GR bus and thus retaining its food production base fertile to lead the country towards an Evergreen Revolution (EGR) by way of converting the 'Organic by Default' areas into 'Organic by Process' areas as well as by methodologically pursuing Natural Farming (NF) in its vast mid, high hills and Shifting Cultivation (SC) areas besides the low altitude/ plain areas in the remote villages and thus earn the distinction of Green Agriculture zone of the country.

The concept of EGR relies on the need for improving productivity in perpetuity without associated ecological harm with emphasis on using selective technologies like Integrated Natural Resources Management (NRM) viz. Integrated Nutrient Management (INM), Integrated Pest Management (IPM), Integrated Weed Management (IWM), improved water management through water use efficiency (WUE), use of appropriate local landraces of different crops, and also improved post-harvest technology (NPOP Standards, VIIth Edition, 2014). Such development will also contribute to achieve SDGs like climate action (Goal 13), good health-wellbeing (Goal 3), biodiversity conservation, land degradation neutrality (LDN) and others.

Since Green farming (GF), is that of sustaining the food without the use of chemicals/minimises chemical, conserves energy and water, emphasizes local production, decreases synthetic, non-renewable inputs and utilizes resources more efficiently on site (reduces Carbon and water foot print in farming), values biodiversity and ecology, and works within the natural resource limitations and their management, the OF and NF mode of farming is envisioned to be pursued in the region using GF technologies like Parma-culture, Biodynamic farming, Hydroponics and Aqua-ponic, urban agriculture, agro-forestry (AFS) and food forest systems, poly-cultures and crop rotation, heirloom and traditional varieties, natural animal raising, natural pest management, mulching, renewable energy, conservation agriculture, rice fallow management (prevalent to a large extent in NER), vertical farming, integrated farming system (IFS), conservation (micro) irrigation, solar farming, drones, fleet management, sensor-based / digital agriculture and others.

The approach will be grouped into

- i. **Eco-smart:** Organic, Natural and Traditional Farming, Biodiversity (traditional and niche crops), AFS, IFS;
- ii. **Resource Smart:** SWC measures, Integrated Watershed, RWH, Land configuration, Cover crops, jhum improvement/rehabilitation;
- iii. **Water smart:** Micro-irrigation, water efficient crops-cropping systems-varieties (millets/pulses/oilseeds/fruits/MPTs/Fodder);
- iv. **Nutrient smart:** INM, SHC, Precision nutrient management (Drone), Decision support tools;
- v. **Carbon smart:** Conservation agriculture (NT/MT, Residue retention), rice fallow management, biochar, AFS;

- vi. **Energy smart:** CA based farming, DSR, Solar energy in agriculture;
- vii. **Weather and knowledge smart:** integrated weather forecasting, ICTs and Digital tools, Capacity building

The major advantage of the region over other regions of the country to lead the EGR movement are its 60 percent of 5.0 million ha cultivable areas where negligible chemical fertilizer is used (2.50Kg in Arunachal Pradesh to a high of Kg in Manipur); its 0.8 million ha. SC land where no chemical fertilizer or pesticides are used; its mixed farming system with animal husbandry and fisheries as integrated components; its organic biomass (crop residue, tree leaves etc – more than 47 mil tons) besides a fertile land that responds positively to organic inputs (bio-fertilizer and pesticides including cow dung) use for enhanced productivity. Further the region, besides being one of the 12 mega biodiversity hot spot area, has also agro-ecological zones ranging from plain, foot hills, mid hills, high hills and temperate and alpine eco-zones that is conducive of producing all types and kinds of crops, fruits, vegetables and spices.

Realising the scope and potential of, Sikkim had adopted this mode of farming since 2016 and has distinguished itself as the first organic State of the country. Similarly, a time has come to transform the entire region into OF and NF system of farming for Agriculture System Sustainability (ASS) and the present document explores and looks forward to this transformation for a, what late Bankim Chatterjee in *Bande Mataram* said and we sing, – “*Sujalam* (clean water), *Sufalam* (Tasty fruits), *Malayaji Sitalam* (refreshing air), *Shashya Shaymalam* (Food abundance).

4.9.2. Global Scenario

The latest global organic agriculture data for 2022 from 188 countries give an encouraging picture with global area crossing 96 million hectares (mainly due to growth in Australia), and OF farmers to 4.5 million numbers. The sales of organic products in the retail sector reached nearly 135 billion Euros (FiBL, 2022), despite experiencing slower growth and stagnation and also declines in certain European countries. In 2022, nearly 96.4 million hectares of agricultural land were organic (including in-conversion areas). In 2022, 2.0 percent of the world’s agricultural land was organic. The highest organic shares of the total agricultural land, by region, were in Oceania (14.3 percent) and Europe (3.7 percent; European Union: 10.4 percent).

The countries with the most organic agricultural land were Australia (53.0 million hectares), India (4.7 million hectares) and Argentina (4.1 million hectares). Asia led the way with a commanding 61 percent of the world's organic producers, closely trailed by Africa at **22** percent, Europe at **11** percent, and Latin America at **6** percent. The top three countries with the highest number of organic producers were India (24.81 lac), Uganda (4.04), and Thailand (1.21). In 2022, the countries with the largest organic markets were the United States (58.6 billion Euros), Germany (15.30) and China (12.40). The largest single market was the United States (**43** percent of the global market), followed by the European Union (**34** percent) and China (**9.2** percent) (FiBL and IFOAM Year Book, 2024).

4.9.3. National Perspectives

India ranked 6th position in World's Organic land and first in total number of producers as per 2021 data (FiBL and IFOAM Year Book, 2023). The APEDA, Ministry of Commerce and Industries, Government of India is implementing the National Programme for Organic Production (NPOP). The programme involves the accreditation of Certification Bodies, standards for organic production, promotion of organic farming and marketing etc.

The NPOP standards for production and accreditation system have been recognized by European Commission and Switzerland for unprocessed plant products as equivalent to their country standards. With these recognitions, Indian organic products duly certified by the accredited certification bodies are accepted by the importing countries. APEDA is also in the process of negotiation with Australia, South Korea, Taiwan, Canada, Japan etc. Presently there are 36 accredited certification bodies under NPOP of which 30 are fully operational.

As on March 31, 2023 total area under organic certification process (registered under NPOP) in India is 10.17 m ha. This includes 54.0 lac ha cultivable area and another 48.0 lac ha for wild harvest collection (Source: FiBLand IFOAM Year Book, 2023). Among all the states, Madhya Pradesh has covered largest area under organic certification followed by, Maharashtra, Gujarat, Rajasthan, Odisha, Karnataka, Uttarakhand, Sikkim, Chhattisgarh, Uttar Pradesh and Jharkhand.

India produced around 2.9 million metric tons (MT) of certified organic products in 2022-23 which includes all varieties of food products namely oil seeds, fibre, sugar cane, cereals and millets, cotton, pulses, aromatic and medicinal plants, tea, coffee, fruits, spices, dry fruits, vegetables, processed foods etc. The total volume of export during 2022-23 was 3,13 lac MT. The organic food export realization was around INR 5,525.18 Crore (708.33 million USD). Organic products are exported to USA, European Union, Canada, Great Britain, Switzerland, Turkey, Australia, Ecuador, Korea Republic, Vietnam, Japan, etc.

4.9.4. Status of North East India

Primarily indigenous farming practices are followed in the NER which are chiefly organic in nature and depend on the indigenous technical knowledge systems ubiquitous in the region for centuries. Besides, the agro-climate of the region being generally rainfed is most conducive for organic farming. Low use of synthetic fertilizers (<26 kg/ha specially in hills) and chemicals, abundant availability of biomass and animal manure is typical to the region and therefore, this region offers sufficient prospects for OF, a reason that Government of India identified NER as a potential hub for promoting organic farming. While Sikkim proved the transformation way to OF, other NER States are on their way to reap the benefit.

Presently, a total 1.98 lac ha is utilized for OF in the NER that includes almost 1.38 lac ha under NPOP certified organic farming while another 60,020 ha is in the process of conversion. Interestingly, this area encompasses all eight states with the highest area of 75,475 ha in Sikkim (Table 4.9.1). The organic farm produce data reported as the commercial output for sale and not the actual production (Table 4.9.2). Other seven states, apart from Sikkim reveal encouraging signs of progress on the road to adopting organic farming. The production is expected to improve with transfer and adoption of complete organic production technologies.

Realizing the potential of organic farming in the NER, Ministry of Agriculture and Farmer Welfare (MoA and FW) has launched a Central Sector Scheme entitled “Mission Organic Value Chain Development for North Eastern Region (MOVCD-NER)”. The scheme aims at development of certified organic production in a value chain mode to link growers with consumers and to support the development of entire value chain starting from inputs, seeds, certification, to the creation of facilities for collection, aggregation, processing, marketing and brand building initiative. The scheme, as reported by MoA and FW on July 15, 2023, has facilitated in bringing 1.73 lakh ha area under OF benefiting 1.89 lakh farmers establishing 379 FPOs/FPCs with 205 collection, aggregation and grading units, 190 custom hiring centers and 123 processing units and packaging houses. Seven brands have also been developed.

Table 4.9.1-State-wise area under organic certification NPOP in North East India, 2022-23

State	Cultivated area (ha)		Total area (ha)
	Organic area	Conversion area	
Arunachal Pradesh	3,109.00	9,773.68	12,882.68
Assam	15,593.93	7,473.49	23,067.42
Manipur	7,682.00	3,003.50	10,685.50
Meghalaya	21,652.71	2,356.33	24,009.04
Mizoram	4,796.84	15,264.10	20,060.94
Nagaland	7,550.61	5,002.56	12,553.17
Sikkim	75,453.18	22.096	75,475.276
Tripura	2,490.13	17,124.31	19,614.44
Total	1,38,328.40	60,020.066	1,98,348.466

Source: www.apeda.gov.in/apeda_website/organic/data.htm

Table 4.9.2- State-wise organic farm production in North East India, 2022-23

State	Organic production (MT)	Conversion production (MT)	Total (MT)
Arunachal Pradesh	14497.86	--	14497.86
Assam	793.00	--	793.00
Manipur	11.00	--	11.00
Mizoram	334.00	--	334.00
Nagaland	NA	--	--
Sikkim	51.90	--	51.90

Tripura	332.78	216.04	548.82
Total	16,020.54	216.04	16,236.59

Source: www.apeda.gov.in/apeda_website/organic/data.htm

Note: The data on production is the commercial output for sale and not the actual production.

4.9.5. Why the NER lags behind?

Since the first ever International Conference on NER organic farming at ICAR Research complex, Meghalaya in 2004, it has taken 2 decades to cover an area of 1.98 lac ha and 16,237 MT of organic produce (Table 4.9.1 and 4.9.2) which itself speak of the laggard syndrome in the form of not delineating appropriate policy-strategy-finance- capacity building back up to leverage the benefit from OF. Sikkim model could be studied well to address the laggard syndrome with needed modification. There are serious institutional drawbacks. Besides there are other bottlenecks in terms of resources and skills and capacities.

4.9.6 Vision 2047

The strategic thinking involves a comprehensive approach to achieve the vision of Green and Organic farming in NER in 2047 integrating technological innovation, policy frameworks, and collaborative efforts. NER is largely rain-fed with high rainfall (> 2000 mm annually), large chunk of arable land in Assam, Tripura and the valley regions of Manipur. Better positioned in Soil Organic Carbon (SOC) content compared to the country, less use of chemical inputs, the food habits of the local people preferring organically produced food and the traditional wisdom and experience of the farmers to grow food organically are the strengths to methodically transform its agriculture into organic mode to increase the region's share to country's organic food basket from **7** to **30** percent for which following strategic approach is presented.

4.9.7 Vision Goal I: 4 Way Green Economy Matrixes

1. Increase OF and NF area in the region from 1.73 lakh ha to 16 lakh ha by 2047.
2. Increase present organic production of 0.2 MT to 3.75 MT and 12 MT by 2030 and 2047, respectively
3. Increase organic farmers households from 1.8 lakh to 10.00 lakh
4. Increase the region's current **7** percent organic food share of the country to **30** percent by 2047

For the above purpose, following specific crops shall be considered as priority crops.

Table 4.9.3- Few states specific crops for organic and natural farming (indicative)

State	Important crops
Assam	Joha Rice, Assam lemon, banana, tea, litchi, spice crops
Arunachal Pradesh	Rice, Orange, Kiwi, Large Cardamom, Ginger and Turmeric, Capsicum,
Sikkim	Large Cardamom, Ginger, Dalle chilli, Black gram (<i>Pahelo dal</i>), Frenchbean, Orange, Buckwheat, Maize, Cherry pepper, Orange
Mizoram	Turmeric, Rice, Maize, Ginger, Frenchbean, Banana, Bird's eye chilli Dragon fruit, Papaya, Chow-Chow
Meghalaya	Rice, maize, Cashewnut, Turmeric, Ginger, Strawberry, Frenchbean, <i>Khasi</i> mandarin.
Tripura	Local aromatic rice, Pineapple, Ginger, Turmeric, Banana, Chilli, Brinjal,
Nagaland	King chili, Ginger, Pineapple, Rice, Maize, Pulses, Chow-chow.
Manipur	Aromatic rice, Pulses, Pineapple, Orange, tree bean.

Table 4.9.4 Area under agriculture and share projected under organic farming by 2047-50

States/Regions	Geographical area (km ²)	Agriculture land (ha)	Target area by 2047	Area (ha)
Sikkim	7,096	1,14,246	100%	1,14,246
Meghalaya	22,429	10,81,078	50%	5,40,539
Assam (hills)	78,438 (15,322)	27,01,000(1,60,881)	10% valleys and 30% hills	3,02,275
Tripura	10,486	3,10,386	20%	62,077
Mizoram	21,081	4,46,917	50%	2,23,459
Manipur	22,327	1,62,987	25%	4,0747
Nagaland	16,579	6,36,634	30%	1,90,990
Arunachal Pradesh	83,743	293,101	50%	1,46,550
NER				16,20,883

4.9.8 Vision Goal II: 7 Way Qualitative targets

1. Pesticide free organic products
2. Anti-microbial resistance free organic foods
3. Improvement in soil health in terms of pH, organic C, etc.
4. Improved Carbon foot print
5. Nutritional quality of organic food
6. Circular economy using the wastes from organic food production sources
7. Water quality improvement in-terms to address Fe and Al toxicity and also to mitigate heavy metal infestation

4.9.9 Vision Goal III: 50 % Land Search and Shifts: 2.00 million ha under OF/NF by 2047

- Bringing 50 percent area of shifting cultivation (0.85 m ha) under OF/NF by 2040 (15 years from now) and further 25 % by 2047 i.e. 6.37 lac ha.
- 50 percent of high-altitude areas i.e., 0.59 m ha to OF/NF by 2040 (2 lakh ha every 5 yr) i.e 2.95 lac ha
- Bringing 50 percent of mid altitude areas of 0.90 m ha to OF/NF by 2047 i.e 450.0 lac ha 4.50 lac ha
- Bringing about 10 percent of foot hills and low altitude areas i.e., 0.30 m ha to OF/NF by 2047 (0.75 lakh ha every 5 yr) i.e 30,000 ha. Total
- Around 5.0 lac ha will be the area converted to OF over 20 years thus taking the total area 16.12 lac ha as envisioned.
- Some new areas may also be brought under organic farming through conversion.

Table 4.9.5 The half decadal target of achieving the above strategy is:

2025-2030	3.50 Lakh ha
2030-2035	4.50 lakh ha
2035-2040	4.50 lakh ha
2040-2047	4.00 lakh ha

4.9.10 Vision Goal IV: Quantum Jump in Organic Production by 2047

- Considering the coverage of 17.5 lakh ha under cereals at an average productivity of 3.5 t/ha, there is potential of 61.25 lakh tones
- Considering 7.55 lakh ha under horticulture crops at an average productivity of 10 t/ha, there is potential of 75 lakh tones
- Contribution from spices (turmeric, ginger, chilly, cardamom, pepper, cinnamon, etc.) sector is expected to be 10.0 lac ton
- Thus, by 2045 organic production may be about 146.25 lakh ton or approximately 15.0 million ton

4.9.11 Vision Goal V: 6 Million Employment Target

- From Production to marketing value chain @ of 4 person/ha, an employment potential of 64 lac persons (16 lac ha X 4) is the number the sector can employ as the program implementation continues up to 2047.

4.9.12 Vision Goal VI: Novel Product and Processes

- **Introduce high value crops** such as saffron, hing (*Ferulaassafotida*), spices (vanilla, clove, thyme, rosemary, oregano etc.), walnut, almond, Blueberry, microgreens, baby leafy greens etc.
- **Produce biomolecules** like vitamins, hormones, and secondary metabolites (e.g., terpenes, carotenoids, polyphenols, saponins, etc.), vanillin, curcumin, gingerol, allicin,

antioxidants, flavonoids, anthocyanins, lycopenes, rutin, myrcenes, limonene, pinene etc.

- **Extraction of high value oil** from moringa, tea, clove bud, rose, large cardamom, cinnamon, *Gaultheria fragrantissima*, *Ocimum* spp., Assam lemon, Kachai lemon etc.
- **Cultivate high value medicinal plants** namely, *Nardostachys jatamansi*, *Swertia chirata*, *Picrorhizakurroa*, *Withaniasomnifera*, *Rauwolfia serpentina*, *Panax giloy* (*Tinosporacordifolia*) etc.
- **Generate value added and processed products** – High value crops as listed in Table 4.9.4 are to be processed into low volume, high value products for export.

4.9.13 Critical Policy interventions

- State level policy on embracing shifting cultivation, high altitude areas, about **50** percent mid hill and foot hill areas to OF and NF.
- Respective State's Land Use policy for organic agriculture.
- A regional policy on OF/NF for speciality, complementary and supplementary support to each other for resource, information, technology, skilled manpower, facility and market sharing.
- Policy on conversion of chemo-centric areas into organic areas by identifying the Institutions and players.
- Policy support for organic input production, seed production, processing industries and marketing infrastructures
- Policy for gradual reduction of chemicals and fertilizers use by regulating markets and incentives/subsidies etc.
- Sub-sector wise (crop. Horticulture etc.) strategic budget planning, accessing and allocation policy.
- Bio-inputs - seed, bio-pesticide and bio-fertilizer, biodynamic input, micro- irrigation facility etc.
- Designated markets, area wise, backed transportation linkage limitation from production to consumption sites.
- Marketing bodies including private players – product procurement, transportation, storage, packaging and marketing skills.

4.9.14 Physical infrastructure:

- Organic input production facilities at district level and block wise
- Soil and water testing facilities as above
- Farm machinery support banks like laser leveling, ZT implements etc. at District level
- Cattle sheds particularly at NF zones identified
- Infrastructure for organic feed production (concentrates, permissible ingredients etc.)
- Specific training centers for capacity building and skill development at District level
- Communication and market infrastructure

4.9.15 Technological inputs:

- Location specific IPM/INM, IFS
- Resource integration modules and its percolation
- Resource conservation (No-till, Minimum tillage, conservation agriculture, residu management, land shaping etc.) technologies
- Seed and bio-input production technologies
- Technologies for precision OF
- Use of sensors, IoTs, drones, etc. technologies in OF management
- Post harvest handling and value addition technologies

4.9.16. Institutional support:

Specific intuitional support is necessary for the following areas

- Human resource development in OF/NF
- Engagement of Ph.D. students in different aspects of OF problem-solving research.
- For handholding with different stakeholders.
- The need is also to establish a dedicated institution to Of/NF in the form of an Organic University with campuses at each State of the region.

4.9.17 Cross border interconnections:

Other countries in and around NER are also looking for promoting organic farming for boosting their economy through green technologies and tourisms avenues. With Act East policy, SAARC forum and the target to enhance organic food share trade globally, NER will have to be ready for qualitative and quantitative products through policy, technology, finance and manpower support as well as market intelligence-based selection of crops filling in the weakness of other countries with the strength and opportunities of NER in NF/OF.

4.9.18 Role of multilateral and bilateral agencies

Organic/green farming is the viable and sustainable option especially in the highly bio-diverse NER. Multilateral agencies IFAD, GIZ, FAO, ADB, *etc.* may be approached for funding support while JICA, FiBL, IFOAM-OI *etc.* may provide technical backup and capacity building support. Bhutan and Nepal with near-similar geographies and agriculture are also venturing into organic/sustainable farming systems. This offers scope for cross-learning and experience sharing on both sides. These agencies can contribute to the global efforts in sustainable agriculture by providing funding, expertise, and coordination.

Multilateral agencies, such as the United Nations (UN), FAO and the World Bank, can be roped in to provide funding opportunities for research, development, and implementation of Green and Organic farming in NER on a global scale making the region as Organic Hub. Bilateral engagements for facilitating knowledge-sharing initiatives and capacity-building programs between countries can help transfer expertise, best practices, and technological know-how in the context of sustainable agriculture and harmonization of policies in NER.

CHAPTER 5

Addressing Industrial, Investment and Energy Dimensions

- 5.1 Handloom, Textile, Designs
- 5.2 Bamboo
- 5.3 Mineral Resources
- 5.4 MSME & Entrepreneurship
- 5.5 Energy, Electricity Generation and Trading
- 5.6 Ease of Doing Business

5.1. Handloom, Textile, Designs

5.1.1 Brief Background

The handloom sector of the North-East reveals immense diversity and styles that developed in the availability of resource materials leading to specialization in specific techniques. Signature textiles have been woven in cotton once the principal thread particularly among hill communities on traditional back-strap looms. Natural fibers such as yak wool, nettle, and tree barks have been utilized by ethnic groups, an alternative resource where cotton was not grown. Silk particularly Muga attained distinction with the earliest reference to the highly sophisticated silk cloth from Kamrupa, the ancient name for Assam found in writings from the 3rd century BCE. Weaving has always been a gender way of life in the multi-ethnic cultures of the North-East of India. Textiles amongst the multi-ethnic groups distributed over the plains and hill regions of North-East Region of India stand as a reflector in the cultural identities of the people. Marked by the clothes that people wear and weave, it accords a sense of identity and belonging to the tribe they belong.

National and Regional:

In the period between April, 2023 and January, 2024, India’s total export value combining Cotton yarn and fabric; other Made Ups and Handloom was 9.56 billion USD

Table 5.1.1: Export Data – Commodity Group (Textiles) – All states of India

Commodity Group - Textiles	Total Exports Apr'23 - Jan'24 (\$Mn)	% Share
Ready-made garments of all textiles	11,582.97	41.80%
Cotton Yarn/Fabs. /Made-up, Handloom Products Etc.	9,561.79	34.51%
Man-Made Yarn/Fabs. /Made-up Etc.	3,808.00	13.74%
Handicrafts Excl. Hand Made Carpet	1,318.27	4.76%
Carpet	1,152.79	4.16%
Jute Mfg. Including Floor Covering	283.77	1.02%
Total	27,707.59	100.00%

Against this, the scenario of NER with respect to column 3 in the above Table gives a gloomy picture.

Table 5.1.2: Textile Export Scenario OF NER (April 2023-January 2024)

State	Total Export (\$Mn)	% Share
Assam	1.32	0.004%
Arunachal Pradesh	0	0.00%
Nagaland	0.1	0.0003%
Mizoram	0.04	0.0001%
Tripura	0.02	
Manipur	0.01	
Meghalaya	0	0.00%
Sikkim	0	0.00%
TOTAL	1.49	0.24

The NER of India is home to more than half of the total handloom of the country, with 65.2% of looms being located in this region. ~61% of all handloom households in India (16.83 lakhs out of 27.80 lakhs) are in the eight North-Eastern states. Weaver households in the region have increased from 15.1 lakhs in 2009-10 to 16.98 lakhs in 2019-2020, emphasizing the popularity of the sector. However, it is only Assam that had a significant percentage of the handlooms at nearly 46.8%, followed by Manipur at 8% and Tripura at 5% (Ministry of Textiles, 2019).

As will be seen, the contribution from NER was only 0.24 percent, percentage of share being 0.00%. Given the kind of resources in the form of HR (Handicraft sector- 28.64% and Handloom sector- 67.58% weavers of the country), the output is very meagre and is almost not counted though this sector has immense opportunities for non-farm employment. Export earning wise, the region during the referred period, earned \$ 1.49 Million– the State of Assam topping the list among NER States at 1.32 Mil USD. Table below indicate the HR in the sector in NER

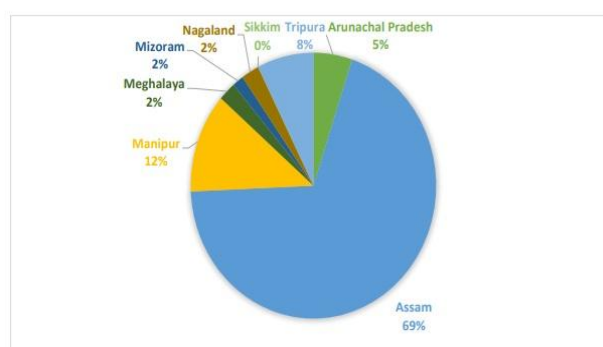
Table 5.1.3: Number of handloom weavers in North-East India

State	No. of Weavers
Assam	1255837
Manipur	179060
Nagaland	61673
Tripura	120699
Arunachal Pradesh	31031
Meghalaya	12489
Sikkim	571
Mizoram	39549

Source: Ministry of Textiles, 2019-2020

As the Table will indicate, Assam and Manipur with the highest numbers of weavers in NER and have also the distinction of being among the four highest states which together account for 18 lakhs of all weaver households in the country. Within NER, a total of 22.5 lakhs (or 88.7%) weaver households are located in rural areas while 2.8 lakhs (or 11.3%) are in urban areas, with nearly 72% of handloom weavers being female. NER State wise percentage distribution of weavers is presented in Fig 5.1.1

Figure 5.1.1: NER State wise percentage distribution of weavers



Source: IIM Shillong-Action Plan for the Development of Handicrafts and Handloom Sectors in NER

As per the 4th all India Handloom census 2019-20 the count of handloom units is linked with the choice of which fabric are considered major. The count of major fabrics produced by North-eastern States is significant. The production information of such fabric provides an understanding of the specialization in terms of fabrics in different states of North East Region.

Table 5.1.4: State-wise share of production of handloom products of North-East

Products	State	Share of overall production	Size
Mekhala chador Shawl, stole, muffler	1. Assam	77.4%	The single State of Assam accounts for the bulk of the Production of shawls (etc.). The top 5 places are occupied by the Northeast States together accounting for 93% of total Shawls, Mekhela chador, etc. production.
	2. Manipur	4.9%	
	3. Arunachal Pradesh	4.6%	
	4. Nagaland	3.7%	
	5. Meghalaya	2.3%	
Saree	1. Assam	7.8%	7.8% Silk Sarees from Assam & Tripura dominates. Together top 5 States account for 78.6% of the handloom saree production in the country.
	2. Tripura	7%	
Gamosa, towel, napkin	1. Assam	72.4%	The North East States completely dominate the production of towels, cloth napkins and dusters. Together they account for 81.7% of the production in the country
	2. Manipur	4.2%	
	3. Meghalaya	2.9%	
	4. Tripura	2.2%	
Dress material	1. Assam	23.6%	The production of dress materials is more widely spread than most other major
	2. Manipur	17.3%	

suiting, shirting, Running cloth	3. Tripura	13.2%	fabrics, even though close to 54% of the production continues to come from the northeastern States.
Bedsheet, furnishings, blankets	1. Assam 2. Manipur	26.8% 14.5%	Having the largest number of looms and weavers, Assam again dominates as the largest handloom-based home decor production

Source: (IIM Shillong, 2020)

The eight north-eastern states are home to a large number of tribes and sub-tribes who bring into this region's export basket, natural and handmade products from about 450 different communities (IANS, 2017)¹. As per the Census conducted by NCAER in 1995-96, NER has 8.87 lakhs handicrafts artisans, which accounts for 18.63% of the total artisan population in the country.

List of Handicraft of North-East

1. Bell Metal Industry of Sarthebari
2. Brass metal
3. Fireworks Craft in Barpeta
4. Craft on Jute
5. Bamboo & Cane
6. Sitalpati Craft
7. Water Hyacinth
8. Areca Nut Leaf
9. Pottery Craft
10. Wood carving
11. Decorative Candle
12. Thangka Painting
13. Carpet Craft
14. Black Pottery
15. Manipuri Jewery
16. Nagaland Beads
17. Kauna Craft
18. Assamese Jewellery
19. Terracotta Craft

Geographical indications of goods (registration and protection) act, 1999

The **Geographical Indications of Goods (Registration and Protection) Act, 1999** (GI Act) is a *sui generis Act* of the Parliament of India for protection of geographical indications in India. India, as a member of the World Trade Organization (WTO), enacted the Act to comply with the Agreement on Trade-Related Aspects of Intellectual Property Rights.

¹[Handicrafts exports from northeast poised for quantum jump, Business Standard 2017](#)

- India, as a member of the World Trade Organization (WTO), enacted the Geographical Indications of Goods (Registration & Protection) Act, 1999, which came into effect from September 15, 2003.
- The Act ensures that only registered authorized users or residence of territory within the tag are allowed to use the popular product name, thus conferring upon it legal protection and helping in preventing misuse of a registered GI.
- GI tags assure customers of the authenticity and quality of the product.
- GI tags help farmers and artisans in rural areas to get recognition for their products and earn better livelihoods.
- GI tags also promote tourism by creating awareness and interest in unique local products and attracting tourists to visit the places of origin.
- GI tags provide national and international recognition to products that are unique to India, contributing to the country's branding and image all over the world.

Table 5.1.5: List of GI Registered Handloom and Textile products of NE

S. No	Application No.	Geographical Indications	Goods (As per Sec 2 (f) of GI Act 1999)	State
1.	55	Muga Silk of Assam	Handicraft	Assam
2.	384	Muga Silk of Assam (Logo)	Handicraft	Assam
3.	371	Shaphee Lanphee	Handicraft	Manipur
4.	372	Wangkhei Phee	Handicraft	Manipur
5.	373	Moirang Phee	Handicraft	Manipur
6.	542	Chakshesang Shawl	Handicrafts	Nagaland
7.	586	Pawndum	Handicraft	Mizoram
8.	587	Ngotekherh	Handicraft	Mizoram
9.	588	Hmaram	Handicraft	Mizoram
10.	582	Tawlhlohpuan	Handicraft	Mizoram
11.	583	Mizo Puanchei	Handicraft	Mizoram
12.	625	Idu Mishmi Textiles	Handicraft	Arunachal Pradesh
13.	594	Gamosa of Assam	Handicraft	Assam
14.	810	Arunachal Pradesh Tangsa Textile Product	Handicraft	Arunachal Pradesh
15.	848	Arunachal Pradesh Handmade Carpet	Handicraft	Arunachal Pradesh
16.	849	Arunachal Pradesh Wancho Wooden Craft	Handicraft	Arunachal Pradesh
17.	808	Arunachal Pradesh Apatani Textile	Handicraft	Arunachal Pradesh
18.	811	Arunachal Pradesh Monpa Textile	Handicraft	Arunachal Pradesh
19.	854	Arunachal Pradesh Nyishi Textile	Handicraft	Arunachal Pradesh
20.	861	Arunachal Pradesh Monpa Handmade Paper	Handicraft	Arunachal Pradesh
21.	934	Arunachal Pradesh Adi Textile	Handicraft	Arunachal Pradesh
22.	938	Arunachal Pradesh Galo	Handicraft	Arunachal Pradesh

S. No	Application No.	Geographical Indications	Goods (As per Sec 2 (f) of GI Act 1999)	State
		Textile		
23.	1070	Arunachal Pradesh Tai Khamti Textile	Handicraft	Arunachal Pradesh
24.	893	Tripura Risa Textile	Handicraft	Tripura
25.	939	Majuli Mask of Assam	Handicraft	Assam
26.	940	Assam Majuli Manuscript Painting	Handicraft	Assam
27.	959	Bodo Dokhona	Handicraft	Assam
28.	960	Bodo Eri Silk	Handicraft	Assam
29.	961	Bodo Jwmgra	Handicraft	Assam
30.	962	Bodo Gamsa	Handicraft	Assam
31.	965	Bodo Thorkha	Handicraft	Assam
32.	972	Bodo Kham	Handicraft	Assam
33.	973	Bodo Serja	Handicraft	Assam
34.	974	Bodo Sifung	Handicraft	Assam
35.	977	Bodo Gongona	Handicraft	Assam
36.	978	Bodo Jotha	Handicraft	Assam
37.	979	Assam Jaapi	Handicraft	Assam
38.	980	Assam Asharikandi Terracotta Craft	Handicraft	Assam
39.	1001	Assam Mishing Handloom Products	Handicraft	Assam & Arunachal Pradesh
40.	1002	Assam Bihu Dhol	Handicraft	Assam
41.	1003	Assam Pani Meteka Craft	Handicraft	Assam
42.	1013	Sarthebari Metal Craft	Handicraft	Assam
43.	1071	Tripura Pachra-Rignai	Handicraft	Tripura
44.	1094	Meghalaya Garo Textile	Handicraft	Meghalaya
45.	1095	Meghalaya Lyrnai Pottery	Handicraft	Meghalaya

Source: <https://ipindia.gov.in/registered-gis.htm> , Office of the Controller General of Patents, Designs & Trade Marks (CGPDTM)

5.1.2. Laggard Syndrome:

Recognized as one of the primary sectors of employment and income decade back, the H&H sector apparently started suffering from technology-strategy-policy draw back with the result that many looms in the government set up have become outdated leading to production inefficiency; area under food and other associated plants either remained static or reduced; ; quality seed/ cocoon production hovers around only 20-40 per laying; cutting edge technology was not injected as per call of time; efficiency of traditional looms to increase per weaver productivity and income.

Digital knitting of the weavers and their capacity building including App based service advisory to the weavers and the players from production to marketing chain remained as a laggard syndrome. Non tapping of niche area market particularly from eri and muga to make a significant mark in national and global trade is yet another laggard syndrome, among others including non-exploration of tools and techniques, methods and methodologies to counter environmental issues like rainfall related restriction of working

days, climate impact on seed production and their adaptation/ mitigation strategies, negative impact of pesticide use on the sector etc.

The rationale in Manipur leading the way, with the highest rate of engagement in weaving at 216 days in the NER, despite its second position in the number of weavers after Assam, would probably be the local demand by the Meitei women's choice of wearing traditional attires in almost all aspects of daily life. This trend is also prevalent in Mizoram where women uniformly wear the *puan* the traditional attire. Almost similar is the case with Nagaland and Arunachal Pradesh

Other Challenges remain in

- Limited Market Access
- Competition from Power loom and Machine-made Textiles
- Technological Obsolescence
- Financial Constraints
- Skills Shortage and Aging Workforce

However, there are strong comparative advantages like

- Cultural Authenticity and Heritage
- Rising Demand for Sustainable Products
- Social Impact and Environment
- Unique Market Positioning
- Collaborations and Partnerships
- Nagaland, social media influencers are promoting traditional attires. Social media can leverage the trend which in turn can create the demand and increase the income of weavers.

5.1.4. Markets, Technology and Infrastructure:

One of the areas that require urgent attention is product marketing. Most of the rural weavers and artisans, the number of which far exceeds their counterparts in the urban sector, have been producing only on the requirements of the middlemen and a few customers with whom they have direct contact. Though this may just provide sustainability for their day to-day existence, it is certainly not sufficient for their business's longevity and growth.

Despite the regional textile distinctiveness and specialty, the export market potentials other than the local demand, has remain largely untapped and unexplored barring few intrepid entrepreneurs and exporters who participate in international textile fairs with the regional exportable handloom developed products in eri, Muga silk, cotton and loin loom products catering to the niche market. However, showcasing handlooms of the region only through exhibitions and in showrooms located in metros cannot help in market penetration.

5.1.5. Vision 2047: Possibilities, Potentials and Promises.

Table 5.1.6: Vision Goal I: Towards Sufficiency

Indicators	Production Targets	
	From	To
	Insufficiency	Sufficiency
Production of required seeds and food plants for all categories of silk	(In a consortium mode within NER States)	
All forms of silk production with focus on eri, muga, mulberry and pat.	6-8pc	8-12 percent
Increase cocoon production per laying	20-40pc	40-60pc
Modernization infrastructure	Techno-Unfriendly	Techno friendly
Linking/ registering producers to Silk Mark	Meager Number	50-60 pc
Increasing NER share to global trade of the country	0.24pc	10-12PC
Establishment of quality checking and monitoring laboratories with latest equipments	01	10-12
Establishment of designated skill centers	Nil	08
Market infrastructure development	In all the 8 States	
Farm Mechanization	Negligible	covering at least the large farms

Vision Goal II:

North-East Tribe - Fashion Design Hub

NER has a rich heritage of culture and designs that are brought to life in the traditional apparel of the different tribes and communities in the eight states. The region has more than 100 tribes each with its unique craft traditions.

Traditional dress of an ethnic group plays a major role in showcasing the ethnic identity. Each ethnic group has its own designs and colour combination. Different motifs and designs of textiles have a relationship with the rituals and religious life of the people of North-east India. The method of weaving also varies according to the region and ethnic groups. The materials used for textiles have a varied range - cotton, wool, Eri, Muga and orchid skin. Some ethnic groups, even use animal hair as textile material.

So, a Design hub can be set up where all the tribal designs of North-East can be produced as per the designers need and create a new market in the fashion world.

Vision Goal III: Sitalpati Capital of India

Sitalpati or cool mat has been recognised as an "intangible cultural heritage" by the United Nations Educational, Scientific and Cultural Organisation (UNESCO). These mats are used for sitting or to hang on doors or windows during summer. The mats are made up of weaved green cane slips of murta plants which are indigenous to the region. Sitalpati is traditionally used for sleeping and sitting. There are various kinds of Pati like, Kamalkosh (the best of the Patis, in terms of finesse) Mihi Sital, BhushnaiPati, MotaSital, Dalar Pati, etc.

The production of sitalpati is a household industry in Assam. Generally, men prepare the cane slips, while women do the weaving work. People mainly from Kacchhar district of Assam are involved in this craft. It is found in riverine areas like Majuli island and Goalpara in Assam. The sleeping or sitting mat is still the main product. Other than this there are some other products like ladies hand bag, Sling bags, Air bag, folder, hat, mobile cover, table mats, coaster, lamp shades, panels and other home décor items.

Vision Goal IV: 50 Geographical Indications Tags and 25 Patents Mission

Seek recognition and protection through Geographical Indication (GI) to safeguard the unique identity, quality and traditional craftsmanship and to give protection, identity, recognition, global visibility and improve their brand image.

All products from the region can be certified to ensure products from the region have a minimum quality and certification made mandatory similar to the Craft Mark certification by AIACA. Create a 'Brand North East' and NEHHDC be authorized to issue such certifications and branding. Strengthen Intellectual Property Rights (IPR) mechanism to protect traditional designs, motifs, and weaving techniques associated with NER handloom textiles, prevent unauthorized imitation and exploitation

Vision V: Establishing an ASEAN-NER/India Cross - Regional Handloom Value Chain with a **Central Hub** at **NEHHDC in Assam** and spokes extending to different states of NER and the ASEAN countries

The **Hub** will manage strategic planning, marketing, partnerships with international buyers, and overall coordination of export activities

Each **State in NER and ASEAN countries (spokes)** will focus on local coordination of weavers, identifying unique products for export, quality control, and preparing products for export based on international standards

- **Product Identification:** Spokes identify and forward unique local products to the Hub
- **Quality Assurance and Branding:** The Hub ensures products meet international standards and are well-branded
- **Marketing and Sales:** The Hub engages with global markets, leveraging international trade fairs and digital marketing to promote products
- **Logistics and Distribution:** The Hub coordinates with logistics partners to ensure efficient distribution of products to international markets

Vision Goal VI: Qualitative targets

This could encompass a range of goals aimed at fostering sustainable development, preserving cultural heritage and promoting socio-economic wellbeing.

- Preservation of Traditional Techniques
- Empowerment of Artisans and Weavers
- Enhancement of Product Quality
- Promotion of Sustainable Practices
- Market Access and Branding
- Research and Innovation

The handloom sector in the Northeastern Region (NER) of India holds significant potentials and possibilities for various stakeholders, including artisans, policymakers, businesses, and consumers.

- Employment Generation
- Market Expansion
- Community Empowerment

5.1.6. Benefits of Achieving the Vision Targets:

Achieving the targets set for the handloom sector in the Northeastern Region (NER) would yield numerous benefits across various dimensions, including economic, social, environmental, and cultural aspects.

- Job Creation and Livelihoods
- Export Revenue
- Entrepreneurship Development and Start-Ups
- Value Addition
- Empowerment of Marginalized Groups
- Gender Equality
- Social Cohesion and Identity
- Carbon Foot Print Reduction
- Sustainable Resource Management
- Cultural Exchange and Dialogue
- Heritage Tourism

At the same time the cost of not achieving the targets set for the handloom sector in the Northeastern Region (NER) could have significant implications including:

- Loss of Livelihoods
- Missed Economic Opportunities
- Decline in Export Revenue
- Under Utilization of Resources
- Cultural Erosion

- Loss of Intangible Cultural Heritage
- Cultural Homogenization

5.1.7. Strategic Moves and Policy Interventions to Achieve the 2047 Vision

- Formulate a comprehensive handloom development policy specifically tailored to the unique needs and challenges of the NER
- Establish mechanisms for policy coordination, collaboration, and monitoring
- Enhance infrastructure development, build work sheds, create CFCs (Common Facility Centre) equipped with upgraded pre and post-production facilities, yarn depots, including roads, electricity, water supply, and market facilities, to improve connectivity and accessibility for artisans and weavers in remote areas.
- Allocate funds for infrastructure projects targeting handloom clusters and weaving communities
- Establish or upgrade marketplaces, craft bazaars, and exhibition centers to showcase NER handloom products in the cities
- Develop digital infrastructure and online marketplaces to promote e-commerce
- Skill development Centres
- Establish incubation centers and artisan clusters
- Setting-Up of North East Textile and Apparel Hub:
- Adopt One District One Product (ODOP) Initiative:
- Upgraded Looms: Inculcate best examples and emulate good practices from Meghalaya introduced by a German organization “Sidentraum” for a new type of loom - called “Flying 8” looms - for Eri Silk weavers in the Ri Bhoi district.
- Computer-Aided Design (CAD)
- Establish dedicated fund or credit facility
- Establish state of the art facilities for finishing exportable handloom goods and garment manufacturing with handloom and silk fabrics.
- Set up design and innovation centers focused on silk and handloom textiles to support artisans in product development, design adaptation, and value addition
- Establish market promotion agencies
- Facilitate access to bank loans, credit facilities, and financing schemes for artisans, weavers, and handloom enterprises, providing collateral-free loans, low-interest rates, and flexible repayment terms.
- Establish export-oriented units (EOUs) or special economic zones (SEZs) dedicated to handloom production and export, attracting foreign investors and facilitating technology transfer, market access, and export promotion.
- Offer subsidies, tax incentives, and financial assistance schemes to incentivize investments in the handloom sector, including support for infrastructure development, technology adoption, and market promotion.
- Collaborate with private sector companies and investors in public-private partnerships to develop infrastructure projects such as weaving clusters, handloom parks, and textile hubs, leveraging private sector expertise and resources.
- Explore export markets in neighbouring countries and regions
- Establish cross-border partnerships, joint ventures, and collaborative projects

- Promote cross border cultural exchange and collaboration between artisans, weavers, and cultural practitioners
- Organize cross-border cultural festivals, exhibitions, trade fairs and workshops showcasing the rich heritage and diversity of handloom traditions
- Develop textile tourism circuits to include visits to handloom weaving villages, artisan workshops, and cultural landmarks across borders.
- Multilateral development banks such as the World Bank, Asian Development Bank (ADB), and International Fund for Agricultural Development (IFAD), can provide funding for handloom and handicraft development projects in the NER.
- Multilateral agencies bring technical expertise and best practices
- Multilateral agencies conduct policy research, assessments, and studies
- Multilateral agencies can support market access initiatives

Draft Report

5.2. Bamboo

5.2.1. Background

Northeast India is known as 'treasure house of bamboo resources'. It occupies around 36 percent of the total area of 15 million hectares and 46 percent of production capacity of 53336 million of fresh bamboo culms². There are numerous uses of bamboo, including its usage as a building material, furniture, handicrafts, basketry, paper, and as a source of food, fodder, and material for alternative fossil fuel as green energy. Furthermore, bamboo makes it possible for persons living in poverty to participate in livelihood and economic development, which brings to a reduction in poverty and contributes to ecosystem services in this region. Notably in 2017, Indian government removed bamboo from the definition of trees under the Indian Forest Act of 1927. This decision was made to promote the bamboo industry and encourage cultivation and use of bamboo by farmers and industries. The Prime Minister stated in favour of bamboo, 'thousands of small-scale farmers and other livelihoods dependent on bamboo trade and cultivation will be positively impacted.'

However, due to a variety of complicated factors, the bamboo in the North Eastern region of India has not been exploited to its full potential. One viable method for addressing the current situation and broadening market access is to upgrade the existing value chains. This may be accomplished by providing a greater variety of products that are geared towards the market. Through the creation of ecologically responsible job possibilities and the establishment of a position in the global bamboo markets, it will create an environment that is conducive to the expansion of the bamboo sector and the entrepreneurs who are already operating within bamboo business eco-system.

The current vision for bamboo sector in the Northeast region, known as Bamboo Vision 2047, generates the green jobs by establishing interconnected value chains in the bamboo sector. This will provide an opportunity to participate in domestic and international markets and overcome the current status towards the goals of the bamboo vision 2047.

5.2.2. Potentials as an Industry

The NER possesses highest bamboo area as well as the country's growing stock. The wet tropical evergreen forest is regarded as the biological corridor that connects South East Asia with the rest of the continent. The inhabitants of this area are members of diverse tribes and have been coexisting harmoniously with the abundant forest resources and cultivating bamboo on their homesteads. However, the bamboo in North Eastern India has not been fully utilised due to various complex causes i.e. pro-poor technology; business enabling environment and market-based products development. Even that, a worldwide renaissance is currently taking place for bamboo sector in Northeast India through establishment of National Bamboo Mission (NBM) under the ministry of Agriculture and Farmers Welfare. A visible bamboo large scale industries in place in the state of Tripura, Assam and Mizoram.

² Gogoi, Jeemoni, et al.(2021), Growth in area and production of bamboo in North Eastern Region of India, Indian Journal of Hill Farming, [http://www.icarneh.ernet.in/IAHF/Volume%2034\(2\)December%202021/21.pdf](http://www.icarneh.ernet.in/IAHF/Volume%2034(2)December%202021/21.pdf) accessed on 05/12/2023

These industries are producing bamboo sticks based and engineered products to feed the domestic markets. Despite the fact that other materials had previously dominated the market. Due to the fact that the majority of the output of producing is mostly sold within their local markets, international trade accounts for a virtually insignificant part of the total global output. There has been a considerable increase in the international trade of bamboo products that have been thoroughly processed. According to INBAR, woven bamboo products continued to be the most significant traded item in 2017, accounting for 21% of global exports. These commodities had a total value of \$380 million in exports. The upcoming, Numaligarh Refinery Limited (NRL) will be mile-stone for bamboo sector in Northeast and play a major role in bamboo sector globally.

Enhancing the existing value chains is a feasible strategy to tackle the current scenario and expand market access by offering a wider selection of market-oriented products. It will establish a favourable climate to expand the current bamboo entrepreneurs and industry, generating environmentally friendly employment opportunities and securing a position in the global bamboo markets.

The adaptability and sustainability of bamboo make it highly promising for growth in India. It has versatile applications, including construction materials, handicrafts, furniture, paper manufacturing, textile production, and as a sustainable energy source.

Sustainable building materials- Bamboo, a sustainable and renewable material, has seen a growing use in construction and infrastructure development. It is a robust and long-lasting substance that is suitable for constructing buildings, bridges, and even for road construction. Due to its excellent strength-to-weight ratio, it is an optimal material for constructing structures. The Table 5.1.7 shows the consumption of bamboo pole in single housing construction and creating employment in the bamboo value chains.

Table 5.2.7: Utilization of Bamboo in Housing Construction in North East Region

Sl.No.	Building Components and Features*	Uses of Bamboo*	No of bamboo Pole Utilized	Current Price (INR)
1.	Foundation and Structure	Building on Bamboo Beam and Post System: Flooring is made with bamboo panels and bamboo mats supported by the structure.	5-6 poles (big diameter)	1500-1800
2.	Walls	Ikra System: Woven bamboo mats with bamboo strips are used to make walls. Plastering is done depending upon the region's climatic conditions.	100-120 (small diameter)	3000-3500

3.	Roofing	Pitched roofs: Most of the roofing structure is made entirely out of bamboo covered with thatch or corrugated sheets.	20-25 (medium diameter)	4000-5000
Average consumption of bamboo (INR)				8500-10300

Source: https://isvshome.com/pdf/ISVS_8-4/ISVS-8.4.7-Vijayalaxmi.pdf accessed on 02.04.2024

A flourishing bamboo industry has the potential to allure investments from both domestic and foreign stakeholders, resulting in a surge of capital influx and breakthroughs in technology. This can expedite the advancement of the industry and foster a favourable atmosphere for sustainable economic expansion.

The bamboo sector has the potential to empower local populations, particularly women and youth, by offering them chances to generate revenue and nurturing their entrepreneurial drive. This can result in enhanced social mobility, elevated social prestige, and heightened engagement in decision-making processes. Bamboo holds a significant place in the cultural history of the Northeast region. Advancing the bamboo industry can effectively safeguard indigenous expertise and proficiencies, foster cultural distinctiveness, and generate prospects for cultural tourism.

Moreover, in contrast to timber, bamboo is a rapidly regenerating and renewable resource. By harnessing the potential of bamboo, we can alleviate the strain on forests, foster sustainable land management methods, and actively contribute to the preservation of biodiversity. Bamboo plays a crucial role in mitigating climate change by sequestering substantial amounts of carbon dioxide during its growth cycle, so serving as a vital asset in the battle against global warming.

Through the promotion of its cultivation and utilisation, we may actively contribute to the process of carbon sequestration and effectively lower our carbon footprint. Bamboo's large root system aids in the prevention of soil erosion and land degradation, particularly in mountainous terrains, by effectively mitigating the loss of soil and maintaining its quality. Implementing this method can enhance soil fertility and agricultural productivity, hence ensuring the long-term sustainability of the environment.

Developing a knowledge-based economy within the bamboo. It needs to allocate the financial resources to research and development has the potential to fully exploit the capabilities of bamboo and facilitate the creation of groundbreaking applications in several sectors including as building, textiles, healthcare, and bio-composites.

The bamboo sourced from the NE region possesses exceptional quality and a wide range of uses, making it capable of accessing the global market. Consequently, the region's bamboo industry can experience a surge in export revenues, accumulation of foreign exchange reserves, and gain international reputation. Sustainable trade partnerships: Developing robust collaborations with global corporations and institutions can enable the sharing of expertise, transfer of cutting-edge technologies, and entry into markets for bamboo goods from the northeastern region.

5.2.3 Green growth economy-

Assam Bio-Refinery, a joint venture between Numaligarh Refinery Ltd. Fortum and Chempolis, plans to produce ethanol from bamboo. The company will consume around 5,00,000 MT of bamboo per year, which will be processed to produce 48,900 MT of ethanol. It will create ample opportunities for the smallholder bamboo farmers to sell bamboo and increase their income and employment.

Environmental Management and Carbon Sequestration- Bamboo, being a rapidly growing and extremely renewable material, can be effectively utilised for the purpose of environmental management and carbon sequestration. Bamboo plants possess a significant ability for carbon sequestration, enabling them to efficiently absorb and store substantial quantities of carbon dioxide from the environment. Bamboo has a crucial role in mitigating climate change and minimizing the release of greenhouse gases. Bamboo possesses not only the ability to sequester carbon, but also serves as a useful resource for environmental management due to its applications in erosion control, water purification, and habitat restoration.

The bamboo bearing areas in the NE region shown in Table 5.1.8 in total 53,538 (km²). It showed that pure bamboo area around 1,149(km²) equivalents to 114,900 hectares. The pure bamboo area could sequester 1953300(tCO₂) *. It can fetch a value of INR 718.32 crore by participating in the carbon market. It will improve livelihoods and incomes in the region through sustainable bamboo management and practices through participatory forest management.

Table 5.2.8: Bamboo bearing Areas in NE Region

State	Area as per Class of Bamboo Bearing Area (km ²) (*)					Bamboo Bearing Area (km ²)
	Pure Bamboo	Dense	Scattered	Bamboo Present Clumps Completely Hacked	Regeneration Crop	
Arunachal Pradesh	417	3,389	10,904	0	271	14,981
Assam	204	2,350	7,664	0	307	10,525
Manipur	0	1,383	6,862	995	663	9,903
Meghalaya	140	467	4,803	0	0	5,410
Mizoram	0	1,370	2,106	0	0	3,476
Nagaland	227	1,137	2,730	75	115	4,284
Sikkim	141	94	894	0	47	1,176
Tripura	20	617	3,146	0	0	3,783
Total	1,149	10,807	39,109	1,070	1,403	53,538

Source: India State of Forest Report 2019; * considered normal bamboo carbon sequestration 17-20 MT/per hectare.

5.2.4. Promises in use and employment

Bamboo is expected to have a bright future in North East region of India as it can be used in a wide range of industries such as construction, furniture, shoots and as an environmentally friendly alternative to plastic. The Indian government has recognised the potential of bamboo and as a result a number of policies and measures have been put in place to encourage its production and use. The feasible target could be achieved by 2047 through increased exports: 1% by 2030; 2% by 2035; 3% by 2040 and 6% by 2047 from the current export 2021 and subsequently reduce the import as projected below in table 5.1.9:

Table 5.2.9: Current export of bamboo products and broader target

Promising Areas	Import value in 2021 (in USD)	Export value in 2021 (in USD)	Phase-wise boarder target to export				Export target in USD
			Phase-I: 2023	Phase-II: 2035	Phase-III: 2040	Phase-III: 2047	
Bamboo shoots	60,877	15900	16059	16380.18	16871.59	17883.88	83094.65
Bamboo Round Pole Furniture	170,218	571,645	577361.5	588908.7	606575.9	642970.5	2987461.6
Bamboo housing	78764061	15763175	15920807	16239223	16726400	17729984	82379589
Bamboo Incense sticks/sm all sticks	744,795	7012,933	7083062	7224724	7441465	7887953	36650137
Bamboo Charcoal	771,806	77315	78088.15	79649.91	82039.41	86961.78	404054.25
Bamboo flooring	1732401	347647	351123.5	358145.9	368890.3	391023.7	1816830.4
Bamboo mats	396,261	96050	97010.5	98950.71	101919.2	108034.4	501964.81
Bamboo baskets	109195407	29834216	30132558	30735209	31657266	33556702	155915951
Bamboo raw materials	77700923	12286026	12408886	12657064	13036776	13818982	64207734
Total in	-	660049	66664956.	67998255.	70038202.	74240495.	34494681

USD		07	07	19	85	02	6.1
Total INR in Cr.	-	547.84	553.32	564.39	581.32	616.20	2315.23
NER target based on bamboo (38%)	-	208.1792	210.2616	214.4682	220.9016	234.156	879.7874

Source: <https://trade.inbar.int/> and <https://www.nedfi.com/wp-content/uploads/2021/11/COVERES-63.pdf> accessed on dated 15April2024

The current employment opportunity in the bamboo sector 210,672 in the North East region (NEDFI, 2021). It can be tripled through increased the export target and strengthen value chains products to create triple employment by 650,000 in bamboo sector.

Bamboo Vision-2047

Vision Project I: ‘Quadruple exports and triple employment’

Exports from

Employment from 210,672 in Bamboo sector in the NER in 2021 to triple employment level to 650,000 in bamboo sector.

Vision 2047 is a long-term initiative launched by the region bamboo development institutions to promote the use of bamboo as a sustainable resource for economic development and environmental conservation. The vision aims to harness the potential of bamboo to create livelihood opportunities, support rural development, and contribute to the country's green economy. It also focuses on promoting research, development, and innovation in the bamboo sector. The vision-2047 for the bamboo sector in the Northeast aims to create favourable bamboo ecosystems in the region, with the goal of ‘**Quadruple exports and triple employment**’ by that year.

Vision Project II:

Bamboo plantation for the embankment protection of river bank in the North Eastern Region of India

Vision Project III:

Study on Indigenous Bamboo Species, Indigenous Knowledge on Bamboo Preservation or Treatment, Bamboo Shoot Utilization, and Creation of a Digital Data Bank in North East India

Vision Project IV:

Establishing a Bamboo Research and Innovation Hub (BRIH) in North East India

Vision Project V:

Studies on Bamboo Species in North East India Suitable for Construction and Promoting Bamboo Cottages for Tourism

Vision Project VI:

Bamboo Oxygen Park in North East India for promoting eco-tourism.

Vision Project VII:

Setting Up NER-South East Asia Bamboo Value Chain

Policy Interventions

Core approaches and actions to achieve the 2047 Vision may include:

- Bamboo plantation on homestead farming systems development; private land plantation;
- Improve the productivity of bamboo forests, and promote the utilisation of bamboo in a variety of different industries.
- Combating climate change: bamboo serves as a natural reservoir for carbon, effectively absorbing substantial quantities of carbon dioxide as it grows.;
- Injecting the modern technology in planting, production, manufacturing, processing, packaging and marketing
- Playing role in green financing markets to contribute in Nationally Determined Contribution (NDC) as per the Party to the Paris Agreement;
- Establishing research and development facilities for bamboo products;
- Implementing supportive policies for bamboo-based industries and enterprises,
- And providing training and support to local communities for sustainable bamboo harvesting and processing.
- Connecting with the ASEAN countries for value chain initiations
- Introducing sustainable harvesting methods, the promotion of agroforestry systems based on bamboo, and the reduction of waste creation at every stage of the value chain.
- Forging robust alliances with international corporations and organisations, engaging in worldwide trade exhibitions and events, and advocating for the exceptional quality and sustainability of bamboo products from the NE region.
- Utilisation of digital marketing and e-commerce networks for the purpose of advertising bamboo products and expanding into places that have not yet been explored.

5.3. Mineral Resources of North East India

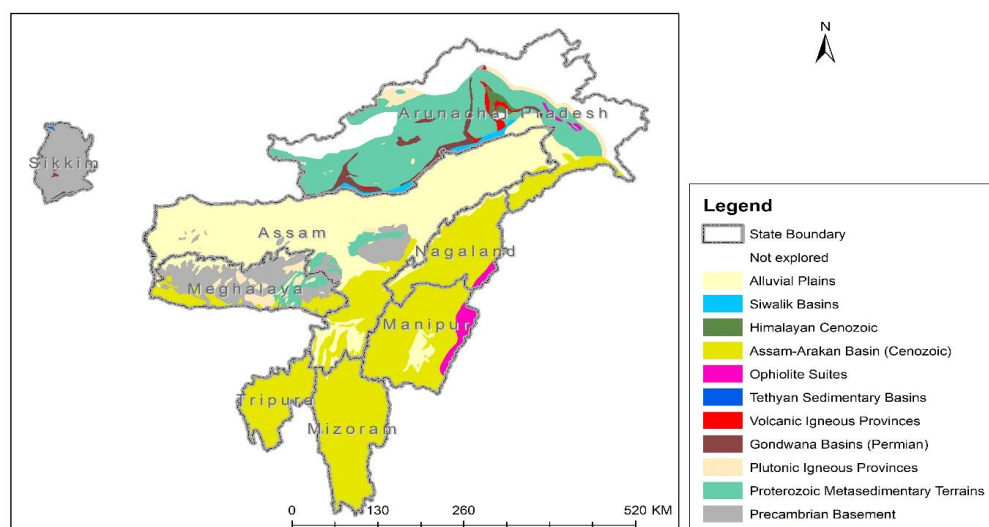
5.3.1: Brief Background

Geologically, Northeast India exhibits diverse terrains (Fig. 5.2.1), such as the Eastern Himalayas in Arunachal Pradesh and Sikkim, Indo-Myanmar Mobile Belt in the states of Nagaland, Manipur, Mizoram and Tripura, as well as the Assam-Meghalaya Plateau (including Shillong Plateau and Karbi Anglong Plateau). Additionally, extensive alluvial regions are found in the Brahmaputra and Barak valleys of Assam, along with the Imphal valley in Manipur, characterized by fertile plains formed through the deposition of alluvial sediments during the Pleistocene-Holocene time.

Key mineral resources

- **Petroleum and Natural Gas:** Assam and Tripura play significant roles in India's oil and gas production, primarily found within the Assam-Arakan basin.
- **Coal:** The Assam-Arakan sedimentary Basin harbours commercially viable sub-bituminous coal deposits in Meghalaya, Assam, Nagaland, and Arunachal Pradesh. Additionally, some minor Lower Gondwana coal deposits have been reported in Sikkim and Arunachal Pradesh.
- **Limestone:** A contiguous belt of limestone-bearing sedimentary sequences stretches from the South Garo Hills District of Meghalaya, traversing all along the southern fringe of Meghalaya to the Umrangso area of Dima Hasao, and re-emerging again in the East Karbi Anglong District in Assam. This belt is rich in high-quality limestone deposits, extensively utilized in cement and lime manufacturing, also as building materials. Moreover, small pockets of limestone deposits in Manipur and Nagaland could potentially support mini cement plants.
- **Uranium:** Meghalaya boasts India's largest sandstone-type uranium deposits, with the potential to enhance energy security (development subject to regulatory frameworks).

Figure 5.3.1: Different geological provinces in Northeast India



Other mineral resources

These deposits, if thoroughly explored and properly exploited, have the potential to make a substantial contribution to the regional economy.

- **Chromite:** Chromite deposits linked to the ophiolite belt in Manipur and Nagaland continue to hold promise for future exploitation. While these deposits are not currently active, they have been mined in the past. Although not as extensive as those in the Sukinda-Nausahi region of Odisha, the quality of the ores remains high. Furthermore, these deposits represent the sole chromite reserves in India beyond those in the Sukinda-Nausahi region.
- **Rare earth elements (REE):** Four ultramafic-alkaline-carbonatite complexes discovered in Meghalaya and Assam hold promise for REE deposits. While some deposits have been identified, ongoing exploration efforts may unveil additional resources. However, extraction has not commenced yet.

5.3.2. Key Mineral Resources

5.3.2.1. Petroleum and natural gas deposits

Present Status

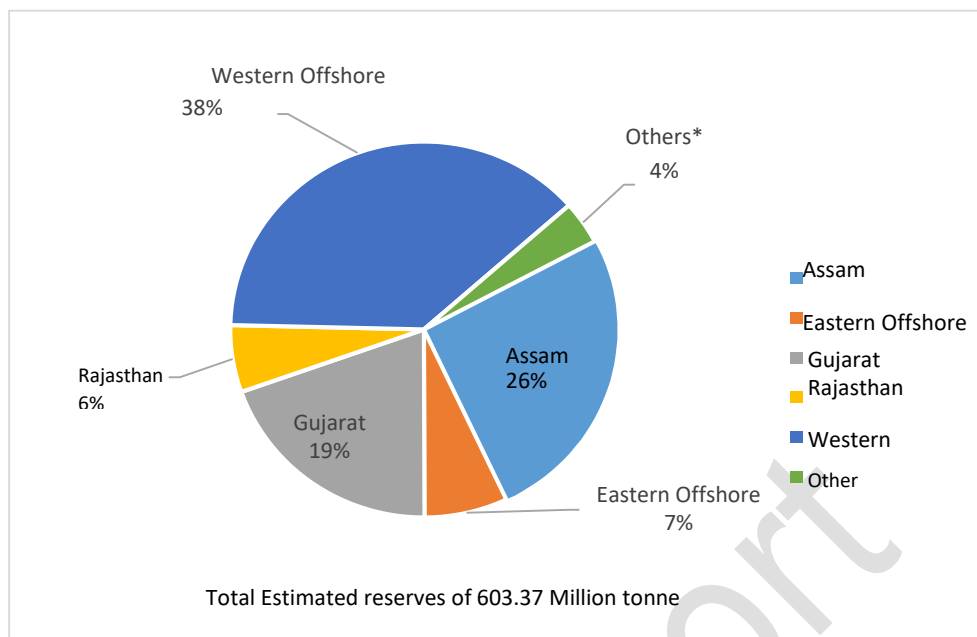
Given the expansion in exploration efforts and a significant increase in the availability of geoscientific data resulting from the New Exploration Licensing Policy (NELP), there arose a necessity to revisit the hydrocarbon resource assessment for all sedimentary basins in India. To accomplish this, a Multi-Organization Team (MOT), composed of representatives from ONGC, OIL, and DGH, conducted an estimation of the hydrocarbon resource potential across the country. The findings of this assessment for North East India are detailed in Table 5.2.1 The Fig. 5.2.2 illustrates the basin-wise percentage distribution of hydrocarbons in India.

Table 5.3.1 Hydrocarbon reserve in North East India.

SI No.	Basin name	Prognostic resources (MMTOE)	
		1994-95	2017
1	Assam Arakan Fold Belt	1860	1632.8
2	Assam Shelf	3180	6001.2

Source: Ministry of Petroleum and Natural Gas, Govt. of India
(<https://mopng.gov.in/en/exp-and-prod/conventional-hydrocarbon>)

Figure 5.3.2. Distribution of hydrocarbon reserves in India



Source: National Statistical Office (2021). Energy Statistics India 2021. <http://www.mospi.gov.in>.

The combined estimated hydrocarbon reserves in the Assam Shelf (Upper Assam) and Assam-Arakan Fold Belt (encompassing Nagaland, Tripura, Arunachal Pradesh, Mizoram, and Manipur) in Northeast India amount to 7,644 million metric tonnes. This constitutes the largest deposit among onshore petroliferous basins and ranks as the third largest when considering both onshore and offshore petroliferous basins in India (The Bombay Offshore and KG Basin being the first and second largest, respectively).

Production-wise, Assam held the exclusive status of being the sole producer of petroleum in India from the establishment of the Digboi oilfield until 1958. The scenario changed when ONGC made the groundbreaking discovery and extraction of oil from the Cambay Basin in Gujarat in 1958. Subsequent oil discoveries occurred in the Rajasthan Basin in 1959 and the offshore Bombay High Basin in 1974.

However, due to most large oilfields in Assam being over 50 years old, coupled with the absence of significant discoveries in the Upper Assam Shelf in recent decades, oil production in Assam has either plateaued or witnessed a decline. In the 2009-10 fiscal year, Assam produced 4740 million tonnes of oil, constituting 40% of the total onshore oil production and making Assam the largest onshore oil-producing state in India at that time. However, since then, Assam's oil production has not experienced significant growth, while Rajasthan and Gujarat have seen substantial increases. In the 2015-16 fiscal year, Assam produced 4185 million tonnes of oil, and in Arunachal Pradesh, with only one oilfield, the production has remained nearly constant at 295-305 million tonnes annually (Table 5.2.1.2).

Assam holds the distinction of being the largest onshore producer of gas in India. Gas production in Assam experienced a slight rise from 2009-10 to 2015-16. In the 2015-16 fiscal year, Assam produced 8.3 million cubic meters of gas, accounting for 32.9% of onshore production in India. Tripura also contributed significantly to gas production,

producing 3.6 million cubic meters in the same period, representing 14.3% of the national onshore production (Table 5.2.1.2).

As per the Union Minister of Petroleum & Natural Gas, (statement in the Rajya Sabha on 01-08-2018), Oil and Natural Gas Corporation (ONGC) Limited, Oil India Limited (OIL), and private/joint ventures companies have been actively producing natural gas from fields/blocks located in Assam, Arunachal Pradesh, and Tripura. In the fiscal year 2017-18, these entities collectively produced a total of 4.67 billion Cubic Meters (BCM) of natural gas (Table 5.2.1.2). The total balance recoverable reserve of natural gas resources in the North-Eastern States is estimated to be about 198 BCM.

Table 5.3.2. Year wise crude oil and gas production trends in NE India (figures in the brackets represents percentage of total national onshore production).

State	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Year-wise crude oil production trends (thousand Metric tonnes) in NE India							
Arunachal Pradesh	304 (2.6%)	305 (1.9%)	305 (1.7%)	295 (1.5%)	297 (1.5%)	254 (1.4%)	294.79 (1.7%)
Assam	4740 (40.1%)	4,724 (28.8%)	5,025 (27.9%)	4,863 (25.0%)	4,709 (24.0%)	4,473 (24.1%)	4185.13 (23.4%)
Year-wise Natural Gas Production Trends (Figures in MMSCMD) in NE India							
Assam	7.4 (31.1%)	7.4 (31.5%)	8 (32.1%)	8 (32.9%)	7.9 (32.0%)	8.1 (33.6%)	8.3 (32.9%)
Tripura	1.5 (6.3%)	1.7 (7.2%)	1.8 (7.2%)	1.8 (7.4%)	2.3 (9.3%)	3.1 (12.9%)	3.6 (14.3%)

Source: <https://dghindia.gov.in/assets/downloads/ogp.pdf>

The Hydrocarbon Vision 2030 for North East India, unveiled by the Indian Government on February 9, 2016, outlines a comprehensive plan aimed at transforming the region into a leading hydrocarbon hub by 2030. As the initiatives under this visionary plan unfold, significant changes are anticipated in the landscape of hydrocarbon exploration and production.

Key features of the vision document include:

Dominant Hydrocarbon Hub: Develop the North East Region as a dominant hydrocarbon hub, playing a pivotal role in the energy economy.

Production Doubling: Double the production of Oil and Oil Equivalent Gas (O+OEG) by 2030.

Access to Clean Fuel: Ensure access to clean fuel for 100% of households in the region at affordable prices, with a focus on LPG/PNG.

Infrastructure Development: Establish natural gas grids, City Gas Distribution (CGD) networks, and CNG highways.

Operational Flexibility: Approve relaxation of timelines for challenging area blocks and provide flexibilities for outstanding Minimum Work Programs (MWP).

Policy Implementation: Implement the Hydrocarbon Exploration and Licensing Policy (HELP) and Open Acreage Licensing (OAL) for oil and gas fields in the North Eastern region.

To facilitate the realization of these goals, an Executive Council comprising government officials and industry stakeholders has been formed. The successful execution of this vision plan is expected to revolutionize the hydrocarbon exploration and exploitation scenario in the region.

Laggard syndrome: why and what the NER lacks

Despite the potential, North East India's hydrocarbon sector lags behind other regions in India. Here's why:

- **Limited exploration**
- **Technological constraints**
- **Unconventional resources**
- **Complexities in land acquisition**
- **Regulatory bottlenecks**
- **Fragmented approach**
- **Balancing development and environment**
- **Community engagement**
- **Transparency and accountability**
- **Financial constraints**
- **Skilled workforce shortage**
- **Research and development gap**

Geography and connectivity

- **Challenging terrain:**
- **Environmental sensitivity**
- **Remote locations:**
- **Connectivity constraints:**

Markets, technology, and infrastructures

- **Limited refining capacity:**
- **Inadequate gas distribution network:**
- **Technological dependence: Vision 2047**

Potentials:

- **Enhancing recovery techniques:**
- **Focus on Unconventional Resources**
- **Promoting Regional Exploration**
- **Carbon sequestration**
- **Collaboration with research Institutions**

Vision Goals 2047

Building upon the North East India Hydrocarbon Vision 2030, the following ambitious targets can be envisioned for the year 2047, contingent on successful implementation, significant new discoveries, and continued advancements in financial and technological investment:

Vision I

Double oil and oil equivalent gas (O+OEG) production by 2047 compared to a 2024 baseline and reduce dependence on imports.

Vision II

Ensure access to clean fuel (LPG/PNG) for 100% of households in the region by 2047 at affordable prices.

Vision III

Establish North East India as a leading hydrocarbon hub contributing to India's energy security.

Vision IV

Develop a sustainable hydrocarbon sector that minimizes environmental impact.

Policy Interventions, Strategic moves and Instruments

To achieve the ambitious vision for North East India's hydrocarbon sector by 2047, a multi-pronged approach is required. This involves strategic thinking, critical policy interventions, and various enablers for success.

Strategic thinking

- Long-term perspective
- Sustainable development approach
- Collaboration and stakeholder engagement

Critical policy interventions

- Streamlined exploration and production policy
- Fiscal incentives
- Land acquisition reforms
- Environmentally friendly regulations

Physical Infrastructures

- Upgrading existing infrastructure
- Developing refining capacity
- Improved transportation network

Technological inputs

- Advanced exploration technologies
- Research and development

- Digitalization

Institutional support

- Strengthening regulatory bodies
- Skill development institutes
- Collaboration with research institutions

Finance and resources mobilization

- Public-private partnerships (PPPs)
- Foreign investment
- Domestic investment promotion
- Newer Financial instruments
- Start-ups and innovation

Cross-border interconnections

5.3.2.2. Coal deposits

Present status

Coal mining activities constitute a dominant component of economic activities particularly in this region. For example, the coal extraction and its related activities have been contributing about 10% of the net domestic product of Meghalaya till the coal mining activities were banned by the National Green Tribunal (De, 2007). Four coal producing states of Northeast India, viz., Meghalaya, Assam, Nagaland, and Arunachal Pradesh contain a total reserve 1496 million tonnes (Table 5.2.2.1). Assam and Meghalaya contribute majority of the reserves with 36% and 31% of total reserves respectively. Nagaland and Arunachal Pradesh contribute 26% and 6% of total reserves respectively.

In terms of proved reserves Assam contains 465 million tonnes of coal which constitutes 78% of gross proved reserves of coal in Northeast India. Majority of this reserve is contributed by the Makum coalfield, which is the most developed and the only coalfield in Northeast India under systematic mining activities. Meghalaya contains 15%, Arunachal Pradesh contains 5% and Nagaland contains 2% of total proved reserves of coal in Northeast India.

Total reserve of coal in Meghalaya is 576.48 million tonnes, the largest in the North East India. The Garo Hills owns 68% of total reserves of coal in Meghalaya, followed by the Khasi Hills with 25% and Jaintia Hills with 7%. The coalfield of Jaintia Hills is very small. Barring the Langrin and Mawlong-Shella coalfields, other coalfields of Khasi Hills are also very small. Coalfields of the Garo Hills are much bigger than their counter parts in the Jaintia and Khasi Hills.

Table 5.3.3.: State wise distribution of coal reserves (in million tonnes) in Northeast India as on 2019-20.

State	Proved	Indicated	Inferred	Total
Meghalaya	89.04	16.51	470.93	576.48
Assam	464.78	42.72	3.02	510.52
Nagaland	8.76	21.83	415.83	446.42
Arunachal Pradesh	31.23	40.11	18.89	90.23
Total	593.81	121.17	908.67	1623.65

Source: Coal Directory of India, 2019-20.

The state wise distribution of coal production for the year 2011-12 to 2019-20 is shown in the Table 5.2.2.2.

Table 5.3.4: State wise production of coal as from 2011-12 to 2019-20 in Northeast India (in thousand tonnes).

State	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20
Meghalaya	7206	5640	5,732	2524	3712	2308	1529	-	-
Assam	602	605	664	779	487	600	781	784	517
Arunachal Pradesh	221	73	-	-	-	-	-	-	-
Total	8029	6318	6396	3303	4199	2908	2310	784	517

Source: (Data taken from the Indian Mineral Yearbook (Coal & lignite) published by the IBM for the respective years)

Most coal production in Northeast India originates from Meghalaya and Assam. However, production in both states has been steadily declining, primarily due to environmental concerns associated with mining. Meghalaya, the largest coal producer in Northeast India, saw its output fluctuate between 5.7 and 7.2 million tonnes between 2011-12 and 2013-14, but then significantly declined due to a 2013 environmental ban imposed by the NGT. By 2019-20, production had dwindled to a mere 0.5 million tonnes. However, 2023 saw renewed hope with the Central Government approving mining leases.

Coal extraction in Meghalaya dates back over a century. Initially contributing significantly to the economy, production fluctuated. It peaked in the 1960s before declining sharply and stagnating until 1976. Reasons likely included the Bangladesh independence war and internal factors. Production then rebounded, reaching 2 lakh tonnes by 1979 and steadily increasing until an NGT ban in 2014 due to environmental concerns. By 2012-13, annual production peaked at 5.6 million tonnes. Despite holding only 7% of reserves, the Jaintia Hills region is the major producer (73%). The Garo Hills, with significantly larger reserves (93%), contributes only 9% of annual production. This discrepancy likely stems from better road network and easier terrain in the Jaintia Hills region.

Assam's historical coal production fluctuated significantly between 2012-13 and 2019-20, ranging from 2.80 to 7.84 million tonnes per year. However, production dropped sharply to just 5.17 million tonnes in 2019-20.

Umrangso in Dima Hasao District, Assam, is another coal-producing region geologically associated with the Eocene Shelf of the Assam-Arakan Basin. The Jaintia Group of Eocene rocks contain three confirmed coal seams ranging from 0.2 to 3.8 meters thick. Since 1984, the Assam Mineral Development Corporation (AMDC) has operated mines around Garampani and Khota Arda. AMDC's production began at 9,000 tonnes in 1984 and peaked at 75,000 tonnes in 2012-13. However, a December 2016 report in the Sentinel suggested the CAG estimated AMDC incurred losses by selling coal below Coal India Ltd.'s fixed price, with a loss of Rs. 49.07 crores between April 2011 and March 2015.

Coal mining operations in Arunachal Pradesh are limited to the Namchik-Namphuk coalfield located in the Changlang District. Nagaland's coal mining industry has been plagued by illegal and unscientific practices, particularly in the foothill region stretching from Mon to Wokha districts.

Export to Bangladesh has been a fluctuating market for coal produced in Meghalaya. Kharkongor & Dutta (2014) report exports ranging from 2.7 lakh tonnes in 1994-95 (8.4% of total annual production) to 7.36 lakh tonnes in 2008-09 (13.4%)³. However, recent data scarcity hinders a clear understanding of current export trends.

Looking ahead, India's push for renewable energy like solar and wind power aims to reduce its dependence on coal.⁴ Additionally, research in cleaner coal technologies like gasification and carbon capture and storage offers potential for mitigating the environmental impact of coal use⁵.

Laggard syndrome: resource constraints and limited investment

Limited coal reserves:

Dominance of illegal mining

Difficult terrain and infrastructure bottleneck

Institutional Drawbacks and Governance Issues

Unorganized sector and weak oversight

Public outcry and legal interventions

The need for a sustainable approach

Shifting to a regulated sector

Learning from Makum Coalfield

Balancing development and environmental protection

Limitations in resources and expertise

³ Kharkongor, P., & Dutta, S. (2014). Coal Exports from Northeast India: A Perspective from Meghalaya. *Journal of the North Eastern Economic Association*, 23(4), 19-32.

⁴ MNRE. (2023). National Renewable Energy Programme (NREP) 2023-24. Ministry of New and Renewable Energy, Government of India.

⁵ International Energy Agency (2023). *World Energy Outlook 2023*.

Vision 2047: A sustainable future for North East India's coal sector

Vision I Reaching the Qualitative targets

Safety standards:

Community development:

Institutional capacity enhancement:

Transparency and stakeholder engagement:

5.3.3.3.Limestone deposits

Present status

The principal limestone-rich locales in Meghalaya encompass Siju and Nongjri in the South Garo Hills; Borsora in the West Khasi Hills District; Shella, Ishamati, Mawlong, Komorrah, and Cherrapunji in the East Khasi Hills District; Sutnga in the West Jaintia Hills District; and Litang Valley, Lakadong, Lumshnong, Nongkhlieh, Nongtalang, and Syndai in the East Jaintia Hills District. The largest deposit of limestone in Meghalaya is situated at the Litang Valley. Chemical analysis of these significant limestone deposits demonstrates their optimal suitability for the cement industry, showcasing a chemical profile with elevated levels of CaO and minimized levels of MgO. This favourable composition underscores the potential of Meghalaya’s limestone as a critical resource for cement production. (Table 5.2.3.1).

Table 5.3.5. Chemical composition of major limestone deposits of Meghalaya.

Major oxides	Jaintia Hills Deposits					
	Lakadong	Lumshnong	Nongkhlieh	Nongtalang	Suntnga	Syndai
CaO	42.27-53.89	40.69-54.67	40.46-53.88	46.33	48.75-53.09	42.00-49.60
MgO	1.25-5.58	0.20-11.55	0.36-7.12	3.51	0.72 - 3.41	0.56 - 2.07
SiO ₂	0.14-3.12	0.04-17.20	0.16-10.00	-	-	-
Fe ₂ O ₃	0.26-1.59	0.04-3.87	0.07-4.91	-	-	1.73 - 2.31
Al ₂ O ₃	0.22-2.61	0.05-5.71	0.16-6.37	-	-	-
	East Khasi Hills deposits					
	Cherrapunjee	Komorrah	Laitryngew	Mawlong-Ishamati	Shella	
CaO	44.33-53.53	51.97-54.95	52.02-54.41	51.91-53.04	48.15-53.98	
MgO	0.33-4.21	0.76-2.98	0.15-2.25	0.43 - 4.76	0.72-6.85	
SiO ₂	-	0.46-1.90	-	0.56 - 2.78	0.38-5.20	
Fe ₂ O ₃	-	0.28-1.11	-	0.38 - 0.48	0.28-1.72	
Al ₂ O ₃	-	0.16-0.56	-	0.26 - 1.06	0.48-2.18	
	West Khasi Hills		South Garo Hills			
	Borsora		Darrang-Era-Aning		Siju-Artheke	
CaO	41.86-53.32		38.00-51.35		46.9	
MgO	0.48-6.10		0.55-4.04		1.72	

SiO ₂	0.36-4.52	0.66-6.61	-
Fe ₂ O ₃	0.64-5.78	0.43-5.28	0.47
Al ₂ O ₃	1.14-6.55	0.24-27.05	2.69

Source: Lamare, E., Kumar, V., and Rai, P. K. (2017). Environmental impact of limestone mining and its mitigation measures—A case study. *Journal of Environmental Management*, 192, 34-45.

The limestone formations in the Jaintia Hills region of Meghalaya extend into the Dima Hasao District of Assam, where a significant limestone band, 80-90 meters thick, spans across the Kopili River in the Umrangso area. This particular limestone band is identified as the Garampani Limestone Formation, a name attributed by Samanta in 1971. Notably, deposits have been discovered around the villages of Lobang, Longkingdong, Larphing, and Baralaphing, situated within a zone covering 6.5 kilometers in length and 2.5 kilometers in width. In this vicinity, workable limestone deposits are found between the 3.5 and 6.5-kilometre markers along the Garampani road. These deposits reveal a 60-meter-thick limestone layer that stretches along a ridge on the western flank of the Umrang valley, as documented by the Geological Survey of India⁶.

The limestone occurrences in East Karbi Anglong District are exclusively found within the same Jaintia Group of rocks. The most significant limestone deposit in the East Karbi Anglong Hills is situated in the Dilai Parbat region.

A belt of small-sized and irregular limestone deposits is also exposed along the eastern margin of the states of Manipur and Nagaland. In Manipur, pockets of limestone deposits are visible in the Ukhrul and Chandel districts.

The state wise reserves of limestone as per the Indian Mineral Yearbook of 2012 and 2020 are stated in the Table 5.2.3.2. The data shows that North East India has a huge total reserve of limestone in the order of 19,93,72 million tonnes of limestone with about 91% of reserves being stored in Meghalaya only. Assam has about 8% of total reserves. The limestone deposits in the other states are very negligible in comparison to the Meghalaya and Assam. Out of these total reserves, 1,83,788 thousand tonnes of limestones have already been proved in Assam by detailed exploration. Despite, having a huge total reserve, only 1,35,836 thousand tonnes of limestones have been proved in Meghalaya till 2019-20. However, this figure would definitely change in the future with more detailed exploration activities in the state. As per data furnished in the Indian Mineral Yearbook, 2020, Meghalaya as about 13% of total limestone reserves of India, while Assam has about 1%.

⁶ Kesari, G. K., Das Gupta, G., Reddy, B. V. R., Prakash, H. S. M., Mohanty, B. K., Lahiri, S., and Behara, U. K. (2009). *Geology and mineral resources of Meghalaya*, Geological Survey of India, Miscellaneous Publications, No. 30, Part IV, Vol 2(ii), 52p.

Table 5.3.6. State wise limestone deposits of North East India (Data taken from Indian Mineral Yearbook 2012 for Assam and Indian Mineral Yearbook, 2020 for the other states; in ,000 tonnes)

States	Proved	Probable	Remaining resources	Total
Assam	1,83,788	1,52,562	11,10,992	14,47,342
Meghalaya	1,35,836	2,25,562	2,25,562	1,77,04,116
Nagaland	-	-	1,72,200	1,72,200
Manipur	-	-	46,053	46,053
Sikkim	-	-	2,380	2,380
Total	3,19,624	3,78,124	15,57,187	1,93,72,091

Only two states in North East India have been producing limestones in significant quantities. Meghalaya is the largest producer of limestone, and the figure stands at 7,259 thousand tonnes of yearly production in the year 2019-20 which is 2% of total yearly production in India. Assam produced 1,552 thousand tonnes of limestone in the year 2019-20 which is 0.43% of total Indian production in that year. As per the Indian Mineral Yearbook, 2021 Meghalaya had a total of 19 and Assam had 3 limestone mines. As per the data furnished in the Cement Information System (CIS) of Ministry of Commerce & Industry, Govt. of India, Meghalaya has a total of 9 cement plants while Assam has 11⁷.

Table 5.3.7. state wise production of limestone in North East India (Date taken from Indian Mineral Yearbook, 2021; in ,000 tonnes)

States	2015-16	2016-17	2017-18	2018-19	2019-20
Assam	777	1,594	1,432	1,652	1,552
Meghalaya	3,834	5,095	6,599	7,195	7,259

A sizeable amount of limestone is also exported from Meghalaya to Bangladesh. The Meghalaya High Court had put a ban on limestone export from Meghalaya as a minor mineral on November 2022 (Highland Post, November 28 2022). However, the Supreme Court of India has granted permission to exporters to export limestone to Bangladesh, setting aside a November 24 order of the High Court of Meghalaya banning the same (Shillong Times, December 14 2022).

Laggard syndrome

Limestone deposits are indeed extensively mined in Assam and Tripura for use in cement industries. However, the region continues to grapple with significant risks associated with unorganized mining, particularly in Meghalaya. Instances of illegal mining have been reported in various news outlets. One key issue exacerbating this situation is the absence of a comprehensive mineral policy, leading to ambiguity regarding the classification of Meghalaya's limestone as either minor or major minerals. This uncertainty has led to interventions such as the Meghalaya High Court's temporary ban on the export of limestone to Bangladesh, affecting industries reliant on this resource. A notable Lafarge cement manufacturing facility in Bangladesh heavily relies on limestone extracted from Meghalaya. Despite the flourishing limestone mining industry, the risks persist, mirroring the challenges that prompted the National Green Tribunal to ban coal mining in Meghalaya.

⁷ <https://eaindustry.nic.in /cement/report4.asp>.

Several factors contribute to the Northeast region's lag in achieving sustainable limestone mining practices:

- Limited Focus on environmental rehabilitation
- Lax regulations and enforcement
- Inadequate community engagement
- Institutional drawbacks
- Weak regulatory frameworks
- Limited expertise
- Interdepartmental coordination
- Centralized decision making
- Inadequate stakeholder engagement
- Limits of resources, skills, and capacities
- Financial limitations

5.3.4. Vision 2047: Possibilities, potentials and promises

Northeast India's limestone deposits hold immense potential for economic growth. However, achieving Vision 2047 necessitates a shift towards sustainable mining practices. This transition unlocks a multitude of possibilities for the region's economic, social, and environmental well-being. Sustainable mining can create new avenues for economic development of the region.

Green jobs: A focus on environmental monitoring, reclamation, and clean technology development fosters new job opportunities in the green sector.

Knowledge-based economy: The transition to sustainable practices incentivizes investment in research and development (R&D) for innovative mining technologies, propelling a knowledge-driven economy.

Regional cooperation: Collaboration between Northeastern states and the ASEAN countries for knowledge sharing, best practices, and joint infrastructure development (e.g., shared processing facilities, roads etc.) can lead to a more efficient and sustainable industry. This fosters regional economic integration and strengthens bargaining power in the national and international markets.

Technological innovation: The push for sustainability incentivizes R&D in areas like selective quarrying for minimizing waste generation; advanced waste management systems for resource recovery and pollution control and cleaner transportation options like electric vehicles for reducing environmental impact.

Mini cement plants to harness smaller limestone deposits: While the limestone deposits in Manipur and Nagaland may be modest in size, they present an opportunity for establishing mini cement plants that could significantly boost the local economy.

Reduced health risks: Lower air and water pollution from sustainable practices lead to improved health outcomes for communities residing near mining sites.

Community empowerment: Active participation of local communities in decision-making and benefit-sharing programs fosters a sense of ownership and promotes social equity. This can lead to reduced conflict surrounding mining activities and fosters a more inclusive development process.

Vision Goals: Quantitative targets

To achieve a sustainable future for limestone mining in Northeast India by 2047, measurable goals are essential. Here are some potential quantitative targets:

Vision I: Reduction in land degradation: Aim for a 50% reduction in land degradation caused by limestone mining compared to 2024.

Vision II: Restoration of mined areas: Achieve a target of rehabilitating 70% of previously mined areas through reforestation and soil stabilization programs.

Vision III: Decrease in water pollution: Reduce water pollution from mining effluents by 60% through improved waste management and treatment technologies.

Vision IV: Reduction in air pollution: Aim for a 40% reduction in dust emissions from mining activities by implementing dust suppression techniques and cleaner transportation options.

Vision V: Increase in skilled workforce: Strive for a 100% increase in the number of personnel trained in sustainable mining practices and environmental impact assessments.

Vision VI: Reaching Qualitative targets

- Adoption of cleaner technologies
- Transparency and accountability
- Community empowerment
- Circular economy principles
- Biodiversity conservation
- Potentials and possibilities

5.4. MSME & Entrepreneurship

5.4.1: Introduction

In recent times, there has been a burgeoning recognition that entrepreneurship can serve as a catalyst for change in North East India. Empowered by education and exposure to global influences, the region's youth have begun exploring innovative business concepts and enterprises. This newfound entrepreneurial zeal has been stoked by various factors, including governmental initiatives, enhanced access to information and technology, and a quest for self-sufficiency.

Government policies and programs have significantly bolstered the promotion of a startup culture in the region. Initiatives such as the Startup India Seed Fund, Prime Minister's Development Initiative for North East Region (PM-DevINE), Atal Innovation Mission, and DST(INSPIRE) have incentivized and subsidized investments to support local entrepreneurs. Moreover, the Startup India initiative has fostered an enabling environment for startups by streamlining regulations, facilitating funding access, and nurturing a culture of innovation.

5.4.2: Current Scenarios of Entrepreneurs/Startups from NE

The advent of technology and digital connectivity has also opened fresh avenues for entrepreneurship in North East India. Startups in sectors such as e-commerce, fintech, healthcare, agritech, and tourism-tech have emerged, utilizing digital platforms to reach customers beyond regional borders. This not only has led to job creation but has also spotlighted the region's distinct offerings to a global audience.

Furthermore, the region's natural resources and cultural heritage have served as wellsprings of inspiration for numerous startups. Entrepreneurs are delving into sustainable and eco-friendly business models, focusing on sectors like organic farming, renewable energy, and handicrafts. These endeavours not only contribute to the preservation of the region's environment and traditions but also attract socially conscious consumers and investors.

While the startup ecosystem in North East India is still in its infancy, there is a prevailing optimism and belief in the yet-to-be-fulfilled entrepreneurial potential of the region. Challenges such as access to finance, market linkages, and skill development remain to be addressed. Nevertheless, with adequate support, collaboration, and sustained emphasis on innovation, North East India harbours the potential to emerge as a vibrant nexus of startups and entrepreneurship, reshaping the region's socio-economic landscape and heralding a brighter future for its populace.

This vision document seeks to delve into the transformative influence of entrepreneurial ventures and startups in unlocking the region's potential and propelling it toward a prosperous future by 2047.

Table 5.4.1: Current Status of Startups in North East India

Sl. No.	State	Population As per 2011 census	Total DPIIT Startups	Women Led Startups	Population to Startup Ratio (1 startup for following population)
1	Arunachal Pradesh	1,383,727	36	19	3,84,36.86
2	Assam	31,205,576	1187	512	26,289.45
3	Manipur	2,855,794	133	52	21,472.14
4	Meghalaya	2,966,889	45	22	65,930.87
5	Mizoram	1,097,206	27	12	40,637.26
6	Nagaland	1,978,502	58	32	34,112.10
7	Sikkim	610,577	10	4	61,057.70
8	Tripura	3,673,917	97	43	37,875.43
Total		4,57,72,188	1593	634	28,733.33

The table refers to the census of 2011 and the data updated till March 2024 as per DPIIT (Startup India) which is the nodal agency for the startups in India.

The comparison of startup-to-population ratios between the national average and North East India reveals a significant disparity. Nationally, there is an average of 1 startup for every 12,000 people, indicating a relatively robust entrepreneurial ecosystem. However, in the North East region, this ratio is markedly lower, with only 1 startup for every 28,000 individuals, more than twice below the national average. This discrepancy highlights the need for focused attention and governmental intervention in the form of targeted entrepreneurial policies and frameworks.

Within the North East region, certain states exhibit comparatively higher startup statistics. Manipur leads the pack, followed by Assam, Mizoram, Tripura, and Sikkim. However, there remains a considerable gap in startup numbers in states such as Arunachal Pradesh, Meghalaya, and Nagaland.

This disparity underscores the urgent necessity for governmental intervention. Implementing entrepreneurial policies and frameworks tailored to the unique needs of the North East region can foster a conducive environment for startup growth. Such

interventions are crucial, given the immense potential of entrepreneurial ventures and startups to generate livelihood opportunities, particularly in rural India.

By nurturing the establishment of small-scale industries, agriculture-based enterprises, and service-oriented businesses, these policies can catalyse economic growth and reduce rural communities' dependence on agriculture as the primary source of income. Initiatives like microfinance and skill development programs play a pivotal role in empowering rural individuals to embark on entrepreneurial endeavours, thereby augmenting their income levels and improving overall living standards.

The following table, based on data from the Ministry of Commerce & Industries, Government of India, dated March 31st, 2024, provides a visual representation of the trajectory of startups in the North East region over the past six years. This data serves as a valuable tool for policymakers and stakeholders to assess progress and strategize further interventions to bolster the startup ecosystem in the region.

Table 5.4.2: Startups in The North East Region Over The Past Six Years

S.No.	States/UTs	March 2019	March 2020	March 2021	March 2022	March 2023	March 2024
1	Arunachal Pradesh	2	-	4	9	17	36
2	Assam	62	108	181	282	362	1187
3	Manipur	3	10	33	31	26	133
4	Meghalaya	5	-	6	10	18	45
5	Mizoram	-	1	2	6	13	27
6	Nagaland	2	5	6	7	22	58
7	Sikkim	2	1	3	2	2	10
8	Tripura	7	17	11	25	23	97
Year wise Total		81	142	242	363	466	1593

Employment Generation through Startups in NE:

Startups play a vital role in driving employment generation in North East India, contributing to economic growth and development in the region. As per report of DPIIT and Invest India the State-wise detail of total number of employments generated (as on 30th June 2022) are as follows:

Table 5.4.3: State-wise detail of total number of employments generated (as on 30th June 2022)

S. No.	States/ UTs	Number of Employees
1	Arunachal Pradesh	69
2	Assam	5,335
3	Manipur	806
4	Meghalaya	179
5	Mizoram	87
6	Nagaland	198
7	Sikkim	58
8	Tripura	1,005
	Grand Total	7,668

How startups contribute to employment generation:

- Direct Job Creation
- Indirect Job Creation
- Entrepreneurship Opportunities
- Skill Development and Training
- Innovation and New Industries
- Rural Employment Opportunities
- Government Support and Initiatives

Overall, startups play a crucial role in catalysing employment generation in North East India by creating direct and indirect job opportunities, fostering entrepreneurship, driving innovation, and contributing to the socio-economic development of the region.

5.4.3 FDI in the North Eastern States

Foreign Direct Investment (FDI) serves as a significant driver of economic growth worldwide, fostering development and innovation across various sectors. In the context of India, FDI plays a pivotal role in shaping the country's economic landscape, positioning it as an attractive destination for global investors. The United Nations Conference on Trade and Development (UNCTAD) World Investment Report has consistently highlighted India's appeal as a favoured FDI destination. Notably, in 2022, India secured the third-highest FDI for new greenfield projects, reaffirming its allure to foreign investors.

However, despite India's overall attractiveness for FDI, the North Eastern region struggles to attract significant investments. Several factors contribute to this challenge, including inadequate infrastructure, regulatory hurdles, and a lack of sectoral policies conducive to foreign investment. Understanding these factors is crucial for any nation aspiring to optimize foreign capital inflows.

In India, the determinants of FDI inflows encompass economic stability, regulatory environment, sectoral policies, political stability, and infrastructure. Improving these aspects can enhance the appeal of the North East region to foreign investors and facilitate greater FDI inflows.

To regulate FDI and safeguard national interests, India has established two primary routes: the Automatic Route and the Government Route. The Automatic Route allows foreign investors to invest in sectors without prior approval, promoting ease of doing business and attracting capital, particularly in sectors with higher FDI limits or minimal security concerns. Conversely, the Government Route necessitates prior approval from Indian authorities, primarily for sectors involving national security, strategic interests, or specific regulatory concerns. This route enables the government to maintain control over sensitive areas of the economy while still permitting foreign investments on a case-by-case basis.

Some key areas in the North East region where FDI can be attracted include infrastructure development, tourism, renewable energy, agribusiness, healthcare, and information technology. Targeting these sectors can harness the region's potential, stimulate economic growth, and improve the livelihoods of its residents. The following table is an indicator of FDI that are possible in the North East India along with the entry route mandated by the Government of India.

Table 5.4.4: Indicator of FDI that are possible in the North East India along with the entry route mandated by the Government of India.

Sector	FDI limit	Entry Route
Banking- Private	74%	49%- Automatic. Above 49-74%- Government
Insurance	74%	Automatic
Agriculture & Animal Husbandry	100%	Automatic
Plantation sector	100%	Automatic
Mining	100%	Automatic
Petroleum & Natural gas refining	100%	Automatic
Civil aviation- Airports	100%	Automatic
Civil aviation- Air transport services	100%	Automatic up to 49% Above 49% under Government route.
Telecom	100%	49%- Automatic. Above 49%- Government
Railways	100%	Automatic
Financial services' activities regulated by RBI, SEBI, IRDAI, other regulator	100%	Automatic

Sector	FDI limit	Entry Route
Pharmaceuticals (Greenfield)	100%	Automatic
Pharmaceuticals (Brownfield)	100%	Automatic upto 74%, above 74% under Government
Power exchanges	49%	Automatic
Construction development	100%	Automatic
Industrial parks	100%	Automatic
E-commerce activities	100%	Automatic
Duty-free shops	100%	Automatic
Food products manufactured or produced in India	100%	Government
Cash & carry wholesale trading	100%	Automatic
Biotechnology	100%	Automatic
Food processing	100%	Automatic
Textiles and garments	100%	Automatic
Tourism and hospitality	100%	Automatic

The table below provides a concise overview of Foreign Direct Investment (FDI) inflows into the North Eastern states during the period from October 2019 to December 2023. FDI equity inflow is a crucial indicator of foreign investment activity and can reflect the attractiveness of a region to international investors.

Overall, the table serves as a useful tool for tracking FDI inflows and assessing the effectiveness of policies and initiatives aimed at promoting investment and fostering economic growth in the North Eastern states.

Table 5.4.5: North Eastern STATE-WISE FDI EQUITY INFLOW FROM OCTOBER 2019 TO DECEMBER 2023

Ranking as per Indian States	State Name	Amount of Foreign Direct Investment Equity inflow		% age out of total FDI Equity inflow (in USD terms)
		(In INR Crore)	(In USD Million)	
25	ASSAM	155.41	20.85	0.01
26	ARUNACHAL PRADESH	40.95	5.55	0.00
27	MEGHALAYA	8.17	1.10	0.00
29	TRIPURA	5.19	0.68	0.00
31	NAGALAND	0.10	0.01	0.00
32	MANIPUR	0.01	0.00	0.00
	Gross-Total	417.87	56.51	

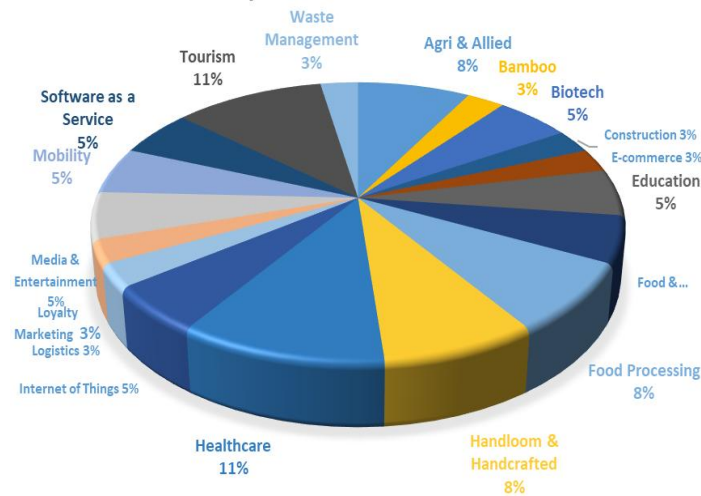
Current State of Investment (as per report from North East Venture Fund, NEDFI):

The North Eastern Development Finance Corporation (NEDFi) has made investments in startups across various sectors in the North East region, as detailed below:

Table 5.4.6: Investments by NEDFi in startups across sectors of NER

State	Number of startups invested	Amount Invested (in Rs in Lakhs)
Arunachal Pradesh	2	140
Assam	24	4679.5
Manipur	6	635
Meghalaya	3	105
Sikkim	1	100
Tripura	1	25
Total	37	5684.5

Figure 5.4.1: Sectors/Domains NEDFI invested



The investments are diversified across various sectors. These investments reflect NEDFI's commitment to supporting startups across diverse sectors in the North East region, fostering economic growth and development. However, the investment thesis needs to increase and also diversify.

5.4.4. Vision 2047 Goals

Vision I

Highland MSME Corridor of South and South East Asia. This corridor will galvanise and regionally aggregate production bases, resources and entrepreneurial store houses that are at present thinly spread across the states and steadily cut down the transaction costs.

The NER exports over 1400 products (most of them relatively nominal, around 400 at the HS Sub-heading level carry export price competitiveness and almost 67 % originate in Assam) to South, South East Asia and other global destinations. In the total exports valued at US\$ 43.29 million in 2018, Assam's share alone was 84 percent. However, both the quantity and quality need to be intensely and drastically scaled up.

In the SMEs promotion in the NER there are no size barriers and are characterized by local synergies of innovation, local centric leadership-resources-knowledge generation-experimentation and low carbon footprints. With ICT as the core, technological leapfrogging, innovations and niche market targeting are easier. Besides the scope for cost reduction, it triggers more inclusive growth and participation of vulnerable groups and harnessing of indigenous talents among women and youth are easily doable.

This corridor connecting the NEER and BBIN partners with the South East Asian countries would physically cut across the NEER States focusing on specific comparative advantage like raw materials, integrating production clusters, inter connecting infrastructural facilities, synergizing skills and enterprises and also inducting easy access to the market. It will mainly integrate agro and food processing state level spices hub of turmeric, chilly, ginger, large cardamom, cinnamon/tejpatta, food and meat processing and spread of other products like ethnic designs, handicrafts, handlooms, mass production of textile and bamboo-based products; fruits, vegetables and flowers. The NEER harbour nearly 90 species of bamboos, 41 of which are endemic to the region.

The 20th Livestock Census (2019) revealed that Assam has the highest pig population (over 2 million and 5.6 million in the NEER) across India thereby scoping massive MSME in piggery value chain from breeding and procurement of piglets, composite improved feed and veterinary services, rearing, slaughtering and processing to value added pig products include cured meats such as sausages, ham, bacon and canned meat products as well as small quantities of frozen meat. A very recent study (Assocham & CRISIL 2020) shows that the Indian MSME sector comprises 630 lakh units (90 % of India's enterprises), employs an estimated 11.10 crore workforce, accounts for 30% of India's gross domestic product (GDP) and 48% of India's exports.

Both the Parliamentary Committee (2015) and DIPP (2016) Reports revealed that after the NEIIPP of 2007, investment of over Rs 11,466 crore were made to build 27644 industrial and service sector units in the NEER. This generated over 2.28 lakh employment. As per the MOSPI – MSME Survey 2015-16 the share of the NEER in the total MSME units (63392) is 3 percent and in total employment (11.12 million) is 2.6 percent. Both in the value added per worker and per unit NEER's performance has been more or less tallying with the national data.

MOTT Report (2018) shows that Assam's array of industrial infrastructures led to MSME as a major focus where more than 45509 SSI/MSME units were set up during 2007-2017 that alone provided employment to 2.69 lakh persons by 2016-17. Within these also micro enterprises constituted as high as 78 % and medium as low as 1 %. Dibrugarh (14 percent) and Kamrup (12 percent) districts had major concentration. However, there has been massive degree of subsidies under the NEIIPP provisions.

NEDFi data show that a total subsidy of Rs 3919.54 crore was extended to the NEER states from 2000-2017 wherein transport subsidies alone constituted the highest 68 %, followed by capital investment (25 %), interest (6%) and insurance and freight (1 %). Among the states Assam took maximum (47 %) followed by Meghalaya (37 %) and the remaining 16 % were shared by the other six states. In the total transport subsidy also, Assam [with a 48 percent (9375 units) of the total established units in the NEER] alone constituted 45 percent of the total subsidy followed by a relatively small state like Meghalaya [with not even one percent (59 units) of the total industrial units] taking 38 percent, thereby leaving hardly 17 percent to share among the remaining six states. In the capital investment subsidy too Assam and Meghalaya usurped almost 88 percent of the total subsidy.

Besides their feeble linkages with larger units in their field of operations, the challenges faced by these MSMEs are mainly related to lack of access to institutional finance, outdated underwriting process, unfavourable cost competitiveness, delayed payments to MSMEs and lack of comprehensive quality database. (Assocham & CRISIL 2020).

Recommendations of the Expert Committee on Micro, Small and Medium Enterprises (Sinha, RBI, 2019) are very relevant for the MSMEs to expand further in the NER. These need to be implemented at the shortest possible time frame to realise the potential goals of MSME corridor. These relate to

i) In the capacity building of the entrepreneurs, an essential pre-requisite for development of the sector, it proposed to establish Enterprise Development Centres (EDCs) within District Industries Centres (DICs) in each district to facilitate development of entrepreneurs into full-fledged, self-sustaining enterprises and provide technical know-how, managerial skill, filling up of the knowledge gap,

ii) MSME clusters are inadequately equipped in areas such as tool rooms, innovation centres, testing facility. Therefore, these clusters should collaborate with companies having innovation infrastructure, R&D institutions and universities that specialize in a specific industry or knowledge area. In terms of funding, private sector contribution must be found, viz., through debt instruments like bonds, CDs, etc., with tax incentives through SIDBI.

iii) MSMEs lack expertise in product development, technology adoption and marketing strategy. Therefore, Government should build networks of development service providers that can provide customized solutions to MSMEs in the area of technology, product development and marketing techniques and also strengthen MSME Export Promotion Council.

iv) Ministry of MSME may consider setting up of a Non-Profit Special Purpose Vehicle (SPV) to support crowd sourcing of investments by various agencies particularly to pave the way for conducive business ecosystem for MSMEs. For convergence of policies and creating a promotional ecosystem, a National Council for MSMEs should be set up at the apex level under the Chairmanship of the Prime Minister with the Ministers for MSME, Commerce & Industry, Textiles, Food Processing, Agriculture, Rural Development, Railways and Surface Transport being members. The States should have a similar State Council for MSMEs.

v) SIDBI which is responsible for the development of the MSME sector must be given an expanded the role where its PSL shortfall be supplemented on the lines of RIDF fund of NABARD. SIDBI should also play the role of a facilitator to create platforms wherein various Venture Capital Funds can participate.

The Japanese MSMEs that are relocating themselves from China to other countries in South and South East Asia are likely to be one of the potent driving forces. Several studies on Japanese and Chinese relocations of firms in the ASEAN countries, (Kyaw & Lwin 2016, Berger-Thomson and Doylen 2013, Yang 2016, JLL 2019, ADBI 2017) do clearly demonstrate that the newer locations like Vietnam in Southeast Asia attracted more manufacturers mainly for its increasingly vibrant ease of doing business matrices, competitive workforce, lower tariffs, costs of overhead and logistics and large, growing consumer market.

For the India-Japan Act East Forum set up in 2017, the MSME corridor could be a major action-oriented goal.

Given the changing profile of the NER, fast improving connectivity, cultural affinity, English speaking people and cheaper and fast learning labour, it requires only a start of Japanese ventures. The multiplication of these ventures would be much faster as Japanese investors and entrepreneurs are already active in CLMV-Thailand, Malaysia and Indonesia.

There is huge scope for inducting Sikkim’s 60 plus pharmaceutical industries in this MSME corridor of value chain that can supply to the global market. Some of the top brands including Sun, Cipla, Alkem, Torrent, Macleods, Alembic, Unichem, Zydus and Glenmark already have such manufacturing arrangements. Could the product of this collaboration between a Vietnamese investor and a Naga entrepreneur be given a green channel access to ASEAN market under the ASEAN-India Free Trade Agreement? Could this NER-Vietnam triggered ‘Make in India’ product be considered under Article 3 of this agreement which deals with national treatment and Article 17 where a Joint Committee could look into this matter of collective interest.

In some cases, the subsidies and other incentives under NEIDS could selectively also be extended to entrepreneurs from the CLMV countries if they are investing here in a substantive, durable and efficient ways.

Vision Goal II: MSME/Startup Triggered growth in Arunachal Pradesh

This strategic geographical position offers significant prospects for international trade with South Asian nations. Arunachal Pradesh's economy is diversified, with major sectors including agriculture, arts and crafts, weaving, cane and bamboo, horticulture, as well as power and mineral-based industries.

Table 5.4.7: Growth Plan for Arunachal Pradesh through Startups and MSME and key areas of intervention

	2022	2027	2037	2047
GSDP (Current Price 2021-22)	Rs 39938 Cr	43000 Cr	48,000 Cr	55,000 Cr
GSDP growth rate YoY	11.82%	13%	15%	17%
Per capita GSDP Current price (2021-22)	INR 228,075	INR 280,000	INR 350,000	INR 500,000

Source: Author’s Calculations

Key areas of interventions

- Power Generation
- Tourism
- Agriculture and Forest-based Industries
- Textile and Handicrafts
- Mining and Minerals

Vision Goal III: MSME/Startup Triggered growth in Assam

To capitalize on its rich natural endowments, including tea, oil, and natural gas, Assam has established specialized parks for tea and food processing, agri-export zones, and hosts four oil refineries. Over 600 hectares of land are designated for industrial use. Notably, the Assam-Arakan Basin in Northeast India is a significant oil-producing region, harbouring over 15% of the country's reserves. Assam is home to India's longest road bridge, the Bhupen Hazarika Bridge, and the longest railroad bridge, the Bogibeel Bridge.

Table 5.4.8: Growth Plan for Assam through Startups and MSME and key areas of intervention

	2022	2027	2037	2047
GSDP (Current Price 2021-22)	Cr 32,829	Cr 40,000	Cr 45,000	Cr 50,000
GSDP growth rate YoY	19.52 %	22%	25%	28%
Per capita GSDP Current price (2021-22)	INR 118,504	INR 180,000	INR 250,000	INR 400,000

Source: Author's Calculations

Key areas:

- Pharmaceuticals and Medical Equipment
- Plastics and Petrochemicals
- Power
- River Transport and Port Township
- Textile, Handloom, and Handicrafts
- Tourism, Hospitality, and Wellness
- Agri-Horticulture and Food Processing

Vision Goal IV: MSME/Startup Triggered growth in Manipur

Manipur, hailed as India's 'Gateway to the East' via Moreh town, stands as the sole viable land route facilitating trade between India and Myanmar, as well as other Southeast Asian nations. Over 77% of Manipur's landmass is cloaked in forests, boasting abundant reserves of timber, firewood, and bamboo. With agriculture at its core, Manipur presents ample opportunities for the commercial cultivation of various horticultural crops such as figs, olives, and mandarins. The state's thriving handloom, handicraft, and sericulture industries significantly bolster its economic landscape. Notably, Manipur holds the distinction of being the largest producer of the oak tasar variety of silk in India. Bordering Nagaland, the

Cachar district of Assam, and Mizoram within India, as well as Myanmar's Chin Hills and Chindwin region internationally, Manipur strategically positions itself for trade and connectivity.

Table 5.4.9: Growth Plan for Manipur through Startups and MSME and key areas of Intervention

	2022	2027	2037	2047
GSDP (Current Price 2021-22)	Rs 42301 Cr	Rs 45000 Cr	Rs 49,000 Cr	Rs 55,000 Cr
GSDP growth rate YoY	8.30%	10%	12%	14%
Per capita GSDP Current price (2021-22)	INR 91,559	INR 120,000	INR 200,000	INR 400,000

Source: Author’s Calculations

Key areas

- Agriculture and Allied Activities
- Horticulture
- Sericulture
- Bamboo-Producing Industries

Vision Goal V: MSME/Startup Triggered growth in Meghalaya

With its diverse climatic conditions and fertile land, Meghalaya emerges as a significant agricultural hub, contributing to the nation's agricultural output. It is the third-largest producer of strawberries in India, showcasing its agricultural diversity. Despite its predominantly rural landscape, the state displays impressive infrastructure for hydroelectric power generation, boasting a potential capacity of approximately 3,000 MW.

Table 5.4.10: Growth Plan for Meghalaya through Startups and MSME and key areas of intervention

	2022	2027	2037	2047
GSDP (Current Price 2021-22)	Rs 41,010 Cr	Rs 47,000 Cr	Rs 57,000 Cr	Rs 65,000 Cr
GSDP growth rate YoY	11.5%	13%	15%	17%
Per capita GSDP Current price (2021-22)	INR 124378	INR 180,000	INR 300,000	INR 600,00

Source: Author’s Calculations

Key areas

- Hydro Power
- Agriculture and Horticulture
- Mineral Industry
- Tourism and Hospitality
- Handloom and Handicraft

Vision Goal VI: MSME/Startup Triggered growth Mizoram

Mizoram, often referred to as the "Land of the Hill People," is one of the fastest-growing states in India, characterized by its unique cultural vibrancy and commitment to social values. Mizoram demonstrates a strong emphasis on education and intellectual development. The state also upholds gender equality, with women actively participating in the workforce and being accorded equal respect and opportunities. The presence of major rivers like Tlawng and Tiau provides ample hydroelectric power potential, contributing significantly to the state's energy requirements. Mizoram's connectivity to the rest of the country is facilitated by an airport in Lengpui, enabling trade and commerce with other regions.

Table 5.4.11: Growth Plan for Mizoram through Startups and MSME and key areas of intervention

	2022	2027	2037	2047
GSDP (Current Price 2021-22)	Rs 32829 Cr	Rs 35000 Cr	Rs 40,000 Cr	Rs 45,000 Cr
GSDP growth rate YoY	13.5%	14%	17%	19%
Per capita GSDP Current price (2021-22)	INR 232,126	INR 300,000	INR 450,000	INR 600,000

Source: Author’s Calculations

Key Areas:

- Textile and Handloom
- Fisheries
- Agriculture and Food Processing

Vision Goal VII: MSME/Startup Triggered growth in Nagaland

Renowned for the Naga chili, one of the world's spiciest, Nagaland is divided into four agro-climatic zones, experiencing an average annual rainfall ranging between 1,800 and 2,500 mm. Forest resources, including medicinal plants and timber, play a pivotal role in driving the state's economy, alongside its vast array of 650 indigenous species of medicinal and aromatic plants and substantial untapped crude oil reserves estimated at around 600 MMT. Dimapur via Kohima to Manipur, is slated to become an international route under the Look East Policy. The annual Hornbill Festival celebrates Nagaland's rich cultural heritage and serves as a magnet for both domestic and foreign tourists, presenting abundant opportunities for various industries to thrive.

Table 5.4.12: Growth Plan for Nagaland through Startups and MSME and key areas of intervention

	2022	2027	2037	2047
GSDP (Current Price 2021-22)	Rs 22111 Cr	Rs 28000 Cr	Rs 34,000 Cr	Rs 40,000 Cr

GSDP growth rate YoY	9.76%	11%	13%	15%
Per capita GSDP	INR	INR	INR	INR
Current price (2021-22)	159,000	190,000	250,000	500,000

Source: Author’s Calculations

Key Areas:

- Agriculture and Allied Activities
- Apiculture
- Mining
- Sericulture

Vision Goal VIII: MSME/Startup Triggered growth in Sikkim

In addition to its agricultural prowess, Sikkim stands out for its significant hydropower generation capacity, holding the highest share of renewable energy in India's North-East region. The state's estimated hydropower potential of around 8,000 MW has attracted independent power producers to approve 29 hydroelectric power plants for development, with a combined installed capacity projected to reach around 5,350 MW upon completion. Sikkim's strategic focus on tourism has positioned it as a burgeoning destination for travellers. Sikkim has emerged as a preferred destination for pharmaceutical companies like Cipla, Sun Pharma, and Zydus Cadila.

Table 5.4.13: Growth Plan for Sikkim through Startups and MSME and key areas of intervention:

	2022	2027	2037	2047
GSDP	Rs	Rs	Rs	Rs
(Current Price 2021-22)	32,133 Cr	35,000 Cr	40,000 Cr	45,000 Cr
GSDP growth rate YoY	11.50%	13%	15%	18%
Per capita GSDP	INR	INR	INR	INR
Current price (2021-22)	5,41,544	5,80,000	7,50,000	10,00,000

Source: Author’s Calculations

Key Areas

- Agro and Food Processing
- Renewable Energy
- Tourism
- Pharmaceuticals

Vision Goal IX: MSME/Startup Triggered growth in Tripura

Primarily an agrarian state, Tripura boasts significant agricultural production, with rice being the major crop. Moreover, it holds the distinction of being the largest producer of bamboo in Northeast India and the second-largest rubber-producing state in the country. The state's favourable climate supports a variety of horticultural and plantation crops, including pineapple, jackfruit, tea, rubber, and bamboo. In terms of industrial infrastructure, Tripura has made significant strides, establishing rubber, food, and bamboo

parks to support investors. The state boasts 5 industrial estates, 6 industrial areas, 14 public sector undertakings, 2 growth centers, and an Export Promotion Industrial Park, providing a conducive environment for industrial growth and investment.

Table 5.4.14: Growth Plan for Tripura through Startups and MSME and key areas of intervention

	2022	2027	2037	2047
GSDP (Current Price 2021-22)	Rs 72,635 Cr	Rs 78,000 Cr	Rs 87,000 Cr	Rs 95,000 Cr
GSDP growth rate YoY	8.80%	10%	11.5%	14%
Per capita GSDP Current price (2021-22)	INR 175,958	INR 200,000	INR 350,00	INR 500,00

Source: Author’s Calculations

Key Areas:

- Bamboo
- Tourism
- Food Processing
- Tea

Building a Supportive Ecosystem:

Establishing a vibrant ecosystem that fosters and sustains startups is imperative to unlock the entrepreneurial potential of North East India. This entails the establishment of incubation centres, provision of mentorship programs, and facilitation of networking opportunities. Moreover, it is essential to formulate government policies aimed at incentivizing entrepreneurship through measures such as tax incentives, grants, and subsidies to foster innovation and risk-taking.

Creating a conducive startup ecosystem in North East India is pivotal to harnessing the entrepreneurial prowess of the region. Such an ecosystem ensures that startups receive the requisite resources, mentorship, and infrastructure for their growth. Here is an elaboration on the fundamental components of developing a supportive startup ecosystem:

- Incubation Centres
- Mentorship Programs
- Networking Opportunities
- Government Policies and Incentives
- Access to Funding
- Skill Development Initiatives
- Collaboration with Educational Institutions
- Infrastructure Development

Fostering Innovation and Research: Policies and Strategies

- Innovation Hubs and Incubators:
- Seed Funding for Research-Driven Startups:
- Technology Transfer Platforms:
- Encouraging Cross-Disciplinary Innovation:
- Government Incentives for R&D:
- Research Parks and Innovation Zones:
- Industry-Academia Collaboration:
- International Research Collaborations:

Technological Interventions

- Adoption of Emerging Technologies
- Support for Digital Skills Development
- Encouragement of Tech Entrepreneurship
- Collaboration and Partnerships
- Promoting E-Governance
- E-Commerce and Market Access
- Digital Literacy and Skill Development
- Innovation Hubs and Tech Incubators
- Precision Agriculture and AgriTech
- HealthTech Initiatives

Draft Report

5.5. Energy, Electricity Generation and Trading

5.5.1: Background

Given the natural resources endowments, energy has been a distinct comparative advantage in the NER. It encompasses the strengths (locally available untapped resources and technological advancement), weaknesses (inadequate financial resources, not-so-impressive regional cooperation, inadequate policy and inherent reluctance), opportunities (changing dynamics of electricity demand-supply, bridging gaps of developmental disparity, the regional contribution to net-zero emission target) and challenges (collaboration among states and with the transborder regions) while proposing the Smart New Energy Hybrid System for NER (SNEH-NER). Realistic expectations of SNEH are validated by the ground zero static (geography, society, culture) and dynamic (population, climate and development) factors concerning NER.

Augmentation of the self-generation capacity of electricity using local resources to reduce dependence on imported electricity is kept as the inherent motto of this part of the vision 2047. Further, a techno-smart decentralized electricity generation model based on the ambitious *one-stone-multiple-targets* idea is envisioned. The resources (*viz.*, solar, biomass, hydro, wind) of the new energy system are distributed with inherent variability both spatial and temporal. Uses of futuristic smart technologies (AI and IoT) are expected to make such distributed resources potential for in-situ renewable electricity generation to fulfil the distributed demand for electricity even for the remotely located population.

The enhanced share of renewable electricity in the total mix of the NER required quota would decarbonize the power sector while addressing the social and economic concerns for its development. Thus, SNEH is envisaged to tackle the inherent diversities of available resources and the potential demands of enhanced quantity of electricity among the population in the states of NER for the benefits of grid stability, incorporating the strength of futuristic technologies such as AI and IoT and regional cooperation among the states. Planning and management of a NER-centric electricity grid with inherent cultural diversity among the communities would curtail undesirable high peak loads. The scope of extension for such cooperation beyond the border is also analyzed for overall benefits. SNEH hypothesizes regional collaboration and charts a roadmap towards a robust, sustainable, and inclusive energy future for the Northeastern Region of India.

Beyond electricity, SNEH also aspires to augment the current practices of sustainable production and consumption of coal, petroleum, natural gas and novel resources (bio-methane, bio-methanol, bio-ethanol and hydrogen and similar) matched with the developmental needs of NER and neighbouring transborder regions.

5.5.2: Present Status

NER at an early stage of development: crucial role of energy planning

As we envisage the development trajectory ahead, it's imperative to recognize that multiple factors, including population dynamics, income levels, urbanization, industrialization, digitalization, electrification, and the effects of climate change, intricately shape energy demand. These factors interact intricately, presenting challenges and prospects in energy planning and policy formulation. Population growth and rising incomes invariably drive an increased demand for diverse energy services, encompassing lighting, heating, cooling, cooking, mobility, and communication. Simultaneously, urbanization and

industrialization propel this demand further by concentrating the population in cities and fostering energy-intensive economic activities. Interestingly, compared to both the global and national scales, NER appears at an early stage while counting the above factors.

The drive for enhanced energy efficiency, conservation measures, and the adoption of cleaner and more decentralized energy sources, including renewables and microgrids is also comparatively low in NER. An eco-sensitive smart energy system has been the aspiration for NER. The NER has the inherent potential to contribute to the national aspiration of a smoother fuel transition from petrol domination to low-GHG emitting fuel due to the predominance of natural biomass resources. The capacity augmentation of an existing petroleum refinery located in NER by bio-refinery has begun with the indication of further growth with provisions of indigenous R&D and policy support.

Global and National Outlook: lesson for NER Energy planning

The world's total energy supply (including electricity) by source in 2023 is still dominated by fossil fuels, accounting for 77% of the total⁸. Coal, oil and natural gas were the main contributors, with shares of about 25%, 46% and 16% respectively¹. The remaining 23% came from non-fossil sources, such as nuclear energy, hydropower, biofuels and waste, and other renewables¹. However, the pressing demand for a sustainable and clean energy system has made the exponential growth of electricity generation based on new and alternative sources. The NER vision is sensitive to the global concern about phasing out the fossil system to mitigate climate change and thus, save the planet.

Energy production and consumption, especially electricity, have a strong correlation with development. The countries within the upper band of HDI (human development index above 0.8) have the opportunity to consume more than 2000 units of electricity per capita per annum, whereas lower HDI countries consume less than 1000 units of electricity per capita per annum. The status of the development of NER could be realized from the fact that the average per capita annual consumption of electricity remains as low as 450 units. The current level of electricity consumption of NER states is much lower than the minimum estimated requirements of 1875 units⁹.

The world's total electricity generation by source in 2023 is more diversified, with renewables accounting for 35% of the total. Solar PV is the largest contributor, with a share of 13%, followed by wind (9%), hydro (8%), bioenergy (3%) and other renewables (2%)¹.

Fossil fuels made up 54% of the total, with coal having a share of 25%, gas 21% and oil 8%. Nuclear had a share of 11%¹. At the global level, a concerted push towards renewable energy sources has gained momentum as nations strive to mitigate climate change and transition towards sustainable energy. This global commitment aligns with India's ambitious goals of expanding renewable energy capacities, aiming to reduce its carbon footprint and increase energy security. Thus, NER's future energy roadmap has the opportunity to experience growth with committed responsibilities.

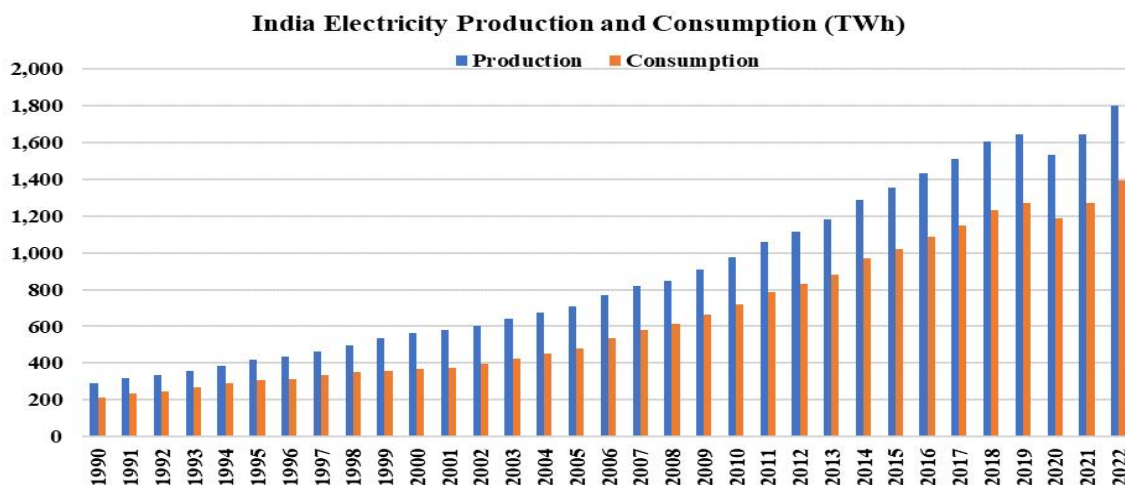
In the national context, India is grappling with a perennial energy deficit, wherein the potential demand consistently surpasses the available supply as evidenced by the chronically low level of electricity consumption (Table 5.4.1). However, the electricity

⁸ Executive summary – World Energy Outlook 2023 – Analysis - IEA

⁹ Sukhatme, S. P. (2012). Can India's future needs of electricity be met by renewable energy sources? A revised assessment. *Current Science*, 1153-1161.

production and consumption in India show an increasing trend mostly attributed to the development witnessed by several regions (Fig. 2). NER states, while contributing significantly to India's biodiversity and natural resources, face infrastructural and logistical challenges that perhaps, hinder the growth of electricity consumption/production as well the adoption of renewable energy at the pace seen in other regions. This results in a developmental disparity where certain pockets have limited access to reliable power resources, impeding socio-economic growth and exacerbating the gap between these states and more developed regions of the country.

Figure: 5.5.1: Electricity Production and Consumption in India over the year



Source: Representation based on Energy Data of International Energy Agency

Table 5.5.1: Historical trend of electricity consumption (kWh/capita/year) among the Indian states

State	Year									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Arunachal Pradesh	240	503	525	600	648	656	703	631	528	645
Assam	268	280	314	322	339	330	341	348	350	384
Manipur	296	266	295	360	326	347	371	385	347	362
Meghalaya	353	684	704	835	832	743	881	861	679	751
Mizoram	469	445	449	503	523	490	617	629	645	582
Nagaland	690	259	311	346	345	348	356	367	421	433
Sikkim	719	700	685	687	806	810	873	929	911	1011
Tripura	862	331	303	329	470	714	514	425	449	435
A. & N. Islands	559	368	361	355	370	569	597	585	873	878
Andhra Pradesh	1135	1196	1040	1230	1319	1388	1480	1507	1434	1567
Bihar	145	160	203	258	272	280	311	332	316	329
Chandigarh	1168	1133	1052	1112	1128	1004	978	986	1460	1529
Chhattisgarh	1495	1601	1719	2022	2016	2003	1961	2044	1923	2211

State	Year									
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
D. & N. Haveli	1434	1451	1376	1513	1578	1521	1517	1551	1047	1225
Daman & Diu	1	5	9	7	3	8	9	7	8	0
Delhi	7927	8003	6960	7836	7965	7902	7758	7561	5473	5914
Goa	1613	1446	1561	1557	1574	1564	1548	1572	1619	1684
Gujarat	2045	2198	1803	2738	2466	2229	2274	2396	3137	3736
Haryana	1796	1973	2105	2248	2279	2321	2378	2388	2048	2239
Himachal Pradesh	1722	1773	1909	1936	1975	1990	2082	2229	2131	2186
Jammu & Kashmir	1380	1348	1336	1339	1340	1393	1418	1527	1478	1742
Jharkhand	1043	1066	1169	1234	1282	1284	1322	1384	1402	1475
Karnataka	847	810	835	884	915	927	938	853	794	867
Kerala	1129	1179	1211	1242	1367	1356	1396	1468	1284	1376
Lakshadweep	630	645	672	704	763	766	757	826	814	844
Madhya Pradesh	592	665	657	649	633	563	554	551	820	819
Maharashtra	753	764	813	929	989	1020	1084	1086	1271	1232
Odisha	1239	1183	1257	1318	1307	1371	1424	1418	1378	1588
Puducherry	1209	1349	1419	1564	1622	1593	1628	1559	1829	2264
Punjab	2136	1692	1655	1672	1784	1749	1745	1752	2031	2138
Rajasthan	1761	1810	1858	1919	2028	2049	2046	2171	2200	2350
Tamil Nadu	982	1011	1123	1164	1166	1178	1282	1317	1301	1345
Telangana	1226	1544	1616	1688	1847	1834	1866	1844	1549	1714
Uttar Pradesh			1356	1439	1551	1727	1896	2071	2012	2126
Uttarakhand	450	472	502	524	585	628	606	629	634	663
West Bengal	1297	1285	1358	1431	1454	1450	1467	1528	1384	1520
All India	594	609	647	660	665	699	703	757	697	733
	914	957	1010	1075	1122	1149	1181	1208	1161	1255

Source: Central Electricity Authority, 2024

The NER with diverse culture, landscape, and economic trajectories, faces a pronounced gap between energy demand and supply. This gap not only exacerbates existing developmental disparities but also presents unique challenges in the context of both global and national energy paradigms.

The energy system of NER: small but diverse and non-fossil dominance

The energy landscape in the NER is characterized by non-fossil resource dominance with two-thirds share by a mixture of large hydro (58.5%), small hydro (4.8%), solar (3.1%) and biomass (0.2%) while the remaining one-third of installed capacity is contributed by natural gas (22.6%), coal (10.2%) and diesel (0.5%) (Table 2). The domestic installed capacity of NER (7360 MW) is inadequate to fulfil even its essentials. However, the diversity in terms

of sources is distinct where the contribution of large hydropower is notable almost in all the states except Tripura where natural gas has a major share. Geographical remoteness, diverse topography, and logistical challenges amplify the region's struggle to meet its energy demands sustainably. The region, rich in renewable energy sources like hydroelectricity, solar, and biomass, holds immense untapped potential. The potential of harnessing seasonal wind resources which prevailed in some pockets of NER, as a component of renewable hybrid, cannot be overlooked. However, unlocking this potential requires strategic interventions that address technological, financial, and infrastructural barriers.

Table 5.5.3: NER domestic installed capacity of Electricity Generation (MW as of 31-03-2023)

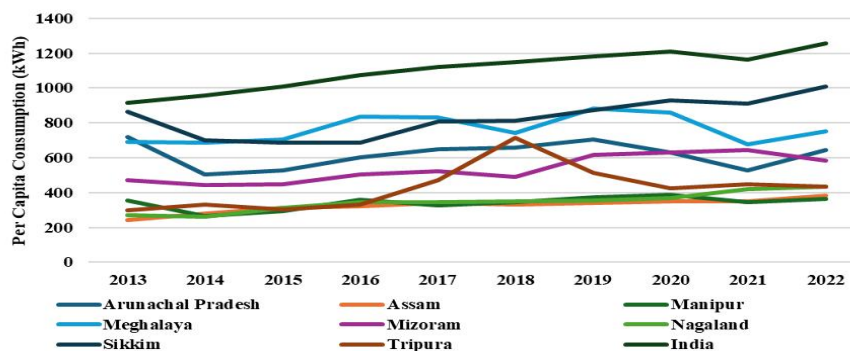
Source	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	Total
Coal	-	750	-	-	-	-	-	-	750
Gas	-	597	-	-	-	-	-	1068	1665
Diesel	-	-	36	-	-	-	-	-	36
Hydro	1115	350	105	322	60	75	2282	-	4309
Small Hydro	133	34	5	33	45	33	55	16	354
Biomass	-	2	-	14	-	-	-	-	16
Solar	12	148	12	4	28	3	5	18	229
Total	1260	1881	159	372	133	111	2342	1102	7360

Source: Central Electricity Authority, 2024

Energy inadequacy among NER states: goal to reach 2000 kWh

The level of electricity access among the states of the NER remains lower than the national average as evidenced by the historical trend of annual per capita consumption statistics (Figure 5.4.1). The trends of increase in quantity of energy access during the last 10 years have also not been impressive almost for all NER states except Sikkim. A common aspiration for all the NER states is to improve the level of electricity consumption up to a minimum of 2000 kWh through a multi-pronged developmental strategy. Apart from the lower level of consumption, the current scenario concerning the plant load factors (PLF) of the installed systems is also not encouraging (Table 3). The higher installation capacity associated with an ambience for a higher capacity utilization factor and plant load factor (PLF) would result in competitive and affordable electricity prices for domestic utilization besides making export potential to neighbouring regions. Renewables, including solar, small hydro, and wind have the inherent limitations of capacity utilization at individual modes of generation due to the intermittent availability of resources, which can be addressed through proper hybridization based on the site-specific potentials.

Figure 5.5.2: Historical trends of electricity access (kWh/per capita/year) of NER States and India



Source: 5 Central Electricity Authority, 2024

The remarkable progress of electrifying the villages in India through the consistent effort of the Government is also markedly visible in NER states. As reported, 100% of villages and households are wired in NE India. However, augmentation of such efforts with additional generation and provisions for smart infrastructure for generation, transmission and distribution are inevitable to address the current issues of uncertain supply, frequent load-shedding, and voltage drop, which deter the users from planning developmental or industrial activities.

Table 5.5.4: Daily, Monthly and Annual Load Factors (2020-2021) in North Eastern States in comparison to India

Region	Load factor (%)		
	Daily	Monthly	Annually
Arunachal Pradesh	69	55	42
Assam	70	64	56
Manipur	59	53	47
Meghalaya	71	59	48
Mizoram	64	55	43
Nagaland	68	58	48
Sikkim	56	46	33
Tripura	64	54	45
India	92	88	83

Source: Source: Central Electricity Authority, 2024

The annual energy transaction budget of NER (Table 4) indicates prospects for enhancing the transborder export of electricity. Currently, with less than 0.5% share of domestic generation in India, NER (except Sikkim) is contributing to more than 10% national share of energy sold/exported. However, higher levels of losses of electricity in NER electricity network is a concern.

Table 5.5.5: Annual energy budget (transaction and utilization) in the NER region during the year 2020-21

Sl. No.	Parameters	NER except Sikkim	All India	NER share (%) of all India
1	Own including IPP and others Ex-bus Generation (GWh)	3192	673345	0.47
2	Ex-bus import from the captive power plant (GWh)	28	21336	0.13
3	The energy available for drawing from the grid including import from other countries (GWh)	14698	628918	2.34
4	Total energy available (GWh) (1+2+3)	17918	1323599	1.35
5	Energy sold/exported to other countries (GWh)	1013	9574	10.58
6	Net energy available for supply/availability ex-bus (GWh) (4-5)	16905	1314025	1.29
7	Energy sold to ultimate consumers (GWh)	11858	1041656	1.14
8	Energy loss in transformation, transmission and distribution and unaccounted for (GWh) (6-7)	5047	272369	1.85
9	Percentage loss (%) (8÷6) ×100)	30	21	--

Source: Central Electricity Authority, General Review 2022

5.5.3 Renewable energy: global scenario and lesson for NER

Renewable energy has emerged as a focal point in numerous global initiatives aimed at achieving objectives such as achieving net-zero emissions and fostering sustainable development. International leaders have collectively committed to supporting the expansion of renewable energy (RE) through the implementation of policies and programs. This transition towards RE has also garnered significant attention and involvement from the business and commerce sectors. Leveraging advancements in renewable energy generation technologies holds significant promise for NER India, where the utilization of state-of-the-art solutions showcases substantial progress, emphasizing efficiency, sustainability, and reliability. Renewable energy technologies (RET) contributing globally more than 8 million GWh annually are now fully matured¹⁰. Justified investment in R&D has made RET a fully mature technology up taken by market traversing through different scales of prototypes and demonstrations in several locations including in India.

Solar photovoltaic (PV) technology, in particular, has seen notable advancements. Enhancements in solar cell efficiency and cost reduction have been remarkable. Cutting-edge solar panels, utilizing materials like perovskite-based cells, have significantly boosted efficiency levels. Furthermore, the integration of bifacial panels and floating solar arrays expands generation capacity by optimizing land use and utilizing both sides of panels, respectively. The coupling of energy storage systems, such as lithium-ion and flow batteries, with solar installations, enables smoother power supply, effectively addressing intermittency issues.

¹⁰ IRENA, Statistics Time Series, <https://www.irena.org/Data/View-data-by-topic/Capacity-and-Generation/Statistics-Time-Series>

In the context of biomass, modern technologies employ advanced conversion processes like gasification and pyrolysis, producing biogas, biofuels, and syngas. Combined heat and power (CHP) systems efficiently utilize biomass feedstock to generate electricity and heat simultaneously. Innovative waste-to-energy techniques transform agricultural residues and organic waste into valuable energy resources, with enhanced gas cleaning technologies aiding in emissions reduction. Indian power sector initiated the move of fuel blending to attract surplus biomass resources which are normally considered as waste.

Advancements in hydropower technology focus on turbine design and efficiency improvement. Run-of-the-river systems and pumped-storage hydroelectricity contribute to grid stability by storing excess energy and meeting peak demands. Innovative dam designs incorporate fish-friendly turbines and fish ladders to mitigate environmental impacts on aquatic ecosystems. Moreover, micro-hydro systems cater to decentralized energy needs, especially in remote areas. Small hydropower system (less than 25 MW up to pico hydro scale) is also reported as potential for local demands using mini-grids.

Hybrid renewable energy systems integrating multiple sources, such as solar-wind hybrids, capitalize on complementing generation patterns, enhancing reliability and efficiency. These hybrid power plants combining solar, wind, hydro, and other renewables offer increased grid stability. Energy management systems and smart grid technologies play a pivotal role in balancing variable output, ensuring a consistent and dependable power supply.

5.3.4. Regional and transborder cooperation: National status

Realising the importance of transborder cooperation, India has proven records of joint action in several domains including the Energy sector. A review of some of the notable joint-venture energy initiatives taken with Nepal, Bhutan, Bangladesh and Myanmar will be useful to propose a fresh tie concerning NER energy vision.

India – Nepal

India and Nepal are interconnected at various places through 11kV, 33kV, 132kV and 220kV lines. For the transfer of bulk power, a 400kV D/C transmission line has been constructed between Dhalkebar (Nepal) and Muzaffarpur (India). About 700 MW of power is being supplied to Nepal through these interconnections. In addition, the following lines have been agreed: 400kV D/C Gorakhpur (India) – Butwal (Nepal) line, 400kV D/C Dhalkebar (Nepal) – Sitamarhi (India) line, 132kV D/C Nanpara, Bihar (India) – Kohalpur (Nepal), second circuit of 132kV line Kataiya (India) – Kushaha (Nepal) and 132 kV Raxaul (India) – Parwanipur (Nepal) lines¹¹. Nepal has vast hydropower potential and relies on hydropower for 96.2% of its installed capacity. Thermal and solar plants contribute 3.7% and 0.1%, respectively. However, Nepal also faces a power crisis during the winter when water flow decreases.

India – Bhutan

India and Bhutan are already connected through various 400kV, 220kV and 132kV lines, mainly for the import of about 2000 MW power from Tala HEP (1020MW), Chukha HEP (336MW), Kurichu HEP (60MW) and Mangdechu HEP (720 MW) in Bhutan to India⁹.

¹¹ Interconnection with neighbouring countries, Govt. of India, Ministry of Power, <https://powermin.gov.in/en/content/interconnection-neighbouring-countries>

Moreover, Punatsangchu-I (1200 MW) and Punatsangchu-II (1020 MW) HEPs in Bhutan, are expected to be commissioned by 2024-25. The transmission system for transfer of this power from these projects to India is already in place. With the commissioning of these HEPs the power transfer between Bhutan and India would be increased to about 4200 MW. Bhutan has achieved 100% energy access through off-grid energy sources. Bhutan is also a net exporter of electricity to India and Bangladesh.

India – Bangladesh

A high-capacity interconnection between India and Bangladesh exists through Baharampur (India) – Bheramara (Bangladesh) 400kV D/C lines along with a 2×500 MW HVDC back-to-back terminal at Bheramara. Another 400kV (operated at 132kV) interconnection exists between Surajmaninagar (Tripura) in India and Comilla in Bangladesh. These interconnections cumulatively facilitate transfer of power of the order of 1160MW to Bangladesh¹². Furthermore, to enable more intra-regional electricity trade, including competitively priced power generated from Hydro-electric power projects in India, Nepal and Bhutan; a 765kV Double Circuit cross-border electricity interconnection between Katihar (India), Parbotipur (Bangladesh) and Bornagar (India) was agreed in the India-Bangladesh Joint Statement during Official Visit of Prime Minister of Bangladesh to India¹³. Bangladesh has achieved 95% of energy access, mainly through fossil fuel-based power plants. However, Bangladesh also faces challenges of power shortages, high costs, and environmental impacts. Bangladesh is aiming to increase its RE share.

India – Myanmar

India is providing about 3 MW of power from Moreh in Manipur (India) to Tamu town in Myanmar through 11 kV transmission line. The strengthening of more low-capacity links at various places along the border is being jointly worked out. High-capacity link between the countries is also under discussion¹⁰. Myanmar has reported its access to energy as 50% in 2019, mostly through hydropower and natural gas. Myanmar also has the potential for solar, wind, and biomass energy. Myanmar is aiming to achieve universal electrification by 2030.

Establishing strong transborder energy networks can address several challenges, notably financial constraints and locational hurdles. This collaboration could involve leveraging Bhutan's hydropower potential for electricity generation, where surplus power could be shared with NER of India. Similarly, fostering cross-border energy trade agreements with Bangladesh and Myanmar could facilitate the export and import of electricity, optimizing resource utilization and enhancing energy security for the entire region. Moreover, regional cooperation could include joint infrastructure projects for efficient power transmission and distribution, creating interconnected grids that benefit all participating nations. This collaborative approach not only addresses financial and locational challenges but also fosters mutual economic growth, energy sufficiency, and stability, paving the way for a sustainable and resilient energy landscape in Northeast India and its neighboring countries.

¹² Bhattacharjee, R, Changing scenario of power sector in Bangladesh, Bhutan, India and Nepal sub-region

¹³ Rahaman, M. M., & Hossain, M. S. (2020). Hydropower development along the major rivers basins in South Asia: benefits for Bangladesh. *Sustainable Water Resources Management*, 6(6), 116.

5.5.5. Vision 2047: Possibilities, Potentials and Promises

The NER faces a significant challenge in balancing its energy demand and supply, calling for an integrated approach that specifically addresses distinctive energy needs. Achieving a sustainable energy future in this region relies on tapping into its renewable energy capabilities, minimizing vulnerabilities, and promoting collaborative endeavours for fair and comprehensive development. Consequently, the pressing need emerges for a Smart New Energy Hybrid System for NER (SNEH), one that comprehensively considers all interrelated factors. Features of SNEH-NER are summarised in Table 5.4.6.

Table 5.5.6: Features of Smart New Energy Hybrid System for NER (SNEH-NER)

Features	Existing System	SNEH-NER
Reliance on imported electricity	High	Increases self-reliance
Centralised vs. Distributed generation	Centralised	Optimal and planned blending of decentralized and centralized generation including transborder networking
Scope for decarbonization and sensitivity to eco-system	Limited	High
Level of technology-infrastructure advancement vis-à-vis efficiency	Limited	High
Access to local R&D	Limited	Extensive
Regional and transborder cooperation	Limited	Extensive
Participation of private players	Limited	Extensive
Fuel system	Conventional	New, lower GHG

The SNEH-NER presents a transformative approach to energy development, including a range of innovative features. Beyond prioritizing self-reliance and optimizing energy generation through a blend of centralized and decentralized systems, SNEH-NER emphasizes the significance of advanced energy technology solutions which ensure grid stability and reliability, effectively managing the variability of the energy sources.

Additionally, SNEH-NER aims to integrate smart grid technologies to modernize electricity infrastructure, enabling real-time monitoring and optimization of energy flows. This not only enhances operational efficiency but also facilitates demand-side management strategies, contributing to resource optimization and reduced peak demand. Collaboration is pivotal in realizing the vision of SNEH-NER, with engagement across government agencies, international organizations, private sectors, and research institutions. Through collective action, SNEH-NER represents a transformative pathway towards sustainable energy development, economic prosperity, and improved quality of life for the North East region.

The following section delves into the exploration and analysis of SNEH-NER, aiming to illuminate its potential impact and effectiveness in this unique energy landscape.

Vision Goal 1: Adequate energy access for development tuned to Vikshit Bharat, 2047

Based on the current levels, individual road maps for all eight states are prepared anticipating a linear growth which would result in 2000 kWh of electricity for all citizens of NER as presented in Table 5.4.7.

Table 5.5.7: Projected per capita annual energy consumption (kWh) up to 2047

State	Energy access (kWh/capita/annum) for the year						
	2022*	2025	2030	2035	2040	2045	2047
Arunachal Pradesh	645	808	1079	1350	1621	1892	2000
Assam	384	578	901	1224	1548	1871	
Manipur	362	559	886	1214	1541	1869	
Meghalaya	751	901	1151	1401	1650	1900	
Mizoram	582	752	1036	1319	1603	1887	
Nagaland	433	621	934	1248	1561	1875	
Sikkim	1011	1130	1327	1525	1723	1921	
Tripura	435	623	936	1249	1562	1875	

**Actual value as per the data available with Central Electricity Authority, 2024*

Ambitious growth of domestic installed generation capacities of all feasible energy sources, in a phased manner, is envisaged at **24066 MW** for NER (more than three-fold increase) contributed by large hydro (27%), solar (25.9%), coal (16%), gas (15%), small hydro (13.6%), wind (1.4%) and biomass (1.2%).

Thus, the roadmap for achieving 100% quality energy supply in North East India is a meticulously crafted plan aimed at elevating per capita electricity availability from the current level to 2,000 kWh by the year 2047.

Vision Goal II: Financial resource mobilization

Mobilizing financial resources is crucial for upgrading and expanding electricity infrastructure. This involves both public and private investments, with an emphasis on innovative financing mechanisms. An estimation of the financial resource requirement for augmenting the projected generation levels up to 24066 MW by 2047 is shown in Table 7. A significant aspect of the roadmap involves the upgrading of transmission infrastructure.

An aggressive plan to mobilize financial resources will be crucial (i) to materialize a more than three-fold increase in domestic generation, (ii) to modernize infrastructure to transform into a smarter and more efficient energy generation, transmission and distribution system, (iii) to enhance the share of renewable energy which is characterised by higher investment and (iv) to take care of the characteristics fragile geo-eco system of the NER.

Table 5.5.8: Estimated funds requirements for additional power plant installations as visioned to 24.66 GW

Power plant type	Estimated funds requirements, in INR, Crore					
	2025	2030	2035	2040	2045	2047
Biomass power	107	297	327	362	399	249
Coal	2076	5731	6328	6986	7713	4815
Gas	774	2136	944	2604	1150	5385
Hydro	1402	3870	4273	4718	5209	3252
Small Hydro Power	1396	3852	4253	4696	5185	3236
Waste to Energy	18	49	54	59	65	41
Wind	132	364	402	444	490	306
Solar	2160	5963	6583	7268	8025	5010
Total, INR '000 Crore	8.065	22.262	23.164	27.137	28.236	22.294

Incentives through policy intervention coupled with ensured revenue from domestic and international sales of NER-generated power including revenue from carbon funds will attract reputed private parties (including the World Bank and the Asian Development Bank) to invest. Strategies chalked out for investment in the power sector at the National level may be meticulously aligned with the Energy vision of NER.

The above factors leverage policy reforms, financial investments, and infrastructure upgrades to propel the region towards becoming a thriving energy hub by 2047 targeting 100% quality energy supply in North East India. Through coordinated efforts and sustained commitment, the vision of enhanced electricity access and availability can be realized, driving inclusive growth and prosperity for the North East and the nation as a whole. SNEH-NER serves as a cornerstone for enhancing local energy production, reducing reliance on imported electricity, and fostering a resilient, decentralized energy infrastructure. Moreover, the integration of renewable energy into the grid not only enhances energy security but also fosters economic growth by creating new opportunities for local job creation and investment.

Vision Goal III: Smarter and Cleaner Energy System

The vision delineates a forward-looking approach centred around efficiency improvements by incorporating intelligent technologies, such as smart grids, meters, and devices, alongside strategies to balance loads and ensure grid stability. The Northeastern region of India harbours abundant renewable resources that may potentially exceed current estimations. The theoretical potential of NER renewable energy resources, as estimated from the grass-root data, is adequate to fulfil the 2000 kWh of electricity per capita annually, provided shared among the states (Table 5.4.9).

Table 5.5.9: Theoretical renewable energy (RE) potential in NER based on scenario for the year 2050

States	The total potential of biomass, solar and hydro-based RE, MU	Per capita RE availability at the present level of population, kWh	Per capita RE availability in 2050, kWh	Possible contribution of SPRE, %	The possible contribution of BRE, %	The possible contribution of RHE, %
Arunachal Pradesh	27260	19701	13134	85	2	13
Assam	30535	979	652	87	11	2
Manipur	8314	3235	2156	93	3	3
Meghalaya	7674	2587	1724	75	17	8
Mizoram	8206	7479	4986	90	4	5
Nagaland	5502	2781	1854	76	14	9
Sikkim	3414	5591	3727	76	3	20
Tripura	3675	1000	667	93	4	3

Digitalization, characterized by the pervasive use of information and communication technologies (ICT), smart devices, the Internet of Things (IoT), cloud computing, and artificial intelligence (AI), presents opportunities for efficient energy management, innovative energy services, and transformative business models. Electrification, particularly in transportation and building sectors, holds the promise of reducing dependence on fossil fuels and lowering the carbon intensity of energy consumption, especially when sourced from low-carbon generation. Climate change, evidenced by rising global temperatures and altering weather patterns due to greenhouse gas accumulation, affects energy demand by changing heating and cooling requirements, impacting renewable resource availability, and increasing risks associated with extreme weather events and natural disasters. In response to these drivers, a smart electricity generation system emphasizes several crucial components as listed below.

Efficiency Enhancement: Integration of Smart Grids, Meters, and devices: Load Balancing Strategies: Grid Stability Measures: Advanced Control and Automation: Resilience to Variable Energy Sources: Cybersecurity and Data Privacy: Scalability and Flexibility:

Vision Goal IV: Sharing of resources and loads by regional cooperation

The conceptualization of a smart electricity generation system must address not only efficiency, smart integration, and grid stability but also account for temporal variability in electricity demand. Regional cooperation with provision for the commitment to share resources, market, and sellable energy on fair principles would be boosting for SNEH-NER.

Table 5.5.10: Timing of major festivals of the NER

State	Festival	Time of Year
Assam	Bihu (Rongali Bihu)	April (Mid-April)
Manipur	Sangai Festival	November (Late Nov)
Nagaland	Hornbill Festival	December (Early Dec)
Tripura	Durga Puja	October (Mid-Oct)
Mizoram	Chapchar Kut	March (Early Mar)
Meghalaya	Shillong Autumn Festival	October (Late Oct)
Arunachal Pradesh	Losar	February (Late Feb)
Sikkim	Dusherra-Diwali-Loosong	October – January

Distinct peaks in electricity demand occur during major festivals around the year (Table 9). Smart grid technologies, advanced metering systems, and predictive analytics will forecast these surges and adjust energy distribution and generation accordingly. NE regional cooperation among the utilities backed by smart infrastructure opens up the scope to manage the demands that arise from rich cultural heritage.

Vision Goal V: Eastern South Asia Power Pool: Cooperation for energy transaction

In the landscape of energy generation and distribution in Northeast India, a pivotal strategy to overcome challenges and unlock potential lies in cooperation with neighbouring countries. The NER States are strategically located in the South Asian region and have cross-border interconnections with several countries (Nepal, Bhutan, Bangladesh and Myanmar), enabling them to play a major role in the effective utilization of regional resources. Regional and cross-border electricity trade can offer many benefits, such as lowering energy prices, enhancing energy security, improving environmental sustainability, and promoting economic development, for the participating countries. To facilitate import/export of electricity between India and neighbouring countries, the Ministry of Power, Govt. of India issued the 'Guidelines for Import/Export (Cross Border) of Electricity-2018'. India has also developed expertise in high-capacity high voltage transmission projects including AC 400kV and 765kV and HVDC systems. Currently, India is connected with Nepal, Bhutan, Bangladesh, and Myanmar.

Recognizing the Northeast region's profound potential as a pivotal player in electricity trading and cross-border power transactions, particularly with neighboring nations such as Nepal, Bhutan, Bangladesh, and Myanmar, underscores India's broader aspirations of fostering regional energy cooperation and harnessing the region's abundant hydropower resources. Leveraging the CBET (Cross Border Energy Trading) guidelines of 2020, tailored to facilitate and regulate cross-border electricity transactions, presents a strategic avenue for realizing this vision. Moreover, embracing regional cooperation frameworks like the Eastern South Asia Power Pool offers a structured platform to expedite electricity exchange and trade, with an ambitious target of up to 24,066 MW by 2047.

The first South Asian Power Pool called Eastern South Asia Power Pool (ESAPP) located in the NER will produce, trade and transmit electricity both within the country and with its neighbors including the ASEAN countries. The cross-border energy trading (CBET) is emerging as the most practical, potentially beneficial and socio-politically acceptable project in eastern South Asia. The Palatana exchange between Tripura and Bangladesh,

Behrampur-Bheramara interconnection with Bangladesh, Chukha-Kurichu-Sankosh interconnection with Bhutan, 400 KV Muzaffarpur-Dhalkebar transmission with Nepal, Tamnathi Dam in western Sagaing region of Myanmar and 400 KV transmission line in the NER including Bishwanath-Chariyali-Agra transmission line are geared to bring power from generating units in Bhutan, Nepal and various NER states including Sikkim and Arunachal Pradesh to ESAPP. Bangladesh has signed agreements with power producers in Bhutan and Nepal to jointly produce and also to import power. All these indicate that Eastern South Asia is emerging as a core, competitive and commercially viable theatre of power exchange like Laos in South East Asia.

This would entail a domino effect and consolidate one nation one grid-based electricity market. In the total hydel power potential of about 58971 MW (40% of national potential) in the NER, hardly 4 % has been harnessed. A series of power projects are in the pipeline awaiting completion in the NER, Bangladesh, Bhutan, Myanmar and Nepal. Sikkim's installed capacity alone has increased from a mere 39 MW in 2000 to over 2200 MW in 2019. A distinct trend towards green and renewable energy-oriented policies and intended nationally determined contribution (NDC) commitments exists. Besides natural gas reserves of 4.29 billion cubic meters with the potential to generate 7500 MW for 10 years in the NER, its coal reserves of 864.78 million tonnes could generate 240 MW for 100 years.

Vision Goal VII: Augmentation of Infrastructure

The establishment of massive transmission layouts is pivotal for realizing the ambitious goal of enhancing the electricity supply and facilitating cross-border power transactions in the Northeast region. This endeavour involves coordination among key stakeholders viz., the Power Grid Corporation of India (PGCIL), State power generation and distribution companies, and private companies led by the Ministry of Power such that robust infrastructure comprising high-voltage transmission lines, substations, and grid interconnections are built.

Incorporation of advanced grid technologies such as HVDC (High Voltage Direct Current) transmission, FACTS (Flexible AC Transmission Systems), and advanced grid control systems will be crucial in optimizing power transmission and management.

Gas and Oil Pipeline

The integration of gas and oil pipelines is a strategic initiative aimed at enhancing energy security, fostering regional cooperation, and facilitating the efficient transportation of petroleum resources across borders. Spearheaded by key stakeholders such as the Ministry of Petroleum and Natural Gas, GAIL (India) Limited, and Oil and Natural Gas Corporation (ONGC), this endeavour involves the development of robust infrastructure comprising gas pipelines and oil pipelines connecting Myanmar, India, Bangladesh, Bhutan, and Nepal.

The recently inaugurated India-Bangladesh Friendship Pipeline (IBFP) stands as a testament to the strong bilateral ties between India and Bangladesh. The experiences of operation of this cross-border energy project which has a shared commitment to energy security and regional integration, will be useful for building more meaningful partnerships centred around NER. (With a capacity to transport one Million Metric Ton Per Annum (MMTPA) of High-Speed Diesel (HSD), the pipeline initially serves seven districts in northern Bangladesh. Reducing Bangladesh's reliance on imported fuel, not only benefits the two nations but also contributes to stability in the region. NER's vision on Energy considers IBFP's vision of

energy cooperation to foster economic growth and environmental sustainability as one of the guiding mandates.

NER envisaged the revival of the India-Myanmar-Bangladesh Gas Pipeline (IMBGP) which has the potential to counterbalance China’s influence in the region and ensure energy security. The notable deliverables of IMBGP are efficient gas transmission, boosting economic ties, and promoting sustainable development besides the national commitment to fostering energy connectivity across South Asia.

NER envisages the Ministry of Petroleum and Natural Gas (PNG) to play a central role in formulating policies, regulations, and strategic initiatives for oil and gas resources in NER with special reference to NER's vision on Energy with needful collaboration with public sector entities like GAIL, ONGC and other domestic and transborder parties. PNG has a crucial role to play to materialize diplomatic engagement and cross-border cooperation for transborder transaction of oil and gas besides tasks like regulatory approvals, environmental clearances, and land acquisition. The government's role in gas and oil pipeline integration extends beyond domestic regulatory oversight to encompass. Diplomatic engagement with neighbouring countries is essential for negotiating cross-border agreements, resolving disputes, and fostering trust and cooperation. crucial for project implementation, requiring coordination among government agencies and stakeholders. Gas and oil pipeline integration being a complex and multi-dimensional endeavour that requires coordinated efforts from governments, energy companies, financiers, and technology providers.

Vision Goal VIII: Regional manufacturing hub of energy appliances

The development of an electricity-based manufacturing hub linked with the production market in the Northeast borderlands, coupled with the establishment of electricity trading and cross-border power grids, represents a transformative initiative aimed at driving economic growth and sustainable development in the region. Central to this endeavour is the need for strong coordination among government ministries, regulatory bodies, and regional institutions to align policies, regulations, and investment priorities. This coordination ensures a cohesive approach to infrastructure development, transmission network expansion, and the creation of industrial zones conducive to electricity-based production activities. Investments in these critical assets are facilitated through a combination of government funds, international loans from multilateral development institutions, and private sector investments. Leveraging diverse sources of financing ensures adequate capital for infrastructure development while also fostering partnerships with international stakeholders and private investors.

The engagement of both public and private sector entities is essential for the success of this initiative. Energy companies, industrial players, and other stakeholders contribute expertise, resources, and market insights to drive innovation and investment in electricity-based production activities. Collaborative efforts among these stakeholders facilitate the development of integrated value chains, supply chains, and market linkages, fostering a dynamic and competitive electricity market in the region.

5.6 Ease of Doing Business

India has emerged as one of the most attractive destinations not only for investments but also for doing business. India jumps 79 positions from 142nd (2014) to 63rd (2019) in 'World Bank's Ease of Doing Business Ranking 2020'.

The Ease of Doing Business (EDB) index is a metric designed to assess the regulatory environment that directly impacts businesses. It focuses on specific regulations rather than broader socio-economic factors like market proximity, infrastructure quality, or social conditions such as crime rates and inflation. A nation's ranking on the EDB index is determined by averaging scores across 10 sub-indices:

- (a) Starting a Business: Measures procedures, time, cost, and minimum capital required to establish a new business.
- (b) Dealing with Construction Permits: Assesses procedures, time, and cost involved in obtaining permits for construction projects.
- (c) Getting Electricity: Examines procedures, time, and cost for businesses to obtain a permanent electricity connection for newly constructed facilities.
- (d) Registering Property: Evaluates procedures, time, and cost associated with registering commercial real estate.
- (e) Getting Credit: Considers the strength of legal rights and the depth of credit information available to businesses.
- (f) Protecting Investors: Analyses indices related to disclosure requirements, director liability, and shareholder rights.
- (g) Paying Taxes: Looks at the number of taxes paid, hours spent preparing tax returns, and the total tax payable as a share of gross profit.
- (h) Trading Across Borders: Assesses the number of documents required, as well as the cost and time needed to export and import goods.
- (i) Enforcing Contracts: Examines procedures, time, and cost involved in enforcing debt contracts.
- (j) Resolving Insolvency: Considers the time, cost, and recovery rate under bankruptcy proceedings.

Each of these sub-indices provides insight into specific aspects of the business environment, allowing policymakers to identify areas for improvement and implement targeted reforms to enhance the ease of doing business. By addressing these regulatory challenges, governments can create a more favourable environment for entrepreneurship and economic growth.

While the state-wise EODB indices are collected and evaluated under BARP portal (Business Action Reform Plan) under DPIIT, some of the states does from North East India has not participated in this exercise. While it is important to sensitise all the states to participate, it should be made mandatory and should be linked with incentivization

schemes for each state as this ranking indicator becomes the key parameters for attracting investment.

Improving the ease of doing business is essential for fostering entrepreneurship and economic growth in North East India. Here are some key factors that contribute to enhancing the ease of doing business in the region:

- Simplified Regulatory Environment:
- Efficient Administrative Processes
- Access to Finance
- Infrastructure Development
- Skilled Workforce
- Promotion of Innovation and Technology Adoption
- Strengthening Legal Frameworks
- Promoting Entrepreneurship Culture

Vision 2047

Vision Goal I

NER to be the most competitive investment destination

Table 5.6.1: The EODB Ranking from 2015 till 2019 and subsequent projections in Ranking range in the national level

State	Historical Ranking			Target Range of Rank (Projections)		
	2015 Rank	2017 Rank	2019 Rank	2027 Rank Range	2037 Rank Range	2047 Rank Range
Arunachal Pradesh	32	34	29	23-25	15-17	10-15
Assam	22	17	20	15-18	10-13	5-10
Manipur	–	32	29	21-24	15-18	10-15
Meghalaya	30	34	29	22-25	15-19	10-15
Mizoram	28	30	25	18-20	12-15	7-10
Nagaland	31	28	29	23-25	17-20	10-15
Sikkim	27	33	29	23-25	17-20	10-15
Tripura	26	25	29	21-24	15-18	10-15

Vision Goal II:

Transformative changes in the landscape of number of Startup, Incubators, Unicorns, Investment funds, FDI and number of Employments.

Table 5.6.2: Transformative changes in the landscape of number of Startup, Incubators, Unicorns, Investment funds, FDI and number of Employments

Description	2024	2027	2037	2047
Number of Startups	1593	2500	5000	10000
Number of Incubators	23	45	75	150
Investment (Seed Fund to Startups)	56 Cr	100 Cr	200 Cr	500 Cr
Program/events promoting startups from NE	-	10	100	500
Number of Unicorns targeted	-	2	7	15
FDI	180 Cr	300 Cr	700 Cr	1000 Cr
Number of employments generated by Startups (as on 30 June 2022)	7668	25000	50000	100000

Key Interventions required to improving the ranking of EODB of the NER are:

- Awareness & Engagement
- Business Advisory
- Strategy & Implementation
- Investor Aftercare
- Long-term Partnership

Vision Goal III

Establishing a central nodal agency like the "North East Innovation Mission" in a PPP Mode led by the Ministry of Department of North East Region with the following functionalities:

1. Mandate and Responsibilities
2. Policy Formulation and Planning
3. Capacity Building and Support Services
4. Monitoring and Evaluation
5. Collaboration and Partnerships

Chapter 6 Reaching Sustainable Development Goals

6.1 Human Resources Potentials

6.2 Health and Wellbeing in North East India

6.3 Sustainable Development Goals Achievement Capital of India

6.1 Human Resource Potentials

6.1.1 Brief Background

Any envisioning of a development trajectory in the eight states comprising the NER of India by the year 2047 is bound to involve some informed crystal gazing of the future.¹ The time horizon, however, is still long enough, stretching past the SDG targets of 2030, for mid-course corrections and extensions of Goal no. 4 on Education till 2047. This would help because data are not enough to predict the uncertainties mankind has experienced recently – natural ones like the COVID-19 pandemic, or man-made ones like the Russia-Ukraine war (and more recently the Hamas-Israeli conflict), and the economic crisis like the galloping inflation in commodity prices – all three as red-flagged by the *Economic Survey 2022-23* – to stall or digress the projections. To guard against going wrong, there could be alternative assumptions and probabilities to infer the “best-case scenario”, the “worst-case scenario” and the average “middle path” in between. Keeping this caveat in mind, this blueprint of Vision 2047 should be useful guiding light for avoiding serious pitfalls while treading to make people and nature the core of HRD in the North-east.

Within the overall paradigm of regional development of the North-east, the specific one for human resource development, or HRD in short, would involve two mutually integrated parts or processes, viz., Production and Utilization of human capital. In ordinary language, people understand them as Education and Employment. Focusing on higher education or production part of HRD, further broken down by two post-secondary streams, i.e., (1) Formal education leading to general and professional degrees pursued in colleges and universities, and (2) Vocational and Technical (VTE) education leading to diplomas and certificates by apprenticeships, internships and other variants of what is called “on-the-job training” at the institutes.

This section is focused upon the formation of HRD through higher education, or generically speaking “post-secondary education”, where secondary school students are the potential inputs. Primary education is not human resource development, but a Basic Minimum Need recognized as a Fundamental Right and its universalization is an objective in itself and beyond the scope of this chapter.

India’s New Education Policy, or NEP 2020, may be said to be one of the referral points specifically geared towards dealing with the above-mentioned aspects on the production side of HRD, which has two uniquely interdependent domains – the “institutional domain” for the supply of education and the “individual domain” of demand for education, both indispensable for the production of human capital to take place.² At the highest levels it leads to the most precious resources for development of a possible sixth “global common”, viz., the Human Capital, the other five

¹ These eight states are: Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura.

² T. Majumdar (1983), *Investment in Education and Social Choice*, Cambridge University Press, London.

established ones being the High Oceans, Atmosphere, Outer Space, Antarctica and the Internet – the high externality benefits of which are universally accessible to the entire world. This is because it is the product of the post-secondary higher education systems – comprising the high value-added, high positive-externality emanating STEM courses for the creation of Scientists, Technologists, Engineers, Mathematicians, as well as the managers, entrepreneurs, lawyers, teachers, and now increasingly, in the post-COVID-19 era, doctors, nurses, vaccine experts, etc. These human resources are produced through the UG/PG/Research degrees awarded by universities and institutions of national importance like the IITs, Regional Colleges of engineering, agriculture, mining, medical, nursing, veterinary and so on.

At the lower tier is the post-secondary vocational training in institutes like the ITIs, Polytechnics, and other specialized entities. They grant diploma and certificate courses focused on skills development in a whole range of specializations (including paramedics and ancillary workers who were felt to be in short-supply during the COVID-19) rather than creation of frontier knowledge. The map below elaborates a generic classification of both these streams of HRD.

Table 6.1.1 The Universe of Discourse for Human Resource Development: Education by Inputs and Output

THE UNIVERSE OF DISCOURSE FOR HUMAN RESOURCE DEVELOPMENT: EDUCATION BY INPUTS AND OUTPUT Post-secondary Education for Producing "Knowledge Workers and Skilled Workers"						
OUTPUT: Occupation-tied Career-specific	Formal Education	Know- ledge	Experi- ence	Train- ing	Activity	OUTPUT: Occupation-wide Generic Category
Scientists, Engineers	Third Level S & T	o	o	o	Disruptive Tlgy, Invention, Innovation	<u>Creators</u> STEM- Professionals
Educators, Trainers	Third Level R & D	o	o	o	Communication & Transformation	<u>Teachers,</u> Instructors
Executives, Supervisors, Civil Servants,	Third Level. Business, Commerce, Vocational Education	o	o	o	Finance, Management, Policy & Governance	<u>Managers,</u> Entrepreneurs
Middle and Elementary Education for "Service Workers" (MEDIUM & LOW SKILLED)						
Semi- Professionals, Technicians, Craftsmen	Second Level - Vocational	o	o	o	Facilitation, Operation, Correction	<u>Operators</u>
Semi-skilled, Unskilled	First level - Literacy	o	o	o	Production, Construction	<u>Labourers</u>
INPUTS: Knowledge: Know-why		Experience: Do-how		Training: Know-how		

Source: Khadria, B. (1999), *The Migration of Knowledge Workers – Second-generation Effects of India’s Brain Drain*, Sage: New Delhi.

6.1.2. Present Status

By investing in school and higher education, enhancing vocational training, and promoting gender parity, this Vision document envisions a future where the NER's human resources are fully equipped to drive sustainable economic growth, social development, and environmental stewardship. This vision aligns with the global commitment to achieving the SDGs, ensuring that the region catches up with the rest of the country.

Present status (Quantitative and qualitative)

Education serves as the cornerstone of societal development and personal empowerment, laying the foundation for economic growth, social cohesion, and individual prosperity.

Table 6.1.2: Number of Elementary Schools in the States of North East Region

Sl. No.	State	No. of School
1	Arunachal Pradesh	3562
2	Assam	58117
3	Manipur	4515
4	Meghalaya	7844
5	Mizoram	3026
6	Nagaland	2701
7	Sikkim	1259
8	Tripura	4929
TOTAL		85953

Source: UDISE (2021-2022)

Table 6.1.3: Gender wise Enrolment Number of Elementary Schools of States in North East Region

Sl. No.	State	Total Enrolment		
		Boys	Girls	Total
1	Arunachal Pradesh	124971	124020	248991
2	Assam	2761543	2789595	5551138
3	Manipur	234606	226280	460886
4	Meghalaya	382347	392051	774398
5	Mizoram	106663	101935	208598
6	Nagaland	138679	135715	274394
7	Sikkim	39207	36152	75359
8	Tripura	249122	242835	491957
TOTAL		4037138	4048583	8085721

Source: UDISE (2021-2022)

Table 6.1.4: Pupil-teacher ratio (PTR) by level of school education, 2021-22

Sl. No.	State	Primary (1 to 5)	Upper Primary (6-8)
1	Arunachal Pradesh	12	9
2	Assam	21	14
3	Manipur	13	11
4	Meghalaya	20	14
5	Mizoram	16	8
6	Nagaland	11	8
7	Sikkim	7	8
8	Tripura	18	20

Source: UDISE (2021-2022)

The table 6.1.4 on Pupil Teacher Ratio (PTR) by the level of school education at the elementary level in the North-East Region (NER) of India for the year 2021-22 highlights significant disparities in teacher allocation across different states. Lower PTRs suggest more individualized attention for students, which can lead to better educational outcomes. Sikkim exhibits the most favourable PTRs with 7:1 at the primary level and 8:1 at the upper primary level, indicating an excellent teacher-student ratio that allows for significant individual attention and support. Similarly, Nagaland also has PTRs of 11:1 at the primary level and 8:1 at the upper primary level. Overall, the data reveals lower PTRs at elementary schools in all the states of North East region as compared to the prescribed national level of PTR which is 20:1.

Table 6.1.5: Number of Secondary Schools in States of North East Region of India

S. No	State	Secondary schools	Senior secondary schools
1.	Arunachal Pradesh	319	164
2.	Assam	7290	2415
3.	Manipur	958	271
4.	Meghalaya	1462	386
5.	Mizoram	706	205
6.	Nagaland	576	198
7.	Sikkim	150	117
8.	Tripura	702	479

Source: UDISE (2021-2022)

The number of secondary and senior secondary schools in the North-East Region (NER) of India reveals notable gaps between the two levels of educational institutions across the states. These gaps highlight the challenges in transitioning students from secondary to

senior secondary education, which is crucial for their academic and professional development. Assam shows the most significant gap, with 7,290 secondary schools compared to 2,415 senior secondary schools, resulting in a difference of 4,875 senior secondary schools.

Overall, the difference between the number of secondary and senior secondary schools in the NER highlight a critical area for improvement.

Table 6.1.6: Enrolment in the secondary and senior secondary schools of states in North East Region

Sl. No	State	Enrolment	
		Secondary schools	Senior secondary schools
1.	Arunachal Pradesh	45455	33866
2.	Assam	1004682	545752
3.	Manipur	91005	79580
4.	Meghalaya	117496	66044
5.	Mizoram	48605	28134
6.	Nagaland	58721	34060
7.	Sikkim	23151	17819
8.	Tripura	110536	81686

Source: UDISE (2021-2022)

Table 6.1.6 shows the enrolment data for secondary and senior secondary schools in the North-East Region (NER) of India reveals significant disparities across eight different states.

The enrolment data for secondary and senior secondary schools in the region reveals significant difference, indicating a concerning drop-out in student numbers as they transition from secondary to senior secondary education. This trend raises serious concerns about the continuation of education by the students in the region. Assam, with the highest enrollment figures, shows a dramatic decrease from 1,004,682 students in secondary schools to 545,752 in senior secondary schools. This gap of 458,930 students highlights a major issue where nearly half of the students do not progress to senior secondary education. Arunachal Pradesh also shows a significant gap, with 45,455 students enrolled in secondary schools and only 33,866 in senior secondary schools.

This indicates across the NER, students from senior secondary schools are not reaching senior secondary schools, which poses a concern for the region's human resource development.

Table 6.1.7: Number of teachers in secondary schools and senior secondary schools of states in North Eastern Region

Sl. No	State	Teachers	
		Secondary schools	Senior secondary schools
1.	Arunachal Pradesh	2775	970
2.	Assam	42162	18455
3.	Manipur	NA	NA
4.	Meghalaya	8342	2714

5.	Mizoram	4239	1883
6.	Nagaland	3767	1463
7.	Sikkim	1368	1294
8.	Tripura	5585	4448

Source: UDISE (2021-2022)

The table 6.1.7 shows the number of teachers in secondary and senior secondary schools across the North-East Region (NER) of India. Assam, with 42,162 secondary school teachers and 18,455 senior secondary school teachers, has the highest number of teachers, which matches with large number of schools. However, the teacher numbers might still be insufficient relative to student enrolment, suggesting a need for further recruitment. The absence of data for Manipur shows the need for comprehensive data collection and reporting, essential for informed policy-making and resource allocation.

Table 6.1.8: Student- Teacher ratio in secondary and senior secondary schools

Sl. No	State	Student-teacher ratio	
		Secondary schools	Senior secondary schools
1.	Arunachal Pradesh	11	20
2.	Assam	11	21
3.	Manipur	9	16
4.	Meghalaya	12	20
5.	Mizoram	9	15
6.	Nagaland	10	17
7.	Sikkim	9	11
8.	Tripura	14	15

Source: UDISE (2021-2022)

According to the policy recommendations, the ideal student-teacher ratio is 30:1 at the secondary level and 40:1 at the senior secondary level. The data reveals that the NER generally have much lower student-teacher ratios compared to these national benchmarks, suggesting a favourable environment for more personalized and effective teaching.

6.1.3 Higher Education

According to the All-India Survey on Higher Education (AISHE) 2021-22, the GER in higher education is 28.4 % at all India levels.

Table 6.1.9: GER in Higher Education (North Eastern Region)

Sl. No.	States/UTs	GER (%)
1.	Arunachal Pradesh	36.5
2.	Assam	16.9
3.	Manipur	35.4
4.	Meghalaya	25.4
5.	Mizoram	32.3
6.	Nagaland	18.8
7.	Sikkim	38.6
8.	Tripura	20.7

Source: AISHE (2021-2022)

The table 6.1.9 on Gross Enrolment Ratio (GER) in higher education across the North-East Region (NER) of India reveals significant difference in the enrolment of students in higher education. Sikkim stands out with the highest GER at 38.6%, indicating a large participation in higher education relative to its eligible population. This high percentage suggests that a majority of young adults in Sikkim are pursuing higher education, which is a positive indicator for the region's future workforce development. Arunachal Pradesh, Manipur, Mizoram and Meghalaya also exhibit high GERs of 36.5%, 35.4%, 32.3% and 25.4% respectively. In contrast, Assam, with a GER of 16.9%, Nagaland, with 18.8%, and Tripura with 20.7% shows lower enrolment in higher education.

The NER has a total of 84 universities registered in AISHE, the data suggests that there is a need to enhance the higher education institution and establish more higher education institutions particularly in states with fewer institutions, thus to quality higher education and achieving the sustainable development goals outlined in the North-East Council VISION Plan 2047.

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Table 6.1.10: Universities located in States of North East Region which are registered in AISHE

Sl. No.	States/UTs	Central University	Central Open University	Institute of National Importance	State Public University	Institute under State Legislature Act	State Open University	State Private University	State Private Open University	Deemed University-Government	Deemed University-Government Aided	Deemed University-Private	Grand Total
1.	Arunachal Pradesh	1		1				6	1	1			10
2.	Assam	2		5	15		1	6		1			30
3.	Manipur	3		2	3			2					10
4.	Meghalaya	1		2				8					11
5.	Mizoram	1		1				1					3
6.	Nagaland	1		1				4					6
7.	Sikkim	1		1	1			6					9
8.	Tripura	1		2	1			1					5
North Eastern Region		11	0	15	20	0	1	34	1	2	0	0	84

Source: AISHE (2021-2022)

Table 6.1.11: Enrolment in Higher Education in the states of North East

Sl. No.	States/UTs	No. of College registered with AISHE	Enrolment
1.	Arunachal Pradesh	44	666
2.	Assam	607	906
3.	Manipur	108	1013
4.	Meghalaya	77	909
5.	Mizoram	40	669
6.	Nagaland	69	533
7.	Sikkim	24	712
8.	Tripura	54	1387
	North Eastern Region	1023	

Source: AISHE (2021-2022)

Tripura, with an enrollment in higher education of 1,387 students, has the highest enrollment, indicating a demand high demand for higher education. Arunachal Pradesh and Nagaland have the lowest enrollment, with 666 and 533 students, respectively.

Table 6.1.12: No. of Govt. and Private Colleges (NER)

Sl. No.	State/UTs	Private (Un-Aided)	Private (Aided)	Private Total	Government	Total
1	Arunachal Pradesh	15	4	19	24	43
2	Assam	84	25	109	444	553
3	Manipur	26	19	45	58	103
4	Meghalaya	23	17	40	29	69
5	Mizoram	8	1	9	31	40
6	Nagaland	15	32	47	21	68
7	Tripura	7	4	11	43	54
8	Sikkim	4		4	16	20
	NER	182	102	284	666	950

Source: AISHE (2021-2022)

The table 6.1.12 on the number of government and private colleges highlights the distribution of publicly and privately funded higher education institutions. Assam stands out with the highest number of colleges, totalling 553, of which 444 are government colleges and 109 are private colleges (84 un-aided and 25 aided).

Table 6.1.13: State-wise Enrolment in All Types of Institutions for Higher Education

Sl. No	State/UTs	Male	Female	Total
1	Arunachal Pradesh	34995	29895	64890
2	Assam	333926	344086	678012
3	Manipur	66234	64154	130388
4	Meghalaya	43588	52865	96453
5	Mizoram	23191	23580	46771
6	Nagaland	23557	27666	51223
7	Sikkim	16274	17487	33761
8	Tripura	53538	47013	100551
	NER	595303	606746	1202049

Source: AISHE (2021-2022)

The table 6.1.13 on state-wise enrolment in all types of higher education institutions across the NER states. The gender distribution is fairly balanced, with 333,926 males and 344,086 females, indicating gender parity in higher education participation in Assam.

6.1.4 Vocational Education and Training

NEP 2020 recommends the introduction of vocational education from grade 6 to enable learners to acquire the required skills. In addition, it recommends the integration of vocational education and training with mainstream education at all levels. By 2025, at least 50% of learners shall have vocational exposure through school and higher education (MHRD, 2020). Industrialization and skill development are of critical importance in creating career opportunities, as well as mitigating conflict in the region.

Table 6.1.14: Incremental Human Resource Requirement across States (2013-22)

Sl. No.	State	Incremental HR Requirements (in lakhs)
1	Arunachal Pradesh	1.47
2	Assam	12.34
3	Manipur	2.33
4	Meghalaya	2.49
5	Mizoram	1.40
6	Nagaland	0.97
7	Sikkim	1.48
8	Tripura	2.59

Source: Ministry of Skill Development & Entrepreneurship, Annual Report 2022-2023, p. 12

The table 6.1.14 shows outlining the incremental human resource (HR) requirements across NER states for the period 2013-2022 highlights significant variations in labor demand, it reflects the diverse economic landscapes and developmental priorities of each state. Assam, with an incremental HR requirement of 12.34 lakhs, stands out as having the highest demand. Manipur and Meghalaya, with HR requirements of 2.33 lakhs and 2.49 lakhs respectively, and Tripura, with 2.59 lakhs, indicate moderate demand for additional human resources. The data indicates a need for targeted strategies to meet diverse HR demands across the NER.

6.1.5 Vocational Training and Education in NER

As of 2017, out of the 11964 ITIs all over India, only one per cent was located in the northeastern region. In several States like Arunachal Pradesh, Mizoram, and Meghalaya there are districts which did not have even one ITI (Sarkar, 2021) The opportunities for formal skill training were even lower for women with some States like Arunachal Pradesh, Manipur, Meghalaya, Mizoram, and Sikkim having less than a hundred seats reserved for women in it is (Sarkar, 2021). Performance audit reports of existing ITIs in several NE States revealed severe deficiencies in the basic infrastructure such as inadequate buildings, classrooms, laboratories, washrooms, water and power supply, hostels, and lab equipment.

As per the MIS data of National Council of Vocational Training (NCVT), the average seat utilisation level of ITIs in the country is 77.36 percent. In contrast to this, except for Assam (71.48 per cent) and Arunachal Pradesh (76.32 per cent), in other NE states the current seat utilization level is much below the all-India level.

A very small share of the population in the north-east has received formal VET and the number has not changed much in the last decade. Only 1.08 per cent of the males and 0.61 per cent of the females have undergone any formal VET course.

Table 6.1.15: Percentage distribution of the population by the type of vocational training, NE States

Sector/ Gender	Received vocational training					Total	Did not receive VET
	Formal training	Other VET					
		Hereditary	Self- learning	Learning on the job	Others		
Rural							
Male	0.90	0.21	0.38	0.41	0.09	2.00	98.00
Female	0.43	0.38	0.84	0.24	0.04	1.92	98.08
Person	0.67	0.29	0.60	0.33	0.07	1.96	98.04
Urban							
Male	2.11	0.40	1.94	1.90	0.28	6.62	93.38
Female	1.54	0.58	1.14	0.51	0.11	3.88	96.12
Person	1.83	0.49	1.54	1.20	0.19	5.25	94.75
Rural+ Urban							
Male	1.08	0.24	0.62	0.64	0.12	2.70	97.30
Female	0.61	0.41	0.88	0.28	0.05	2.23	97.77
Person	0.85	0.32	0.75	0.46	0.09	2.47	97.53

Source: PLFS 2017-18

In totality, 2.70% of males and 2.23% of females in the NE states receive some form of VET. This highlights a huge gap in vocational training across the region, with 97.30% of males and 97.77% of females having not received any VET.

The data shows the critical need for enhanced vocational training programs across the NE states, particularly targeting rural areas and women, who are significantly underrepresented in receiving VET.

Two of eleven universities offer courses in specialized fields such as Agriculture and Sports (Central Agriculture University, Manipur, and National Sports Universities, Manipur). Regarding Vocational courses, Bachelor of Vocation (B.Voc.) is offered in four central universities out of nine in their respective states, i.e., Assam, Manipur, Mizoram, and Tripura. A single university, Manipur University, Imphal, offers Master's level Vocational Courses. Master of Vocation (M.Voc.) in Entrepreneurship & Foreign Trade and Tourism & Hospitality Management is offered by Manipur University, Imphal. Courses are offered based on available resources in their area, such as handloom weaving, beekeeping, and food processing. Handloom weaving is very common in the tribal culture so students may start with a specialized degree in such a course (Walia and Darlong, 2023).

6.1.6 ICT facilities

Table 6.1.16: Schools with computers in the States of NER

State	Total schools	Schools with functional computers	Schools with functional computers in percentage
Arunachal Pradesh	3603	1161	32.223
Assam	60859	9900	16.267
Manipur	4617	1659	35.932
Meghalaya	14600	2599	17.801
Mizoram	3911	2033	51.981
Nagaland	2718	1467	53.973
Sikkim	1259	747	59.332
Tripura	4929	1169	23.716

Source: UDISE 2021-22

The table 6.1.16 shows the number of schools with functional computers in the North-East Region (NER) of India. Sikkim leads with the highest percentage, with 59.332% of its schools equipped with functional computers. This high percentage indicates a commitment of the State government to integrate digital tools into education. This low percentage of schools with functional computers highlights a considerable gap in digital infrastructure. It suggests that many students may be missing out on the benefits of computer-based learning and digital literacy skills.

Table 6.1.17: Digital Connectivity in Schools in the State of North East Region

State	Total schools	Internet Facility	Schools with Internet in percentage
Arunachal Pradesh	3603	794	22.037
Assam	60859	7126	11.709
Manipur	4617	1065	23.066
Meghalaya	14600	2460	16.849
Mizoram	3911	307	7.849
Nagaland	2718	1383	50.883
Sikkim	1259	434	34.471
Tripura	4929	896	18.178

Source: UDISE 2021-22

Digital connectivity in schools across the NER highlights significant disparities in access to internet facilities. Nagaland stands out with the highest percentage of schools with internet facilities, at 51%, indicating a strong emphasis on digital connectivity. Assam, despite having the highest number of total schools (60,859), has only 11.71% of its schools with internet facilities.

Tables 6.1.1 and 6.1.2 show the numbers of universities by type and specialization in NER and by its states as compared to all-India total, as per the Annual Survey of Higher Education, 2020-21 data.

Drawing a roadmap for the future production of human capital for HRD in NER by 2047 would require the present status of a limited number of three carefully chosen variables, viz., (1) finance (which also represents infrastructure and facilities), (2) enrolments, and (3) teachers - to be first defined specifically and then measured (whether cardinally and ordinal).³ Tables 3 and 4 and Figures 1, 2 and 3 provide the latest all-India scenario of these three indicators till 2021 or 2023 so as to help us gauge the deviations in the North-east states, whether higher or lower than the national average.

Table 6.1.5 presents an important bird's eye view of the three variables vis-à-vis relevant age group of 18-23 population for All India, individual NE States and All NE States together and per state. It shows the relevant age group (18-23) population as per 2011 census, per student expenditure on higher education in 2007-08 (unavailable for 2020-21 and hence marked as NA?), GER in 2020-21 based on 2011 population, and PTR as reported for 2020-21. Because the relevant age group population is of Census 2011, it is a gross underestimate for the 2021 scenario. Per student expenditure on higher education in 2007-8 was far below the all-India average in two states of Arunachal Pradesh and Meghalaya. GER in 2020-21 was far below the all-India average of 27% in three states Assam, Nagaland, and Tripura. PTR is far below all-India average in two states of Assam and Tripura. These variations across the NE states are camouflaged by the comparable dimensions between all-India and all-NER figures.

³ There are other ancillary indicators on participation in education, e.g., gender-parity index, socio-economic diversity of SC, ST, OBC, physically challenged, LGBT, etc., but I have not addressed them here due to constraint of limited space. For the dynamics of gender issues, see Khadria (2000).

Table 6.1.18 Number of Universities in the NE States by type of Universities

Number of Universities in the NE States by Type of University

(In Numbers)

State	Central University	Central Open University	Institute of National Importance	State Public University	Institute under State Legislature Act	State Open University	State Private University	State Private Open University	Deemed University - Government	Deemed University - Government Aided	Deemed University - Private	Total
Arunachal Pradesh	1	0	1	0	0	0	6	1	1	0	0	10
Assam	2	0	5	13	0	1	6	0	1	0	0	28
Manipur	3	0	2	3	0	0	1	0	0	0	0	9
Meghalaya	1	0	2	0	0	0	8	0	0	0	0	11
Mizoram	1	0	1	0	0	0	1	0	0	0	0	3
Nagaland	1	0	1	0	0	0	3	0	0	0	0	5
Sikkim	1	0	1	1	0	0	5	0	0	0	0	8
Tripura	1	0	2	1	0	0	1	0	0	0	0	5
Total – NE Region	11	0	15	18	0	1	31	1	2	0	0	79
Total - India	51	1	149	403	5	14	365	1	34	10	80	1113

Source: 'All India Survey on Higher Education 2020-21', Department of Higher Education, Ministry of Education, Government of India (AISHE) [Table-1 Page T-1]

Table 6.1.19 Number of Universities in the NE States by Specialization (Based on Actual Responses)

Number of Universities in the NE States by Specialization
(Based on Actual Responses)

(In Numbers)

Specialization	Number of Universities Located in the State for Indicated Specialization								Total NE Region	Total India
	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura		
General	7	16	2	5	1	3	5	2	41	615
Agriculture	0	1	1	0	0	0	0	0	2	51
Education	0	0	0	0	0	0	0	0	0	5
Chartered Accountancy	0	0	0	1	1	1	1	1	5	7
Cultural Studies	0	0	1	0	0	0	0	0	1	2
Fine Arts	0	0	0	0	0	0	0	0	0	6
Fisheries	0	0	0	0	0	0	0	0	0	4
Gandhian / Religious Study	0	0	0	0	0	0	0	0	0	2
Journalism & Mass Communication	0	0	0	0	0	0	0	0	0	3
Language	0	0	0	0	0	0	0	0	0	8
Law	0	1	0	0	0	0	0	0	1	26
Management	0	0	0	1	0	0	0	0	1	23
Medical	1	2	0	0	0	0	0	0	3	71
Oriental Learning	0	0	0	0	0	0	0	0	0	3
Rural Development	0	0	0	0	0	0	0	0	0	2
Sanskrit	0	1	0	0	0	0	0	0	1	19
Science	0	0	0	1	0	0	0	0	1	30
Social Science	0	0	0	0	0	0	0	0	0	7
Sports / Yoga / Physical Education	0	0	1	0	0	0	0	0	1	10
Technical	2	7	3	2	1	1	1	2	19	188
Veterinary	0	0	0	0	0	0	0	0	0	12
Other	0	0	0	0	0	0	0	0	0	5
Total	10	28	8	10	3	5	7	5	76	1099

Source: All India Survey on Higher Education 2020, Department of Higher Education, Ministry of Education, India (AISSHE Table 2, Pages 7 (two pages)) Government of

**Table 6.1.20 Comparative Budgeted Expenditure in Various Sectors, India:
In Rupees Crore, 2019-23 (Ref NEP Target for Education Sector: 6% of GDP by 2035)**

	TOTAL	Defence	Health	Education	Higher Education	School Education
2019-20	27,86,349	3,05,296	63,830	94,854	38,317	56,537
2020-21	30,42,230	3,23,053	67,484	99,312	39,466	59,846
2021-22	34,83,236	3,68,418	74,602	88,002	38,351	54,000
2022-23	39,44,909	3,85,370	86,606	1,04,278 (approx. 3% of GDP)	40,828	63,449

Sources: Union Budgets 2019-20 to 2022-23.

Table 6.1.21: Comparative Dimensions of Three Determining Variables of Higher Education in NE States, 2020-21 (18-23 Age Group Population)

	All India	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	All NE States & Per State
Population Age 18-23 (2011 Census)	151624817	177027	3975400	366852	378800	144322	272017	87117	483282	5884817/ 8 =735602 NER: 3.88% of All India
Per Student Expenditure, in Rupees (2007-8)	26234	16783	26899	37722	19731	24694	27480	31321	24401	209031/8 =26129
2020-21	NA?	NA?	NA?	NA?	NA?	NA?	NA?	NA?	NA?	NA?
GER (Base 2011)	27.3	33.7	17.5	37.8	25.8	26.8	17.3	39.9	19.2	218/8 =27.3
(Difference with All India average)		+6.4	-(9.8)	+4.1	-(2.5)	-(0.5)	-(10.0)	+6.2	-(8.1)	0
PTR	24	23 +1	28 -(4)	23 +1	25 -(1)	16 +8	18 +6	16 +8	33 -(9)	206/8=26

Source: Constructed by Khadria, B., using data and concepts from GOI, AISHE 2020-21 and Khadria, B., Thakur, N. and Ashraf, R. (2016). India's Human Capital in Gen-Y and Gen-Z: Constructs of an Index of Service Production in Education (Research Report prepared for MOSPI, GOI), University of Melbourne Graduate School of Education, Research Report No. 47, Youth Research Centre, Australia.

6.1.7 Lessons of Past Performance: Quantitative Expansion vs. Qualitative Decline

The educational change in the states of India invariably constructs two indexes for 2010-11 (with 2007-08 as the Base Year) (Khadria, Thakur & Asraf, 2016). This can be considered an authentic assessment of the past performance of education in India and its states, particularly of higher education. The relevant findings of the evidence are presented here in Figures 6.1.1 -6.1.7.

Figure 6.1.1 Index of Quantitative Expansion in Overall Education, 2010-11 (Base Year 2007-08)

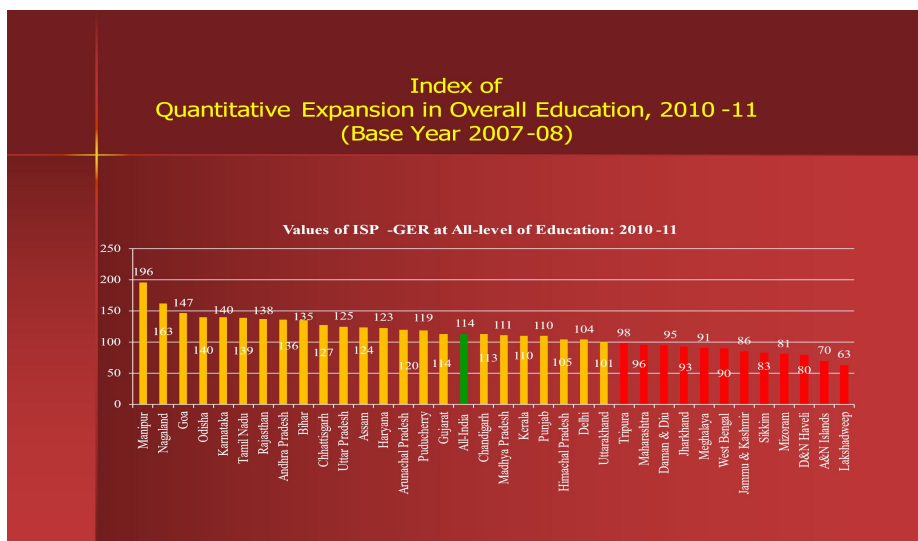
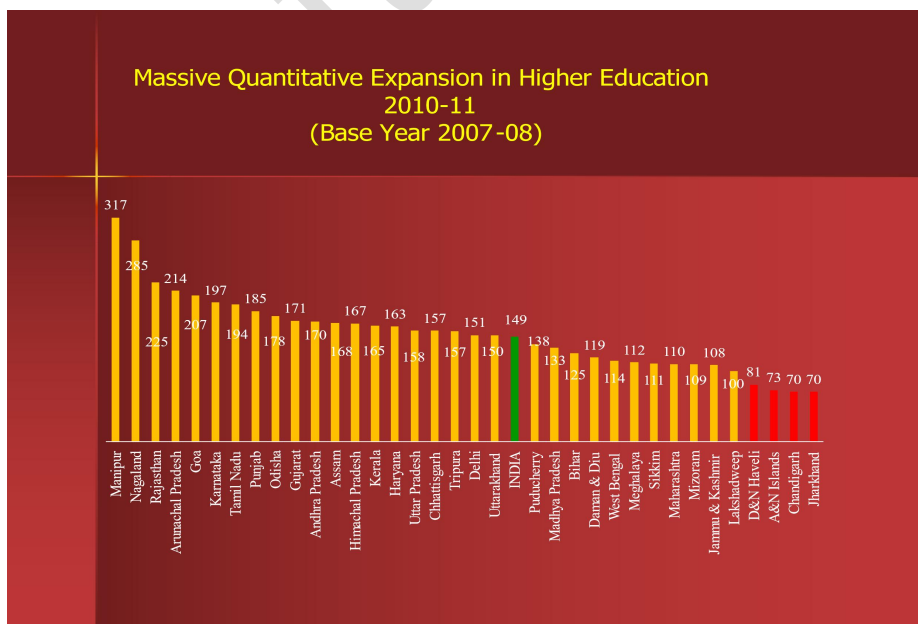


Figure 6.1.2 Massive Quantitative Expansion in Higher Education 2010-11 (Base Year 2007-08)

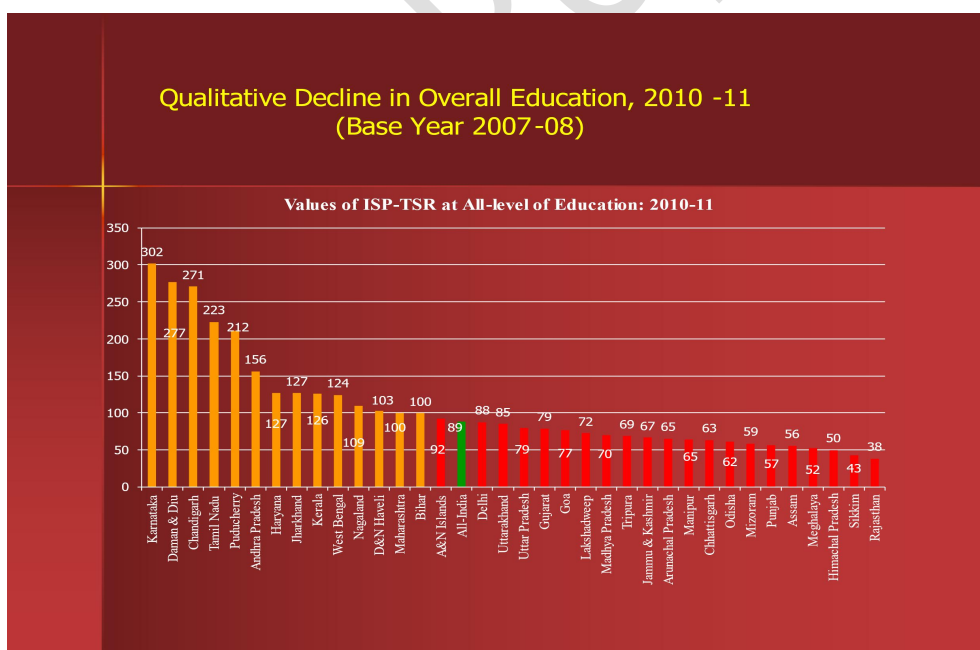


Figures 6.1.1 and 6.1.2 show the Index of Service Production (ISP) in all-levels of education and higher education respectively, estimated through Gross Enrolment Ratio (GER) in 2010-11 with 2007-8 as the Base

Year and the 2007-8 per-student public and private expenditure as weights. For all levels of education, only four states (Manipur, Mizoram, Assam, and Arunachal Pradesh, with the first two leading all the states of India) out of eight NE states had experienced a quantitative expansion in terms of enrolments (Figure 6.1.1). However, for higher education, excepting for four non-NE states, the index had risen in all states of India including all eight North-east states.

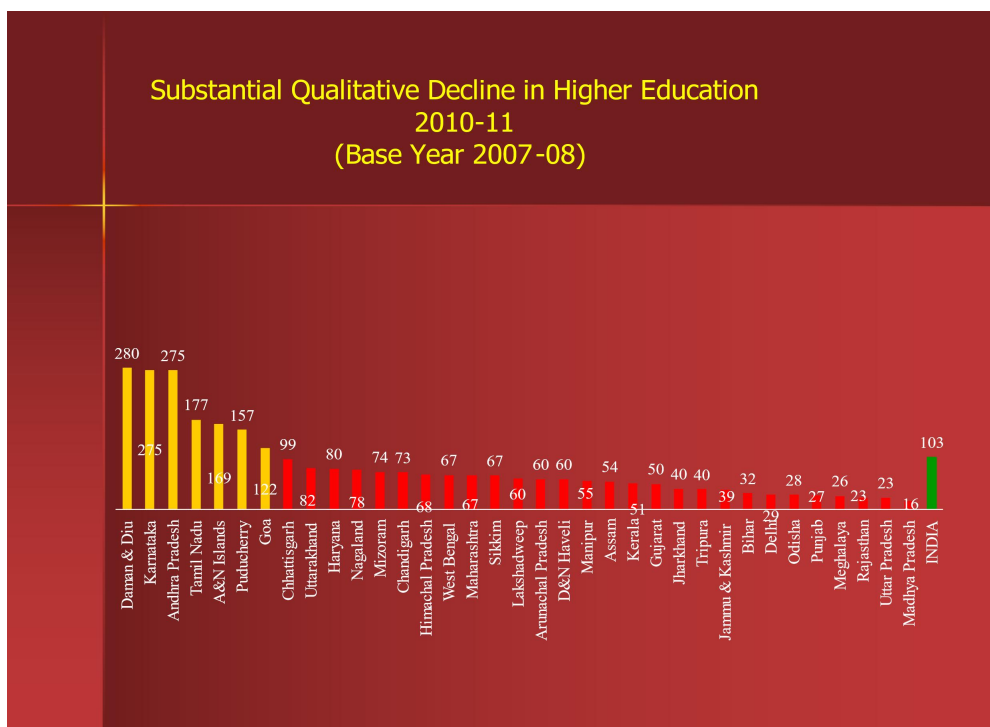
There were two reasons behind this across the states rise in quantitative expansion of higher education. First, after having the financial requirements estimated by the Tapas Majumdar Committee (MHRD, 1999)⁴ accepted by the Vajpeyi government, the Government of India made elementary education a fundamental right in 2009 (Right to Education Act, 2009), thus paving the way for a rights-based approach to free and compulsory elementary education. This led to a rise in not only the GER in elementary education as almost all states of India rushed towards achieving the target of universal enrolment in elementary education, but also in secondary and higher education (Figure 4). The second cause of the hike in ISP-GER was the bigger weight of expenditure in higher education, especially private expenditure incurred since 2007-8 (Figure 5). The change in the quantity of education services has thus been significantly positive in 2010-11, over the previous two years.

Figure 6.1.3 Quantitative Decline in Overall Education, 2010-11 (Base Year 2007-08)



⁴ <https://www.gktoday.in/tapas-majumdar-committee/>

**Figure 6.1.4 Substantial Qualitative Decline in Higher Education 2020-11
(Base Year 2007-08)**



In sharp contrast, Figures 6.1.3 and 6.1.4 show the change in quality of education reflected through an index of service production constructed through teacher-student ratio and per capita expenditure, ISP-TSR, reflecting a decline in quality of overall and higher education respectively, in all north-east states. The teacher-student ratio showed, in contrast to the gross enrolment ratio, the negative impact of increased enrolment of students on quality of teaching in higher education (Figure 7). The variable, teacher-student ratio (TSR, the inverse of PTR i.e., pupil-teacher ratio) provides an estimate of the quality of education because ultimately what matters most in educational production function is the teaching capability of the system, the necessary condition being the number of teachers.⁵ There are of course other factors - inputs like physical infrastructure and financial resources that affect the process of teaching and learning. Nevertheless, the most crucial determinant along with increase in student enrolments is the proportional increase in the number of teachers, maintaining a balance between the two ratios over time.

⁵The capability, for being effective would however, require the “sufficient condition” of quality teacher training, which then becomes a circular process in HRD.

III. Vision 2047: Possibilities, Potentials and Promises

i) Quantitative targets

- **Elementary Education**

1. Increase the Number of Schools: Establish an additional 10,000 elementary schools across the NER by 2047. To address the significant disparities in the number of schools among states and ensure universal access to elementary education.

2. Increase Enrollment: Achieve 100% enrollment of all children in the age group of 6-14 years by 2047, aiming for a total enrollment of 10 million students.

3. Maintain Pupil-Teacher Ratio (PTR): Maintain a PTR of 20:1 in all states at both primary and upper primary levels by 2047. Lower PTRs are associated with better educational outcomes, and this target will help provide more individualized attention to students.

- **Secondary and Senior Secondary Education**

4. Increase the Number of Secondary and Senior Secondary Schools: Establish an additional 5,000 secondary schools and 3,000 senior secondary schools across the NER by 2047. To address the gaps in transitioning from secondary to senior secondary education and ensure that all students have the opportunity to continue their education.

5. Enhance Enrollment Rates: Achieve a 100% enrollment rate in secondary schools and a 60% enrollment rate in senior secondary schools by 2047.

- **Higher Education**

6. Increase Gross Enrollment Ratio (GER): Achieve a GER of 50% in higher education across the NER by 2047. To significantly increase the number of students pursuing higher education, thereby enhancing the region's human resource potential.

7. Expand Higher Education Institutions: Establish 50 new universities and 500 new colleges across the NER by 2047. This is to meet the growing demand for higher education and ensure equitable access to quality higher education to the young adult population.

- **Vocational Education and Training**

8. Increase Vocational Training Centers: Establish 1,000 new ITIs and vocational training centres across the NER by 2047. This is to significantly expand access to formal vocational training and skill development programs.

9. Enhance Vocational Training Enrolment: Ensure that 50% of all students in secondary and higher education have access to vocational training programs by 2047, aiming for a total enrolment of 2 million students. This is to equip students with practical skills and enhance their employability.

10. Improve Gender Parity in Vocational Training: Achieve equal enrollment of males and females in vocational training programs by 2047. Thereby the gender disparity in vocational training addressed and ensure that women have equal opportunities for skill development.

- **ICT facilities and Digital Connectivity**

11. Expand Computer Access in Schools: Equip 100% of schools with functional computers by 2047. So that, to integrate digital tools into education, enhancing learning experiences and preparing students for a technology-driven future.

12. Ensure Internet Connectivity: Ensure 100% of schools have internet facilities by 2047. In order to bridge the digital divide and provide students with access to online resources and digital learning tools.

6.1.8 Qualitative targets

- Elementary Education

1. Enhance Educational Quality: Implement comprehensive teacher training programs to improve pedagogical skills and subject matter expertise by 2047.

2. Inclusive Education: Implement inclusive education policies to cater to children with special needs and ensure accessibility in all elementary schools by 2047.

3. Curriculum Development: Revise and update the elementary school curriculum as per the knowledge development in education and life skills by 2047.

4. Bridge Transition Gaps: Implement targeted intervention programs to ensure smooth transitions from secondary to senior secondary education.

5. Promote STEM Education: Enhance STEM (Science, Technology, Engineering, Arts and Mathematics) education through specialized programs and laboratories and studio in all secondary and senior secondary schools.

6. Student Counselling Services: Establish functional student counselling services in all secondary and senior secondary schools to provide academic, career, and mental health support.

7. Encourage Research and Innovation: Establish research and innovation cell in all universities to promote cutting-edge research, collaborations, and innovation by 2047. So that, it drives the academic excellence and contribute to regional and national development through research.

8. Interdisciplinary and Transdisciplinary Education: Encourage interdisciplinary and transdisciplinary programs in universities and colleges at post graduate and under graduate level to provide holistic education and address complex societal challenges.

9. Industry-Academia Collaboration: Foster strong partnerships between higher education institutions, vocational training institutions and industries to align vocational education training programs with industry needs.

10. Lifelong Learning and Skill Development: Promote lifelong learning and continuous skill development programs to keep the workforce updated with emerging trends and technologies

11. Digital Pedagogy Integration: Integrate digital pedagogy like through SWAYAM, SWAYAM Prabha into teaching and learning processes across all educational levels.

12. **Build Digital Infrastructure:** Develop and maintain digital infrastructure in all educational institutions to support online learning.

13. **Cultural and Linguistic Inclusivity:** Promote cultural and linguistic inclusivity in the education system by incorporating local languages, traditions, and knowledge systems into the curriculum.

14. **Community Engagement:** Strengthen community engagement in the educational process through partnerships with local communities, parents, and organizations by 2047. Community involvement can enhance the relevance and effectiveness of education and promote shared responsibility for educational outcomes.

15. **Upgrade and Expand School Buildings:**

Invest in the construction and renovation of school buildings to provide safe, modern, and well-equipped learning environments.

16. **Improve Sanitation and Hygiene Facilities**

17. **Develop Multipurpose School Facilities**

Create multipurpose facilities within schools that can be used for various activities, including sports, cultural events, and community gatherings.

18. **Increase Classroom Space and Resources**

19. **Develop Specialized Institutes**

Establish specialized institutes focusing on areas such as technology, agriculture, health sciences, and environmental studies to meet regional needs.

20. **Develop Smart Classrooms**

Implement smart classroom technologies, including interactive whiteboards, digital content libraries, and virtual learning platforms.

21. **Improve School Transportation Services**

22. **Enhance Road Connectivity to Educational Institutions**

23. **Develop Sustainable Campus Models**

6.1.9 Projecting Demand and Supply Sides of Higher Education

(i) Comprehending the Age-Structural-Transformation (AST) of NER Population for Enrollments

Understanding the size and composition of the relevant 18-23 age cohorts of NER population by 2047 would be central to comprehending the two crucial determinants of Vision 2047: size of demand and supply sides of higher education for HRD. By 2047, the baby-boomers I and II (born 1946-1954 and 1955-1964) would be in their mid-80s and

above; Gen X (born 1965-1980) will be in their mid-60s to mid-80s; Gen Y (or Millennials, (born 1981-1996) will be in their mid-40s to mid-60s; Gen-Z (born 1997-2012) will be in their mid-30s to mid-40s; and Gen Alpha (children born after 2012 till now) will be up to mid-30s. Gen Beta i.e., children being born now over the next 5 to 7 years till 2030-31 would become the higher education student cohorts of youth by 2047, having completed their elementary and secondary education and ready to demand higher education. On the supply side of higher education, among teachers, it will be the Millennials or Gen-Y (attaining age 45 to 65 in 2047) who will be the eligible professors at the peak of their teaching career, and Gen-Z (35 to 45 age) who will be eligible associate professors, and those born after 2010 in the Alpha generation as eligible assistant professors up to the age of, say 35 years.

Population growth or change taking place behind the above scenario is determined by three variables, viz. birth, death and net migration which are documented by the decennial census. India's last formal and complete population census took place in 2011. The next Census 2021 did not happen due to the COVID-19 pandemic. However, based on 2011 Census, we do have population projections that provide five-yearly state wise estimates till 2036 though not until 2047

For our purpose of Vision 2047, projections till 2031 would be sufficient for taking the gross cohorts of higher education in age group 17 - 27 (including the under- and over-aged beyond 18-23 as counted in GER) in 2047. We also must keep in mind that to make the most of the Demographic Dividend before it peters out by 2050, we need to plan for the relevant generations now.

(ii) Accounting for Out-migration of Students and Youth to Other States and Abroad

The regional average GER for the eight NE states at 27.3, equal to the national average, is a coincidental illusion. One plausible reason behind the close to 10 percentage point lower state-GER in Assam and Nagaland, and 8 percentage point lower in Tripura could be the large-scale migration of tertiary level students to other states particularly to the higher education hubs of Delhi, Bangalore, Pune, Hyderabad and so on that was triggered by the three to four decades long hostilities, extortion, strife and militancy in the region. Even migration abroad to the USA, Canada, UK, Europe and Singapore for frontier STEM fields of studies including the advanced social sciences and to Australia and New Zealand for vocational and technical training (VET) has grown over time. Also, there has been withdrawal from participation in higher education for those migrating to other states for lower end vocational jobs of guards, salesmen etc. in the proliferating malls and hospitality industry. These people were still counted in the population, the denominator in the ratio, which was still based on the 2011 census, but not among the enrolled students, the numerator, which were current in 2020-21.

This phenomenon points towards the untapped potential of the region to become a HRD hub of post-secondary education, which can not only help to retain its own students from migrating out, but also to attract those from other states of India and the neighbouring

countries in South and South-east Asia under the “Act East” policy.⁶ The “necessary condition” for this would be the physical infrastructure of education, transport, accommodation and medical support, but the most vital “sufficient condition” would be the availability of high quality teachers by training or import and recruitment at internationally competitive terms of pay and employment.

(iii) Tapping irreversible irregular immigration for HRD

A highly sensitive issue with the population in NER, particularly Assam, is that of ethnicity and irregular immigration. The region has been a hotbed of ethnic strife over issues culminating in NRC and CAA.⁷ The long-term casualty has been the future of HRD in the NER states. The irregular immigrants who have lived in the region and cannot be uprooted and deported need not be threatened with imprisonment by the state or subjected to pervasive day to day hatred among the public. Rather they should be integrated into the “whole of society” as efforts are on all over the world under the mission of the Global Compact for Safe, Orderly and Regular migration (GCM) as a supplement to the UN-SDGs. Their inherent human capital needs to be enhanced through investment in their education and health (lack of which emanates high negative externalities for society leading to increasing rates of crime and illness) and their formalization in the tax net would add to the growth of the SGDP in NER.⁸ It would possibly also replace the hostility of illegal immigrants by their reciprocal gratefulness and loyalty. This would require grit and determination as there would be many distracting and disrupting elements in society and polity to subvert any public pronouncement of such a policy.

6.1.10 Re-mapping of Financial and Perspective Plans on Budgets and Expenditure

There is a serious disjoint between the educational statistics and financial data on budgets and expenditures which is pervasive in the union documents of education as well as those of the individual states, and this must be bridged now on for the NER states. We need to keep in mind that higher education is a concurrent subject and hence dependent on financial allocations by the Central government to the states, even if in very small proportions for non-central government institutions.⁹ The budget allocation for the Ministry

⁶ Khadria, B. (2021), “Reflections on Vivekanand, Immigrants, and Academic Freedom: Making Universities in Assam the International Hubs of Higher Education”, Chapter 4 in Goswami, S. and Talukdar, M. P, eds., *Different Strokes: Understanding the North East of India*, Chennai: Notion Press, pp. 100-122.

⁷ Khadria, B. (2016) “What after NRC Stocktaking? Fresh Thinking for India’s Immigration Policy Innovation”, *Research Journal of Contemporary Concerns*, vol. 10 & 11, Cotton College Research Council, Guwahati, Assam, pp. 3-13.

⁸ See, Khadria, B. and Kumar, P. (2015), “Immigrants and Immigration in India: A Fresh Approach”, *Economic and Political Weekly*, Feb 21, pp. 65-71. <http://www.epw.in/notes/immigrants-and-immigration-india.html>; and Khadria, B. (2016), “Involuntary and Illegal Migration to India: The Case of Bangladesh”, *NORRAG NEWS (NN)*, vol. 53, May, Special Issue on: Refugees, Displaced Persons and Education - New Challenges for Development and Policy; Section on: Regional Lenses on the Global Politics of Involuntary Migration – Asia: South, South-east and East, pp. 118-119.

⁹ States are practically the sole providers of school education. In higher education their share of responsibility is dominant in number of institutions, enrollment, teachers and most importantly, funding. States bear more than 77% of expenditures of all education and 71% of higher education. The state sector higher educational

of Education, GOI for 2023-24 is Rs.1, 12,898.97 crores, the highest ever allocation granted to the ministry so far. The Ministry of Skill Development and Entrepreneurship has received a total budget of Rs 3,517.31 crores which has gone up from last year's budget of Rs 2,999 crores. Out of total budget, Rs 2,278.37 crores has been allocated for the Skill India program. What do these statistics mean for HRD in the North-east states?

To bolster the supply side of higher education for HRD – the infrastructure and teacher recruitment – the NER states must figure out what share of funds they could acquire from this central pool of financial allocation and how much could be the allocations in their own state budgets over the next two and a half decades. It would take vision for long-term perspective planning of HRD and not populist short-term window dressing for a year or two intermittently. Budgeting needs to follow the HRD plans – both “development” and “maintenance” grants – rather than rule of the thumb statutory allocations followed by hurried wasteful over-expenditure incurred to exhaust allocations by the end of financial year or meek compromise with deficits. Innovations of budgeting techniques like zero budgeting would create an in-built accountability.

6.1.11 Determination of Tuition Fees: Individual/Family Willingness and Ability to Participate in Higher Education

Tuition fees need to be addressed with compassion and determination, addressing issues of state subsidies in free education, merit or means-based scholarships or non-profit full-cost or for-profit charges (Khadria, 1989). Issues of privatization of higher education would be central to this issue for the NER states to take a balanced position and stick to it with patience rather than bringing in frequent changes. Overarching Linkages with other sectors like the Banking Sector for educational loans for study in other states, cities, abroad and the Boards of Direct and Indirect Taxes for educational surcharges and subsidies would have to streamline.¹⁰ Balance must be struck between public and private interests of the stakeholders in Public-Private-Participation (PPP) and Industry-Academia collaboration.

6.1.12 Teacher Supply for Higher Education: Role in Pedagogy, Curriculum and Counselling

There are a lot of initiatives for teacher training for primary and secondary education but not for higher education. Preparations for UGC-CSIR JRF etc. competitive examinations are for research scholarships and teaching job eligibility in higher education but not connected with teacher training.¹¹ B.T./B.Ed., and B.El. Ed programs are for undergraduate teachers, whereas UGC's Orientation and Refresher Courses are for familiarizing all higher education teachers with the frontier topics, not the pedagogic nuts and bolts of teaching. There is room for introducing innovations there and the NER states can think of taking the lead. Technology-curriculum lags must be bridged by regular upgrading of the syllabi to keep pace with technological changes brought about by disruptive technologies incorporating AI and digitization of knowledge including libraries

institutions account for nearly 99.43 higher educational institutions in the country, proving 91.78% of enrollments in higher education.

¹⁰ See chapters on various sectors in Majumdar, T. (1993).

¹¹ See Khadria, B. (2004b), "The State of Education, Or Education of the State? On Rationality of Targeting Inputs Over Outcomes in India." NORRAG NEWS, Geneva, NN 33, Special theme on Targeting in Education.

and pooled resources.¹² Balance between Frontier Disruptive Technologies and Traditional Frugal Technologies also needs to be kept on the agenda.¹³ Value education and soft skills of trust, time and loyalty has to be given due priority to protect and safeguard the environment and take care of frontier concerns like climate change. Counselling services for educational as well as career choice must be integrated with all levels of education including for highly aspired Civil Services.¹⁴ Cut throat competition for cracking the IIT JEE and other entrance examinations propagated by the private sector coaching industry, for example in cities like Kota with increasing incidences of suicides etc., or feeding into profit mongering manpower export business leading to brain drain needs to be tamed and toned down.¹⁵ For this, elements of indigenous philosophy and culture into the syllabus need to be initiated, while keeping the parochial and the superstitious preachings at bay. At the same time autonomy and freedom of thought in teaching and writings by the teachers need to be protected and upheld.¹⁶

IV. Strategic Moves and Policy Interventions to Achieve The 2047 Vision

a) Change the Target from “GDP in Education” to “Education in GDP”

According to India’s latest Economic Survey 2022-23, total education outlay, including both national and state level expenditure, added up to 2.9 per cent of the country’s 2022 GDP – a proportion that has remained constant for the last four years. This is much lower than the ambition of India’s education budget to be at 6 per cent of GDP set out in all National Education Policies since 1968 to 2020. The proportion of total annual education spending since 2020-21 has been below 10 per cent of total government expenditure.

¹²See, Khadria, B. (1986), "Schooling vs. On-the-Job Skill Formation - Some Implications of New Educational Technologies" in Shah, S.Y. ed., *New Technologies in Higher Education*, (AIU), New Delhi, pp. 92-102.

¹³ See, Khadria, B. and Mishra, R. (2023), "Technological Transformation and the Role of Frugal Innovations in Entrepreneurship Development in India", *Journal of Entrepreneurship*, Vol 32, No. 2S, November. Special Issue on "Appropriate Technologies & Entrepreneurship for Global Sustainability Development", Guest Edited by Regnier, P. See also, Khadria, B. and Mishra, R. (2022), "Technological transformation in India: the debate between appropriate and frontier technologies", Chapter 6 in Régnier P., Frey, D., Pierre, S., Varghese, K. and Wild, P. (eds), *Handbook of Innovation & Appropriate Technologies for International Development*, Edward Elgar.

¹⁴See, Khadria, B. (2001), "Social Cost of Recruitment": A Study to Estimate for the Civil Services Examination Review Committee, in UPSC (2001), pp.37, 52-56.

<https://darpg.gov.in/sites/default/files/ExaminationReviewCommittee2001.pdf>

¹⁵ See, Khadria, B. (2011), "International scholarships or global marketing mechanism: Interesting macro-micro dichotomies?" *NORRAG News*, NN45: *Geopolitics of Overseas Scholarships & Awards*, April, pp.97-98, Geneva.

¹⁶ Khadria, B. (2020c), "Reflections on Integrity and its Counterparts for Achieving Excellence in Our Universities", chapter 17 in Mittal, P. and Pani, S. R. D., eds., *Reimagining Indian Universities*, Association of Indian Universities, New Delhi, pp. 237-248. Also, Khadria, B. (2021a) 'Reflections on Vivekanand, Immigrants, and Academic Freedom: Making Universities in Assam the International Hubs of Higher Education', Chapter 4 in Goswami, S. and Talukdar Mudiar, P, eds., *Different Strokes: Understanding the North East of India*, Chennai: Notion Press, pp. 100-122.

North-east must take the lead by trying to set examples for rest of the states and India in select fields. As discussed¹⁷, transitioning from “GDP in Education” till 2030 as the target, to “Education in GDP by 2047” would help change the political mindset about education being a dependent sector to being the largest contributing “service sector” to our national income and therefore having a legitimate claim for higher shares in Central and State allocations of funds, and possibly a comparable share with defense (by highlighting the role of higher education in manning our security services) and bigger than many other sectors in the Central pool. Education is a service sector activity which is the largest contributor to the construction of the national GDP and Gross National Income too if the earnings of our graduate students and professionals abroad are also duly counted. This can be projected as a justified argument to lay HRD’s claim to much bigger shares in the central pool of resources for the NER.

b) Learning from COVID-19: Exigencies of Dropouts in Higher Education

COVID-19 pandemic can be taken as a *tabula rasa* for fresh thinking out of the box. In the post-COVID-19 scenario, when there have been widespread increase in the dropout rates in higher education the simplest indicator of labour productivity and therefore well-being, i.e., per capita state gross domestic product (SGDP), or per capita income, is likely to dip significantly.¹⁸ The prime objective of the suggested mission in NER Vision 2047 would therefore be to first gather data, calculate and then lift the *per-employee per-hour contribution* of the state’s work force to SGDP. This would be a better indicator of average productivity of labour than per-capita income of the entire population.¹⁹

c) Disruptive Digital Technology

On the positive side, COVID-19 facilitated tools that provided large economies of scale through an unprecedented application of what is called “**disruptive digital technologies**” – Artificial Intelligence (AI) along with the proliferation of digitization, emergence of remote learning through online communication, work-from-home, virtual interaction and a whole lot more under a new vocabulary that affected the modes of admission tests, delivery of education and assessment of output through online platforms like zoom, WebEx, google and so on.

d) Collaboration with the North-east Diaspora

There are scopes and opportunities for development of partnerships between Assamese diaspora and the state of Assam – through remittances, transfer of technology and return migration.²⁰ COVID-19 has made it an opportune time now to further research on such partnership possibilities for the hub institutionally through a

¹⁷ Khadria, Thakur, Asraf (2016); Khadria and Thakur (2020).

¹⁸ Khadria (2023), “Post-Covid-19 India: The National Education Policy and India’s Higher Education Trajectory,” University of Pennsylvania-Centre for the Advanced Study of India (CASI)-UPIASI Working Papers on Post-Covid-19 India, 2023.

¹⁹ See, Khadria (2001).

²⁰ As elaborated in my two-decades old book that included examples from the survey of the Assamese diaspora in the United States and in different cities and states of India including Assam. See, Khadria, 1999.

dedicated centre, set us to study the North Eastern diaspora and as well as returnees.²¹ In 2017, the Indian Consulate in New York organized a tie up with the North-eastern Diaspora in the North-east America to contribute to the Indian float in the New York Parade aptly titled “Act East through India’s North-east”. The response was unprecedented and the representation in the parade around India’s Independence Day has continued every year since then. As a follow up, a Forum for North-east Entrepreneurship has been floated with large scale membership from the youth based in the NER and other part of India and abroad. Moreover, the largest Naamghar of North America has been established in the state of New Jersey. Every year, the Assam Association of North America takes the lead in holding its Annual Convention around the American Independence Day of 4th July. There are many philanthropic projects supported by the Assamese and North-east Diaspora in North America as well as VIC-Assam in Australia, which can be invited to join hands for a win-win partnership on HRD in NER.²²

e) Leveraging “Act East Policy” for making NE an Education Hub in South Asia

The Assam government hosted *Advantage Assam Investors’ Summit* in February 2018 wherein a mission to make the state an educational hub of human capital formation and *create* long-term comparative advantages was introduced. This would help retain substantial proportions of Assam’s youth within the state - those going abroad or to other states and cities for higher studies and/or employment - and build up their labour productivity. This is equally applicable for the whole of the NER region.²³ It would also leverage an “Act East” policy and attract students from neighbouring east and south-east Asia, in addition to other countries of South Asia.

The basic factors needed for the proposed hub of human capital formation would be high-quality teachers and trainers. They cannot be ready overnight but can be invited from other states and abroad on suitable terms. This may include retired academics of global standing to come back and provide intellectual support. These can be pursued through public-private-partnership (PPP) across the state and private universities.

f) Soft Skills, Value Education and a Happiness Index

The happiness of the people is core to the success of HRD and happiness depends on the value education - about trust, time and loyalty to people (living together without conflict and war) and nature (preserving the environment from climate change).²⁴ There has to be a proper balance between optimum rate of Growth and equitable degree of Distribution. One precondition is the forward linkages to operate optimally as it is the elementary and secondary education, which gives the inputs of higher education and backward linkages from higher education to which produces teachers as inputs to elementary and secondary education.²⁵ The system must generate a

²¹ See, Council for Social Development (2019).

²² See, Khadria (2015), “Bare Bare Dekhisu Bator Manuh Apun Hoise Bor”, in Enajori (in Assamese and English)

²³ Khadria (2021a).

symphony of interlinkages between preceding and succeeding levels of the educational value chain. Then only one can hope for the actualization of the Vision 2047 for a holistic human resource development in the North-east Region.

Draft Report

6.2 Health and Wellbeing in Northeast India

6.2.1 Introduction

Universal Health Coverage which has emerged as the critical requirement for ensuring health and wellbeing of a nation can only be adequately and effectively addressed through adequate provisioning of health care services and a society centric approach. The Alma-Ata Declaration on primary health care (1978) established a standard of public commitment towards making health care to be community driven with quality service, accessible- both physically and financially and with equity. This declaration was the forerunner of the Global Strategy for Health for All by the Year 2000 pursued by WHO and its partners and subsequently the SDG Goal 3- “Ensure healthy lives and promote well-being for all at all ages” by 2030. The emphasis on primary health care is important as it emphasizes on promotion and prevention, addressing determinants, and a people-centred approach.

Further it can respond and adapt to rapidly changing nature of demand for health care services and provisions required. A careful reading the SDG-3 and its sub themes clearly underlines the importance of health care provisioning in ensuring health coverage with equity and access to all sections of the people with focussed emphasis on those at the margins and vulnerable. A society centric approach for health care aims to ensure well-being by focusing on people’s needs and preferences (both as individuals and communities) as early as possible along the continuum from health promotion and disease prevention to treatment, rehabilitation and palliative care, and as close as feasible to people’s everyday environment²⁶. The centrality of the health care services is built upon the edifice of a synergetic approach which focusses on –

- a) Comprehensive health care for promotive, protective, preventive, curative, rehabilitative, and palliative care prioritizing key health care services aimed at individuals and families through public health functions.
- b) Addressing the social, economic and environmental determinants of health through evidence-informed policies.
- c) Individuals and communities, as the central focus of all efforts towards provisioning of health care through advocacy and awareness building so as to optimize the health care gains across communities.
- d) Governance Issues in Health Sector including service providers and delivery, health finance and insurance and ameliorating vulnerability due to catastrophic health expenditure

The eight states of north east India are strategically located with 98 percent of the borders being shared with neighbouring countries. The region is a mosaic of people comprising of diverse and varied communities settled across its valleys and hills. The geographical terrains and locations have an important bearing on the size and delivery of healthcare services to these states. The health care has largely been state provided in the region. It is pertinent to note here that in India, the Government (Union and the States put together) spends roughly 1.13 per cent of GDP on health, which is grossly inadequate compared to similar spending by other countries. As a result, 62 per cent of healthcare spending is financed by households

²⁶ A Vision for Primary Health care in the 21st century, WHO and the UNICEF, 2018.

through out-of-pocket expenditure at the point of care. Among the states of Northeast India while Assam and Tripura have the lowest proportionate share of Government Health Expenditure (GHE) in the GSDP (1.7%), Arunachal Pradesh and Mizoram have the highest proportionate share of GHE (3.4%).

The health care provisioning in the states of Northeast India has undoubtedly brought in positive impacts in terms of reduction in mortality rates, prevention of communicable disease, access and affordability of healthcare services for the economically weaker sections. However, health care is a challenging area and unresolved challenges remain within the sector which differ from state to state across the region and require sustained efforts to address them. Critical requirement in this regard is provisioning of health including access to safe and clean drinking water and sanitation facilities.

6.2.2 Overall Health Status in Northeast India

The NSSO 75th round (2018) data shows that 7.5 percent of persons in population reported as ailing (PPRA) with Assam reporting the lowest at less than 3 percent. Further the data shows that ailment was higher in the age group of 60 plus (11.4) and 45-59 (27.7) followed by age group 0-4 (8.5). The proportion of females in this respect was 8.3 percent and males were 6.7 percent. Further, disease profiling of population showed that major ailments in India across all states are: Infections, Cardiovascular disease, Endocrine or metabolic disease, Respiratory ailments, Musculo-skeletal and Psychiatric or neurological diseases. While infections including fevers, jaundice, diarrhoea/dysentery had higher prevalence in rural areas, in urban areas cardiovascular (incl. hypertension, heart disease) and endocrine, metabolic (incl. diabetes, thyroid diseases) was comparatively higher. (Table:

The most basic health indicator which sheds light on the overall health sector is the infant mortality rate (IMR) which is a measure of the number of infant deaths per thousand live births in a year. In other words, it is essentially a measure of infant survival rate and also reflects the social, economic and environmental conditions in which children (and others in society) live, including health care availability and practices. In respect of maternal and child health, except for Assam, Meghalaya and Tripura, the other six states in the region have high infant survival rate. Assam had been one of the states in India which had persistently reported high IMR. However, there has been a decline over the years largely due to the launching of the national rural health mission (NRHM now NHM).

The Under Five Mortality Rate U5MR in the region although less than the national average however, in recent years increased in Manipur and Tripura. The under-five mortality rates (U5MR) across India continues to be high. The SDG target to reduce U5MR to 25 per thousand by 2030 remains a major challenge, yet states like Mizoram Arunachal Pradesh and Sikkim, have successfully achieved the SDG target for U5MR. Tripura, and Manipur which had registered substantial decrease in U5MR during NFHS-4 compared to NFHS-3 has witnessed sudden spurt during NFHS-5, which is worrisome and puts a challenge on the states to attain the SDG target. Meghalaya, Assam, and Nagaland though continue to have high U5MR, the declining trend is likely to help the states to reach SDG target by 2030. For all major causes of under-5 death in India, the death rate decreased largely for decrease in death from infectious diseases although the magnitude of decline varied widely across the

states²⁷. A major factor that contributed towards a reduction in infant mortality was the increase in institutional birth especially after the launching of the Janani Suraksha Yojana in the year 2005²⁸. Child and maternal malnutrition were another risk factor, to which child mortality could be attributed to.

The expansion of the JSY has made a significant impact on improving institutional births across the region. Institutional delivery in public health facilities has increased in the region. Except for Meghalaya and Nagaland all the other six states in the region have almost 80 percent child births taking place at institutions either public or private. In Nagaland 45.7 percent of the births are delivered institutionally and the same for Meghalaya is 58.1. Pertinent to note here that caesarean section for delivery has also been increasing and more so in private facilities especially in urban areas. This reflects the changing health seeking behaviour in the region and this has a bearing on the service provisioning for maternal and child health.

Nagaland and Meghalaya are two laggards in respect of healthcare utilisation particularly in the rural parts. In rural areas of both the states, less than one-tenth of the pregnant women have reported of undertaking at least four ANC visits. A comparison of institutional delivery and full immunisation coverage across rural areas of the eight Northeastern states places Meghalaya and Nagaland at the bottom of the list. The state of primary healthcare service utilisation is a huge concern across rural areas of both the states.

Nagaland has the lowest coverage of institutional delivery and full immunisation in rural parts among all the states of the Northeast region. One of the major reasons is the hilly terrain of the state which has slowed down the expansion of health infrastructure. This is reflected in terms of wide inter-district variations in respect of the two indicators of maternal and child health. The institutional delivery coverage for example in Kohima and Dimapur districts is more than five times that of Long Leng and Mon districts. Similarly, full immunisation coverage in Kohima is six times that of Long Leng district. Meghalaya too suffers from accessibility issues, the state has very poor connectivity, due to its hilly terrains and remoteness of the health centres from human habitations.

Increase in immunization coverage also contributed towards reduction in child mortality across the states in India²⁹. The immunization programme³⁰ aims to achieve the goals

²⁷ India State-Level Disease Burden Initiative Child Mortality Collaborators. Subnational mapping of under-5 and neonatal mortality trends in India: The Global Burden of Disease Study 2000-17. *Lancet*. 2020 May 23;395(10237):1640-1658. doi: 10.1016/S0140-6736(20)30471-2. Epub 2020 May 12. PMID: 32413293; PMCID: PMC7262604.

²⁸ Janani Suraksha Yojana (JSY) is a safe motherhood intervention under the National Health Mission. It is being implemented with the objective of reducing maternal and neonatal mortality by promoting institutional delivery among poor pregnant women. The scheme, launched on 12 April 2005 by the Hon'ble Prime Minister is a centrally sponsored scheme, which integrates cash assistance with delivery and post-delivery care. JSY has identified Accredited Social Health Activist (ASHA) as an effective link between the government and pregnant women.

²⁹ At the time of independence, India reported the highest incidence of smallpox cases in the world. The cholera and plague epidemics were a recurring phenomenon but limited budgetary availability curtailed majority of the efforts. Tuberculosis was another major cause of morbidity and mortality. In May 1948, the Government of India launched the BCG Vaccine and by 1949, the BCG vaccination was extended to schools in almost all States of India. In 1967-1968, the smallpox eradication strategy was reformulated with increased

envisaged in National Health Policy and National Population Policy of India. In order to expand its universal immunization programme (UIP), India released the first National Vaccine Policy in 2011. The National Health Policy 2017 reiterates its emphasis on UIP and the focus is built upon the success of Mission Indradhanush³¹. Arunachal Pradesh³² Assam³³, Manipur³⁴, Meghalaya³⁵, Mizoram³⁶ and Tripura³⁷ together have as many as 26 districts covered under High Focus Districts to expand the immunization coverage in unserved and underserved areas and child population.

The expansion of the UIP through Indradhanush Phase-III which targets 216 High Focus Districts in the country has brought about substantial improvement in UIP coverage as revealed from the NFHS-5 data. All the five states in the region have substantially improved their immunization coverage for children in the age group-12-23 months. However, except for Mizoram (83.7) and Meghalaya (80) rest of the states in the region are far away from the national average (83.8) in achieving immunization coverage for the children in the age group 12-23 months. Arunachal Pradesh continues to be highest laggard in the region with coverage of only 64.9 percent (NFHS-5) while rural Nagaland (68.8) as mentioned earlier has inadequate coverage under UIP. Adequate UIP is most vital for improving neo-natal and U5MR and Mission Indradhanush requires concerted effort for effective implementation across the states of Northeast India to ensure health and well-being of children.

While institutional delivery and ante natal and post-natal care has helped in reducing child mortality rate, the maternal mortality also declined due to these institutional interventions. According to the estimates of the Sample Registration System (SRS) of India, the MMR has significantly dropped from 400 per 100,000 live births in the early 1990s to 230 per 100,000 live births in 2008 and further to 97 per 100,000 live births in 2018-20, with the highest rate in the State of Assam (195 per 100,000 live births)³⁸. Although no data is available for MMR

focus on surveillance, epidemiological investigation of outbreaks and rapid containment drives. As soon as India was declared smallpox free in 1977, the country decided to launch National Immunization programme called Expanded Programme of Immunization (EPI) in 1978 with the introduction BCG, OPV, DPT and typhoid-paratyphoid vaccines, Basu RN. Smallpox eradication: lessons learnt from a success story. Natl Med J India. 2006 Jan-Feb;19(1).

³⁰ The EPI targetted at least 80 per cent immunization coverage for infants, and the vaccination was offered through major hospitals in the urban areas. India started its universal immunization programme (UIP) in 1985. It provided guiding principles for functioning of immunization programme in the country. For details see *National Vaccine Policy*, Ministry of Health and Family Welfare, Government of India; 2011. Government of India, New Delhi.

³¹ National Health Policy 2017; Ministry of Health and Family Welfare, Government of India.

³² Changlang, East Kameng, Lower Dibang Valley, Lohit Lower Subansiri

³³ Barpeta, Bongaigaon, Darrang, Dhubri, Goalpara, Golaghat, Hailakandi, Karimganj, Marigaon, Nagaon Sonitpur and Kokrajhar.

³⁴ Churachnampur, Senapati, Tamenglong, Ukhrul

³⁵ East Khasi Hills, West Garo Hills, West Khasi Hills

³⁶ Lawngtlai, Lunglei, Mamit, Saiha

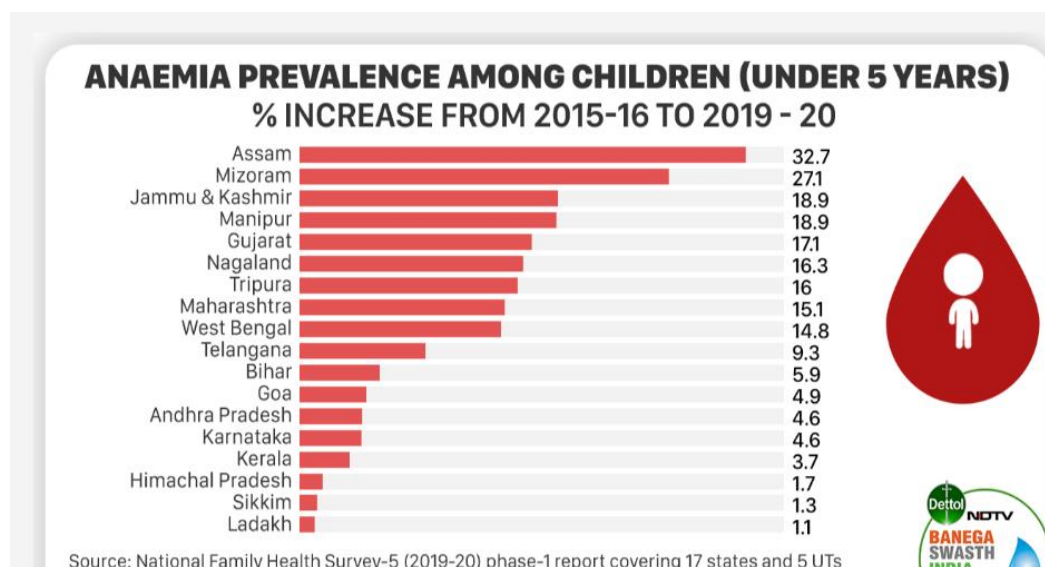
³⁷ Dhalai, Tripura North, Tripura West

³⁸ The SRS has been a gold standard source for fertility and mortality data for more than five decades. It is the largest demographic and health survey in the country, which gives reliable estimates at the national and state level separately by urban and rural areas.

for the smaller states of the region, except for Assam, a recent study³⁹ on MMR based on estimates with unit level HMIS data, shows that Arunachal Pradesh has the highest MMR (284) and Mizoram the lowest (131) and the same for the all-India is 122 during 2017-19 against the SRS estimate of 103 for all India during 2017-19. The estimates reveal that except for Mizoram and Nagaland all the states of the region are reported to have MMR more than 200. The study revealed that districts with better health infrastructure, maternal health care, especially postnatal care, and maternal nutrition have significantly less MMR.

Disease comparison:

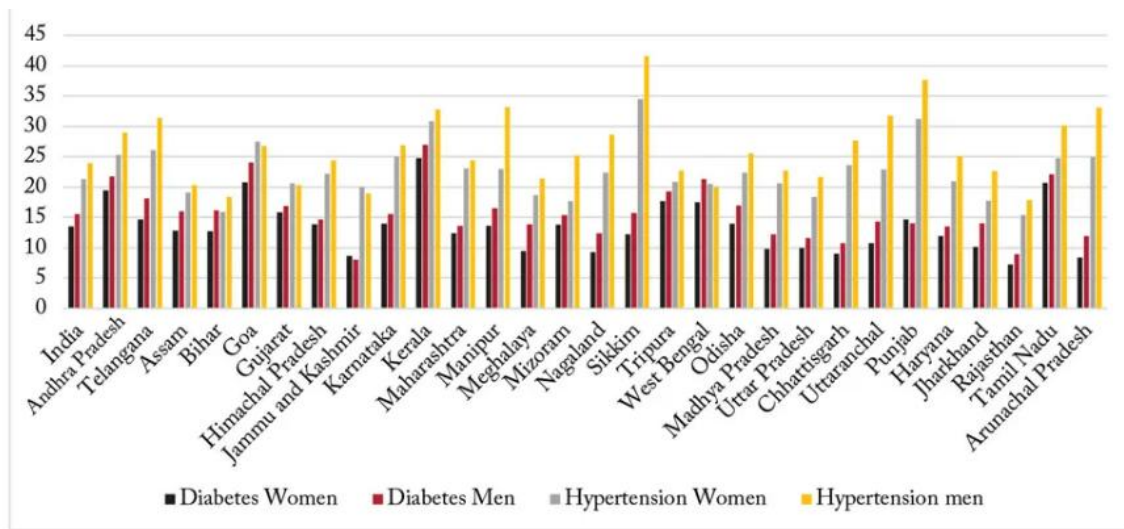
Figure 6.2.1: Disease comparison among the states in India with that of North Eastern state according to NFHS 5



Assam has the highest anaemia prevalence among children (Under 5 Years) that is an approx. of 33% and second highest is Mizoram with an approx. of 27.1. Nagaland stand in 6th position with an approx. of 16%.

³⁹ Goli S, Puri P, Salve PS, Pallikadavath S, James KS. Estimates and correlates of district-level maternal mortality ratio in India. PLOS Glob Public Health. 2022 Jul 18;2(7):e0000441. doi: 10.1371/journal.pgph.0000441. PMID: 36962393; PMCID: PMC10021851.

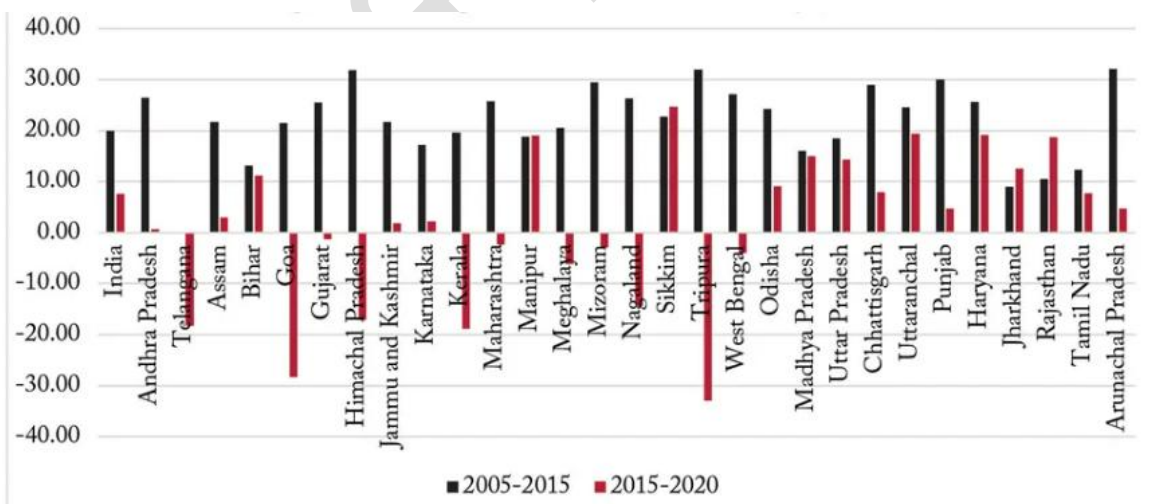
Figure 6.2.2: NCD Burden (%) NFHS 5 data



Source: National Family Health Survey Fact Sheet, 2019-2020

According to the figure, except Assam, Meghalaya, & Tripura NCD Burden is lower than the national burden among the northeastern states and other all the five states of northeastern is higher than the national burden. Hypertension among men and women is highest in Sikkim.

Figure 6.2.3: Stunting-rate of change in successive NFHS surveys, 2005-2020



Stunting- rate of Northeastern states compared to other states shows a mixed of increasing, decreasing or remain same. Meghalaya, Mizoram, Nagaland & Tripura shows a negative deviation that indicates the stunting rate in decreasing in these states. Manipur remains the same rate of stunting from 2005-2020. Assam has slowed or low rate of increasing stunting as compared to NFHS survey ,2005-2020.

In India nutritional deficiencies are structural, originating from the embryonic stage itself owing to prevalence of nutritional deficiencies both for men and women. Except for Sikkim which has achieved substantial progress in respect of its child health, other states of the region face challenges in respect of stunting, wasting underweight and anaemic children. Although Nagaland, Mizoram and Manipur has lowest incidence of anaemia among women in the country, yet in all the three states the incidence has increased over the period NFHS-4 to NFHS-5. Assam and Tripura has the highest incidence of anaemia among women in the region which has also risen sharply during the two NFHS- 4 and NFHS-5 rounds. Though anaemic men are fewer in Assam and Tripura, overall there is an increase in anaemia among men, women and children in the region which largely points to nutritional deficiencies.

A major stressor for the health care provision is prevalence of communicable disease. The recent Covid 19 outbreak brought out the challenges of health care sector in the event of any outbreak of a communicable disease. The data from National Health Profile (NHP) India 2022 show that the states in the region reportedly have higher prevalence of malaria, dengue and Japanese encephalitis. Among the states Meghalaya has the higher incidence of cases reported for communicable diseases. As per the most recent (2018-19) data, Nagaland (with 1.66% prevalence), Mizoram (with 0.91%), and Tripura-(with 0.63% prevalence)- are high prevalence states while Arunachal Pradesh recorded zero prevalence rate for HIV. While communicable diseases require higher investment and awareness building through socially preventive medicine, the challenge is higher for non-communicable diseases.

Non-Communicable Diseases are one of the major challenges for public health, not only in terms of human suffering they cause but also the damage they inflict on the socioeconomic conditions of the households affected and thus leave its adverse effect on the overall socio-economic development of a nation.

6.2.3 Key Inputs for a resilient Health Care Apparatus in Northeast India

A. Medical Education and Health Infrastructure

India faces demand–supply gaps in medical education. In order to increase the medical seat capacity, public medical colleges have created new seat capacities. Simultaneously infrastructure requirements for setting up medical colleges have also been relaxed. During 2018-2022, India added 225 new medical colleges with the total number increasing to 704 as of 2023-24. The number of seats for medical education increased to 107,950, the number of postgraduate seats also doubled in the country in the last eight years. India has 0.9 doctor per 1,000 population (CBHI, 2021)⁴⁰, with substantial inter-state differences. This is much lower than the World Health Organization (WHO) recommended norm of one doctor per 1,000 populations. Within the overall shortage, of particular concern is the shortage of specialists, which is further, aggravated by the increasing burden of noncommunicable diseases (NCDs) and the ageing population.

⁴⁰ Central Bureau of Health Intelligence (2021). National Health Profile 2021. Ministry of Health and Family Welfare, Retrieved from <https://www.cbhidghs.nic.in/showfile.php?lid=1160>

In northeast region, Assam has upscaled its medical education in a large way with setting up of new medical colleges in each district headquarter. The total number of government hospitals in northeast India increased from 522 to 1865 during 2011-21 bed capacity during the period also experienced noteworthy growth, escalating from 23,248 to 49,291 beds. Despite the improvements in rural health care centres in 2022 compared to 2005, following the implementation of NHM, the progress is not sufficient to provide healthcare services to the growing population in the region. The region as a whole faces lesser shortfall in Sub-Centres (19.21 percent), PHCs (0.93 percent), and CHCs (17.74 percent) compared to the national average for the Sub-Centres (25 percent), PHCs (31percent), and CHCs (36 percent).

Among the states of the region, Assam, Manipur, and Meghalaya, face significant shortfalls in rural health infrastructure. In respect of urban health centres, considerable shortfall existed in Sub-Centres (90.62 percent), PHCs (24.94 percent) and CHCs (57.11percent) in the year 2022. At the all-India level, the shortfalls were higher across health centres- Sub-Centres (95.95 percent), PHCs (36.39 percent), and CHCs (85.43 percent). This shows that there is gross undersupply of public health care facilities in urban areas of the region and the country as a whole.

In respect of healthcare personnels in the region, in rural areas, there has been substantial improvement in respect of availability of health care professionals in 2022 after the launching of NRHM in 2005. However, in respect of Specialists at CHCs, the shortfall has increased from 6.13 percent to 82.42 percent during the period which indicates that retention of specialists at rural health centres would also require eco-system support. In urban areas, there are shortages in respect of ANMs at PHCs (42 percent) and Specialists at CHCs (57.50 percent). A recent study has shown that at the state level relationship between a state's economic development and the availability of doctors appears to be linear⁴¹. The study shows that the states of northeast India despite their high per capita income have a relatively low density of doctors.

The availability of doctors has no relationship with per capita public health expenditure. Rather, the availability of seats in medical education has strong relationship with availability of doctors especially in case of state medical colleges where increasing seat capacities in medical colleges/nursing colleges have led to increased availability of doctors. Several incentives like compulsory service in government hospitals for a fixed duration after graduation to become eligible for PG admission as currently in practice in Assam, compulsory one-year service after PG in government hospitals has helped in ensuring a steady flow of doctors in the state. Incentivised eco system structures in the work place can help in addressing shortage of doctors and nurses in the region taking into consideration the physiographic conditions of the region and location of the health care facilities and centres.

India has the largest number of medical colleges in the world. Despite this, India's average annual output of graduates per medical college is 151, as compared with 220 in Eastern Europe and 930 in China. The number of medical graduates per 100,000 populations in India is 4.113, which is much lower than that of the OECD countries. The same for the states in

⁴¹ Agarwal, A., Balani, K., and Venkateswaran S. (2023). Medical Education in India: A Study of Supply-side Dynamics (CSEP Working Paper 55). New Delhi: Centre for Social and Economic Progress.

northeast India is less than one with Assam having the highest with 0.68 while Nagaland the lowest ratio of 0.12. The reasons for low seats per college are largely related to the onerous permission procedures for setting up and running colleges, stringent bed occupancy norms and high initial capital expenditure.

The shortage of teaching faculty in medical colleges is yet another major challenge for health sector in the region. It is only in 2023 that Nagaland got its first medical college in the state. As per the international norms of health professional availability w.r.t. population, WHO norms state that there is requirement of one doctor per 1000 population and two nurses per 1000 population. The states in the region at present have a supply gap of 36,009 registered doctors. The availability of specialist doctors is yet another challenge to make health care available with incidence of non-communicable diseases and injuries together overtaking infectious and childhood diseases in terms of disease burden in every state of the country.⁴²In the northeast Indian states also almost two thirds (63 percent) of the deaths were due to non-communicable diseases (NCD)⁴³, which makes it imperative to build a much higher seat capacity at the PG level, given its importance in attending to a more complex disease burden, as the states steer their demographic transition.

Besides the teaching faculty shortage, the shortage of non-faculty members, junior residents and senior residents, who comprise the important supplementary staff required for the functioning of medical colleges and hospitals, is an equal concern. In respect of nurses, there are a total of 43,642 registered nurses. Based on the WHO norm of 2 nurses per 1000 population the region has an overall gap of 66 percent nurses. In NER there is one nurse per 1483 population whereas at country level there is 1 nurse per 890 people.

The launching of the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) in 2006 steered the way for setting up superspeciality hospitals like AIIMS and upgrading the central and state government medical colleges to increase the number of MBBS seats. This was further paced up with expansion of health infrastructure including buildings and human resources, equipment and other infrastructure, as part of the “Minimum Requirements for annual MBBS Admissions Regulations, 2020” to make the process of setting up a college more financially viable and incentivise the opening of more medical colleges (MoHFW, 2021).

B. Ayushman Bharat or Healthy India: A Holistic Approach

As recommended by the National Health Policy 2017, to achieve the vision of Universal Health Coverage (UHC), Ayushman Bharat was launched with an attempt to move from sectoral and segmented approach of health service delivery to a comprehensive need-based health care service. It is based on a continuum of care approach, comprising of two inter-related components, viz. *Ayushman Bharat-Health and Wellness Centres (AB-HWC)*⁴⁴ now

⁴² <https://www.healthdata.org/research-analysis/health-by-location/disease-burden-initiative-india>, accessed on 09.11.2023

⁴³ Same as 21.

⁴⁴ In February 2018, the Government of India announced the creation of 1,50,000 Health and Wellness Centres (HWCs) with the existing Sub Centres and Primary Health Centres at the base as pillar of Ayushman Bharat. These centres delivered Comprehensive Primary Health Care (CPHC) through community centric approach by bringing healthcare closer to the homes of people covering

called *Ayushman Arogya Mandir* the tagline ‘Arogyam Parmam Dhanam and the Pradhan Mantri Jan Arogya Yojana (PM-JAY).

The *HWCs* are pivotal in offering screenings for various health conditions. The emphasis of health promotion and prevention is designed to bring focus on keeping people healthy by engaging and empowering individuals and communities to choose healthy behaviours and make changes that reduce the risk of developing chronic diseases and morbidities⁴⁵.

India especially northeast India has an inadequate and fragmented delivery of healthcare services. Every year individual patients seek care from a diverse group of healthcare providers increasingly being dominated by the private sector negotiating their own prices for the procedures they undergo. Even among the organized payers, there are multiple schemes. This multiplicity of purchasing platforms, apart from fragmenting risk pools into sub-optimal sizes, prevents standardization of purchasing procedures including insurance has left the poor patients bear a large burden of healthcare expenditure. The average expenditure for private health care in areas is INR 31,845 and the same for public health care services is INR 4452. However, the average private health care expenditure for the states of northeast India are higher than the all India average except in the states of Meghalaya and Nagaland.

The *Pradhan Mantri Jan Arogya Yojana* (PMJAY) empanelled hospital network consists of 28,351 hospitals (including 12,824 private hospitals) across the country. In addition, around 20 percent of the population (approximately) 25 crore individuals – are covered through social health insurance, and private voluntary health insurance, the remaining 30 percent of the population is devoid of health insurance. This uncovered population or the missing middle comprises of multiple groups across all expenditure quintiles in both urban and rural areas, though they are concentrated in the top two quintiles of rural areas, and top three quintiles of urban areas⁴⁶.

Together with growing incidence of NCD (more than 55 percent of disease burden is due to NCD), the growing prevalence and complexity of Anti-microbial Resistance (AMR) is another major threat to health⁴⁷. The *Ayushman Arogya Mandir (AAM)* can be one stop agency

both maternal and child health services and non-communicable diseases, including hypertension, diabetes, oral, breast, and cervical cancer free essential drugs and diagnostic services.

⁴⁵ The community outreach for healthcare is also being provided/ complemented through outreach services, Mobile Medical Units, camps, home and community-based care, based on the principle of seamless continuum of care that ensures equity, universality and no financial hardship.

⁴⁶ Health Insurance for India’s Missing Middle Publishing Agency: NITI Aayog, New Delhi, 2021. The missing middle predominantly constitutes the self-employed (agriculture and non-agriculture) informal sector in rural areas, and a broad array of occupations – informal, semi-formal, and formal – in urban areas.

⁴⁷ The addition of antibiotics to agricultural feed, use in livestock and poultry contributes to the problem of AMR. Also the effluents discharged from pharmaceutical manufacturing units contribute to AMR development. The Ministry of Health and Family Welfare launched the National Action Plan on AMR (NAP-AMR) in April 2017, emphasizing on the need to tackle AMR on human health, animal husbandry, industry and environment in line with the “One-Health” approach.

which can help in conduct of surveillance for infectious disease, non-communicable disease, occupational health and injury related conditions at the individual, family and primary care level. The Integrated Health Information Platform (IHIP) under the Integrated Disease Surveillance Programme (IDSP) is partially functional across several states through NHM including the states in northeast India.

The experience in northeast India where approximately 30 percent of the disease burden is due to communicable disease, the IDSP has demonstrated the potential to detect epidemics, issue early warning signals; capture and respond appropriately There is potential for AAM to engage in local level disease surveillance/risk assessment/monitoring of health through community involvement and citizen centric electronic health records (EHR) to provide effective and timely health care services.

6.2.4 Healthcare in Northeast India: Vision @ 2047

6.2.5 Vision 2047: Possibilities, Potentials and Promises

i) Quantitative targets (Health Development):

1. **Maternal Mortality Rate (MMR):** To Reduce the MMR below 100 per 100,000 live births (current national target).
2. **Infant Mortality Rate (IMR):** To Reduce IMR below 24 per 1,000 live births (current national target).
3. **Life Expectancy:** To Increase the average life expectancy in the region to match the national average.
4. **Increase in Doctors and Medical Staff:** To Set a target for a specific number of new doctors, nurses, and other healthcare professionals per capita in the region.
5. **Reduction in Communicable Diseases:** To Set targets for reducing the prevalence of specific diseases like malaria, tuberculosis, and waterborne illnesses.

ii) Quantitative targets (Service Sector Repositioning):

1. **Increase in Tourism Revenue:** To Set a target percentage increase in tourism revenue.
2. **Growth in Service Sector Jobs:** To Set a target for the number of new jobs created in the service sector.
3. **Contribution of Service Sector to GDP:** To Set a target percentage increase in the service sector's contribution to the region's GDP.
4. **Number of New Service Businesses:** To Set a target for the number of new service-based businesses established.

iii) Potentials and Possibilities (Health Development):

1. Can Leverage the region's rich biodiversity for developing new medicinal plants and therapies.
2. Can Improve access to healthcare facilities in remote areas using telemedicine and mobile clinics.

3. Can Promote traditional healing practices alongside modern medicine.
4. Can Focus on preventive healthcare and public health awareness campaigns.

iv) Potentials and Possibilities (Service Sector Repositioning):

1. Can Develop the region as a wellness and eco-tourism destination.
2. Can Create skilled workforces to cater to the growing service sector.
3. Can Promote the region's unique culture and heritage through tourism and hospitality services.
4. Can Leverage IT and digital technologies to provide new service offerings.

The **first transformative change** required for a Healthy Northeast@47 is with respect to improving service delivery which calls for redesigning of services provided. This would involve:

- **Surveillance:** Public Health Surveillance is the first necessity for public good. Surveillance Information for Communicable/Infectious Diseases, NCD, Occupational Health, Injury and Environmental Health would go a long way to build up the health sector apparatus with multiple stakeholders, including the citizen and the political and bureaucratic leadership at the central, state and district level.
- **Service delivery for health needs of people:** The delivery system shall have to focus on Comprehensive Primary Healthcare (CPHC) through Ayushman Arogya Mandir (AAM) and coordinated care across all providers to address both communicable and NCDs and the unfinished communicable disease and maternal and child health.
- **Cluster organization of AAM and JAK:** This step could involve cluster grouping of AAM and JAK in contiguous areas networked by Panchayat and Local Bodies to ensure maximum outreach to the last mile population to meet their primary health care needs.
- **Comprehensive Primary Health Care (CPHC):** CPHC shall have to be augmented by expanding the roles of non-physicians to free physicians to concentrate on more complex aspects of care in respect of NCDs. The upskilling of existing staff such as ANMs and ASHAs, as well as newly-trained medical graduates with an evidence-based approach to care can ensure quality service. These health workers through community engagement can become catalytic agents in prevention and disease management activities for common conditions together with access to essential medicines.
- **Care linkages:** Care linkages will be the final in this transformative agenda for health and wellness through improved referrals and integrated care pathways between community health workers, primary care providers and hospital based professionals.

The **second transformative change** shall have to focus on institutional eco-system to create a sustainable delivery apparatus through a shared vision across all stakeholders by strengthening the governance and regulatory system. This could be achieved by:

- **Governance and Institutions:** A framework of multi-stakeholder partnerships among health care providers shall have to be developed by creating a reciprocating eco-

system with mutually supportive roles and responsibilities for key actors and incentivized for efficiency and quality output.

- **Public-private engagement:** Public private engagement under an enabling ecosystem will facilitate development of delivery models that align private provider behaviours with government objectives and priorities.
- **Regulatory Framework:** An independent and effective regulatory system with strong enforcement capacity will make all service providers accountable for meeting patient safety standards and improving quality of care.

6.2.6 The Building Block for Vision Health Care in Northeast India @2047

1. Surveillance and Prevention

The HWCs are long-term, sustainable solutions for conducting surveillance for communicable and non-communicable disease, occupational health conditions at the individual, family and primary care level. The PMJAY can be the point source for collection of information to estimate out-of-pocket expenditure on hospitalisation, and diseases managed within in-patient facilities which shall act as feedback loop for identifying gaps in the delivery system and adopt appropriate course correction measures.

2. Health Care, Manpower and Economy

Expansion of medical education is an important milestone for accelerating healthcare provisioning by 2047 with a complete overhauling of the regulatory architecture in Modern Medicine, Indian Systems of Medicine (Ayurveda, Yoga) and Homeopathy. The reforms of medical education with focus on specific needs of the states in the region especially in PG and super speciality courses launched on a priority basis within 2030 in a time bound framework shall help in bridging the demand –supply gap. This in addition shall address the issues related to growing incidence of communicable and NCD in the region especially ischemic heart disease, carcinoma, hypertension and diabetes mellitus.

The expansion of health sector is poised to generate additional jobs and economic activity indirectly in the non-health sector of the region. The employment patterns have additional multiplier effects and distributional benefits. First, the health sector can boost female labour force participation especially in the elder care services and other wellness centres. Health and Wellness Centres (HWCs) established under *Ayushman Bharat* can be managed by a team comprising a Mid-Level Health Provider (MLP) along with ANMs, ASHAs and a male health worker which will boost newer employment opportunities in the region and extend last mile health care coverage.

The creation of *home healthcare* solutions in the states of northeast India which suffer from accessibility issues due to difficult terrains and physical topography can transform the outreach for the rising elderly population, incidence of chronic diseases, and opens new opportunities for employment to meet enhanced demand for constant personalised care with the emergence of nuclear family structures in urban areas of the region.

3. Digitization of Health Care

In his address to the nation on India's 74th Independence Day, the Prime Minister announced launch of the National Digital Health Mission (NDHM). Digitized health data in the region is of utmost priority given its topographical features. Digitized data system can facilitate flawless exchange by developing registries of public and private facilities, health service providers, laboratories and pharmacies and help in clinical decision.

With the availability of internet and mobile connectivity in the region and ongoing expansion, telemedicine can be the change agent to bring specialized medical services to remote areas, reducing the need for patients to travel long distances to access healthcare in Delhi, Chennai, Bangalore and Hyderabad. It would help in facilitating telemedicine services as well and help patients to share their health profiles with providers for treatment. The digitization of healthcare and health data management portals can help in easing access through tele/video conferencing and help in reducing travel and logistic cost and thereby reduce out of pocket expenditure. The electronic health record (ECR) for every citizen from birth with a unique id-based record needs to be prioritized with data updated from both public and private sector health care services availed to ensure full population coverage with ailment mapping and treatment shortfall/effectiveness to strengthen the health care apparatus.

4. Policy Initiatives and New Opportunities

India's commitment to achieving Universal Health Coverage as part of the SDG is well conceptualized in India's National Health Policy (2017). Towards this end the Government aims to increase spending on health to 2.5% of GDP by 2025. The Policy emphasises upon greater investment in preventative and primary healthcare; access to and financial protection at the secondary and tertiary care levels as well as the provision of free drugs, diagnostics and emergency care services at all public hospitals. The Policy envisages private sector collaboration, including the use of financial and non-financial incentives to encourage participation.

Assam with its better investment climate has seen new partnerships between the state government and corporate houses growing. The improved cancer treatment facilities in the state run B.Barooah Cancer Institute is a case in point.

The region has relative cost competitiveness and availability of skilled labour can usher as an increasingly favoured destination for Medical Value Travel for patients travelling from countries of Southeast Asia and Bangladesh to other far-off destinations like New Delhi, Bangalore or Chennai seeking health care services. The recent expansion of public healthcare facilities in the region especially Assam is creating the space for not only an inclusive health service delivery in the region but also leverage itself to take advantage of the captive market in border areas of the neighbouring countries of Myanmar, Bangladesh, Nepal and Bhutan.

5. New Business and Investments in Bio Pharma and Ayush

Northeast India is known for its biodiversity and richness in medicinal and therapeutic plants and herbs. The pharmaceutical sector in India including generic drugs, biopharma, is poised to take a big leap with investments escalating. The region is home to some of the best Ayurvedic and alternative medicine centres in the country and medical tourism can contribute significantly to the region's economy, providing employment opportunities and improving the healthcare infrastructure further⁴⁸. The North Eastern Institute of Ayurveda & Homoeopathy (NEIAH) in Shillong, Meghalaya is an autonomous institute newly established under the Ministry of AYUSH, Government of India. Under the aegis of the National AYUSH Mission (NAM), a total of 1000 new Health & Wellness Centres (HWC) and 100 AYUSH dispensaries, are opened across the states in the region for growth and development of AYUSH systems. The centres would provide a holistic wellness model based on principles of AYUSH systems of medicine⁴⁹.

The region's diverse medicinal flora makes it an ideal location for the pharmaceutical industry. The region's temperate climate is also conducive to growing a variety of crops, including medicinal plants. The region has seen growing investment in its pharma sector⁵⁰. These companies have not only contributed to the growth of the pharmaceutical sector in the region but have also created employment opportunities for the local population. Sikkim has achieved successful investment in the pharmaceutical sector. Assam too has attracted investments from a number of pharmaceutical companies.

The region is the future hub of pharmaceutical manufacturing with export potential in biotech pharmaceuticals and products to its neighbouring countries under the aegis of Act East Policy. The Guwahati Biotech Park offers state of the art research facilities for high-end research to complement research and innovation in bio-pharma industry. The pharmaceutical industry in the neighbouring countries is still in nascent stage and there is a high demand for affordable medicines, which can be met by the investments in pharmaceutical products through an incentivised PPP mode in northeast India.

6. Health Diplomacy

The COVID-19 has revealed the fragility of health care system in the event of a pandemic and the humongous challenges faced by the countries to fight such a catastrophe. This calls for strengthening new areas of diplomacy through health diplomacy. The vaccination

⁴⁸ https://northeastgis.in/wp-content/uploads/2023/05/Sector-Profile_Healthcare_Low-Res_compressed.pdf

⁴⁹ The Ministry of AYUSH has initiated upgradation of the Government Ayurvedic College in Guwahati and develop it as a Centre of Excellence. Besides, facilitation centers for semi processing of raw material viz. Regional Raw Drug Repository (RRDR) shall be set up in the region in collaboration with National Institute of Bio-Resources and Sustainable Development in Imphal, under Department of Bio-Technology. These initiatives will be under the Central Sector Scheme of National Medicinal Plants Board, Ministry of AYUSH. The AYUSH medical facilities under different State Governments in the region, teaching hospitals in AYUSH colleges will be brought under AYUSH Health Management Information System (AHMIS) to develop digital data base for various disease management with AYUSH interventions.

⁵⁰ Zydus Nutrition Care, Glenmark Pharmaceutical, Swiss Garnier Genexia Ltd., Sangrila Industries Pvt Ltd., Anjali Herbal, SBL Pvt Ltd, Alembic Alkem Lab, Unichem, Sun Pharmaceuticals, Cipla Ltd, Torrent Pharma are few of the pharmaceutical companies investing in the region.

support with government-to-government collaborations with individual nations or regional blocks during the pandemic has shown the necessity to collaborate to mitigate any pandemic or health catastrophe faced by the nations. This has opened the way for augmenting affordable and accessible healthcare services (medical value travel, telemedicine, teleconsultation) and products (medical devices of all categories). Northeast India which is projected as the gateway to South East Asia need to take the opportunity to collaborate as well as serve the captive markets alongside integrating health security into the overall national security agenda⁵¹.

Northeast India's forte in providing affordable and quality health care with effective projections on regional forums like BIMSTEC can go a long way for India to push the regional cooperation with neighbouring countries. The developmental agenda of Northeast India focussing on biotherapeutics, antimicrobial resistance, cancer research and treatment, diagnostics technologies, vaccine technologies, are key areas to be factored into diplomatic cooperation in health sector. This would leverage the states in the region to negotiate their individual health sector requirements within a geographically proximate region.

6.2.7 WAY FORWARD: HEALTH in Northeast India @ 2047

- **The health information technology (HIT) and Health Information Management System (HMIS)** need to be developed and strengthened across the states in the region so as to meet the specific needs and requirement of different types of health data, based on the common Health Data Dictionary standards such that the data is interoperable and can provide the basis for consistent collection and reporting across the states in the region to strengthen the health care services in the region.

Alongside, the registry of data under Ayushman Bharat Digital Mission (ABDM), Health Professionals Registry and National Health Resource Repository on the number of speciality hospitals, private hospitals, nursing homes, number of beds and specialities in each private hospital across the region require consolidation.

- **A robust surveillance eco-system for both communicable and NCD** can deliver optimal results in health outcomes. There is need for integrated surveillance apparatus with both vertical and horizontal integration for real-time data capture from existing health records using an UHID. A citizen centric electronic health record (EHR) process where the individual gets the advantage of all health records from birth to death getting updated both from the public and private sector will aid in real time surveillance and ensure full population coverage. This robust surveillance system shall guide the future pathways for health care provisioning in the region.

⁵¹ Health diplomacy helps in disease identification, prevention, and responding to health issues. It aids in and providing medical assistance and humanitarian aid during an emergency as seen in the recent Covid-19 pandemic. Health diplomacy in case of northeast India and its Southeast Asian neighbours has the advantage of binding the societies, and giving the region to create a forum with neighbouring countries for leveraging soft powers to promote multidimensional interests including strategic security issues. International responses to H5N1 (2007), H1N1 (2009), Ebola (2014), and the COVID-19 pandemic are few examples of health diplomacy success stories. For details see: Mol, R., Singh, B., Chattu, V. K., Kaur, J., & Singh, B. (2022). India's Health Diplomacy as a Soft Power Tool towards Africa: Humanitarian and Geopolitical Analysis. *Journal of Asian and African Studies*, 57(6), 1109-1125. <https://doi.org/10.1177/00219096211039539>

- **Preparedness for Epidemic Outbreaks** for communicable disease with re-emergence of known illnesses in different forms (influenza, MDR-TB), or new disease outbreaks (NIPA virus, Corona virus, etc.) with a system of active animal surveillance and integration with agriculture and other sectors is critical. Identifying the sources of infection, block chains of rapid transmission to limit the resulting morbidity, disability or death through an integrated disease surveillance system with neighbouring countries is a strong forte under health Diplomacy. Upgradation of healthcare research and development (R&D) capacity is paramount to transition into a knowledge economy. Northeast India needs to project its priority areas of research and knowledge sharing on areas such as antimicrobial resistance, pathogens, vaccine technologies, biotherapeutics, technologies for antibodies, diagnostics technologies, early warning systems, and health system preparedness as well as social and economic interventions.
- **Expansion of private investments in trauma and critical care** with specialized expertise, advanced technology, and well-equipped facilities holds promise for the region. Remote areas in northeast India have no access to specialized trauma and critical care facilities. The states in the region have implemented one stop single window system for all G2B permissions required for any business activity. Each state in the region has developed industrial land banks for ease of land allocation and have in place robust feedback and grievance redressal mechanisms to improve ease of doing business. Channelisation of investment through National Single Window Portal shall facilitate faster investment on health care sector in the region.
- **Strengthened HWC and the AAM** shall free up specialists' time such that they can attend to the tasks they have specialised and tide over the deficits in specialized manpower availability. The National Medical Commission Act (2019) recommended the creation of a cadre of workers called Community Health Providers who would be provided with a limited license to practice preventive and primary care at the mid-level⁵². This cadre is currently operational in the Ayushman Bharat Health and Wellness Centres (AB-HWCs), and needs to be integrated into the primary care team by establishing permanent position. Prioritizing successful clinical management of NCDs with the help of general physicians, nurses and community health workers shall help build up a resilient health service delivery.
- **Health insurance** contributes 20 percent to the non-life insurance business, making it the 2nd largest portfolio but is not designed for the missing middle as discussed earlier. Contributory insurance products under public private initiative for the missing middle of the states with affordable premium, packaged rates for treatment-both inpatient and outpatient cost coverage including medicine and laboratory and diagnostic tests for reducing out of pocket expenditure shall steer health care spending at individual level.

⁵² https://www.indiacode.nic.in/bitstream/123456789/11820/1/A2019_30.pdf

- **Mental health crisis in northeast India** assumes special significance due to complex socio-political situation of long drawn exposure to violence, insurgency and traumatic situations together with inaccessible hilly terrains. Exposure to insurgency, ethnic clashes, human rights violations, and substance abuse throw up challenges in mental health wellbeing. As many as seven states in the region except Sikkim have passed through adverse phases of insurgency and ethnic clashes. Lokopriya Gopinath Bordoloi Regional Institute of Mental Health, Tezpur is the only mental health facility in northeast India. Strategizing and augmenting the service facilities and delivery to address the growing incidence of mental health problems in the region which if left unaddressed would emerge as one of the major stressors in respect of NCD over the years.

As per the recommendation of NMHS (2016) the states in northeast India may endeavour to execute a specialized Biennial Mental Health Action Plan, with special provisions outlined for the region to address issues of severe mental disorders, common mental disorders and substance use problems together with growing incidence of suicidal deaths and anxiety disorder especially among the youth⁵³. Meghalaya is the only state in the region that has launched a policy on mental health and social care, with special focus on children, adolescence, and youth⁵⁴. The other states in the region need to draw up action plans based on socio-cultural backdrop to address the growing incidence of mental health issues across various age groups in different communities of the region.

- **Comprehensive medical value tourism** with a “purpose-driven” and non-siloed approach to medical tourism that facilitate a public private partnership approach is a fast-emerging prospect in health care sector. Northeast India is fast emerging as an attractive destination for medical value travellers from Bangladesh and has strong prospect to meet the demand for health care services for countries of East Asia like Cambodia Laos, Mongolia and Vietnam (CLMB) besides Myanmar, Nepal and Bhutan. Wellness tourism is growing faster than global tourism, as an increasing number of consumers are incorporating wellness into their travel plans.
- **Lifestyle disorders** due to a combination of rising incomes, fast pace of urbanisation and increased life expectancy has been a major contributor to obesity, cardiovascular diseases, diabetes mellitus and cancer. Together with this an ageing population with a growing middle class and greater longevity is emerging as the major requirement for health care provisioning in the region. This in turn shall act as a catalyst to boost the demand for health services in northeast India as well as increasingly favour growth of wellness and preventative services.

To mitigate the challenges of lifestyle diseases and zoonotic diseases, **curriculum on health care and healthy living** needs to be curated from school level with a clear

⁵³ National Mental Health Survey 2015-2016, available at: https://main.mohfw.gov.in/sites/default/files/National%20Mental%20Health%20Survey%2C%202015-16%20-%20Mental%20Health%20Systems_0.pdf

⁵⁴ It was launched on 29th November, 2025.

focus on physical and mental well-being through yoga, dietary habits and mental health education.

The new approach to social welfare in India is multi-faceted. Encompassing diverse stakeholders in the region, and envisioning health care @2047 requires shared cooperation among the states of the region, the Ministry of DONER, NEC, private entrepreneurs and corporate houses and people of the region. The region which stands as the gateway to Southeast Asia is poised to leverage its locational advantage for delivering robust healthcare services and coverage not only to the people of the region but the larger geopolitical space of Southeast Asia. India's Health Diplomacy in the Southeast Asian region through northeast India would create growth impetus through curated health care for human resource development.

6.3 Sustainable Development Goals Achievement Capital of India

Indicators demonstrate that the NER States really have to put in concentrated efforts to achieve the 17 SDGs by 2030. For instance, the NITI Aayog SDG India Index & Dashboard (2020) show that only in very few goals like clean water and sanitation, reduced inequality, life on land and affordable and clean energy these states come into the category of Front Runner (65-99 percent achievements) and in most of the goals they are just performers (50-64 percent achievements). In a number of cases they seriously lag behind the goals (31 % in Climate action in Arunachal Pradesh; 28 to 31 percent in Sustainable Cities and Communities in Manipur and Tripura; 8 to 27 percent in Industry, Innovation and Infrastructure in Meghalaya, Mizoram, Nagaland and Sikkim).

Latest anthropometric status of children and adolescents published in National Nutrition Survey (Ministry of Health and Family Welfare, 2019) do show some major gaps and halting progress. For examples, the percentage of underweight (30 in Meghalaya), stunting (40 in Meghalaya and 32 in Assam) and wasting (19 in Assam) in the 0-4 aged children and overweight (9 in Sikkim and Tripura) in the 10-19 age group are simultaneously characterized by prevalence of iron deficiency (27 percent in Sikkim) and vitamin A deficiency (21 percent in Assam) and D deficiency (41 percent in Manipur) in the 1-4 age group; percentage of 1-4 year and 5-9 year children with low iodine status (12 percent Nagaland and 14 in Assam respectively); children with diabetic status in age group 1-4 and 5-9 year (17 in Assam and 9 in Meghalaya respectively); children with high cholesterol 10-19 age group (23 percent in Sikkim) and with high serum creatinine (21 in Nagaland and 27 in Sikkim in 5-9 age group). Some of these indicators are far above the national average.

In both the Inclusix Scores and Inclusix Ranks measurement of financial inclusion of CRISIL in 2017, out of the bottom 50 of the 666 districts, 28 districts are in the NER, the lowest being Kurung Kumey of Arunachal Pradesh with 5.2 Score. And 11 lowest ranked districts are also spread over Arunachal Pradesh, Meghalaya, Manipur and Nagaland. On the other hand, overall unemployment rate (8.1) and among the graduates (18.0) has been much higher than the national average of 6.0 and 16.5 respectively. (MOSPI, Periodic Labour Force Survey report 2017-18)

However, given the relatively lower and underperformed starting base, contrasting topographic and ethnographic features and the stupendously steady progress made in the

last two decades, these achievements are commendable and the NER could even lead the entire nation in the achievements of SDGs.

For instance, even when the entire institutions of national higher and professional education reached the NER much later like the first central university (Assam, 1992, Sikkim 2007), IIT (Assam 1994), the first Central Agricultural University (Manipur, 1993), the first IIM (Shillong, 2007) and the first Regional Institute of Health & Medical Sciences (Shillong 1987), this NER Vision 2047 places before it a target of 100 % literacy by 2025 (at present it varies from 92 % in Mizoram and 65 percent in Arunachal Pradesh); 40 % gross enrolment ratio (varies from 17.8 % in Nagaland to 37.6 % in Sikkim), dropout rates steadily sliding down to 5-10 % at all levels, 100 % ICT coverage, 100 % coverage of psychological and stress management facilities at all levels and 100 % transition rate of learners from primary to secondary. The implementation of the New Education Policy 2020 will be strictly monitored and evaluated.

Each economic intervention, social sector action, firm and industrial promotion, connectivity and communication, environmental measure, political decisions, governance framework and private-public-civil society partnership will impinge upon the achievement of SDGs. There has been significant shift in budgetary allocations in the SDG achievements across the states and are also reflected in the performance of Aspirational Districts.

Therefore, it requires constant monitoring, mid-course change in strategy, if needed and more micro level management of sub-sectoral and thematic focus. The strategy of localization of SDGs along with strong partnerships with the private sector, panchayati raj institutions, civil society organizations and global development players; effective utilization of centrally sponsored schemes, infusion of innovation and new technology, harnessing of traditional knowledge and institutions and also consolidating cross border economic and commercial interactions are going to be the driving forces.

Besides the setting up of a Regional Dash Board with 114 decentralised district level dashboards to constantly monitor and evaluate the performance and achievements of SDGs, extra emphasis on the aspirational districts and reorientation of the drivers and planned development process are going to be the hallmark.

¹ A Vision for Primary Health care in the 21st century, WHO and the UNICEF, 2018.

² India State-Level Disease Burden Initiative Child Mortality Collaborators. Subnational mapping of under-5 and neonatal mortality trends in India: The Global Burden of Disease Study 2000-17. *Lancet*. 2020 May 23;395(10237):1640-1658. doi: 10.1016/S0140-6736(20)30471-2. Epub 2020 May 12. PMID: 32413293; PMCID: PMC7262604.

³ Janani Suraksha Yojana (JSY) is a safe motherhood intervention under the National Health Mission. It is being implemented with the objective of reducing maternal and neonatal mortality by promoting institutional delivery among poor pregnant women. The scheme, launched on 12 April 2005 by the Hon'ble Prime Minister is a centrally sponsored scheme, which integrates cash assistance with delivery and post-delivery care. JSY has identified Accredited Social Health Activist (ASHA) as an effective link between the government and pregnant women.

⁴ At the time of independence, India reported the highest incidence of smallpox cases in the world. The cholera and plague epidemics were a recurring phenomenon but limited budgetary availability

curtailed majority of the efforts. Tuberculosis was another major cause of morbidity and mortality. In May 1948, the Government of India launched the BCG Vaccine and by 1949, the BCG vaccination was extended to schools in almost all States of India. In 1967-1968, the smallpox eradication strategy was reformulated with increased focus on surveillance, epidemiological investigation of outbreaks and rapid containment drives. As soon as India was declared smallpox free in 1977, the country decided to launch National Immunization programme called Expanded Programme of Immunization (EPI) in 1978 with the introduction BCG, OPV, DPT and typhoid-paratyphoid vaccines, Basu RN. Smallpox eradication: lessons learnt from a success story. *Natl Med J India*. 2006 Jan-Feb;19(1).

⁵ The EPI targetted at least 80 per cent immunization coverage for infants, and the vaccination was offered through major hospitals in the urban areas. India started its universal immunization programme (UIP) in 1985. It provided guiding principles for functioning of immunization programme in the country. For details see *National Vaccine Policy*, Ministry of Health and Family Welfare, Government of India; 2011. Government of India, New Delhi.

⁶ National Health Policy 2017; Ministry of Health and Family Welfare, Government of India.

⁷ Changlang, East Kameng, Lower Dibang Valley, Lohit Lower Subansiri

⁸ Barpeta, Bongaigaon, Darrang, Dhubri, Goalpara, Golaghat, Hailakandi, Karimganj, Marigaon, Nagaon Sonitpur and Kokrajhar.

⁹ Churachandpur, Senapati, Tamenglong, Ukhrul

¹⁰ East Khasi Hills, West Garo Hills, West Khasi Hills

¹¹ Lawngtlai, Lunglei, Mamit, Saiha

¹² Dhalai, Tripura North, Tripura West

¹³ The SRS has been a gold standard source for fertility and mortality data for more than five decades. It is the largest demographic and health survey in the country, which gives reliable estimates at the national and state level separately by urban and rural areas.

¹⁴ Goli S, Puri P, Salve PS, Pallikadavath S, James KS. Estimates and correlates of district-level maternal mortality ratio in India. *PLOS Glob Public Health*. 2022 Jul 18;2(7):e0000441. doi: 10.1371/journal.pgph.0000441. PMID: 36962393; PMCID: PMC10021851.

¹⁵ Same as 28.

¹⁶ https://nipfp.org.in/media/medialibrary/2019/12/WHO_NSSO_report_2019.pdf

¹⁷ <https://ihds.umd.edu/system/files/2020-03/07HDinIndia.pdf>

¹⁸ Kasthuri A. Challenges to Healthcare in India - The Five A's. *Indian J Community Med*. 2018 Jul-Sep;43(3):141-143. doi: 10.4103/ijcm.IJCM_194_18. PMID: 30294075; PMCID: PMC6166510.

¹⁹ Selvaraj S, Karan K A, Srivastava S, Bhan N, & Mukhopadhyay I. India health system review. New Delhi: World Health Organization, Regional Office for South-East Asia; 2022.

²⁰ Rao M , Rao KD , Kumar AKS , Chatterjee M , Sundararaman T . Human resources for health in India . Lancet . 2011 ; 377 (9765): 587 – 98 .

²¹ 36 percent in 2022 World Bank, Development Indicators, 2022.

²² https://www.niti.gov.in/sites/default/files/2023-06/NITI_policy-paper_BMID_2023-May.pdf

²³ Central Bureau of Health Intelligence (2021). National Health Profile 2021. Ministry of Health and Family Welfare, Retrieved from <https://www.cbhidghs.nic.in/showfile.php?lid=1160>

²⁴ Agarwal, A., Balani, K., and Venkateswaran S. (2023). Medical Education in India: A Study of Supply-side Dynamics (CSEP Working Paper 55). New Delhi: Centre for Social and Economic Progress.

²⁵ <https://www.healthdata.org/research-analysis/health-by-location/disease-burden-initiative-india>, accessed on 09.11.2023

²⁶ Same as 21.

²⁷ <https://nhsrcindia.org/sites/default/files/2022-05/AB-HWC%20Report%20-%20FINAL%20-%20May%202013.pdf> accessed on 10.12.2023

²⁸ In February 2018, the Government of India announced the creation of 1,50,000 Health and Wellness Centres (HWCs) with the existing Sub Centres and Primary Health Centres at the base as pillar of Ayushman Bharat. These centres delivered Comprehensive Primary Health Care (CPHC) through community centric approach by bringing healthcare closer to the homes of people covering both maternal and child health services and non- communicable diseases, including hypertension, diabetes, oral, breast, and cervical cancer free essential drugs and diagnostic services.

²⁹ The community outreach for healthcare is also being provided/ complemented through outreach services, Mobile Medical Units, camps, home and community-based care, based on the principle of seamless continuum of care that ensures equity, universality and no financial hardship.

³⁰ Healthcare. India Brand Equity Foundation. Retrieved December 15, 2020 from <https://www.ibef.org/download/Healthcare-July-2019.pdf>.

³¹ Investment Opportunities in India's Healthcare Sector, NITI Aayog, New Delhi, 2021.

³² It provides 10.9 crore families, or 49 crore individuals – identified as deprived in the Socio-Economic Caste Census (SECC) 2011 – for fully subsidized health insurance cover and has a national portability feature which allows beneficiaries to avail benefits anywhere in India. with an annual hospitalisation cover of up to INR 500,000 per family.

³³ Health Insurance for India's Missing Middle Publishing Agency: NITI Aayog, New Delhi, 2021. The missing middle predominantly constitutes the self-employed (agriculture and non-agriculture) informal sector in rural areas, and a broad array of occupations – informal, semi-formal, and formal – in urban areas.

³⁴ The Scheme is being implemented through the Bureau of Pharma PSUs of India (BPPI), under the administrative control of the Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers, Government of India. In September 2015, Jan Aushadhi Scheme was reinforced as Pradhan Mantri Jan Aushadhi Yojana (PMJAY). In November, 2016, to give further impetus to the scheme, it was again renamed as “Pradhan Mantri Bhartiya Janaushadhi Pariyojana” (PMBJP).

³⁵ Vijayashree Yellapa , Narayanan Devadasan, Anja Krumeich, Nitika PantPai, Caroline Vadnais , Madhukar Pai & Nora Engel (2017) How patients navigate the diagnostic ecosystem in a fragmented health system: a qualitative study from India, *Global Health Action*, 10:1, 1350452, <http://dx.doi.org/10.1080/16549716.2017.1350452> (11)(PDF) How patients navigate the diagnostic ecosystem in a fragmented health system: A qualitative study from India. Available from: https://www.researchgate.net/publication/318849758_How_patients_navigate_the_diagnostic_eco_system_in_a_fragmented_health_system_A_qualitative_study_from_India#fullTextFileContent [accessed Dec 16 2023].

³⁶ The addition of antibiotics to agricultural feed, use in livestock and poultry contributes to the problem of AMR. Also, the effluents discharged from pharmaceutical manufacturing units contribute to AMR development. The Ministry of Health and Family Welfare launched the National Action Plan on AMR (NAP-AMR) in April 2017, emphasizing on the need to tackle AMR on human health, animal husbandry, industry and environment in line with the “One-Health” approach.

³⁷ https://northeastgis.in/wp-content/uploads/2023/05/Sector-Profile_Healthcare_Low_Res_compressed.pdf

³⁸ The Ministry of AYUSH has initiated upgradation of the Government Ayurvedic College in Guwahati and develop it as a Centre of Excellence. Besides, facilitation centres for semi processing of raw material viz. Regional Raw Drug Repository (RRDR) shall be set up in the region in collaboration with National Institute of Bio- Resources and Sustainable Development in Imphal, under Department of Bio-Technology. These initiatives will be under the Central Sector Scheme of National Medicinal Plants Board, Ministry of AYUSH. The AYUSH medical facilities under different State Governments in the region, teaching hospitals in AYUSH colleges will be brought under AYUSH Health Management Information System (AHMIS) to develop digital data base for various disease management with AYUSH interventions.

³⁹ Zydus Nutrition Care, Glenmark Pharmaceutical, Swiss Garnier Genexia Ltd., Sangrila Industries Pvt Ltd., Anjali Herbal, SBL Pvt Ltd, Alembic Alkem Lab, Unichem, Sun Pharmaceuticals, Cipla Ltd, Torrent Pharma are few of the pharmaceutical companies investing in the region.

⁴⁰ Health diplomacy helps in disease identification, prevention, and responding to health issues. It aids in and providing medical assistance and humanitarian aid during an emergency as seen in the recent Covid-19 pandemic. Health diplomacy in case of northeast India and its Southeast Asian neighbours has the advantage of binding the societies, and giving the region to create a forum with neighbouring countries for leveraging soft powers to promote multidimensional interests including strategic security issues. International responses to H5N1 (2007), H1N1 (2009), Ebola (2014), and the COVID-19 pandemic are few examples of health diplomacy success stories. For details see: Mol, R., Singh, B., Chattu, V. K., Kaur, J., & Singh, B. (2022). India’s Health Diplomacy as a Soft Power Tool towards Africa: Humanitarian and

Geopolitical Analysis. *Journal of Asian and African Studies*, 57(6), 1109-1125.
<https://doi.org/10.1177/00219096211039539>

⁴¹ https://www.indiacode.nic.in/bitstream/123456789/11820/1/A2019_30.pdf

⁴² Murthy R.S. National Mental Health Survey of India 2015-2016. *Indian Journal of Psychiatry*. 2017;59(1):21–

26. doi: 10.4103/psychiatry.Indian J Psychiatry_102_17

⁴³ National Mental Health Survey 2015-2016, available at:

<https://main.mohfw.gov.in/sites/default/files/National%20Mental%20Health%20Survey%2C%202015-16%20->

[%20Mental%20Health%20Systems_0.pdf](#)

⁴⁴ It was launched on 29th November, 2025.

Draft Report

Chapter 7

The Urban Planning and Development

7.1 Background

Urbanization is growing at a faster rate than before. As per 1901 census, the urbanization rate in India was 11.40% which only rose to 27.82% in 2001 and stood at 31.14% (2011 census). States such as Goa, Tamil Nadu, Kerala, Maharashtra and Gujarat have attained the urbanization levels of more than 42% and UTs such as Chandigarh, Daman & Diu and NCT of Delhi are more than 75% (MoHUA, 2019). Now, India is the second largest urban system in the world which shares around 11% of the total global urban population. The United Nations in 2019 estimated that India would surpass China as the world's most populous country by 2022. India's urbanization is poised to accelerate in the coming decades and during 2011 - 36, urbanization level will rise to 73%. Earlier estimations indicate that about 416 million people will be added to urban dwellers in India between 2018 and 2050 and that India will constitute a conurbation of 50% by 2050 (NITI Aayog, 2021).

In the NER, Pragjyotishpura changed to Pragjyotisapura in the 9th century is the most ancient city and capital of the Varman Dynasty (350-650) A.D. The location of the city encapsulates the urban localities of Dispur, Jatia and Narakasur of the modern Guwahati (Boruah, 2007). Guwahati said to be the legendary of Pragjyostishpur i.e. the City of Eastern Light has a rich historical past and frequent mentions are made in medieval historical sources. Hiuen Tsang, a famous Chinese Buddhist monk visited the city in 640 A.D. Guwahati *mouza* is included as one of the planning units in the Master Plan for Guwahati Metropolitan Area (GMDA, 2009). Other small but ancient settlements which existed before Pragjyostishpur are available in literature (Mitri, 2018).

The Assam Town and Country Planning Act 1959 ushered in modern town planning followed by the Town Planning Acts of the NER States, empowers town planners to prepare master plans/city development plans, formulate building byelaws, identify and declare slum areas, etc. Before that towns such as Guwahati, Shillong, Jorhat, Dibrugarh, Agartala, Sivasagar, Imphal, Gangtok, Kohima, Aizawl, etc. already grew in an unplanned and haphazard manner.

The NIUA engaged by the NEC, took note of the Region's highly complex nature including its rich but undeveloped resources, difficult and mountainous terrains, small and dispersed settlements, highly diverse characteristics and strategic nature of the people including the striking disparities and inadequate levels of services and infrastructure. It suggested development of several nodal centres for the provision of employment, services and security. It also eked out steps to ensure that the future urbanization process is smooth and is in harmony with the resources, settlement patterns and cultural settings deeply embedded in the NER (NIUA, 1988). Even though Sikkim was not a member of the NEC at that time, an analogy could be inferred upon.

The Region comprising Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura with Sikkim as the younger member; is a conurbation of 414 towns (both statutory and census towns) with an urban population of 84, 03,283 constituting 27.72% of its total population vis-à-vis the country's urban population of 31.14%. The Region's urbanization rate of 34.70% which is much ahead of the national urbanisation rate, gives an alarming signal to town planners, urbanologists and policy makers. Using the AEGR method, the level of urbanization from 1991 to 2011 is given in Table 7.1.

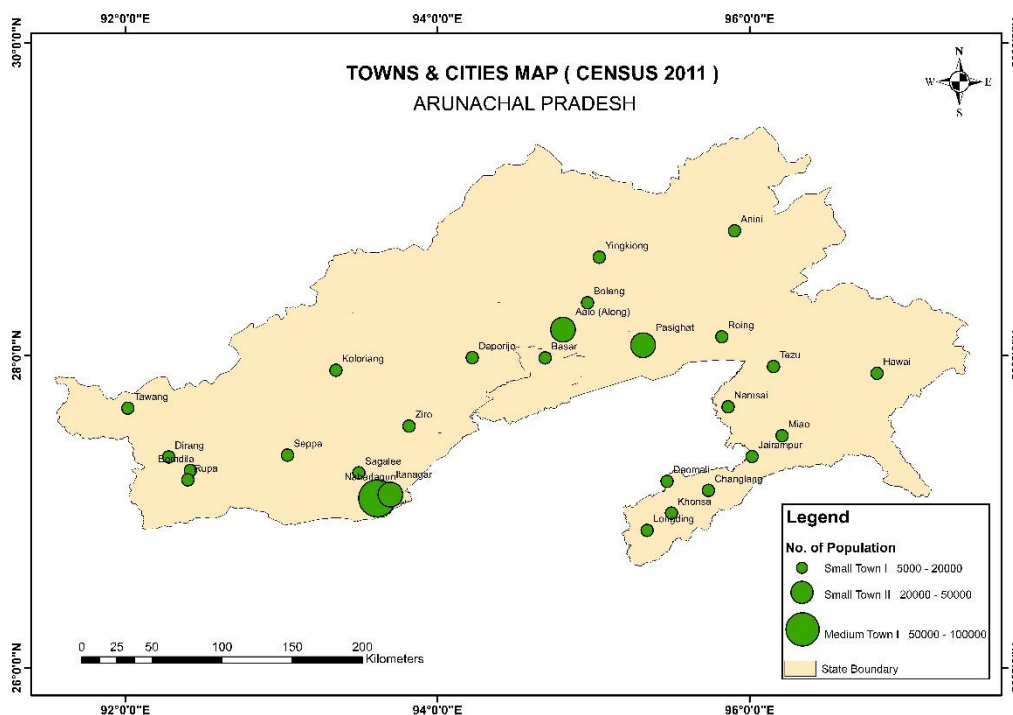
Table 7.1: Urbanisation Levels in NER (1991-2011)

Name of State	% of Urban Population			AAGR	
	1991	2001	2011	1991-2001	2001-2011
Arunachal Pradesh	26.89	27.30	33.36	1.52	3.05
Assam	11.08	12.90	14.10	3.29	2.46
Manipur	27.52	26.58	29.21	1.31	3.70
Meghalaya	18.60	19.58	20.07	3.24	2.71
Mizoram	46.10	49.63	52.11	3.33	2.60
Nagaland	17.21	17.23	28.86	5.11	5.10
Sikkim	9.10	11.07	25.15	4.93	9.42
Tripura	15.30	17.06	26.17	2.61	5.66
Total NER	171.8	181.35	229.03	25.34	34.70
Average NER	21.47	22.67	28.62	3.17	4.23
Average India	25.73	27.82	31.14	2.17	2.76

Source: Handbook of Urban Statistics, 2019, MoHUA, New Delhi.

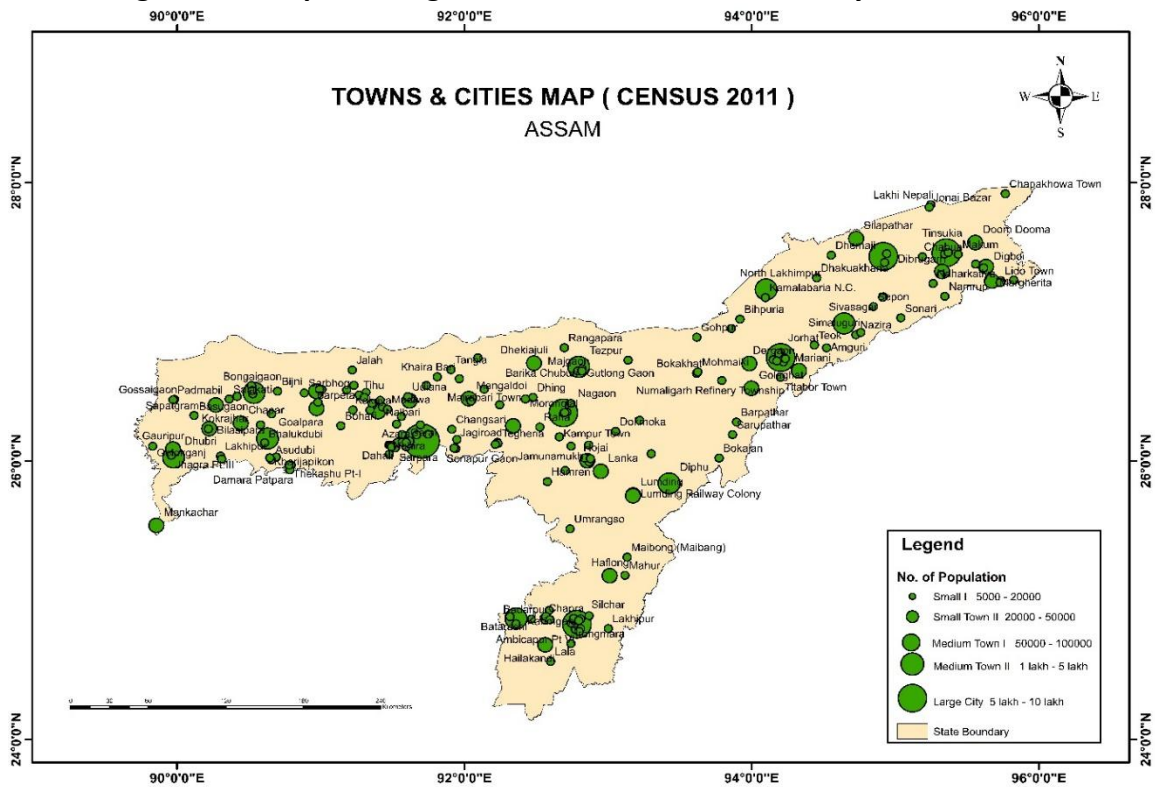
The urban systems of the Region is heterogeneous in demographic and as well as in spatial patterns. The maps showing the locations of towns and cities in the 8 States are given in figure 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7 and 7.8.

Figure 7.1: Map Showing the Locations of Towns in Arunachal Pradesh



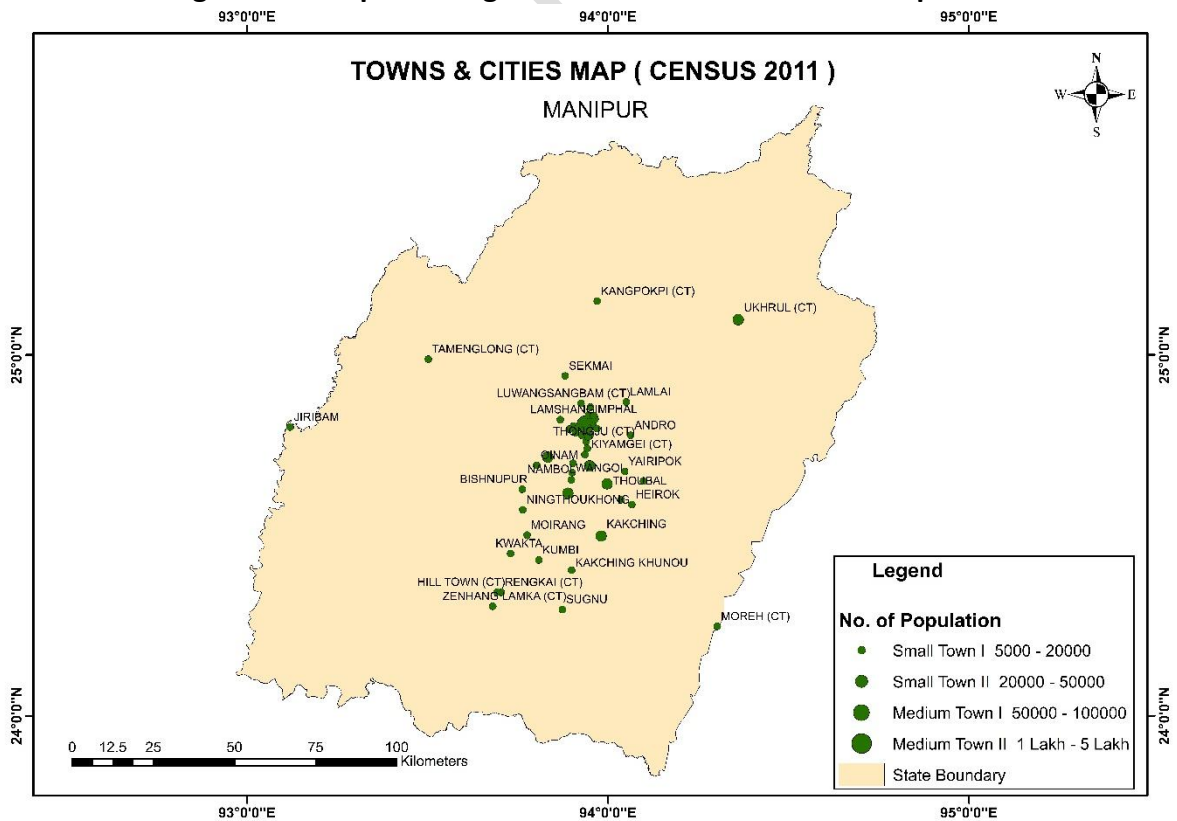
Source: P.S. N̄ianglang & Jonestar Nonglait, 2024

Figure 7.2: Map Showing the Locations of Towns and City in Assam



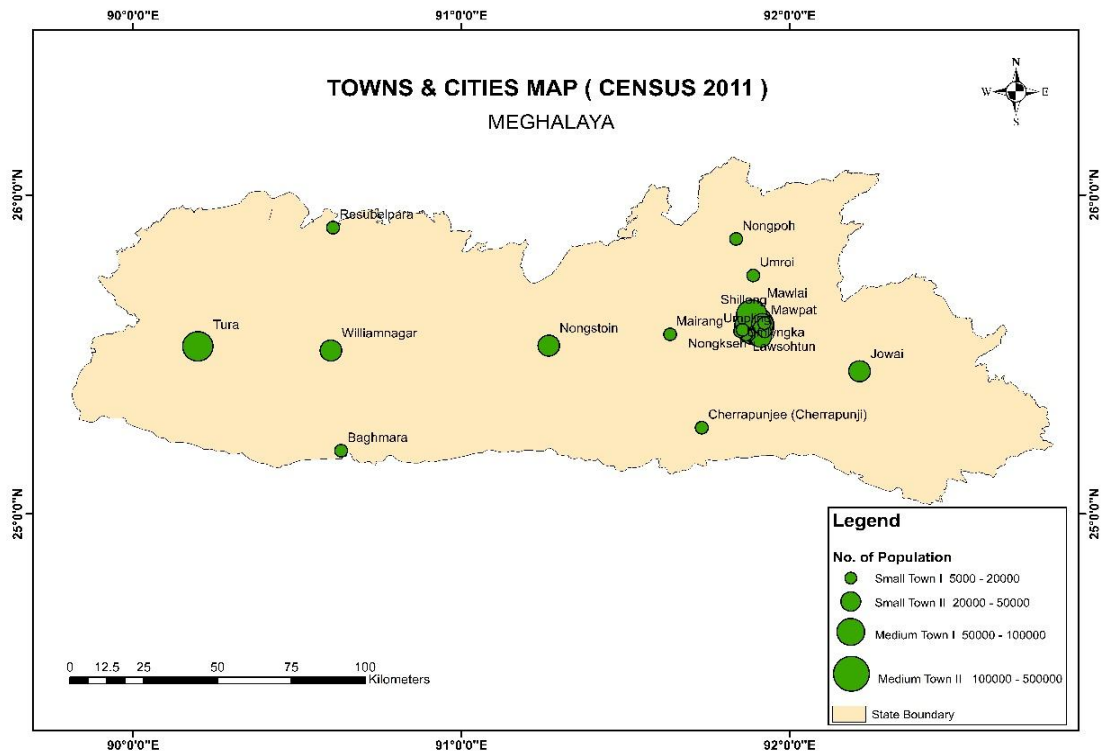
Source: P.S. Nianglang & Jonestar Nonglait, 2024.

Figure 7.3: Map Showing the Locations of Towns in Manipur



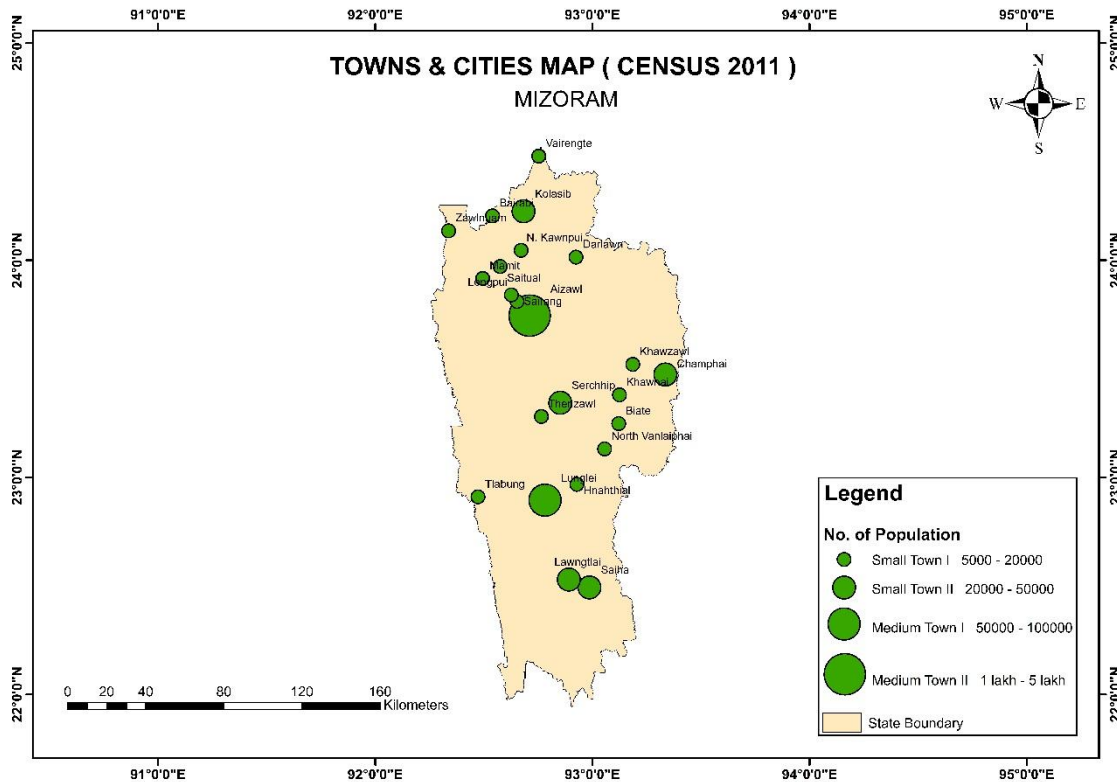
Source: P.S. Nianglang & Jonestar Nonglait, 2024.

Figure 7.4: Map Showing the Locations of Towns in Meghalaya



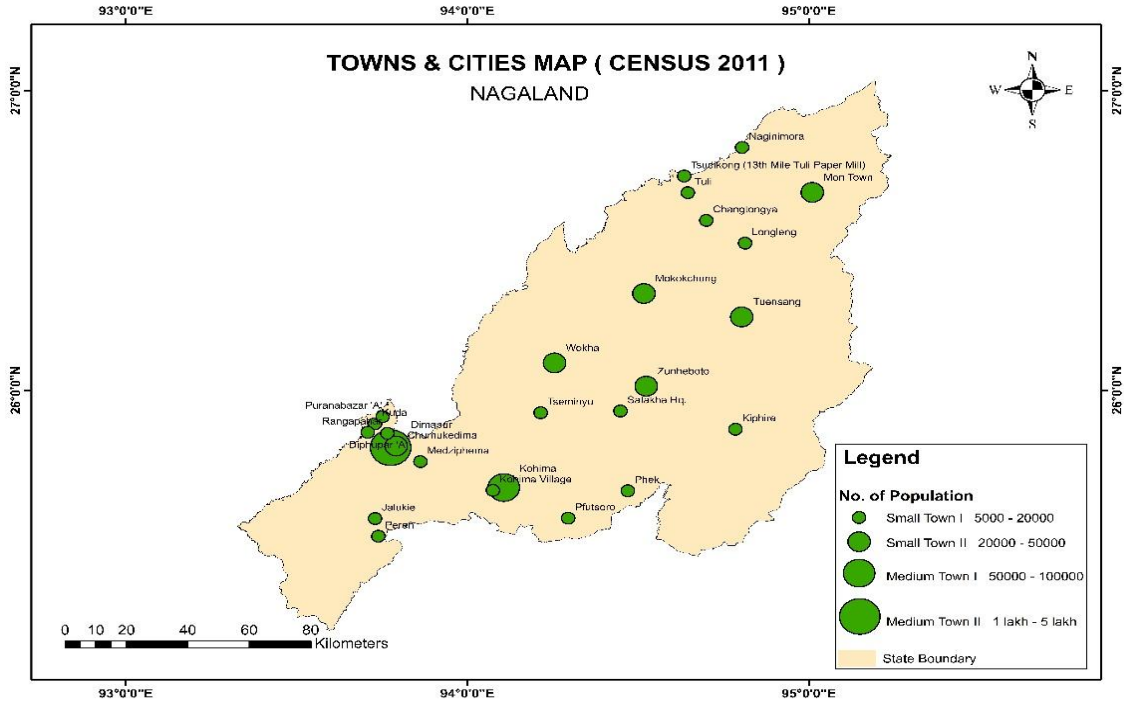
Source: P.S. Āianglang & Jonestar Nonglait, 2024.

Figure 7.5: Map Showing the Locations of Towns in Mizoram



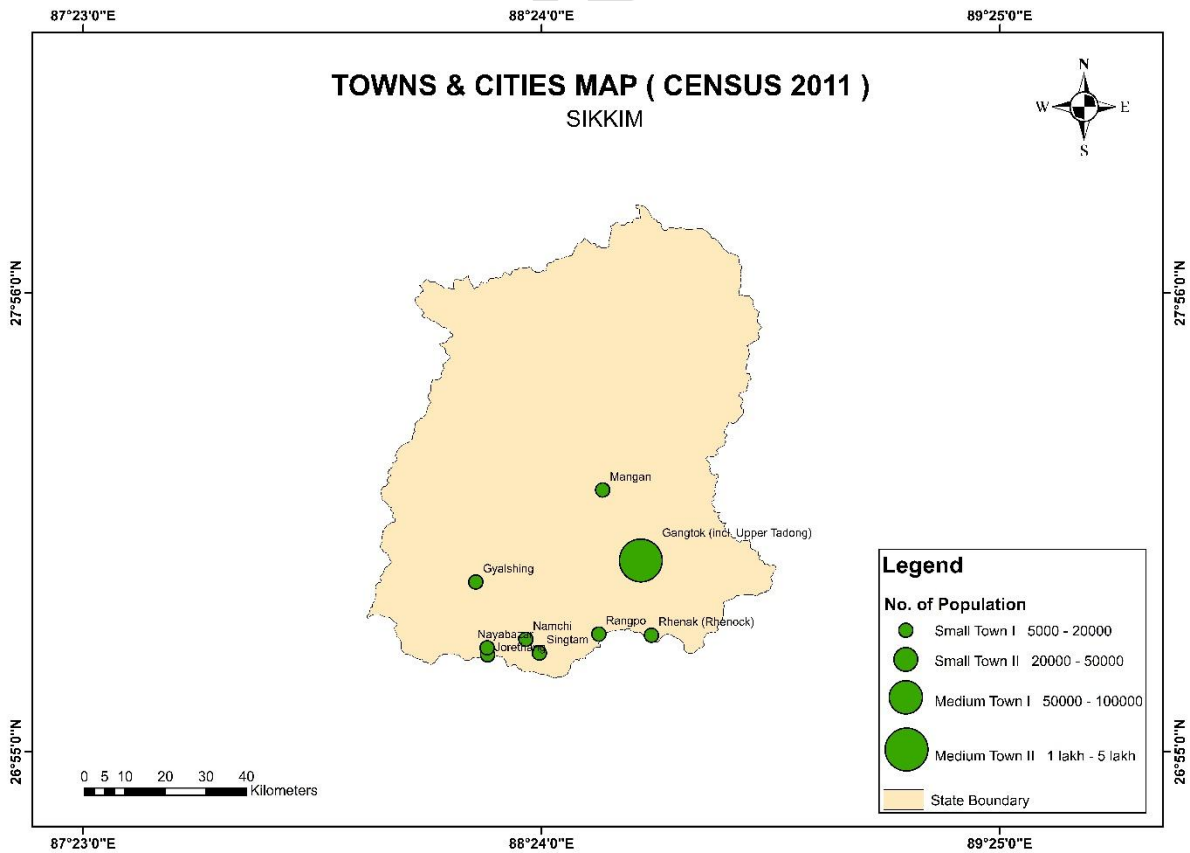
Source: P.S. Āianglang & Jonestar Nonglait, 2024.

Figure 7.6: Map Showing the Locations of Towns in Nagaland



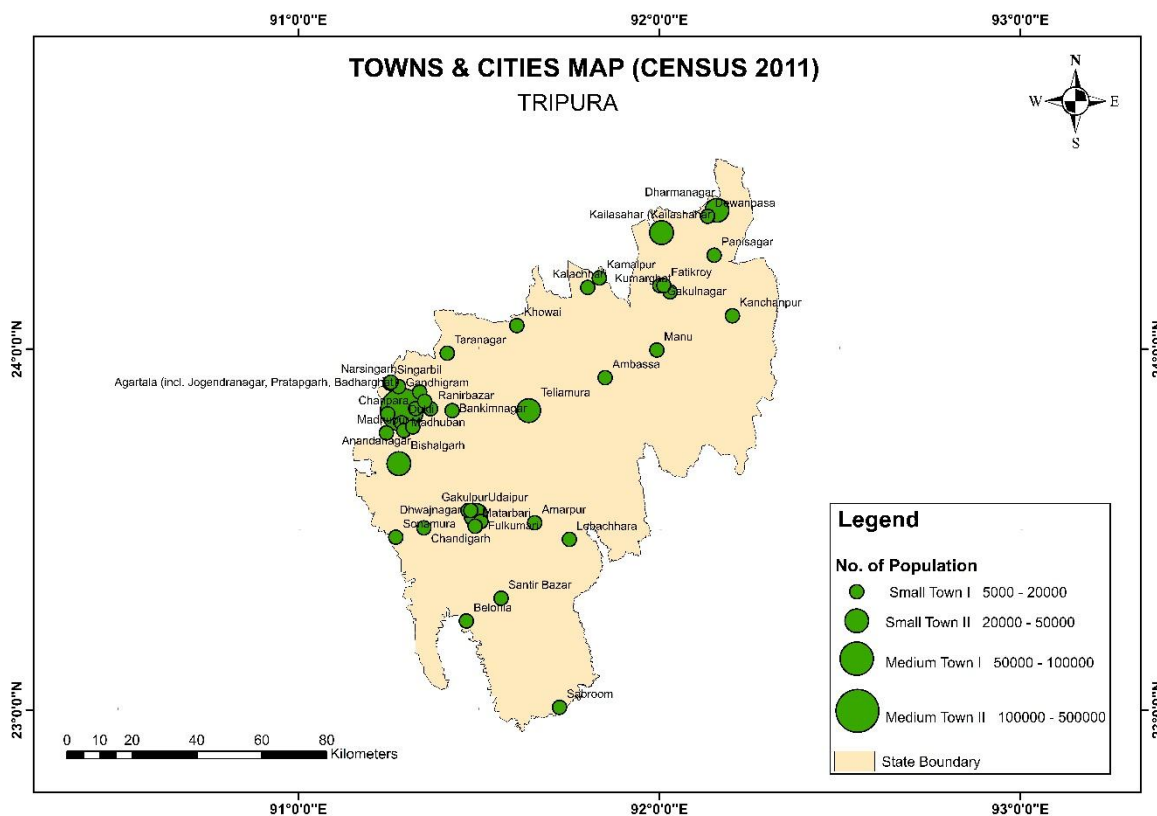
Source: P.S. N̄ianglang & Jonestar Nonglait, 2024.

Figure 7.7: Map Showing the Locations of Towns in Sikkim



Source: P.S. N̄ianglang & Jonestar Nonglait, 2024.

Figure 7.8: Map Showing the Locations of Towns and City in Tripura



Source: P.S. Nianglang & Jonestar Nonglait, 2024.

The onslaught of COVID – 19 did not warrant town planners and policy makers to estimate the space demand of necropolises and hence this ephemeral problem is dropped from the Vision Plan 2047. The classification of towns and cities in the Region based on the URDPFI Guidelines 2014 is given in Table 7.2.

Table 7.2: Size-Class Distribution of Towns in NER

Name of State	Small Town I (5,000 – 20, 000)	Small Town II (20, 000-50,000)	Medium Town I (50,000 to 1,00,000)	Medium Town II (1 lakh to 5 lakh)	Large City (5 lakh to 10 lakh)	Metropolitan City I (10 lakh to 50 lakh)	Metropolitan City II (50 lakh to 1 crore)	Megapolis (More than 1 crore)	State-Wise Total
Arunachal Pradesh	23	3	1	0	0	0	0	0	27
Assam	175	26	7	5	1	0	0	0	214
Manipur	44	6	0	1	0	0	0	0	51
Meghalaya	13	6	2	1	0	0	0	0	22
Mizoram	16	5	1	1	0	0	0	0	23
Nagaland	18	6	1	1	0	0	0	0	26
Sikkim	8	0	0	1	0	0	0	0	9
Tripura			0	1	0	0	0	0	42
NER	264	59	12	11	1	0	0	0	414

Source: Census 2011 & URDPFI Guidelines 2014.

Among the urban systems, Guwahati with a population of 9, 62,334 which is almost 10 lakhs (Census, 2011) qualified as a large city, while the remaining systems are all classified towns. It is expected that Guwahati is a metropolitan city I by now. The numbers of districts, urban settlements and urban households as per 2011 census is given in Table 7.3.

Table 7.3: Numbers of Districts, Urban Settlements and Urban Households

Name of State	Districts	STs	CTs	UAs/ Cities	Urban HHs
Arunachal Pradesh	16	26	1		70,367
Assam	27	90	123	1	9,85,594
Manipur	16	27	24	0	1,72,339
Meghalaya	7	10	12	0	1,17,486
Mizoram	8	23	0	0	1,17,041
Nagaland	11	19	7	0	1,18,511
Sikkim	4	8	1	0	35,718
Tripura	4	15	26	1	2,38,974
NER	86	219	193	2	18,56,030
All India	640	4041	3892	384	

Source: Basic Statistics of North Eastern Region 2015, NEC & Handbook of Urban Statistics, 2019, MoHUA

Over the years, towns and cities exhibited their lateral expansion in the form of urban sprawls and outgrowths while inner urban areas revealed their saturated population growths. The poor and marginalized town lings bear the brunt of unplanned urbanization. Multidimensional problems such as insufficient supply of serviced land, urban water supply, urban blight in housing, traffic congestion, pressure on basic infrastructure, air and water pollution, urban flooding, depletion of green spaces, sewage stagnation, unhygienic solid waste disposal, etc. occurred. These issues indicate a lack of adequate urban planning and thus a need of urban renewal strategies, robust policies, etc.

7.2 Present Status

7.2.1. The Region’s Stand

A lot of efforts are made by the Centre and the States in urban sector, however, making urban systems sustainable and livable, remains an unfinished agenda. Provision of infrastructure, basic amenities, slum eradication schemes/ programmes etc. remain far below the minimum standards. The status of HHs against the target groups/ beneficiaries for urban water supply as on 31.03.2024 is given in Table 7.4.

Table 7.4: Status of HHs Relating to Urban Water Supply in NER.

States	HHs with Tap Water (%)	HHs with Tube Wells / Hand Pumps (%)	HHs with Water Supply within their Premises (%)	HHs with Water Supply within 0.5 km (%)	HHs with their SDW (%)	HHs with Shared SDW (%)
Arunachal Pradesh						
Assam						
Manipur	50.10	Nil	35.62	2.86	50.10	Nil
Meghalaya						

Mizoram						
Nagaland	50.2	3.9	26.1	44.1		
Sikkim	92.08	0.11	78.87	9.885		
Tripura						
NER						
All India						

Source: PHE and related Departments/Organisations of NER States.

The 54th round of NSS showed that 26% of urban HHs had no latrines, 22% used average sewerage system and the sewerage connections varied from 48% to 70%. The CPCB reported that the waste water generated in 300 Class I cities was about 15800 million litres per day while the treatment facilities existed for hardly 3750 million litres per day. The status of HHs against the target groups/beneficiaries in respect of urban sanitation as on 31.03.2024 is given in Table 7.5.

Table 7.5: Status of HHs under Urban Sanitation

States	HHs with Shared Latrines (%)	HHs with no Latrines (%)	HHs with Septic Tanks/ Flush (%)	HHs Using Pit Latrines (%)	HHs Using other Latrines	Towns/ Cities with Community /Public Toilets (%)	ODF Towns/ Cities (%)
Arunachal Pradesh							
Assam							
Manipur (IHHL Mission) only All ULBs	10276	NA Nil	34 121770	NA 78800	NA Nil	100	33.33
Meghalaya		0	99	0.01	0	CT 40 PT 100	100
Mizoram							
Nagaland		25.2	45	28.7	0.9	7.4	100
Sikkim		4.8	55.68	3.2	2.6	100	100
Tripura							
NER							
All India							

Source: PHE and related Departments/Organisations of NER States.

The status of HHs which have bathing and drainage facilities within their premises as on 31.03.2024 is given in Table 7.6.

Table 7.6: Bathing and Drainage Facilities

Sl. No.	States	HHs having Bathroom Facility within Premises (%)	HHs having Drainage Facility (%)
1	Arunachal Pradesh		
2	Assam		
3	Manipur	N.A	N.A
4	Meghalaya		

5	Mizoram		
6	Nagaland	82.4	48.2
7	Sikkim	91.99	92.12
8	Tripura		
9	NER		
10	All India		

Source: PHE and related Departments/Organisations of NER States.

The solid waste management status as on 31.03.2024 is given in Table 7.7.

Table 7.7: Status of Waste Management

States	Total Wards (Nos.)	Wards with 100% Door to Door Collection		Wards with 100% Source Segregation		Waste Processing	
		No. of Wards	% of Wards	No. of Wards	% of Wards	Total Waste Generation (MT/D)	Total Waste Processing (%)
Arunachal Pradesh							
Assam							
Manipur	304	304	100%	97	30	290	50%
Meghalaya	142	97	68	75	52	84.1	40
Mizoram							
Nagaland	420	207	49.29	128	30.48	117TPD	2.43
Sikkim	51	51	100	47	93.7	68.9	231
Tripura							
NER							
All India							

Source: PHE and related Departments/Organisations of NER States.

The *Housing for All* agenda i.e. PMAY (Urban), 2015 is launched to meet the housing demand of urbanites belonging to the EWS and the LIG categories. The mission sought to build 20 million housing units (revised to 12 million) and to make Indian urban slum areas free by taking up slum rehabilitation projects. The supply of decent affordable housing by private sector remained woefully inadequate. Besides the PMAY (Urban), the State Governments implement housing schemes/ programmes for the urban poor. The achievement against the target groups/ beneficiaries as on 31.03. 2024 is given in Table 7.8.

Table 7.8: Status of Urban Housing Beneficiaries

States	Houses under PMAY (U) in % or number	Houses under EWS/ LIG in CLSS in % or number	Houses under MIG in CLSS in % or number	Houses under State Housing Scheme	HHs under other schemes / programmes if any
Arunachal Pradesh					

Assam					
Manipur	55804	205	14	Nil	Number of DUs constructed under BSUP for Imphal) is 1250 and under IHSDP for other towns is 2689.
Meghalaya				4605 HHs benefited from roofing materials	
Mizoram					
Nagaland	30766	31	9	NIL	1,054 DU's under RAY (670 DU's under Housing for Urban Poor and 384 DU's under Rental Housing 3,504 DU's under BSUP projects of JNNURM
Sikkim	125	113	42	502	
Tripura					
NER					
All India					

Source: Housing and related Departments/Organisations of NER States.

The number of statutory and slum reported towns with type wise slum population along with the status of slum improvement as on 31.03.2024 is given in Table 7.9. However, there are no notified slums in Manipur.

Table 7.9: Statutory and Slum Reported Towns and Status of Improvement

States	Towns			Type Wise Slum Population			Slum Improvement (%)
	Statutory Towns (Nos.)	Slum Reported Towns (Nos.)	Total Population (Nos.)	Notified Slums	Recognised Slums	Identified Slums	
Arunachal Pradesh	20	1	34,217				
Assam							
Manipur	Nil	Nil	Nil	Nil	Nil	Nil	Nil
Meghalaya							
Mizoram							
Nagaland	26	7	68706	7			
Sikkim	7	7	1,47,695	17	85		56.4
Tripura							
NER							
All India							

Source: Housing and related Departments/Organisations of NER States.

A multistoried building is a four-storey building while a high-rise building is a building which exceeds 15 metres or more in height above the average level of front-end irrespective of occupancy as per the building byelaws. The fixity in the supply of urban land will promote vertical expansion i.e. construction of high-rise buildings in future.

Agartala, Aizawl, Guwahati, Imphal, Itanagar, Kohima, Shillong and Srinagar which fall in Seismic Zone V are vulnerable to high damage risk and the highest intensity considered is MSK IX or even higher while Amritsar, Chandigarh, Gangtok, Dehradun, Delhi, Faridabad, Haridwar, Jammu, Ludhiana, Mathura, Meerut, Nainital, Patna and Shimla fall under Seismic Zone IV. Other urban systems fall under Seismic Zone III and II (MHA, 2006). It is essential to ensure that building byelaws conform with the recommendations to minimize the very high damage risk to the least possible extent.

The MoHUA has launched the SCM in 2015 to promote smart cities with core infrastructure to ensure adherent QoL, smart solutions, clean and sustainable environment to citizens. The list of selected cities (state-wise) and their progress details are given in Table 7.10.

Table 7.10: List of Cities under SCM and their Progress Details

States	City	Round 1, 2, 3, 4	Tendered		Grounded/ Completed	
			No. of Projects	Value (₹ in crore)	No. of Projects	Value (₹ in crore)
Arunachal Pradesh						
	Itanagar	4	32	488.36	13/19	193.49/339.22
	Pasighat	3	43	509.77	16/27	341.61/169.89
Assam	Guwahati					
Manipur	Imphal	1	24	512.87	24/13	512.87/73.19
Meghalaya	Shillong					
Mizoram	Aizawl					
Nagaland	Kohima	2	32	512	27	362.68
Sikkim	Gangtok	3	34	800	6	196
	Namchi	2	23	512	14	255
Tripura	Agartala					
NER						
All India						

Source: SCMs of NER States.

The AMRUT launched in 2015 in 500 cities across the country by the Hon'ble Prime Minister in which ULBs with a population of one lakh or more, capital cities of States/UTs, all HRIDAY cities, identified cities in hill states, islands & tourist destinations and on the stem of the main rivers; are covered under AMRUT. The thrust areas of AMRUT are water supply and improvement in sewerage & septage management, storm water drainage, green spaces & parks and promotion of NMT in Mission cities. The progress of implementation is given in Table 7.11.

Table 7.11: Progress of Project Implementation under AMRUT
(₹ in crore)

Name of State	No. of Cities/Towns	SAAP Size (Amount)	Works Completed (Amount)	Contracts Awarded & Work in Progress	Contracts Awarded Total (4+5)	Contracts to be Awarded	NITs Issued (Amount)	NITs to be Issued (Amount)	Total (6+8+9) (Amount)	DPRs to be Approved (3-10) (Amount)
1	2	3	4	5	6	7	8	9	10	11
Arunachal Pradesh										
Assam										
Manipur	1	180.31	190.72	179.03	180.31	Nil	Nil	Nil	180.31	Nil
Meghalaya										
Mizoram										
Nagaland	2	120.21	57.64	62.57	120.21	0	0	0	120.21	0
Sikkim	5	49.41	0	4	4	43	6.41	43	49.41	0
Tripura										
NER										
All India										

Source: PHE, Housing and Urban Affairs/Development Department of NER States

To address the multidimensional problems in urban systems such as inadequate supply of skill sets, pressure to support urban livelihoods, rural – urban migration of workforce, creation of more job growth, etc.; the MoHUA has launched the DAY-NULM in 2018 to support both wage employment and self-employment. The status of achievement as on 31.03.2024 is given in Table 7.12.

Table 7.12: Cities Where Street Vendor Surveys Completed and Identified

Name of State	Number of Towns/ Cities where Street Vendor Surveys Completed	Number of Identified Vendors in Surveyed Cities	Number of Identified Vendors issued ID Cards	TVC Completed
Arunachal Pradesh				
Assam				
Manipur	27	20447	20126	3-TVC Regular 17-TVC Provisional
Meghalaya				
Mizoram				
Nagaland	39 ULBs	7925	7242	22
Sikkim	7	871	871	7
Tripura				
NER				
All India				

Source: PHE and related Departments of NER States.

India has witnessed an exponential growth of automobile industry in the last two decades (SIAM Reports, 2018; google. co.in, 2023). The growth of private cars posed great challenges to planners, traffic engineers and policy makers. Improvement of urban transport systems such as construction of urban roads, multilevel parking spaces, bus terminals, flyovers etc. is being made by the Governments. The three ubiquitous problems in urban transport sector are traffic congestion, air pollution and traffic accidents with the former posing the greatest challenge.

A compendium of States’ strategies for transforming urban and regional mobility including the low-cost *traffic calming measures/traffic taming measures* such as setting up of driving schools, lead agency, protection of good Samaritans, provision of road safety fund etc. for the States of Assam, Manipur, Meghalaya, Nagaland and Tripura in conformity with the SDG 11 is available (NITI Aayog, 2018, Government of Meghalaya, 2020, Dalberg, 2021).

The existing levels of traffic congestion during peak traffic hours (9:00 A.M to 11:00 A.M and 5:00 P.M to 7:00 PM) and the measures taken as on 31.03.2024 are given in Table 7.13.

Table 7.13: Traffic Congestion Levels in Towns and Cities

Congestion Levels in Towns and Cities	Population	LoS C i.e., v/c ratio is < 0.5	LoS D i.e. v/c ratio is from 0.5 to 0.74	LoS E i.e., v/c ratio is from 0.75 to 1.00	LoS F i.e., v/c ratio is > 1	Progress of Implementation of Traffic Decongestion Measures (%)
Arunachal Pradesh						
Itanagar	59,490					
Naharlagun	36,158					
Pasighat	24,656					
Assam						
Guwahati	9,62,334					
Silchar	1,78,862					
Dibrugarh	1,45,488					
Jorhat	1,26,736					
Nagaon	1,21,628					
Tinsukia	1,16,322					
Tezpur	75,400					
Bongaigaon	67,322					
Dhubri	63,388					
Diphu	61,797					
Lakhumpur	59,814					
Karimganj	56,854					
Manipur						

Imphal	2,77,196					Imphal does not suffer from LoS E LoS F. Current traffic flows in different TAZs of the city vary between LoS A and LoS C and hence are acceptable.
Thoubal	45,947					<p>Several roads are identified in Thoubal for road widening In response to the growing need for sustainable transportation solutions in Thoubal, three PBS stations are proposed.</p> <p>It is recommended to have a minimum of 1.8 meter width footpath on various roads to segregate motorized and pedestrian traffic.</p> <p>A new mini-bus/Cab route along the southern boundary of Thoubal Municipal Council is proposed.</p> <p>A stretch establishment of a no-parking zone spanning about 1 km is proposed at Thoubal market. On-street parking is prohibited on the stretch.</p>
Moirang	32,138					Moirang LoS E and LoS F. Current traffic flows in different TAZs of the town vary between LoS A and LoS B and hence are acceptable.
Meghalaya						
Shillong (UA)	3,19,605			LoS E	LoS F	
Tura	74,858			LoS E		
Nongstoin	28,742	LoS C	LoS D			
Jowai	28,430			LoS E		
Williamnagar	24,597		LoS D			
Mizoram						
Aizawl	2,93,416					
Lunglei	57,011					
Champhai	32,734					
Saiha	25,110					
Kolasib	24,272					
Nagaland						
Dimapur	1,22,834		LoS D	LoS E	LoS F	
Kohima	99,039		LoS D	LoS E	LoS F	
Tuensang	36,774					
Mokokchung	35,913					
Wokha	35,004					
Mon	26,328					

Chumukedima	25,885				
Sikkim					
Gangtok	1,00,286		LoS D		Junction improvement and widening of inner-city roads as per CMP is 75 %. Construction of dedicated pathways, foot over bridges, elevated walkways as per CMP is 40%. Construction of multilevel car parking in the old core targeting 1000 ECS is 70%. Proposed Aerial Ropeway Act passed by the Assembly.
Namchi	12,190				Current traffic flows in different TAZs of Namchi town vary between LoS A and LoS B and hence they are acceptable.
Tripura					
Agartala	5,22,613				
Dharmanagar	45,887				
Udaipur	37,781				
Kailashahar	23,418				

Source: Census of India - 2011, PHE, Housing and Urban Affairs/Development Department of NER States

Table 7.13 shows that some towns and cities are already in the LoS E and LoS F i.e., heavy congestion and severe/hyper congestion. This therefore requires target setting for implementation of robust traffic decongestion measures, traffic calming measures, strategies for greening of urban transport systems and launching of green street programmes including landscaping of existing urban roads and piazzas, retrofitting of existing bridges and culverts for birds' nests, creation of downtown ecology in traffic roundabouts, etc. to mitigate the multidimensional problems within the horizon year (Tolley, 1997; Sipes and Sipes, 2013, Schilthuizen, 2018).

7.3. Institutional Drawbacks

There are only about 7000 registered members in ITPI, New Delhi. The NER started producing very few qualified town planners with M.T.C.P degree or A.I.T.P (India) in the 1960s and 1970s and there exists a supply-demand gap of qualified town planners. As a result, prospective employers, unaware of these courses and skill sets, end up hiring planning professionals from other disciplines such as architecture and civil engineering to undertake the tasks of urban planning which created a negative feedback loop (NITI Aayog, 2021). The supply-demand gap of master plans or CDPs and qualified town planners targeted to be achieved within the horizon years are given in Table 7.14.

7.14: Supply-Demand Gap for Town Planners and Master Plans

States	Towns with Master Plans/CDPs (in nos.)	Town without Master Plans/ DPs (in nos.)	Strategies to fill the gap by 2047	Existing numbers of Town Planners	Required numbers of Town Planners	Strategies to achieve the Goal by 2047
Arunachal Pradesh	14	23	Master Plan under preparation: 4 towns. Master Plan proposed under AMRUT 2.0 Sub-Scheme: 5 towns.	12	25	Long-term strategy: To create a total of 84 posts of Town Planners. Out of which 9 posts is for State Headquarters, 28 posts for District Headquarters and 47 posts of Assistant Town Planners for Sub-Divisions. b. Short-term strategy: To create a total 18 posts of Town Planners. Out of which 6 posts of Town Planners will be created by segmenting towns into 6 Divisions and 12 posts of Assistant Town Planners for 12 Sub-Divisions.
Assam	102	00	100% GIS based Master Plans. 100% Drainage and Utility Master Plans. 100% Coverage under online building permission system.	35	03	Vacant posts of Town Planners will be recruited shortly. 25 Town Planners have been appointed on contractual basis under the AUKH.
Manipur	1 State Capital	26 Statutory Towns	The MoHUA Affairs has approved funding for preparation of GIS-Based Master Plan for 5 class III towns under AMRUT 2.0. Preparation of Risk Informed GIS based Master Plans for 17 towns taken up under State funding GIS- Based Master Plan for 4 towns under State funding is under preparation by SPA,	11	54	Financial assistance either from NEC or MoHUA is needed for creation and filling up of the suggested no of posts.

			Bhopal.			
Meghalaya						
Mizoram						
Nagaland	7	19	Preparation of Master Plans for 2 towns is in progress while for the 5 towns are under proposals.	24		
Sikkim	1	6	Namchi Master Plan proposal under AMRUT 2.0 has been submitted to the MoHUA.			12 posts viz. Principal Chief Town Planner – 1, Chief Town Planner – 1, Additional Town Planner – 2, Joint Town Planner – 2, Town Planner – 2 and Assistant Town Planner – 4 will be created.
Tripura						
NER						
All India						

Source: Housing and Urban Affairs/Development Department of NER States

7.4. Governance Dynamics

State Governments take unilateral decisions in matters such as fixation of rates of user charges, property tax, octroi, role of parastatals in water supply and sanitation services etc. even if such decisions affect the ULBs. Beholders perceive that ULBs are mere Governments’ subordinate entities existing for their own survival and not for developing the urban systems (Dwivedi, 2007).

The SDG 11 ranking for the year 2020-21 is given in Table 7.15. The score values and ranks as on 2020 indicated the need of more concerted efforts to achieve the SDG 11 by 2047.

Table 7.15: Ranking for SDG 11 as per the SDG India Index & Dashboard 2020-21

Sl. No.	State	Score	Rank
1	Arunachal Pradesh	39	20
2	Assam	55	16
3	Manipur	65	14
4	Meghalaya	51	17
5	Mizoram	61	15
6	Nagaland	48	18
7	Sikkim	85	4
8	Tripura	67	13

Source: SDG India Index & Dashboard, NITI Aayog, 2020.

Recommendation: The score values and ranks of NER States as on 2020 indicated the need to put in more efforts to achieve the SDG 11 by the horizon year.

7.5. Economic Geography of ‘Gateway City-Regions’ and Connectivity

Economic geography approach is an interface of multiple disciplines involving geography, economics, management science, urban and regional planning and governance. It employs spatial economics and leverages strategic planning for city regions to improve urban planning outcomes (MoHUA, 2023). An empirical analysis of gravity model revealed that India’s direction of trade with ASEANs is influenced by distance and size of trading partner. The key takeaway is that minimization of transport cost will augment the trade volume with ASEAN countries (NEDFi, 2018). *Potential city-regions* programme connecting the ASEANs with Chief Secretaries of the respective NER States as Chairpersons may be launched in future to actualize the concept of city-region planning and contribute to the 10 trillion economy of the country.

The dominance of a *primate city* at the regional or meso (state) level in terms of an abnormally large size and influence which is at least twice as large as the second town or city, hampers the healthy growth of other urban systems. The higher the *index of primacy*, the higher is the degree of primacy. Using the *index of primacy*, the urban systems in the Region are given in Table 7.16.

Table 7.16: Primacy and Urban Systems in the Region 1981 and 2011

State	1981			2011		
	First Ranking	Second Ranking	Index of Primacy	First Ranking	Second Ranking	Index of Primacy
Arunachal Pradesh	Pasighat (9,125)	Old Itanagar (7,636)	1.19	Itanagar (59,490)	Naharlagun (36,158)	1.64
Assam*	Guwahati (1,23,783)	Dibrugarh (80,348)	1.54	Guwahati (9,62,334)	Silchar (1,78,862)	5.38
Manipur	Imphal (1,55,639)	Kakching (21,145)	7.36	Imphal (2,77,196)	Thoubal (45,947)	6.03
Meghalaya	Shillong (1,73,062)	Tura (35,131)	4.92	Shillong (UA) 3,19,605	Tura (74,858)	4.27
Mizoram	Aizawl (75,971)	Lunglei (17,773)	4.27	Aizawl (2,93,416)	Lunglei (57,011)	5.14
Nagaland	Kohima (36,014)	Dimapur (32,315)	1.11	Dimapur (1,22,834)	Kohima (99,039)	1.24
Sikkim	Gangtok (36,768)	Singtam (4,042)	9.10	Gangtok (1,00,286)	Namchi (12,190)	8.22
Tripura	Tripura (1,31,513)	Dharmanagar (20,802)	6.32	Agartala (5,22,613)	Dharmanagar (45,887)	11.39

Source: Urbanisation and Urban Systems in India by Ramachandran and P.S. Nianglang’s Computation, 2023.

Note: *For Assam the data 1971 are used since the census data are not available for 1981.

In 1981 the primacy indices for Manipur, Meghalaya, Mizoram, Sikkim and Tripura which are greater than 2, indicated the existence of primate cities and thus called for an ‘interventionist approach’ of planning professionals. Interestingly, the primacy did not occur in Arunachal Pradesh, Assam and Nagaland since the *index of primacy* is less than 2 which implied that Old Itanagar, Guwahati and Kohima is counterbalanced by Dibrugarh, Pasighat and Dimapur respectively (Ramachandran, 1989). In 2011, primacy occurred in Assam too, but Arunachal Pradesh and Nagaland retained their

permissible degrees of primacy. Although, this exercise is not exhaustive, it sounded an alarming bell to town planners about the need to formulate suitable planning strategies and policies to mitigate the possible problems that is likely occur in future.

The Region requires a robust mobility/connectivity network. Among the transportation modes viz., roadways, railways, waterways, airways and pipelines; the former dominates the role of transporting persons and goods. The conceptual classification of intermodal integration for urban transport planning is given in Table 7.17.

Table 7.17: Conceptual Classification of Modal Integration for Urban Transport Planning

<p>Level IV: Individual facilities such as a boulevard, intersection, pedestrian area or bus line.</p>	<p>Level III: Single mode network or system such as a street network, a network of bicycle lanes or a regional rail system.</p>	<p>Level II: Multimodal coordination system incorporating streets and freeways, different transit modes, pedestrian zones and the like.</p>	<p>Level I: A city-transport ridership coordinating between the transport system and the city, its physical components and all other functions such as economy, housing, social conditions and myriad others and is the highest level of planning and operational integration.</p>
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Source: Transportation for Liveable Cities by V.R. Vuchic.

7.6. Markets, Technology and Infrastructure

Technologies such as AutoCAD, ArchiCAD, SketchUp, STAAD.PRO, etc. are widely used by architect-planners and civil engineer-planners for their works and are market-oriented. Transport planners use CUBE, TRIPPS, VISUM, etc. in their works. GIS surveying and mapping techniques such as GPS, Differential GPS, Total Station, UAV, LiDAR, etc. are popularly used by planning professionals and experts in GIS applications working in the private and public sectors as per the Remote Sensing Data Policy 2023. Planners need to update their technical know-how in the field of quantitative techniques along with their concomitant technologies viz., SPSS, R, Stata, LISREL, Amos, MATLAB, etc. Such technical knowledge provides employment opportunities in public and private sectors.

Recommendation: Capacity building of qualified town planners through workshops and trainings including hands-on trainings is inevitable.

7.7. Urban Housing

People need roofs over their heads. Rapid urbanization combined with economic disparities led to increasing problem of housing, overcrowding in small houses, steady growth of slums and makeshift dwellings, severe deleterious effect on civic services etc. in urban areas. The QoL of households in slums and squatter settlements affect them socially, psychologically and economically. Using housing structure, access to drinking water and sanitation facilities (latrine and bathroom) as the parameters; the study examined the housing condition and access to basic amenities and found that housing structure and housing conditions in the urban areas of NER, are slightly lower than the national level (Thanga, 2022).

A significant size of townsfolk lives in six types of housing areas, namely, (1) slums and *jhuggee-jhopadee* clusters, (2) unauthorized colonies, (3) old cities, (4) sites and services of public housing, (5)

built-up units of public housing and (6) in private housing. The role of private sector in EWS/LIG housing is insignificant.

7.8. Urban Transport Planning

Besides the measures given in the Tables, there is an increasing emphasis to put in place a robust urban transport policy with a view to improve the overall QoL in urban systems. Demand for urban transport infrastructure increased manifold in recent decades. This exigency called for drastic improvement including retrofitting of the existing urban transport infrastructure. Provision of medians, walkways, cycle tracks, cycle parks, traffic rotaries, traffic islands, basins and bioswales, arboriculture, cold mix technology and green materials, retrofitting of bridges and culverts for birds' nests and other measures for greening of urban transport is a cynosure of planners' eye.

Urban mass transit system is one of the most effective measures acceptable to both captive and choice riders as it is cheap, comfortable and weans away commuters from using their private cars. Among the 30 sample cities, Guwahati and Gangtok are selected for the study. The findings showed that the share of public transport for Gangtok is 0 and for Guwahati is 8% which is very low as compared to Chennai (31%), Delhi (43%), Mumbai (45%), Kolkata (54%) and other cities (Wilbur Smith Associates, 2008). It is observed that the share of urban PT has increased after the National Urban Transport Policy 2014, however, LoS E and LoS F worsened in some capital cities.

7.9. Urban Drinking Water

Rising water demand is caused by rapid urbanization and enormous stress on supply sources. While planning for water supply system, it is essential to consider water conservation aspects, which may be possible through optimal use and conservation of available water resources, prevention and control of water wastage and effective demand management. The water supply standards prescribed by the CPHEEO are given in Table 7.18.

Table 7.18: Water Supply Standards

Sl. No.	Classification of Towns/Cities	Recommended Maximum Water Supply Levels (lpcd)
1	Towns provided with piped water supply but without sewerage system.	70
2	Cities provided with piped water supply where sewerage system is existing/contemplated.	135
3	Metropolitan and mega cities provided with piped water supply where sewerage system is existing/contemplated.	150

Source: CPHEEO Manual, 1999.

Standards for fire-fighting water demand, water requirements for institutional buildings, industrial units, water requirements for train stations, metro stations and various uses set out by the CPHEEO are available in the URDPFI Guidelines 2014 (MoUD, 2015). It is crucial that urban systems planning should be carried out with adequate provisions of *clean-green-blue* infrastructure conforming to urban structure, land use policy, transport systems and natural drainage patterns.

7.10. Solid Waste Management

The MSW Rules 2000 includes commercial, residential and treated bio-medical wastes generated in a municipal or a notified area either in solid or semi-solid form excluding industrial hazardous wastes. Waste generation is caused by human activities in which a product or material in its present form, is regarded as valueless and is thrown away for accumulation with other waste for disposal. The waste generation per capita per day prescribed for estimation and forecast of waste generation for future planning is given in Table 7.19.

Table 7.19: Waste Generation Per Capita Per Day

Sl. No.	Land use Type	Estimated Waste Generation
1	Residential refuse	0.3 to 0.6 kg/cap/day
2	Commercial refuse	0.1 to 0.2 kg/cap/day
3	Street sweeping	0.05 to 0.2 kg/cap/day
4	Institutional refuse	0.05 to 0.2 kg/cap/day

Source: Manual on Solid Waste Management, CPHEEO, 2000.

MSWM is a systematic treatment of MSW in a sequential manner, namely, waste segregation, storage at source, primary collection, secondary storage, transport, secondary segregation, resource recovery, processing, treatment/ recycling, landfill gas extraction and final disposal of solid waste. Solid waste management is a mammoth task which poses an urban challenge to town planners and civic society.

7.11 Vision 2047: Possibilities, Potentials and Promises

Goals may undergo a phantasmagoria of change in future due to the operation of some causative factors and unpredictable forces, however, such changes are likely to occur within the logical framework of SDG 11. The status of basic urban amenities as on 31.03.2024 warrants target setting for achieving the SDG 11 by 2047 being the horizon year.

SDG 11 aims at making urban systems inclusive, safe, resilient and sustainable by providing access to safe and affordable housing, public transport, basic services and green public spaces through renewed urban planning and management. The goals also aim at reducing the adverse per capita environmental impact and the number of deaths and direct economic losses occurring in urban systems. The targets to be achieved by 2047 are as below-

1. By 2047, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums.
2. By 2047, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons.
3. By 2047, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries.
4. Strengthen efforts to protect and safeguard the world's cultural and natural heritage.
5. By 2047, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product

caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations.

6. By 2047, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management.
7. By 2047, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities.
8. Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning.
9. By 2047, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.
10. Support least developed countries, including through financial and technical assistance, in building sustainable and resilient buildings utilizing local materials.

Table 7.20: SDG Targets and Key Strategies for Manipur

Key Strategies/ Monitorable Indicators/	Targets set for 2030 (%)	Targets set for 2035 (%)	Targets set for 2040 (%)	Targets set for 2045 (%)	Targets set for 2047 (%)	Key Departments /ULBs/ Parastatals
7.11.1	25	25	25	20	5	Municipal Administration, Housing and Urban Development (MAHUD) Department and the ULBs
7.11.2	30	20	25	20	5	Public Works Department, MAHUD and Transport Department, Manipur
7.11.3	30	20	25	20	5	Town Planning Department and all the ULBs.
7.11.4	25	25	25	20	5	Arts and Culture and Tourism Department, Manipur.
7.11.5	30	20	25	20	5	Water Resources Department, Relief and Disaster Management, Medical and Health Services, Manipur.
7.11.6	30	20	25	20	5	Environment and Climate Change Department, Manipur Pollution Control Board and all the ULBs.
7.11.7	25	25	25	20	5	All the ULBs
7.11.a	30	20	25	20	5	Town Planning Department, Manipur
7.11.b	30	20	25	20	5	Environment and Climate Change Department, Manipur
7.11.c	40	20	20	15	5	All the ULBs.

Source: Housing and Urban Affairs/Development Department of NER States

Recommendation: Town and Country Planning Departments/Urban Development Authorities jointly with ULBs shall actualize the targets (tentatively assigned in percentages) of the Key Strategies/Monitorable Indicators/ Key Performance Indicators (KPIs) for achieving the SDG 11 by 2047.

7.12 Formidable Challenges and Possible Pull Factors

Earthquake, floods, storm, bad weather and other hazards are formidable challenges faced by the urban community. Growth of towns without master plans, mushrooming of slums, lack of urban financing to ULBs, traffic congestion, increasing risk of water scarcity, lack of disaster mitigation plans, etc. are alarming. The signing of peace/ ceasefire agreement between the Government of India and the insurgent groups led to the overall improvement in security. The recommendations of experts stipulate the Centre and the State Governments to implement those strategies/ measures meant for overcoming the urban challenges (NITI, Aayog, 2021). Urban challenges such as water, food, environment, energy, disasters and non-traditional security threats are discussed in other chapters.

The existence of aesthetic landscape containing waterfalls, cascades, heritage sites, natural and scenic beauty in and around the urban systems; showcase tourism and attract tourists (both domestic and international) besides attracting the businessmen/investors from other parts of the country. Focus needed for the development of niche tourism meant for the EWS of society is discussed in Chapter 9. The existing mechanism for creation of hotels, inns, restaurants, heritage, archeological sites and other tourism-related infrastructure including high-end tourism needs further improvements and equipment with the latest technologies. These collectively will act as pull factors for agglomeration economies in urban systems.

Recommendation: Explorations of available resources and appropriate measures/ strategies may be carried out to the maximum to overcome the formidable challenges and possible pull factors.

7.13 Cost not Doing/Reaching the Targets

The cost of not doing or reaching the targets by 2047 may result in *backwash effects* which will paint a gloomy picture of the futuristic *urban systems*. Effects such as urban unemployment, hyper traffic congestion, depletion of green spaces, severe air pollution, urban poor without housing, makeshift dwellings etc. are likely to continue which may result in law-and-order problems, namely, rampant drugs peddlers, robbery, child trafficking and insecurity including cybercrimes and may induce a state of anarchy/anomie. Such effects will pull down the ranking of States' performance.

7.14 Critical Policy Intervention

Experts identified ten critical issues for policy interventions, namely, (1) urbanization and recognition of urban areas, (2) lack of planning of cities and regions, (3) lack of institutional clarity, (4) lack of adequate and technically qualified planners in public sector, (5) demand-supply issues, (6) challenges in developing the private sector, (7) disconnect between urban planning and urban land records, (8) lack of specialized professionals, (9) challenges in growth of urban planning profession and (10) limited awareness about urban planning (NITI Aayog, 2021). Other critical issues such as application of systems planning, regulating the growth of *primate cities*, setting up of Transport Planning Research Cells/Divisions, creating green roadways, enactment of Urban Mass Transportation Act 2024, TEA-21, formulation of policies, namely, Urban Transportation Policy, Urban Land Bank Policy, Guidelines/ White Zoning as the Planning Standard, TDRs, TOD, etc. need special focus and policy intervention.

7.15 Institutional Support

The recommendations of the Advisory Committee, namely, programmatic intervention for planning of healthy cities, optimum utilization of urban land, ramping up of human resources, supply of qualified planning professionals for undertaking urban planning, mainstreaming capacity-building activities and rejuvenation of capacity-building centres, re-engineering of urban governance, amendment of Town and Country Planning Acts, de-mystifying planning and involving citizens, building local leadership needs introspection of the present functioning system (NITI Aayog, 2021).

The setting up of the SPA, Shillong, approved in the 57th NEC plenary and reiterated in the 59th NEC meeting needs early fruition to meet the demand-supply gap of qualified town planners in the Region in the face of urban challenges.

In keeping pace with the 2047 agenda, urban planners in public service shall, from time to time, monitor and evaluate the progress of implementation in synchrony with the *Report on Urbanisation and Urban Development Policy Issues of the North Eastern 1988*, the *Final Report on 'Reforms in Urban Planning Capacity in India 2021*, the *First Report 2023 of the High Level Committee on Urban Planning i.e. Pathways to Amrit Kaal: Envisioning and Realising a New Future for Indian Cities* and the recommendations taken in different meetings of the NCCS chaired by the Hon'ble Prime Minister. The NITI Aayog has set out the objectives, KPIs, targets and sub-goals for achieving by 2047. Bearing in mind these policy instruments, the *systems planning* approach may be adopted expeditiously to produce the 'flux state' or 'cycle state' master plans for all the extant and futuristic urban systems.

7.16 Town and City Level Recommendations

It is the bounden duty of town planners to carry out regularly a gap analysis pertaining to the demand of measures/strategies for traffic decongestion, traffic accidents mitigation, pollution control, provision of housing for the poor, slums and makeshift settlements eradication, augmentation of water supply, robust solid waste management systems, sewage and sewerage systems, urban infrastructure and other amenities/utilities keeping pace with the rapid increase of urban population, latest research and development and passage of time.

- Application of *systems planning* approach which overcomes the weakness of *physical planning* and *design* approach.
- Preparation of *GIS based master plans* preferably the 'flux state' or 'cycle state' *land use plans* for every 10 years may be explored.
- Preparation of city development plans/city investment plans for every 5 years is essential.
- Review of progress of implementation of *master plans* or *cycle land use plans* may be carried out regularly every 2½ years to effectively control erratic changes that are likely to occur in the *probabilistic urban systems* in the foreseeable future. It is expedient that evaluation of plan alternatives is carried out regularly.
- Implementation of the town/city-wise key strategies, targets set for achieving the SDG 11 in a time-bound manner is extremely essential.
- Provision of street vending schemes for removal of street vendors from walkways and road spaces meant for pedestrians and vehicles needs to be completed in phase manner.
- Provision of universal/national supply- and demand-driven traffic decongestion measures including short, medium and long-term traffic strategies suitably modified /customized according to the existing transport systems, urban structure and physiognomy of urban system is of paramount importance.

Chapter 8

Ecological Security Threats, Climate Change Impact and Adaptation /Mitigation, Strategy for Conservation & Protection of Biodiversity

8.1 Ecological Security Threats

8.2 Climate Change Impact with Adaptation and Mitigation Strategies

8.3 Disaster Management

8.4 Strategy for Conservation, Protection and Utilisation of Biodiversity

8.1 Ecological Security Threats

8.1.1 Non-Traditional Security Threats in Northeast India

Security is the opposite of risk, focusing on keeping things safe. Ecological security ensures people are not harmed by environmental damage. This includes maintaining clean air, water, and a healthy environment, especially in biodiversity-rich areas like NER. Checking ecosystem health, analyzing risks, creating safe landscapes, and managing ecosystems are crucial for ecological security. North East India faces a unique set of security threats beyond the traditional military and territorial concerns. These non-traditional threats pose significant challenges to the region's stability, development, and well-being.

In Northeast India, rainfall has decreased by 8% since 1901 and is projected to continue declining until around 2050, before eventually returning to early 20th-century levels by the end of the century. Climate models suggest a significant increase in extreme rainfall events by 2050, particularly under high greenhouse gas emission scenarios. This underscores the need for carefully designed assessment studies to generate reliable projections and inform effective mitigation strategies.

Some of the most prominent non-traditional security threats in North East India are mentioned below:

1. Climate Change:

- CC and its negative impact on environment and lives on the planet is a global reality now.
- In so far as NER is concerned, melting of Himalayan glacier particularly through Sikkim and Arunachal Pradesh is an additional threat which might inundate plain areas and deposit tons of silt besides washing away the rich biodiversity along the path.
- Glacial retreat: Melting glaciers contribute to water scarcity and threaten the livelihoods of communities reliant on glacial melt water for agriculture and hydropower.

- Loss of biodiversity: Rising temperatures and changing ecosystems disrupt natural habitats, endanger wildlife, and impact traditional livelihoods dependent on natural resources.
- 2. Socio-economic disparities:**
- Poverty and unemployment: Limited economic opportunities and lack of access to education and healthcare trap many in poverty, fueling social unrest and instability.
 - Ethnic tensions and conflicts: Historical grievances, land disputes, and can lead to violence and hinder regional cooperation and development.
- 3. Drug trafficking and organized crimes:**
- Corruption and lack of accountability: Weak governance and corruption can enable criminal networks to operate with impunity, undermining the rule of law and public safety.
 - Negative impact on health and security: Drug abuse and criminal activity contribute to social problems, health risks, and violence, posing a significant threat to human security.
 - Porous international borders facilitate trafficking.
- 4. Cybercrime and misinformation:**
- Limited digital literacy and awareness: Lack of awareness and knowledge about cybersecurity makes individuals and communities vulnerable to cyberattacks and online scams.
 - Threats to critical infrastructure: Cyberattacks can target critical infrastructure, such as power grids and communication networks, disrupting essential services and causing widespread chaos.
- 5. Resource extraction and environmental degradation:**
- Unsustainable resource extraction: Unregulated mining, logging, and other resource extraction activities can lead to deforestation, land degradation, and water pollution.
 - Environmental damage and health risks: Pollution from resource extraction activities can have serious consequences for human health and the environment, causing respiratory illnesses, water contamination, and other health problems.

8.1.2 Ecological Security Threats:

Northeast India faces various ecological security threats that pose risks to its diverse and fragile ecosystems. These threats are interconnected and can impact biodiversity, water resources, and the overall well-being of the region. Some key ecological security threats in Northeast India include:

A. Humans and Nature

- Deforestation: Widespread logging, agricultural expansion, and infrastructure development in Northeast India threaten forests, causing habitat loss, ecosystem disruption, and biodiversity decline.
- Illegal Wildlife Trade: The region's diverse endangered species face additional threats from illegal wildlife trade, driven by demand for exotic pets, traditional medicine, and animal parts, disrupting ecological balance.
- Climate Change: Northeast India's vulnerability to climate change, including shifts in temperature, precipitation patterns, and extreme weather events, poses risks to ecosystems, agriculture, and water resources. (This has been covered above hence can be deleted instead of repeating)
- Unsustainable Agriculture Practices: *Intensive farming practices like slash-and-burn cultivation contribute to soil erosion, land degradation, and reduced agricultural productivity. Chemical fertilizers and pesticides further harm local ecosystems.* (Since there are opinion for and against slash and burn, we may avoid this. Further, average chemical fertilizer and pesticide use in NER is one of the minimal. We may perhaps say as follows:
 1. Eco-Insensitive agriculture: Faulty land tenure system and absentee land ownership leading to a agricultural practice pursued largely by ecosystem refuse without any concern for maintenance of ecological health.
 2. SLUB (State Land Use Policy) has remained inoperative in most of the NER State.
- Invasive Species: Introduction of invasive plants and animals competes with native species for resources, altering habitats and reducing biodiversity in the region.
- Population Pressure: Rapid urbanization and population growth increase demands on resources, leading to habitat loss, overexploitation of natural resources, and heightened pollution.
- Lack of Conservation Awareness: Limited awareness about ecological conservation exacerbates unsustainable practices, hindering efforts to protect biodiversity and ecosystems.

8.1.3 Vision 2047

Vision 2047

Strategic Moves and Policy Interventions: Addressing ecological security threats in Northeast India necessitates comprehensive efforts, including sustainable land-use practices, conservation awareness promotion, environmental regulation enforcement, and community engagement in conservation. Implementing phased targets can enhance the effectiveness of these efforts.

Vision Action I:

Table 8.1 Regional Water and Forest Policies and Implementation

Phase	Targets
2025 - 2030	<ul style="list-style-type: none"> Formulating state-level policies to attain Nationally Determined Contribution targets involves the creation of dedicated and proactive initiatives to combat climate change. These policies aim to promote Sustainable Land Management, enhance Capacity Building and Farmer Education, and foster Climate Resilient Livestock Farming. Introduction of carbon credit systems to reduce negative impact of economic growth on the environment.
2025 - 2027	<ul style="list-style-type: none"> Drafting and strengthening water and forest policies and Integration of forest issues into overall adaptation strategies. and proper implementation of National Action Plan on Climate Change (NAPCC)
2028-2047	<ul style="list-style-type: none"> Implementation of water and forest policies and robust monitoring and evaluation framework to track the successful implementation of policies and issuance of carbon credits.

Vision Action II

Table 8.2: Indigenous communities for Climate Change Actions

Phase	Target
2025-2030	<p>Massive block/ taluk level awareness creation on negative impact of climate change with alternative models land use and life styles. <i>Indigenous communities are relatively less aware of climate change therefore involving community youth and women from different sectors to study and share knowledge and experience about climate change issues including eco systems, agricultural practices, livelihood, and disasters.</i></p>
2026-2035	<p>Use mid and high hill areas including shifting cultivation areas for promoting natural farming and conservation of biodiversity including medicinal and aromatic plants.</p> <p>Generate and build skills among a critical mass of youths , women and other stakeholders on climate change issues</p>
2035-2047	<p>Mid-term review on the progress, take corrective measures and ensure ecosystem people connect with the monitoring and evaluation team to be put in place.</p>

Vision Action III

Sustainable Forest Management and Trees outside Forests Certification schemes contribute to climate change mitigation by preserving trees, especially benefiting small landholders. This aligns with the commitment to achieve 2.5 – 3 billion tons of CO2 equivalent by 2030 (Paris Agreement, 2015) and the goal of attaining 33% Forest & Tree cover (National Forest Policy, 1988).

Table 8.3: Vision Actions on Sustainable Forest Management

Phase	Target	Village and Landholders
2025- 2030	<ul style="list-style-type: none"> • Massive a forestation drive with MPTs (Multi-Purpose Trees) involving the eco-system players with location specific multi-tier agro forestry models. • Map the soil and air quality before and after the drive to record intervention benefit, if any in terms of biodiversity protection, carbon sink development. <p><i>Webinars, workshops, trainings for creating awareness and close interaction of certification organizations with land holders and officials at district level by promoting Agro-forestry practices to improve soil fertility, prevent erosion, and diversify farmers' income with timber and fruit sales.</i></p>	Consider at least 500 landholders from each district

Vision Action IV

Bringing Technology to the Forefront

Lack of technological inputs in the region can be addressed through geospatial technology, aiding land managers and conservationists in visualizing ecosystem service patterns and anticipating impacts of land use or climate changes. Preventing deforestation is crucial, as it reduces exposure to disease-causing microbes, mitigating the risk of pandemics.

Table 8.4: Vision Actions on Bringing Technology to the Forefront for SDG

Phase	Target
2025-2035	<ul style="list-style-type: none"> • High density planting of trees • Carbon sequestration modeling for <i>in-situ</i> carbon deposit as well as canopy management. • Attempt in forest areas to collect, value add and apply animal

	<p>dung along the plantation sites and flora rich areas for microbial diversity restoration and plant growth.</p> <ul style="list-style-type: none"> • Massive bamboo plantation along the forest periphery both for bio-fuel generation and territory protection. • Major thrust in the forest areas on orchid cultivation on the selected trees so planted or establishes specially designed orchidarium. • Use either side of the national highways for different fruit/ ornamental tree plantation so as to earmark each district with a particular fruit/ ornamental tree. <p><i>Development of Regional IT institutes for climate and crop/forest resource for vulnerability-adaptation mapping</i></p> <p><i>NER or collaboration with technical institutes and Digitization</i></p> <ol style="list-style-type: none"> <i>1. Climate Resilient and Disaster Resistant Infrastructure</i> <i>2. Green Infrastructure</i> <i>3. Infrastructure Maintenance</i>
2035-2047	<ul style="list-style-type: none"> • Mid-term appraisal/ showcasing the success stories and attracting tourists and naturalists from across the globe. • Impact assessment of the program on environment rejuvenation, timber/ fruit yields and value added products made out of them. • Creation of startups on planting material generation and supply to other regions/ countries, encasing carbon credits etc. • <i>Monitoring and evaluation of data obtained over the years.</i> <ol style="list-style-type: none"> <i>1. Conduct vulnerability assessments</i> <i>2. Develop contingency plans for infrastructure repair and restoration</i>

Vision Action V: Attain the SDG Targets

Table 8.5: Vision Action for Attain the SDG Targets

Phase	Target
2023-2035	<p>Achieve goals of SDG by :</p> <ol style="list-style-type: none"> 1. Eradicating poverty 2. Providing Good health and wellbeing 3. Providing Quality education 4. Gender equality 5. Climate action 6. Life on land 7. Decent work and economic growth
2035-2047	<p>Monitoring the parameters every 2nd or 3rd year and achieve the target of 5%</p>

Vision Goal VI

Dealing with Climate Change exacerbated public health issues such as malaria and malnutrition, affecting both humans and microbial ecosystems.

**Table 8.6:
Vision Goal and Targets to Dealing with Climate Change and exacerbated public health issues**

Strategies	Targets
1. Disease Surveillance and Response	<ul style="list-style-type: none"> • Molecular animal and human disease surveillance and monitoring system has to be made stronger with collaboration with national • A strong mechanism for early diagnosis of zoonotic diseases considering particularly the threat from trans-boundary entry of zoonotic disease carrying viruses. Partners.
2. Climate Change Adaptation in Healthcare Delivery	Use of advanced technologies like drones for healthcare service delivery, weather/climate stress forecasting advisories through print and electronic media, linking the health status of the individual with Adhaar cards for instant disease reporting, etc.
3. Public Awareness and Education	Prepare Rapid Action Force at district level, manned preferably by para-medicos, to generate massive awareness among the people about climate change related disease problems and educate them on using the advisories listed above.
4. Cross Sectoral Collaboration	Strong collaboration among healthcare institutions-animal husbandry-public health departments-ICT department-Finance-Disaster Management and other national and global institutions working in the area. (Link up with national and global One Health Program)

Vision Action VII

Keeping the carbon foot prints at the lowest possible level

The Northeastern Region faces a convergence of challenges threatening its socio-economic stability and environmental security. Social fragmentation, encompassing racial, ethnic, linguistic, and religious divides further compound these challenges. Climate change and disasters further trigger environmental impacts and jeopardizing national security and development.

Table 8.7: Vision Action for keeping the carbon foot prints at the lowest possible level

Strategies	Targets
1. Assess Carbon Footprints of each person in the region	A team with experts from Carbon Footprint Assessment area to be constituted to estimate carbon emission by each person and suggest emission reduction methods and guidelines.
2. Reduce the use of private vehicles to a minimum number promoting public transport means	<p>1. Since, every litre of petrol is estimated to emit more than 1kg of CO₂, restriction of private vehicles, may be through appropriate State directive, to reduce the emission.</p> <p>2. Promote hydrogen fuel based public vehicles for zero emission of GHG. Latest technologies like 400hp water engines which is rated to be better than hydrogen and electricity are to be promoted by 2030.</p>
3. Spread of Climate change facilitated viral pathogen attacks to be restricted	Many pathogens like the Covid which are observed to be temperature friendly could be countered through the development of medical strategies and action plan needed to check highly infectious viral diseases. Further strengthening of such packages is advocated employing the emerging frontier medical technologies.
4. Special provision for mandatory health check-up at all the airports in NER as well as in the international borders	With the technological advancement and the developmental paradigm the NER has recorded, the flow of visitors to and from the region has increased almost hundred-fold increasing thereby also the risk on spread of contagious diseases. Similarly, due to the porous international border, the threat of such diseases has increased.
5.Special Provision to handle immigrants'	Strong border management departments in all the states. Regulated border with facilitation for trade, tourism, energy and other services by Defence, External Affairs and Home Ministries.

8.2 Climate Change Impact with Adaptation and Mitigation Strategies

Vision Action VIII

8.2.1 Ecosystem Restoration and Climate Action

Ecosystem restoration is essential for rehabilitating degraded ecosystems, aiming to create self-sustainable and resilient environments. In the rain-fed Northeast region, water sources face contamination and scarcity issues, including arsenic, fluoride, iron, and salinity. To navigate these challenges, restoring indigenous ecosystems, reducing consumption, and embracing diversity are crucial.

Table 8.8: Vision Strategy and Targets on Ecosystem Restoration and Climate change

Strategy	Targets
5. Provide incentives to ecosystem players and the service providers for restoring and also improving the ecosystems	Based on the observation that upstream disturbance in the ecosystems also impacts the downstream ecosystem negatively, it will be important to identify the players in ecosystem promoter and destroyers, have dialogue with them through the village chieftains and incentivize the ecosystem service providers for ensuring ecosystem health improvement
6. Research institutions to be engaged for identifying the various dimension of ecosystem degradation	1. Institutions to engage their PhD students in each of the identifying ecosystem degradation possess for implementable research output. 2. Document, analyze and model preparation of data base for biodiversity management committees
7. Provisioning of special central budget for ecosystem restoration	A minimum of 0.2% of the 10% special NE grant may be earmarked for this activity.
8. Integration with major	Integrate restoration components into schemes like MGNREGS, CAMPA, RKVY.
9. Develop legislative and policy frameworks	Establish frameworks that recognize restored lands as valuable carbon sinks.
10. Ecological restoration as part of CSR obligations	Integrate restoration projects into corporate social responsibility (CSR) initiatives.

Vision Action IX:

Table 8.9: Managing the varied facets of Man-animal Conflicts

Actions
Identify, assess, and secure critical wildlife corridors, migratory routes, and movement paths of conflict-prone wildlife species.
Reduce human reliance on protected areas, corridors, forests, and natural habitats for livelihoods.
Decreasing incidents of wild animals entering human-dominated areas using technological innovations and wildlife-friendly preventive measures. Control of Monkey menace at Religious and tourist places
Develop efficient response teams in forest divisions and protected areas at HWC hotspots in India.
Restore wildlife habitat within protected areas and forests.
Promote sustainable waste management and safe food storage in and around protected areas and HWC hotspots.

8.2.2 NER: Impact of Climate Change

1. Habitat destruction stands as an ominous threat looming over the world's diverse array of plant and animal species. Its pervasive impact extends beyond individual species, fundamentally jeopardizing the global ecosystem's health and resilience.
2. Land clearance for agriculture, grazing, mining, drilling, and urban expansion exacts a profound toll on the 80 percent of global species that inhabit forests. The staggering annual loss of approximately 15 billion trees starkly echoes the drastic decline in global tree density— a staggering 46 percent decrease since the dawn of civilization, as reported in a Nature study.
3. Scavenging system in NE has been observed to be yet another source of spread of GHG which is therefore, envisioned or planned to be gradually transformed into confinement system of animal rearing both for production and waste utilization purposes.
4. The Imperative of Achieving Equilibrium Between Human and Wildlife: A Holistic Perspective Alignment at District and Division Levels: At the heart of effective management lies the alignment of HWC mitigation plans with disaster management strategies at district and division levels.
5. Utilizing Disaster Relief Funds for HWC Impacts: Disaster relief funds, traditionally allocated for addressing the aftermath of natural calamities, can also be utilized to compensate for the impacts of HWC.
6. Operational Synergies: Highlighting the operational synergies between disaster management and HWC mitigation is vital for a comprehensive approach. By recognizing and capitalizing on shared resources, expertise, and strategies,

stakeholders can develop holistic plans that address both disaster response and HWC management.

As a result of global warming and climate change, glaciers in the Himalayas are retreating at an average rate of 15 meter per year, consistent with the rapid warming recorded at Himalayan climate stations since the 1970s.

Widespread water scarcity in the river basins like those of the Indus, the Ganga and the Brahmaputra are serious consequences. Moreover, in case of glacier-fed rivers, glacial- melt runoff is seen to augment winter flow in the lean season (the period between harvest that last from May to August).

Extreme precipitation events (heavy rainstorm, cloud burst) may have their own impacts on the fragile geomorphology of the Himalayan part of the Brahmaputra basin causing more widespread landslides and soil erosion.

Forestry, Fisheries, and agriculture are three most climate sensitive sectors.

Climate change impacts in the NER are relatively underexplored and uncertain for vulnerability assessment and risk management. However, indicators suggest visible impacts are already evident, including warm winters, forest fires, flash floods, emergence of diseases, drying springs, agricultural losses, and man-animal conflicts. The region's communities demonstrate resilience by adapting traditional livelihoods to cope with these impacts, yet their traditional knowledge remains localized and underutilized globally. Although some states have initiated Climate Change Action Plans, broader regional institutions and strategic planning to address climate impacts are insufficient. Establishing a Multi-disciplinary High Land Institute for Climate Change Study and Mitigation is proposed to align with India's commitments under the Paris Agreement and address trans-border challenges effectively.

8.2.3 Northeast India - Strategic Moves

The impacts of climate change on regions like northeast India are less explored and less known thereby making the future scenarios more uncertain for vulnerability assessment and risk management. However, certain indicators point to impacts being already visible in the region.

Studies on rainfall and temperature in northeast India show no significant trend in overall rainfall, while the "South Assam Meteorological Subdivision" experiences a notable decrease in summer monsoon rainfall, decreasing at about 11 mm per decade over the last century. Climate models predict a temperature increase of 2.0-3.5°C and a precipitation increase of 250-500 mm in the Northeastern region, with forested areas expected to receive higher precipitation. Strategic action to address human-wildlife conflict in various state of Northeast India will depends on how well the mapping of threats with respect to habitat is done.

8.3 Disaster Management

India has been known to be one of the countries most prone to natural disasters. India experiences a wide range of hazards such as floods, droughts, cyclones, earthquakes, and landslides, which can have an overwhelming impact on lives, livelihoods, and infrastructure. To address this challenge, India announced the 10-Point Agenda for Disaster Risk Reduction (DRR) as part of the Sendai Framework. In 2022, India suffered an economic loss of \$4.2 billion due to extreme weather events and climatic disasters, according to the World Meteorological Organization (WMO). This loss was almost double the average annual loss between 2002 and 2021.

North East India is prone to various natural disasters due to its unique geographical location and environmental factors. Every year, floods, flash floods, landslides, and earthquakes disrupt the lives of people in different parts of North East India. When such disasters occur, the affected regions of North-East India come to a standstill and the aftermath of such disasters paralyzes the social and physical systems (<https://www.leadsconnect.in>).

North East India faces several challenges in reducing the risk of disasters like floods, landslides, earthquakes, and storms. These include:

- Multiple threats:
- Fragile ecosystem:
- Geographical hurdles:
- Socio-economic factors:
- Infrastructure limitations:

International cooperation is crucial for creating a strong and resilient global community that can effectively manage and reduce the risks associated with disasters. The Sendai Framework for Disaster Risk Reduction 2015-2030 is a recent global agreement that outlines a 15-year strategy to prevent and decrease current disaster risks. It was approved by 193 United Nations member countries during the Third UN World Conference on Disaster Risk Reduction held in Sendai, Japan, in March 2015.

8.3.1 National Agenda for Disaster Risk Reduction:

Prime Minister's 10-Point Agenda for Disaster Risk Reduction:

1. Mainstreaming Disaster Risk Reduction in Public Expenditure:
2. Risk Coverage for All:
3. Greater Involvement and Leadership of Women:
4. Invest in Mapping Disaster Risk:
5. Promote Early Warning Systems:
6. Invest in Climate Resilient Infrastructure:
7. Protect Ecosystems for Disaster Risk Reduction:
8. Enhance International Cooperation and Partnerships:
9. Empower Local Communities and Panchayati Raj Institutions:
10. Promote Education and Awareness for Disaster Risk Reduction:

8.3.2 NER: Disaster Management System

Managing disasters in North East India is of utmost importance due to the region's vulnerability to various natural calamities such as floods, earthquakes, landslides, and cyclones. The region's distinct geographical features, including its hilly terrain, dense forests, and complex river systems, create additional difficulties for disaster preparedness and response.

The disaster management system in Northeast India operates through a multi-tiered institutional framework that involves various stakeholders at the national, state, and district levels. The National Disaster Management Authority (NDMA) oversees the overall disaster management strategy. The State Disaster Management Authorities (SDMAs) and District Disaster Management Authorities (DDMAs) coordinate disaster preparedness, response, and recovery efforts at their respective levels.

Despite the challenges, there are opportunities to improve disaster risk reduction in the region through:

- Technological advancements:
- Community involvement:
- Nature-based solutions:
- Livelihood diversification:
- Regional cooperation:

Recent Initiatives

Several initiatives have been undertaken to strengthen disaster management in NER including:

1. *Establishment of NERDRR at the North Eastern Space Application Centre (NESAC):*
2. *Development of forecasting and warning systems:*
3. *Capacity building and training programs:* through Centre for Disaster Management and Research (CDMR), IIT-Guwahati, and NESAC in collaboration with NDMA.

8.3.3 Vision 2047: Disaster

Vision Action X : Resilient NER

There is no definitive solution to achieving a completely disaster-free region or state, as various natural and man-made threats exist, and even the most well-prepared regions can face unforeseeable situations. However, several key approaches can significantly reduce disaster risks and enhance resilience. NER must prioritize all essential areas of disaster management like:

Mitigation: Preparedness: Recovery and adaptation:

- And devising Institutional framework including:
- Early Warning Systems and Preparedness (EWS&P) for all possible disasters:

- Promoting Community-Based Disaster Risk Reduction (CBDRR):
- Integrating Disaster Risk Reduction into Development Planning:
- Leveraging Technology for Enhanced Disaster Management:
- Collaborating with International Partners and Sharing Best Practices:
- Continuous Capacity Building and Training:
- Developing Innovative Risk Transfer Mechanisms:

Vision Action XI : Type of Disasters and Techniques of Management

Suggested action plans for selected disasters have been proposed for the years 2030, 2040, and 2047.

Table 8.10: Vision Action on Disasters and Techniques of Management

Type of DISASTER	ACTION	
FLOOD	Enhance Floodplain management & Early Warning	<p>2030</p> <ul style="list-style-type: none"> • Have a fine scale (<4000) Flood Hazard Risk assessment for all urban and rural habitation buildings. • Have a Hydrologic and hydraulic modeling-based vulnerability assessment of the entire NER to estimate the flood risk and potential future risk with climate-induced changes. • Implement strategic land use planning with prioritized green space and natural flood buffers (based on micro-watershed prioritization). • Prepare a community participatory-based planning to minimize flood risk for each community/ village/cluster level. • Proposed new building codes and zonation based on Flood Hazard Risk assessment and modeling requiring new developments to be flood-resilient or even elevated on stilts. • AI and real-time data-based improved flood modeling to predict flood events with higher accuracy, allowing for better preparedness. <p>Have a more sophisticated, robust Flood Early Warning System (better than 72 hrs for catchment/ block level & 12 hrs for urban/ flash floods)</p>

Type of DISASTER	ACTION	
		<p>2040</p> <ul style="list-style-type: none"> • Complete restoration of depleted wetlands and natural habitats to act as natural sponges, absorbing excess rainwater and mitigating flood peaks. • Propose appropriate building codes for Urban green infrastructure like rain gardens and permeable pavements into city designs to manage stormwater runoff. <p>2047</p> <ul style="list-style-type: none"> • Update/revise the building codes to fit the requirements of time and technology. • Improve the early warning system. • Keep target of zero loss disaster management support system.
Landslide	Proactive mitigation, Advanced monitoring and early warning systems	<p>2030</p> <ul style="list-style-type: none"> • Robust landslide monitoring and early warning systems should be in place based on dense networks of sensors embedded in slopes to provide real-time data on movement, moisture levels, and other factors that can trigger landslides & AI-powered analysis of the sensor data and predict landslide risks with greater accuracy, allowing for timely evacuations. • Bioengineering of all vulnerable road patches by planting specific vegetation or using natural materials to reinforce slope stabilization. • Ensuring incorporation of Improved infrastructure with advanced geotechnical analysis to account for landslide risks and design more resilient structures. • Land-use planning regulations: stricter regulations to be implemented to restrict development in high-risk areas and promote sustainable land use practices.
		<p>2040</p> <ul style="list-style-type: none"> • Remote monitoring: Satellite imagery and aerial LiDAR surveys will enable continuous monitoring of large areas, identifying potential hazards before they escalate. • Prepare alternate road connectivity to habitations connecting by roads prone to landslide.
		<p>2047</p> <ul style="list-style-type: none"> • All major national projects to be free from landslide hazards.

Type of DISASTER	ACTION	
Urban	Hazard Risk Vulnerability Analysis	<p>2030</p> <ul style="list-style-type: none"> • Digital cadastral record (1:100 – 500) to make available for all. • Urban flood (mapping, risk zone, vulnerability) assessment to be prepared based on digital cadastral records coupled with UAV, very high-resolution satellite data. • Studies on Urban Repercussion Pressure on Waterbodies to be made compulsory for all urban sprawl plans to keep the minimum impact on existing water bodies. • Approved Climate Resilient Master Plan to be ready for all urban agglomerations. • Modification/ propose new Building Bye Laws based on the above studies.
		<p>2040</p> <p>North East to have City Digital Twin (CDT) for all urban agglomeration. CDT will help asses urban vulnerability in simulating disasters, risk assessment, etc.</p>
		<p>2047</p> <ul style="list-style-type: none"> • Develop City Digital Twin (CDT) for all rural habitations.
Earthquake	Vulnerability, Risk analysis and early warning	<p>2030</p> <ul style="list-style-type: none"> • NE being in High Seismic Zone i.e. Zone V, highly vulnerable to earthquakes. Therefore, high-resolution micro-seismic zonation mapping is to be completed for the entire NER. • Based on micro-seismic zonation, Vulnerability & Risk assessment of NER to be completed for proposing new building bye laws. all new building approvals to be as per norms. • Setting up of High density instrumentation (CORS, MPGO, Seismic Station, etc) for earthquake precursor study in NER.
		<p>2040</p> <ul style="list-style-type: none"> • Develop an Earthquake Early Warning System based on Continuously Operating Reference Stations (CORS), Multi Parametric Geophysical Observatory (MPGO), Seismic Stations, OLIR, TEC, etc. • Entire NER to cover with earthquake proof building by taking appropriate measure for old buildings and earthquake proof construction of new building as per building bye laws.
		<p>2047</p>

Type of DISASTER	ACTION	
		<ul style="list-style-type: none"> • Ready with an emergency plan for rescue, rehabilitation and recovery.
GLOF	Early warning and preparedness	<p>2030</p> <ul style="list-style-type: none"> • Develop a robust Early Warning System by installing automated monitoring systems on glaciers and downstream areas to provide real-time data on lake levels, glacier movement, and weather for all important glaciers of the NE region. This will allow early warnings to be issued to potentially affected communities. • Preparing potential GLOF hazard map: Creating detailed maps of areas vulnerable to GLOF inundation helps identify populations at risk and plan evacuation routes. • Built necessary GLOF risk reduction infrastructure: In some cases, structural measures like dams or diversion channels might be built to regulate lake levels or divert floodwaters. However, these solutions can be expensive and have environmental impacts that need to be considered.
		<p>2040</p> <ul style="list-style-type: none"> • Improve EWS and prepare robust community participatory emergency rescue plan.

8.4 Strategy for Conservation & Protection of Biodiversity

The United Nations Convention on Biological Diversity (CBD) defines biodiversity as ‘the variability among living organisms including, inter alia, terrestrial, marine, and other aquatic systems and the ecological complexes of which they are part. This includes diversity within species, between species and of ecosystems.’ Biological diversity or biodiversity is therefore the very heart of our environment and is the web of life that includes the full range of ecosystems, their component species and the genetic variety of those species produced by nature or shaped by humans.

India became a Party to the CBD in 1993, and as per her commitment, prepared its first National Biodiversity Action Plan (NBAP) entitled “National Policy and Macro Level Action Strategy on Biodiversity” in 1999. This was followed by the enactment of the Biological Diversity Act, 2002 (BDA) to provide the legislative basis for the implementation of the Convention. Section 36(3) of the Act obligates the Government of India to “as far as practicable wherever it deems appropriate, integrate the conservation, promotion and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.” This means that biodiversity concerns must be integrated into all forms of development activities across sectors and programmes.

8.4.1 NER: Transition Zone

The northeast region is the transition zone between the Indo-Malayan and the Indo-Chinese geographical regions and a known biodiversity hotspot. Biodiversity in this region is facing significant challenges because of various factors such as land use change, human economic activities - which includes biopiracy and illegal wildlife trade - and climate change. By prioritizing the preservation and restoration of biodiversity, we can address multiple interconnected issues and create a more sustainable future.

The strategic direction of this Vision 2047 for Biodiversity Protection and Conservation of the northeastern region of India is to forge a direction where the protection and conservation of the rich biodiversity of the region takes priority but without hampering development that is sustainable and progressive.

8.4.2 A vision where the Northeastern region of India is:

“Coexisting and developing in harmony with nature and where biodiversity is valued, conserved, restored, and wisely used, thereby sustaining a healthy Earth. The Northeast of India is a Global Center of Excellence for Ecosystem based Solutions (EbS) and is a Global Bio- cultural Heritage Site delivering benefits essential for all people and species across the world.”

The region also has diverse wetland and riverine ecosystems with varying species composition at different elevations of the Brahmaputra, Barak, and Teesta River basins. The Northeast of India is not a homogenous region but rather a combination of diverse ecological, social, landscapes and ecosystems, requiring thorough analysis and conservation efforts.

Table 8.11 NER: A Glimpse of Biodiversity Richness

India’s north east region forms a major part of the Indo Burma biodiversity hotspot - Biodiversity hotspots are regions that are lavish in endemic species and have lost 70% of the original habitats. 51 forest types broadly classified under 6 categories of forest. The Alpine regions and the broad-leafed forest in this region is regarded as the most species rich region in the world. 6 out of 9 important vegetation type in India is found in this region. 8,000 out of 15000 flowering plants reside in this area. Out of 1500 endangered floral species 800 are present in this region. The occurrence of primitive plants like *Euptelea*, *Tetracentron*, *Haematocarpus*, *Alnus Betula*, *Paryatia*, *Stannonia*, *Distyllum* etc., have rendered Northeast region as the “Cradle of Flowering Plants”. Rich with 40 endemic rice cultivars. Approximately 3624 species of insects, 50 mollusks, 236 fishes, 54 amphibians, 137 reptiles, 541 birds and 160 mammalian species making this region genetically rich. Over 50 species of economic plants have their genetic diversity in this region.

9 out of 15 species of primates are present in this area. Out of the 6 world's largest feline species identified 4 are present in the region. 137 species of reptiles have been recorded from this area. This area has maximum number of butterflies and moths in India. More than 62.81% of freshwater fishes are available in this region.

8.4.3 Challenges

Protecting and conserving biodiversity in Northeast India faces significant challenges, primarily balancing infrastructure and economic development with the preservation of natural landscapes and biological resources. The region's unique ecological diversity is threatened by environmental degradation, biodiversity loss, unsustainable development practices, and resulting socio-economic disparities. Deforestation, landscape degradation, and unsustainable agriculture exacerbate ecosystem decline, while climate change increases vulnerability to natural disasters like floods and landslides, further stressing marginalized communities and landscapes.

Institutional deficiencies, inadequate capacity, coordination gaps, and weak enforcement hinder biodiversity protection efforts despite national policies and initiatives. There's a critical need for improved research and documentation capabilities to gather sustained data on biodiversity resources and their exploitation. While states have biodiversity laws and action plans, these concerns often lack priority in broader state development strategies, especially where land and forests are under autonomous or community controls.

Efforts to address biodiversity conservation and landscape restoration remain compartmentalized, failing to integrate development planning with comprehensive conservation strategies. Policy frameworks and enforcement mechanisms have not kept pace with evolving threats such as wildlife trafficking, invasive species, and the use of technology for biodiversity mapping. Effective enforcement, inter-state collaboration, and international border monitoring are essential, especially given Northeast India's proximity to international borders, to combat illegal wildlife trade and strengthen biodiversity conservation efforts.

There, therefore, is an urgent need to enhance the capacity and skill base of both formal, non-formal or even technical and research institutions in the region for the research, documentation, protection, and management of biodiversity. The region is yet to take advantage of new and modern technologies to map, document or manage biodiversity in the region. As such, many of the forests and bioresources in this bio-diverse region remains to be mapped, surveyed or documented.

8.4.4 Threats to Biodiversity

To be more specific, the Biodiversity Action Plans of the different states, *inter alia*, identified the following as threats to biodiversity protection and conservation:

1. Deforestation, forest degradation, fragmentation of land and forests, and loss of habitat:
2. Invasive Alien Species (IAS):
3. Agricultural intensification, monoculture, and loss of local genetic varieties:
4. Impact of development activities:
5. Shortening of shifting cultivation (jhum) fallow cycle:
6. Mining
7. Alienation of communities and loss of traditional knowledge and practices

These gaps include challenges not just to the protection and conservation of biodiversity, but also include the documentation of and establishment of a reliable biodiversity information base; safeguarding traditional knowledge; etc.

8.4.5 Key Strategies of State Policies

In pursuance of Article 6a of the CBD, and as per the National Biodiversity Strategy and Action Plan (NBSAP), each state has also developed their respective State Biodiversity Strategy and Action Plan. The state plans have in detail worked out action plans and strategies to protect and conserve biodiversity. Amongst others, following are some of the key common issues identified by the states:

- i. Build capacity for valuation of biodiversity and ecosystem services and undertake assessment of key ecosystem services, their flow and use by various groups to safeguard health of and restore/conserves key ecosystems and their services.
- ii. Improve understanding on Invasive Alien Species (IAS) and prepare for pre-emptive actions against them.
- iii. Promote and encourage the sustainable use of biodiversity.
- iv. Promote agrobiodiversity and use of indigenous seeds.
- v. Promote sustainable agricultural practices that ensure conservation of biological diversity.
- vi. Recognize and promote the importance of traditional knowledge systems and traditional governance systems.
- vii. Actively work towards conservation and promotion of domesticated local livestock and fish species.
- viii. Avoid and reduce environmental degradation, especially fragmentation and destruction of habitats and ecosystems.
- ix. Review and frame appropriate policies to promote biodiversity conservation and halt habitat fragmentation.
- x. Develop a state policy and legal framework for the implementation of the Access and Benefit Sharing Policy

8.4.6 Vision 2047

The Vision aims to catalyze, enable, and galvanize urgent and transformative action – collectively and otherwise – at national, sub national and local levels, and with the involvement of all of stakeholders to stop biodiversity loss, to achieve the global and national targets for biodiversity conservation and to provide a for a collective policy pathway. Recognizing the 1986 United Nations Declaration on the Right to Development, the vision also envisages responsible and sustainable socio-economic development that contributes to both the conservation and sustainable use of biodiversity. It is also strategized as a contribution to the achievement of the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SGDs) in all its three dimensions (environmental, social, and economic).

The Vision is therefore aligned to this global framework, to the national framework for India’s NBSAP and NBTs and to the strategic directions and challenges identified by state governments of the region.

Table 8.12: Core Vision

NER as a Citadel of Climate Change Studies in the Himalayan Region to contribute to discourse, strategy, mitigation policy and adaptation practices at the local, national, regional and global level. A range of studies (Five Working Groups, NITI Aayog 2018, UNCTAD 2019, McKinsey Global Institute 2020, IPCC 2019, National Mission for Sustaining the Himalayan Eco-System 2010, Climate Central 2019, ICIMOD-HIMAP 2019) show that given the strategic location surrounded by the mountains, glaciers, water towers, plateaus, biodiversity, diverse geo-morphology and extraordinary cultural ecology the NER is likely to face the first and substantive brunt of adverse impact of climate change. These newly emerging non-traditional security threats are widely recorded in the last two decades or so as manifested in warm winters, forest fires, untimely flowering, trans-border environmental injuries like flash floods and glacial lake outburst flood, and man-animal conflicts.

The origin of Covid-19 in Wuhan in China did highlight large scale smuggling of indigenous wild life and other bio-diversity species from and vulnerabilities of the NER. Such issues that adversely affect the NER further extend to the South East Asian countries and immediate neighbourhood in South Asia. Therefore, inter-institutional collaborations, sharing of experimentation and stock of knowledge and basic management practices (BMP) are becoming inevitable.

On the other hand, robustness and resilience demonstrated by the communities in negotiating their traditional livelihood, adaptation to these unusual phenomena and their adverse impact and more importantly, use and deployment of their traditional knowledge and collective wisdom have generated a new set of discourse on shock absorptions and adaptation techniques. This knowledge is confined to the NER and has never been globalised for larger deliberations and sharing. Some NER states have even prepared State Action Plan

on Climate Change (Assam 2015 and others).

All these have huge trans-border dynamics like river system, genetic pools and gene piracy, natural disasters, migration, diseases, hydrological and environmental flows in the river system and dislocations of livelihoods. In order to consolidate the strategy, aggregate the resources and scientifically project and grapple with the large scale impact and also align with India's Nationally Determined Contribution (NDCs) under Paris Agreement 2015, there will be an exclusive Multi-disciplinary High Land Institute for Climate Change Study and Mitigation for the NER and the other Himalayan regions of India and neighbouring countries. This cutting-edge institute in Northeast India will collaborate with national and global institutions to address climate change in mountainous regions. It will work closely with the National Mission on Sustainable Himalayan Ecosystems and partner with trans-border institutions. The institute aims to secure international climate finance, such as from the Green Climate Fund (GCF), to establish carbon sinks, conduct frontier research, and develop robust early warning systems. Additionally, the institute will focus on building mitigation capacities among youth, communities, and professionals.

8.4.7 Vision Action I

The immediate Mission towards the Vision for Protection and Conservation of Biodiversity in Northeast India being: *Initiate effective and immediate action to halt the loss of biodiversity, so that by 2035 all necessary data, policies, and regulatory frameworks for action – improved and revised - are in place; and are being implemented through effective participation and collaborative actions involving local communities, governments, and all other stakeholders; and integration of best practices of traditional knowledge.*

Based upon India's global and national commitments and the unique biological diversity of the region, following are the key guiding principles for the biodiversity protection and conservation vision:

1. Preserve the diversity of species and ecosystems:
2. Sustainable utilization of species and ecosystem:
3. Maintain life-supporting systems and essential ecological processes:
4. Strengthen management, conservation, and collaboration:.
5. Incentivize biodiversity and landscape conservation:
6. The Kunming-Montreal Global Biodiversity Framework (GBF) to arrest and reverse biodiversity loss until 2030 – comprises four broad goals relating to restoring ecosystems and preventing species extinction; ensuring people can benefit from sustainable use of wild species; the equitable sharing of the benefits of genetic resources; and securing adequate resources to implement the framework.

8.4.8 Vision Action II

Fully make functional the State and National Biodiversity Strategy and Action Plans (NBSAPs), and awareness strategies:

Set up Eastern Himalaya Centre of Excellence for Biodiversity Research, Conservation and Action:

Prioritize holistic ecosystem-based conservation approaches that focus on ecosystem functions and restoration of services:

By 2030 all the 8 states have specific and coordinated plans to restore degraded ecosystems, protection of critical habitats, grasslands, wetlands, and the establishment of ecological corridors to maintain ecological integrity, including the assessment of values of both natural capital and range of ecosystem services.

8.4.9 Vision Action III

Given that 98% of the northeastern borders are international boundaries, states with the support of national agencies and institutions by 2030 strengthen existing quarantine measures and build capacities and capabilities of both institutions and communities for ensuring biosecurity by regulating transboundary movement of pests and any other introduced alien species.

8.4.10 Vision Action IV

Sustainable management of agriculture, aquaculture, fisheries, and forestry resources with priority on sustainability of food system:

Pre-empting against Introduced Alien Species (IAS):

By 2040, the northeastern states have the capacity, skills, and legal instruments in place to eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species.

Strengthen and harmonize biodiversity-friendly policies and legislation

By 2035, the states will do away with policies that support negative incentives hampering India's commitment to eliminate, phase out, or reform incentives harmful to biodiversity and develop positive incentives; and ensure a stricter and more proactive ecosystem of policies and legislations for biodiversity protection and conservation.

Enhance the network, management and monitoring of protected areas and Other Effective Area-based Conservation Measures (OCEMs):

By 2030, states will introduce legislation and initiatives to identify, prioritize, and conserve ecologically significant sites.

8.4.11 Vision Action V

Strengthen the role of local communities and Community Conserved Areas in biodiversity conservation: The biodiversity of the region is not only diverse and rich but also the community-based land holding system and role of community institutions in managing such resources.

To overcome the challenges and to further integrate the knowledge and actions of local

communities in biodiversity conservation, the northeastern states will by 2027 initiate special frameworks and mechanisms to promote community-led initiatives for sustainable resource management and biodiversity protection.

By 2030 all community-owned conservation areas are fully mapped and comprehensively assessed for threats; and their ecosystem services and conservation status and values ascertained.

8.4.12 Vision Action VI

Integrate and Mainstream biodiversity into development planning and Incentivizing biodiversity conservation and Nature-based Solutions: By 2035, biodiversity will be fully integrated into sectoral strategies, plans, and programs across the region.

The immediate Mission towards the Vision for Protection and Conservation of Biodiversity in Northeast India being: *Initiate effective and immediate action to halt the loss of biodiversity, so that by 2035 all necessary data, policies, and regulatory frameworks for action – improved and revised - are in place; and are being implemented through effective participation and collaborative actions involving local communities, governments, and all other stakeholders; and integration of best practices of traditional knowledge.*

8.4.13 Vision Action VII

Biodiversity Impact Assessments (BIA) alongside Environmental Impact Assessments (EIA) by 2035:

By 2030, the region will establish a dedicated financial mechanism to support biodiversity research, innovation, and monitoring, promoting nature-based solutions.

The establishment of a robust Green Credits market by 2035 will further enhance biodiversity conservation efforts in the region. This system will leverage private funding, including Corporate Social Responsibility (CSR) funds and other incentives, to support biodiversity initiatives effectively.

Chapter 9

Relocating the Service Sectors: Commercial Opportunities

9.1. Tourism

9.2. Telecommunication and Internet

9.3 Banking & Credit

9.4 Insurance and the North East

9.1 Tourism Vision 2047

The tourism industry of the North Eastern region of India has a major comparative advantage. It is expected to make a significant contribution to the economic development and employment generation for the region, given its influence on local employment and community engagement through the expansion of supplementary livelihoods.

Although the North-East Region has a significant potential to attract a large number of visitors, it remains one of the least frequented regions in India. The absence of sufficient amenities, limited connectivity, and inadequate physical infrastructure have hindered the arrival of visitors to the area.

9.1.1 NER Tourism: Present Status

Except for the COVID-19 years, tourist arrival numbers in the North East region have been increasing over the years. Over the course of the previous decade, the number of visitors visiting the North East states has increased steadily. The region witnessed a cumulative influx of 2.5 million tourists in 2021, which resulted in a consolidated revenue of USD 85 million. Tourist visitation increased post-pandemic, with 118.45 lakh domestic and 1.04 lakh foreign tourists visiting NER in 2022.

According to the most recent 2021 ranking by the Ministry of Tourism, Assam is the top state in the North Eastern Region (NER) for domestic tourist visits, ranking 23rd. Following Assam, Sikkim ranks 25th, Meghalaya ranks 31st, and Arunachal Pradesh ranks 33rd. Sikkim, ranking 13th, emerged as the leading destination for foreign tourists, while Manipur, Assam, and Meghalaya secured the 26th, 27th, and 28th positions respectively. It is pertinent to note none of the states in the North Eastern Region (NER) were able to attract a tourist visitation share more than 1%, except for Sikkim, which garnered 1.09% of international tourists.

The current situation regarding the availability of accommodation is likewise indicating a bleak outlook. The North East area has a total of 1929 properties, including star category hotels, various types of resorts, and guest houses and the total rooms inventory is approximately 1 lakh rooms. (India Tourism Statistics, 2022). In contrast to the national

standards the region lacks an adequate number of travel trade service providers such as tour operators, travel agents and transport operators.

Table 9.1.1: Tourist arrivals in NER states in the recent years

State	2016		2017		2018		2019		2020		2021	
	Domestic Tourist Visits	Foreign Tourist Visits	Domestic Tourist Visits	Foreign Tourist Visits	Domestic Tourist Visits	Foreign Tourist Visits	Domestic Tourist Visits	Foreign Tourist Visits	Domestic Tourist Visits	Foreign Tourist Visits	Domestic Tourist Visits	Foreign Tourist Visits
Arunachal Pradesh	383875	6398	444005	7147	512436	7653	555639	7825	42871	961	102915	182
Assam	5160599	19456	6052667	21760	4710617	15592	5447805	26878	1266898	7285	1409161	536
Manipur	150638	3064	153454	3497	176109	6391	167560	13608	49669	3139	49371	648
Meghalaya	830887	8476	990856	12051	1198340	18114	1245633	25813	24734	2311	154409	411
Mizoram	67238	942	67772	1155	76551	967	163762	2249	30890	265	87232	234
Nagaland	58178	3260	63362	4166	101588	5010	125949	5577	10979	518	23968	325
Sikkim	747343	66012	1375854	49111	1426127	71172	1421823	133388	316408	19935	511669	11308
Tripura	370618	36780	398669	69899	414388	102861	437201	154405	127815	31877	177816	5
Total – NE Region	7771376	144588	9546639	168786	8616156	227760	9565372	369743	1870264	66291	2516541	13849
Total - India	1615388619	24714503	1657546152	26886684	1853787719	28851130	2321982663	31408666	610216157	7171769	677632981	1054642

9.1.2 Qualitative scenario

The majority of North-Eastern states recognize tourism as an essential economic sector in the area, underscoring the critical nature of its growth in order to augment revenue generation. As the states prioritize sustainable ecotourism, adventure tourism, village tourism, and rural tourism, they are formulating strategies that are tailored to local circumstances and opportunities. The importance of government and private sector participation in the advancement of the tourism industry is acknowledged by all states, which is proclaimed in tourism policies and vision plans. The majority of governments have given priority to the development of environmentally sustainable tourism and have issued tourism policies that emphasize this aspect.

NER presently receives a variety of assistance in the form of initiatives, schemes, and programme for the expansion of the tourism sector. The Govt of India has been providing support and prioritizing the involvement of ministries and agencies to aid in the planning and development of tourism in the region. Some recent and notable projects that have had a positive impact on the tourism industry in the region are given below.

- Ministry of Tourism, Govt of India** - The Ministry of Tourism has implemented several measures across all aspects to fully exploit the tourism potential in the region. These initiatives encompass the improvement of tourism infrastructure through the Swadesh Darshan and PRASHAD schemes, the organisation of international tourism marts to showcase the region's tourism potential in both domestic and international markets.

- **MDoNER & NEC-** The "North East Entrepreneurs Development Scheme" (NEEDS) provides financial assistance to the Micro, Small, and Medium Enterprises (MSME) sector with a lower interest rate. Entrepreneurs in the tourism industry now receive assistance.
- **Ministry of Civil Aviation** - The Ministry of Civil Aviation has allocated a fund of Rs 500 crore to improve both inter and intra-northeast connectivity. UDAN 4.2 has allocated 24 out of 132 routes specifically for the Northeast region. In recent years, a total of seven new airports have been constructed, and the country's Act East policy has included the introduction of two international lines connecting the North East region to Myanmar and Bangladesh. There are currently 16 functioning airports in the North Eastern Region (NER), including Rupsi, Tezu, Tezpur, Pasighat, Jorhat, Lilabari, Shillong, Pakyong, Itanagar, and Dimapur. These airports have received assistance through the UDAN project.
- **DPIIT:** Department for Promotion of Industry and Internal Trade (DPIIT), is making efforts to attract Foreign Direct Investment (FDI) in the tourism and hospitality sector under the 100% automatic approach.
- **Externally aided initiatives** - Another significant aspect is the financial assistance provided to NER states by international organizations such as The World Bank, Asian Development Bank, New Development Bank, JICA, etc., for the purpose of planning and promoting tourism.

9.1.3 Why NER Ranks so low in Tourist Arrivals?

Numerous problems that fall into two general categories—supply side and demand side issues—hinder the growth and development of the tourism sector in the North East Region. There are some major concerns that have constrained the steady development of tourism in the NER. These include:

- i. Absence of High values tourism products, facilities and services
- ii. Accessibility and Transportation
- iii. Inadequate and Underdeveloped Accommodation facility
- iv. Quality and Hygienic food
- v. Security and safety perceptions
- vi. Climate change leading to increasing disaster frequency.
- vii. Unaddressed Brand image and exposure
- viii. Lack of investments
- ix. Destination sensitivity and restrictive measures like ILP and PAP.

9.1.4 TOURISM VISION 2047

"A well-established, responsible, and sustainable tourism industry that makes a substantial contribution to the economic growth, social inclusion, and ecological security of the North Eastern Region of India and its people as a whole."

The following aspects are expected to influence NER's tourism sector planning and development strategy.

- The distinctive natural and cultural environment gives NER a one-of-a-kind advantage, and the future growth of tourism in the region should be based on recognizing and maximizing this advantage.
- Furthermore, the North East region possesses a distinctive geographic and ethnic landscape that warrants emphasis on niche tourism offerings such as ecotourism, adventure tourism, ethnic tourism, mountain tourism, dark tourism, rural tourism, festivals & events, sports tourism, golf tourism, and so forth, rather than mass tourism.
- The growth of tourism in the NER will primarily benefit and include the local people.
- In accordance with the G20 Tourism Roadmap and the National Tourism Policy, the strategies for NER tourism development will centre on destination management, digitalization, green tourism, festival tourism, war tourism, Buddhists Circuits, skills, and tourism micro, small, and medium-sized enterprises (MSMEs).
- For the development of the NER tourism industry to advance, a branding and communication strategy that is both meticulously planned and implemented is indispensable.

9.1.5 VISION TARGET

The following target for the NER tourism industry is what the Vision 2047 for NER seeks to accomplish:

Area	Current Share in India	Target by 2047
Total Tourist visitation in the region	9.9 million (2019)	20 - 25 million
Domestic Tourist Visit	0.41%	5 - 10%
Foreign Tourist Visit	1.17%	10 - 15%
GSDP contribution of Travel & Tourism in the region	1.55% (as per 2019 statistics)	8-10%
Accommodation inventory	1 lakh rooms	5 lakh rooms
Tourism Competitiveness Rank - Foreign Tourist Arrivals	1 NER State in Top 20	3 NER States in Top 10
Tourism Competitiveness Rank - Domestic Tourist Arrivals	2 NER State in Top 30	5 NER States in Top 20

9.1.6 STRATEGIC OBJECTIVES: NER Tourism Vision 2047

Specific objectives-

- To transform tourism in NER into a prominent economic sector, contributing significantly to the GDP and a catalyst for socio-economic progress

- To promote community-focused, culturally appropriate, and environmentally sustainable tourism in the area
- To foster tourist-centric tourism development that contributes to NER becoming a preferred tourist destination for both local and foreign tourists.
- To improve destination competitiveness through service delivery, product quality, and skill sets
- To encourage investments in the tourism sector by providing a clear, simple, and effective framework

Strategic plans-

Strategic Direction 1	Strengthen institutional environment for tourism
Strategic Direction 2	Human Resource Development
Strategic Direction 3	New destinations, New Products Better visitor experiences and services
Strategic Direction 4	Branding, Marketing & Promotion
Strategic Direction 5	Enhanced connectivity and improved tourism infrastructure

Action Plan:

- Establish and operationalise North Eastern Tourism Board (NETB)
- Activate Destination Management Organizations (DMO's)
- Tourism statistics and Data base management
- Develop regional skills framework and standards for tourism & hospitality industry-
- Capacity Building of Tourism Administrators & Destination Management Organizations
- Create comprehensive destination development plans
- Build niche segments and promote theme-based multi-state itineraries like *Sports, Food, Music & Entertainment*
- Theme based multi-state itineraries
- Cross border Tourism
- Promote and incentivize private sector investments in the tourism industry.
- Partnership mode of tourism development
- Encourage and promote Tourism MSME's
- Renew and redesign NER Tourism brand
- *Websites and APPs*
- Implement branding campaign
- Improve Airports and air connectivity - Improve Road Access
- Improve the general tourist amenities

Some of the thematic routes that are indicative:

Table 9.1.2- Thematic Routes

Tour	Duration	Route
Monastic Tour with Heritage Touch	6 nights/7 days	Guwahati – Wild Mahseer – Tawang – Bomdila – Guwahati
Indigenous Community Tour	6 nights/7 days	Guwahati – Wild Mahseer – Ziro – North Lakhimpur – Majuli – Kaziranga National Park – Guwahati
Heritage of Assam by River	8 nights/9 days	Guwahati – Kaziranga National Park – AD3 Cruise
Weekend Tour of Imphal	2 nights/3 days	Delhi – Imphal. Visit to Indian National Army (INA) Museum, Japanese War Memorial, Loktak Lake, Kangla Fort, World War II Cemetery.
Wildlife Tour of Assam	8 nights/9 days	Guwahati – Manas National Park – Guwahati – Nameri National Park – Kaziranga National Park – Dibrugarh
Golf Itinerary	2 nights/3 days	Jorhat – Kaziranga Golf Resort – an 18 holes golf course.
Golf Itinerary	3 nights/4 days	Guwahati – Shillong – Cherrapunjee – Guwahati. 18 hole Shillong Golf Course.
Temple Tour of Assam	4 nights/5 days	Guwahati – Kaziranga National Park – Sivasagar – Jorhat – Guwahati. Visit Kamakhya Temple, Umananda Temple, Shiva Dol, Joydol.
A visit to the Battlefields of Imphal & Kohima	4 nights/5 days	Imphal – Kohima – Dimapur
Tribal Tour with Rhino Park	6 nights/7 days	Dibrugarh – Mon – Sibsagar – Jorhat – Majuli – Kaziranga National Park - Guwahati

(Source: North Eastern Council)

9.2. Telecommunication and Internet

The Northeast region remains a laggard as far as telecommunication and IT based services are concerned. The index takes into consideration various factors like tele-density, use of internet in governance, internet literacy in schools, etc. It is a sad fact that all the states in the region rank very poorly in the index. This is not a good sign considering the internet age that we are living in and the expected surge in internet-based activities. There is an urgent need to establish the required facilities so as to connect the remote areas of the region and make them a part of India’s digital revolution.

According to TRAI reports, the average tele-density of India as of April 2023 stood at 84.46% but tele-density in Assam state is 71.09% and that of Northeast Licensed Service Area (LSA) [consisting of six states of Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Mizoram, and Tripura] is 79.66%. Though the gap in the tele-density figures between NE-States and the national average has reduced over the recent years but there exists non-uniform proliferation of telecom and internet infrastructure cum services in the states, with major Telecom Service Providers (TSPs) emphasizing on rollout and consolidation of digital infrastructure mostly in plain and valley area compared to its hilly regions. Despite having reasonable tele density, there is considerable intra-state disparity/ non-uniformity in mobile connectivity in the NE states.

Due to wide diversity in the socio-demographic structure (e.g., population density, no. of villages per sq. Km. etc.) and due to other factors (e.g., delay in execution of government funded projects, etc.) there exist a gap in the mobile coverage in the villages/rural area in the NE States. Further, due to poor Return on Investment (RoI) prospects, considerable coverage by TSPs is still continuing on older generation technologies (like 2G and 3G) which needs to be upgraded to next generation technologies (like 4G and 5G).

9.3. Banking & Credit

9.3.1. Background

By 2047, the people in the region hope to see their region emerge strong, peaceful, self-assured, and prepared to participate in the global economy. They want to be involved in governance, have a say in how public resources are distributed, and be able to improve their economic, social, and cultural standing as they advance toward prosperity and well-being. Despite the small share of population in the region, it is home to numerous ethnic communities speaking different mother-tongues belonging to language groups, but mostly belonging to the Mongoloid racial stock. One remarkable demographic feature of the region is the presence of diverse ethno-lingual communities, having more than 100 distinct mother-tongues, some with a population less than 5,000 while others having more than 10,00,000.

In order to support today's educated, enterprising, and well-informed youth, banks and bankers in the North-Eastern States must get over their shyness/inhibitions and step forward proactively. At the operational Credit Manager level of the Banks, historical perspectives on non-performing assets from the early 2000s and lingering legacy issue concerns about staff accountability should not serve as a barrier in taking Credit decisions. They need to overcome the syndrome of risk aversion and Credit aversion.

After the Committee on Financial Sector (CFS) Reforms' 1991 and 1998 recommendations were put into practice, these difficulties emerged. The Income Recognition & Asset Classification (IRAC) norms were implemented for the banks to become transparent in identifying and declaring their Non-Performing Assets (NPAs) and thus enabling Indian Banks to become more globally acceptable.

9.3.2. Institutional Obstacles

Even though the bank's top management wants to see more outflow of bank credit in the North Eastern Region, there are still obstacles at the operational level. However, with support from the government, capable, devoted, and knowledgeable aspiring business owners have emerged to create jobs. 65% of the population are youths in our nation today with a median age of 29 on the average. Having a large proportion of young people in the population is a great asset for the nation, but if we don't use them for productive purposes, it could become a liability. "Transforming Job Seekers into Job Creators" is the government's current "mantra."

In order to ensure that bank credit outflow increases more quickly in the North-eastern States—where an improvement in the credit-deposit ratio is required—the Reserve Bank of India and the bank's top management have taken proactive measures.

Finance as such is not an issue as the Banking Industry has enough of liquidity the issue is in accessing Credit more especially from the Banks, as apparently, there is some lack of willingness to lend, to understand & analyse the various issues and challenges at the grass root level, there is need for coming out with more and more bottoms-up approach in Customising Loan products in conformity with the need and aspirations of the people and the local Government in the North Eastern States. Accessing finance from banks continues to be a significant challenge, particularly in the Northeast India, this issue is particularly pronounced for first-generation entrepreneurs in NER, who generally are seen to be suffering from

inhibitions as there is virtually neither much encouragement and support from their parents and society in setting up of enterprises, venturing into business nor they are getting adequate positive response from the Banks.

It would therefore be necessary to address the Banks and Financial Institutions in speeding up of their efforts in taking forward Financial literacy, on a mission mode.

Today, Northeast India presents immense opportunities for banks to expand their bank credit. It is crucial for banks to shift their focus towards addressing the supply-side issues that hinder the flow of bank credit, rather than relying on the same excuse that the credit-deposit ratio is low in Assam and other North eastern states due to a lack of credit demand. This argument is no longer valid in the current context, considering the vast emerging opportunities in the region.

Moreover, initiatives like the 'Act East' policy and the Indian government's special emphasis on infrastructure development, including roadways, airways, railways, and waterways, further enhance the region's prospects. Additionally, there is a growing interest among highly skilled technocrats and professionals, equipped with extensive experience and expertise, to establish enterprises in the Northeast. Therefore, it is imperative for banks to seize these opportunities and tap into the region's potential for increased bank credit outflow.

9.3.3. Emerging Trends and Challenges

- A. Technology Disruption
- B. Regulatory Dynamics
- C. Changing Consumer Preferences
- D. Embracing Technology Advancements

9.3.4. Action points for increasing the Credit outflow:

- The Credit-Deposit Ratio (CD) of Banks in North East is still comparatively less. It is hovering around 46% as against what it could have been 77.5%. The Top bankers of NER are generally of the opinion that the Credit Absorption Capacity is less in the North Eastern States indicating that the Demand for Credit is low. This reason, they have been attributing for the last 40 years. Can we allow such a situation to continue for the next 23 years 2047? We cannot and we need to address the issue in our vision statement. In today's (April 2024) context the Statutory Liquidity Ratio stipulated by Reserve Bank of India, is 18% indicating that the Banks will have to set aside this amount compulsorily for investment in Government of India approved Securities and retain 4% of the deposits mobilized to be kept in the form of Cash Deposit Ratio (CRR). This broadly indicates the Banks are free to lend as on date 77.5% of the deposits mobilized. Even though every State cannot demand that their CD Ratio be at the peak level, however every State Government in NER wishes that Banks deploy the funds thus mobilised, within the State to the desirable extent.

It should be the endeavour of the Banks to make proper assessment of the demand for Credit in NER and address the supply side deliverable issues for increasing the outflow of Bank Credit for economic prosperity of the North Eastern States.

As a Policy initiative, in today's data driven economy, the Top Management of Banks' may take a Policy decision that every 5 years all their Bank branches will carry out a detailed economic survey of their respective area of operation and thus assess the Demand & Supply for Goods & Services in enabling the Banks to find out the actual demand for credit.

- In NER the distribution of the Micro Sector out of the total MSME is almost 99% and out of which almost 90% is remaining in the unorganized/ informal sector. They therefore are unable to raise finance from the organized banking industry and financial institutions. The major cause of remaining in the informal sector and remaining at the subsistence level for ages is their financial illiteracy and not being able to comply with the regulations governing the entire MSME sector. It is therefore recommended that the Government may consider either a separate legislation exclusively for the Micro Sector with simplified regulations for compliance and thus enabling millions of micro sector enterprises and service providers to come under the organized sector to be able to raise finance and funds from financial institutions to scale up their business operations from the subsistence level to commercial level, paving the way for creation of more and more employment opportunities.
- NER is a miniature India with lot of diversities and bankable practices. The Banks must be able to customize their loan products and loan schemes in conformity with the needs and aspirations of the people of NER. A bottom-up approach is needed to be carried out at the grass root level by the banks in collaboration with the village level planners and Panchayats in identifying such bankable practices which are being followed at the village level and escalate such propositions to their Top Management for Policy interventions.
- NER suffers from a situation where people are generally hesitant to raise loans from Banks and as such, they do not have adequate credit history. Due to lack of credit history their Credit Score under the CIBIL Rating is low. The bank managers are seen to be rejecting proposals of micro sector enterprises based on the personal CIBIL credit rating score (Credit risk ranging between 300 to 900) even though for the MSMEs there is a separate CIBIL Credit rating score in the range of 0 to 10. For NER and for the Micro sector enterprises of NER such procedure of rejecting viable micro sector projects, proposals is needed to be reviewed by the Top Management of Banks and Reserve Bank of India.
- Some of the Banks reportedly have withdrawn the financial discretionary powers of the Branch Managers and consequent to which the micro sector prospective borrowers are facing lot of hardship in securing Credit facilities from the banks. Considering the lower level of awareness and logistics problem in NER, the Top Management of Banks should review their loan sanctioning Policy's and restore the financial discretionary powers of the Branch Managers for ensuring faster disposal of Credit proposals by the banks.
- The Banks must increase their network of Banking Correspondents (BCs), Banking Facilitators (BFs) and Customer Service points (CSPs) in NEC for better financial inclusion

and door step banking facilities so that the people are able to take greater benefits from the banking industry.

- With the improvements in the law & order situation in North Eastern States, it is time to review and withdraw the North East Incentive Scheme of Government of India which was implemented some decades ago when the North East was in the turmoil and was considered as a Disturbed area. Today there is no such problem. The assured incentives with fixed tenure of service, place of choice posting on completion of the contractual period, LTC facility every year, retention of quarter and provision of quarter facility in North East is generally seen to be a deterrent in taking Credit decisions leading to a situation of Authorities virtually deciding not to decide.

Figure 9.3.1: State-wise Deposit and Bank Credit of SCBs (As at end-March)

Table 3.3: State-wise Deposit and Bank Credit of SCBs (As at end-March)												
(in ` Crore)												
Region/State/Union Territory	Deposit						Credit					
	2019	2020	2021	2022	2023	2024	2019	2020	2021	2022	2023	2024
Arunachal Pradesh	16659	17171	19525	24121	26656	29205	3834	4277	4920	6053	7279	8735
Assam	147091	164299	173014	189483	207312	220474	65150	70625	80871	95992	107839	127803
Manipur	9927	10369	12323	13813	14851	15669	4900	5931	7115	9163	10768	11600
Meghalaya	24063	23756	25821	29441	31275	34372	6480	8374	9719	9512	11736	14134
Mizoram	9255	11332	12000	13102	14682	15713	3405	4087	5038	5982	6910	7980
Nagaland	11183	12242	12579	14579	15579	17135	3959	4596	5432	6381	7628	8821
Tripura	24880	26487	28400	31304	34065	37109	10370	11246	11952	13562	14128	16452
Sikkim	9632	10130	10604	12411	13554	14748	2731	3159	3800	5182	5804	6520
NORTHERN REGION	252690	275786	294266	328254	357974	384425	100829	112295	128847	151827	172092	202045

Source: Economic Survey 2023-24

Table 9.3.1: Projected State-wise Deposit & Credit Amount in 2047

(in ₹ crores)		
Region/State/Union Territory	Projected Deposits	Projected Credit
North-Eastern Region	24,40,780	11,33,255
Arunachal Pradesh	4,55,722	1,14,360
Assam	13,61,508	6,89,739
Manipur	1,60,899	1,06,734
Meghalaya	1,46,262	47,255
Mizoram	1,68,782	77,061
Nagaland	98,432	43,082
Tripura	2,03,541	88,181

9.3.5. Vision Goals

1. **Resource gap arising out of huge saving and investment rates gaps is to be wiped out by 2047**
2. **De-mystification of credit outflows. Credit/deposit ratio to reach at least 70 percent (from 46 percent in 2022-2023) and outflow of credit to be made zero through various interventions like Infrastructural, Regulatory interventions and easy Access related policies.**
3. **Decimation of informal credit markets:** In the NER 80 percent of the credit market is still under the informal sector. Money lenders have hugely usurped the financial markets and the debt burdens on farmers, self-employed activities, micro enterprises have been immense. By 2047, the informal credit market will be decimated and would be replaced by formal credit markets including by the micro credit organisations, grameen banks, national banks, NEDFi and others.
4. **Linking credit availability** and friendly access to credits with diversion and de-attraction of youths from the militant and other violent activities to productive enterprises and stability triggering activities.
5. **NER as a financial hub in the Eastern South Asia : Moving away from** a shallow development regime to a financial hub triggered development regime. The core activities will be to make brisk investment and financial centres by bringing both national and global players including from the South East Asia. NER would be the sports capital, commercializing venue of music and other entertainments, and traditional and slow food destination.
6. **One Bank in covering 4-8 villages in the NER**

In crafting a Vision Statement 2047 for this pivotal sector, several key inputs and considerations emerge, delineating the path toward a dynamic and inclusive financial landscape for the North-eastern region.

- Financial Inclusion as a Cornerstone
- Tech-driven Financial Ecosystem
- Sustainable banking Practices
- Regional Cooperation & Integration
- Skills Development & Employment Opportunities
- Resilience in Economic Shocks

9.4. Insurance and the North East

9.4.1. Background

Insurance is one of the four pillars of financial inclusion. Insurance products can make a significant positive difference in the lives of vulnerable individuals by helping households mitigate shocks and improve the management of expenses related to unforeseen events such as medical emergencies, a death in the family, theft, or natural disasters. Financial inclusion means not only having a bank account but also having insurance products, postal facilities, etc. (Anusha and Nadig, 2020). However, gaps exist especially in developing countries.

Insurance penetration (ratio of insurance premium to GDP) in India was 4.2% in 2021-22, which was the same as in 2020-21. Insurance density increased from USD 78 in 2020-21 to USD 91 in 2021-22. India ranks 10th in the global insurance business with a market share of 1.85% in 2021. This is an increase from its share of 1.78% in 2020 (IRDA, 2022). The segments in terms of share in general and health insurance premiums in India were health (36%), motor (32%), fire (10%), others (20%), and marine (2%) at the all-India level in 2021-22. The sector wise shares were private sector insurers (50%), and public sector insurers (36%) in 2021-22. The rest were standalone insurers (9%), while specialized insurers had a share of 7% in the same year (IRDA, 2022).

Presently, the insurance industry of India has 57 insurance companies - 24 are in the life insurance business, while 34 are non-life insurers (IBEF, 2023). India's life insurance sector, among the world's largest with approximately 360 million policies, is projected to grow at a compound annual rate of 12 to 15 percent over the next five years. However, despite this growth, a significant proportion of the Indian populace remains uninsured, with insurance penetration, measured by the percentage of insurance premium to GDP, standing at 3.44 percent in 2015 and anticipated to surpass four percent by FY 2017. This translates to only 10 percent of the Indian population having insurance coverage. Total insurance premiums in India increased by 13.46 percent (7.8 percent inflation-adjusted real growth) in 2021 whereas global total insurance premiums increased by 9.04 percent (3.4 percent inflation-adjusted real growth) during the year.

The government's policy changes, including the increase in foreign investment limits from 26 to 49 percent, have prompted shifts in insurers' strategies. India's strides in inclusive insurance serve as a test case for the industry's evolution, attracting global attention to observe its outcomes. Furthermore, the insurance sector shields economies from risks arising from health issues, natural calamities, and accidents.

Moreover, insurance fuels innovation and entrepreneurship, unlocks high-risk high-return investment opportunities, and facilitates seamless trade and commerce by safeguarding against associated risks. Its coverage lessens financial impacts from disruptions in the supply chain due to technological advancements.

9.4.2. Present status

In the North Eastern states, the coverage of health insurance was highest in Arunachal Pradesh (59%) followed by Tripura (58%), Mizoram (47%) surpassing the all-India level of 27%, while the lowest was in Manipur (4%) followed by Nagaland (6%) and Assam (10%). (using data on NFHS 2015-16) (Meitei and Singh, 2021). So, in the north east, coverage in some states was higher than the national average. Table 1 shows the state wise distribution of insurance offices in the North eastern states (along with the all-India total). We note that both the number of offices as well as the number of districts with insurance offices are low.

Table 9.4.1: State/UT wise distribution of offices in North East (as of 31st March 2022).

State/UT	Number of offices			Total number of districts	Number of Districts with offices		
	Life insurers	General insurers	Stand-alone Health insurers		Life insurers	General insurers	Stand-alone Health insurers
Arunachal Pradesh	15	12	-	25	7	3	0
Assam	281	221	20	34	32	27	10
Manipur	25	12	2	16	6	2	2
Meghalaya	23	24	2	12	7	3	1
Mizoram	12	10	-	11	6	4	0
Nagaland	18	12	-	15	7	3	0
Sikkim	11	10	1	6	2	2	1
Tripura	37	46	2	8	8	4	1
Total (all India)	11060	9410	1365	750	691	575	387

Source: IRDA Annual Report 2021-22

In 16 states/union territories, the share in the number of policies bought by women (to total policies) is higher than the all-India average of 34.7%. Among the top 5 states are Sikkim (at 42%) and Arunachal Pradesh (at 41%). Also, in the same vein, none of the north eastern states are among the bottom 5 states in the same category (Nagar and Shyam, 2020).

Table 9.4.2: Policies sold by state in North East

State/UT	Estimated Population in 2021	Policies sold	% of total	Policy sold per lakh population
Arunachal Pradesh	1591286	14082	0.05	1018
Assam	35886412	874737	3.11	2803
Manipur	3284163	35996	0.13	1260
Meghalaya	3411922	24439	0.09	824
Mizoram	1261787	7968	0.03	726
Nagaland	2275227	21121	0.08	1068
Sikkim	702164	14742	0.05	2414
Tripura	4225005	124626	0.44	3392
Total (all India)	1392483224	28127425	100	2323

Source: Compiled from Majumder (2023)

Table 9.4.2 shows the number of policies sold in the north east and also in the per capita terms. Assam, Sikkim and Tripura have higher than all-India policy sold per lakh of population.

The relationship between the insurance sector and economic development in India has been examined in a few studies e.g. Verma and Bala (2013) show a positive impact of the Indian life insurance sector on the country's Gross Domestic Product (GDP) from 1990-91 to 2010-11. Similarly, Ghosh (2013) noted a long-term relationship between the life insurance industry and economic growth, suggesting the life insurance sector bolsters economic expansion. Kaushal and Ghosh's study (2016) extended this by incorporating variables encompassing the entire Indian insurance and banking sectors. Their analysis indicated a short-term relationship between insurance and economic growth from July 2004 to June 2013. In Ray et al. (2020), we observe that there is an intricate relationship between financial development and the insurance sector in India and non-life insurance led to more financial development in the period 1992-2017.

9.4.3. Current policies

Since May 2014, the Government of India, has taken proactive steps to address the insurance sector. The central government has introduced schemes such as Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY) in 2015 to counter the low penetration of life insurance in India and has established them relevant to the NE states. Most of them are provided through LIC and private Life Insurance companies and are often tied up with banks for easy access. To promote inclusion, particularly in rural areas, the Ministry of Finance has initiated policies mandating service for low-income individuals within the private-sector-dominated market.

Other policies include Pradhan Mantri Jan Arogya Yojana (PM-JAY), Pradhan Mantri Fasal Bima Yojana (PMFBY) /RWBCIS, Pradhan Mantri Suraksha Bima Yojana (PMSBY), Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY), Pradhan Mantri Jan Dhan Yojana (PMJDY), and the Pradhan Mantri Vaya Vandana Yojana (PMVVY).

Pradhan Mantri Jan Arogya Yojana (PM-JAY), launched in 2018 under Ayushman Bharat, is a **health insurance/ assurance scheme fully financed by the government**. It provides financial protection (**Swasthya Suraksha**) to 10.74 crore poor, deprived rural families and identified occupational categories of urban workers' families as per the latest Socio-Economic Caste Census (SECC) data (approximately 50 crore beneficiaries). It offers a **benefit cover of Rs. 5 lakhs per family per year** (on a family floater basis). **10.7 lakh hospital admissions** have been authorized under this scheme during the financial years 2018-19 to 2021-22 in the North East.

The Government of India lunched the Ayushman Bharat under whose aegis 1.5 lakh Sub-Health Centres (SHCs) and Primary Health Centres (PHCs) across the country into Ayushman Bharat- Health and Wellness Centres (HWCs) by December, 2022. The establishment of Ayushman Bharat HWCs in the North-Eastern states has achieved steady progress, thus strengthening the primary healthcare system as envisaged under the initiative. A large number of health screenings are being performed in these centres. A total of **7,246 Health and Wellness Centres (HWCs) have been proposed for the NE till December 2022.** All seven states initiated the upgradation of Sub Health Centres (SHC) and Primary Health Centres (PHC) to HWCs in **2018.**

Pradhan Mantri Jeevan Jyoti Bima Yojana saw 5.67 crore enrolments and disbursement of Rs 2488.44 crore up to 31st December 2018 (PIB, 2019). In 2017-18, more than 47.9 million farmers benefitted from Pradhan Mantri Fasal Bima Yojana (IBEF, 2019). The risk coverage of the scheme was increased to include protection against hailstorms, crop fires, damage from animals, landslides, and rainstorms (IBEF, 2019). These schemes also prove to be a helping hand in spreading awareness of insurance products to otherwise isolated segments of the population. The central government's move to extend the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PMJAY) to migrant workers amidst India's battle with the COVID-19 pandemic (Sharma, 2020) is likely to enhance the non-life insurance penetration in India and also improve awareness and perception of insurance products among the uninsured and isolated segments of the population.

9.4.4 Life insurance

The number of districts without a life insurance office stood at 59 in the country, out of which 48 districts belong to the north eastern states (IRDA, 2022). As elsewhere, in the NE states, Individuals with a lower age group below 40 years have the least number of policies. Similarly, almost all private life insurers are concentrated in the urban regions while Life Insurance Corporation of India (LIC) is more focused on rural penetration of life insurance. The number of policies has increased in recent years through online sales and web aggregators. With the advent of the 'Act East Policy', the high literacy rate and multiple plans by the Government to increase digital connectivity in North-East India have led to increased use of digital mediums to access insurance. There was no business done till 2014-15 through the digital medium but it has slowly gained some popularity in 2015-16 and claimed a business of 0.77% in the year. Since then, it has been growing. In 2018-19, it approximately doubled as compared to 2015-16 (Nagar and Shyam, 2020).

9.4.5 Health and life insurance

The study accessed the raw data of the National Family Health Survey (NFHS-4) (2015–16), which was an extensive, multi-round survey conducted in a representative sample of households throughout India, which included socioeconomic, demographic, and information on coverage of health insurance of any member of the household. The multivariate analysis of logistic regression was adopted to find the correlates of health insurance for all eight (8) north-eastern states of India. The multivariate analysis of logistic regression found that the socioeconomic and demographic factors, households with a bank account and below poverty line (BPL) cardholders played a significant role in the coverage of health insurance in the north-eastern states of India (Meitei and Singh, 2021).

9.4.6 Challenges

While government-sponsored health schemes had higher coverage among the north-eastern region states, these policies are also not without problems. High out-of-pocket payment for health care has been a regular phenomenon in the country at large and also in the northeastern region. There has been a significant impact of targeted intervention schemes on health insurance. However, except in Nagaland, health insurance coverage was skewed towards the better-off households in the North East (Meitei and Singh, 2021).

9.4.7 Crop insurance

The Northeast (NE) region of India, encompassing Assam, Arunachal Pradesh, Nagaland, Mizoram, Meghalaya, Manipur, Tripura, and Sikkim, has varied agricultural production and climatic conditions. However, it also faces considerable risks owing to its physiological and climatic factors. Crop losses due to floods, droughts, extreme temperatures, hailstorms, landslides, cyclones, and other localized calamities are common, posing significant threats to agricultural production and farmers' incomes (Hazarika and Yasmin, 2018).

Crop insurance serves as a risk management tool for agricultural producers, offering compensation for crop loss or decline resulting from natural disasters or price fluctuations in agricultural commodities. Under it, the insurer indemnifies the agricultural producer (insured) within a specified period in lieu of a fee called a premium. National Agricultural Insurance Scheme (NAIS) and Weather Based Crop Insurance Scheme (WBCIS) are prominent insurance schemes in India, aiming to protect farmers against such losses (Deepa, 2018).

However, in NE India, these crop insurance schemes have not had the anticipated impact, with the region having notably low insurance coverage. The National Agriculture Insurance Scheme NAIS, prevalent between 1999-2000 and 2013-14, saw limited participation from only five states in the region: Assam, Meghalaya, Manipur, Sikkim, and Tripura. Moreover, in states like Mizoram, Nagaland, and Arunachal Pradesh, the NAIS implementation was either delayed or non-existent. The number of insured farmers increased in Assam but remained minimal in Meghalaya and Tripura, while states like Manipur and Sikkim showed negative coverage (Hazarika and Yasmin, 2018).

This disparity showcases how the Northeastern states have lagged in adopting crop insurance for risk mitigation compared to other Indian states. This could stem from a lack of awareness about insurance schemes or high premiums, often coercively bundled with crop loans.

9.4.8 Auto insurance

Under the provision of motor vehicle act 1988, all the vehicles operating in public places should have compulsory insurance at least to cover third party liabilities. It means that a vehicle insurance policy must cover a third party in case of any accident. It may or may not cover the damages caused to the vehicle. In the hill districts of Manipur, only 30- 40% of the vehicles are registered.¹

¹ http://e-pao.net/epSubPageExtractor.asp?src=education.Jobs_Career.Importance_of_general_insurance_in_the_context_of_Manipur_By_Luikang_Maram

9.4.9 Others

In May 2020, a decision was made to finance disaster risk through insurance protection in Nagaland. Collaborating with Swiss Re as its reinsurance partner, Tata AIG General Insurance Company Limited, a leading private general insurance company in India, signed a Memorandum of Understanding with the Nagaland State Disaster Management Authority (NSDMA) to provide insurance coverage for the monsoon season. This coverage triggers payouts when rainfall exceeds certain levels, potentially resulting in severe flooding. The solution aims to assist the state government in covering emergency expenses arising from heavy rainfall, which may not be covered by traditional indemnity programs. Such expenses may include emergency shelters, food and medicine for affected families, immediate infrastructure repairs, and more. Implementing similar arrangements can enhance India's resilience to natural catastrophe exposures (Swiss Re, 2023).

In North East India, diverse sectors such as exports, agriculture, climate change adaptation, textile-related businesses, and event management necessitate specific insurance coverage to mitigate risks and foster growth.

Table 9.4.3: Sector specific policies, institutions, finance and users of insurance in the North East

Sector	Policies	Institutions	Finance	Users
Agriculture	Crop insurance	Agriculture Insurance Company of India Ltd.	MNAIS PMBFY	Farmers
Climate	Crop insurance	IRDAI MDONER	Government	All citizens
Disaster (floods)	NIMS	MoWR	Government	All citizens
Exports	ECI ECGC	EXIM Bank ECGC	EXIM Bank through NEIA Trust	Exporters
Handloom	NER TPS		Ministry of Textiles	Weavers
Human security	No specific policies			All citizens
Music festivals	No specific Policies	Chubb KK Graystone	Government finance Corporates Private insurance companies	Event companies
Sports events	No specific policies	Chubb KK Graystone	Government finance Corporates Private insurance companies	Event companies
Textiles	Group Insurance		Ministry of Textiles	

The table above provides details of insurance policies, institutions, finance, and users for insurance in several sectors of interest for North East India. We discuss the details of insurance requirements and schemes pertinent to some sectors of interest to the North East region-

i. Exports

The Export Credit Guarantee Corporation (ECGC) offers schemes like Export Credit Insurance for Banks Whole Turnover Packaging Credit and Post Shipment (ECIB-WTPC & PS), providing up to 90% coverage of export credit risk for small exporters. Utilizing such schemes enables exporters to explore new markets, diversify products, and secure export credit from banks with reduced risks, ultimately fostering export growth in the region.² Exporters can benefit from trade credit insurance, marine cargo insurance, and political risk insurance to support global exports.

ii. Agriculture-Oriented Insurance

The Pradhan Mantri Fasal Bima Yojana (PMFBY) provides comprehensive crop insurance to safeguard farmers against various risks related to crops. Private sector insurance companies like Agriculture Insurance Company of India Ltd. (AIC) offer crop insurance coverage, collaborating with the government to stabilize farmers' income and ensure continuity in farming.³ The PMFBY is implemented in the State of Assam in 2016, with the government of Assam primarily aiming to expand crop insurance in the state. The sources of finance for agriculture insurance in North East India are mainly from the Indian Government's agricultural insurance schemes, such as the Modified National Agricultural Insurance Scheme (MNAIS) and the Pradhan Mantri Fasal Bima Yojana (PMFBY). These schemes are implemented in collaboration with insurance companies, both public and private, which provide the necessary financial resources to cover the risks associated with agriculture.⁴ Solutions include crop insurance, weather-based crop insurance, and livestock insurance tailored for bamboo and textile crops.

iii. Climate Change Insurance

Comprehensive coverage against climate change-related disasters including property insurance, health insurance, and business interruption insurance is needed. Initiatives like the Flood Management Programme (FMP) provide central assistance to states in financing resilience activities to reduce losses from floods, with special emphasis on North Eastern states receiving significant allocations in the first phase.⁵

iv. Textile-Related Business Insurance

The North East Region Textile Promotion Scheme (NERTPS) aims to promote and enhance the textile sector in North Eastern states, covering all textile sub-sectors.⁶ The scheme

² <https://www.businesstoday.in/latest/economy/story/ecgcs-new-insurance-scheme-to-cover-up-to-90-export-credit-risk-for-small-exporters-342792-2022-07-26>

³ https://agriwelfare.gov.in/Documents/MNAISo29910_0.pdf

⁴

https://www.researchgate.net/publication/327719775_Crop_insurance_in_North_Eastern_States_of_India_Performance_of_National_Agricultural_Insurance_Scheme

⁵ Ray et al. (2022)

⁶ https://www.texmin.nic.in/sites/default/files/Textiles_NERTPS_Guidelines.pdf
<https://www.india.gov.in/north-east-region-textile-promotion-scheme?page=1>

covers all textile sub-sectors, including handlooms, handicrafts, sericulture, jute and allied fibres, powerloom, and garments and made-up sectors. Financial, infrastructure and technical support are provided to address production and infrastructure constraints, increase value addition, and compete in international markets. Funding patterns and processes are outlined, with the Ministry of Textiles and implementing agencies (IA) sharing responsibilities. The funding pattern of the scheme is shared between the Ministry of Textiles and IA in a ratio 90:10.

v. Insurance for Music Festivals and Sports Events

Festival insurance is essential for organizers to safeguard against unforeseen circumstances that could disrupt events, offering coverage tailored to meet their unique needs. The coverage may include event cancellation insurance, liability insurance for accidents, equipment insurance, and performer insurance. There are no specific policies in this sector. However, various policies such as weather insurance, general liability insurance, and terrorism insurance are crucial to mitigate risks associated with organizing such events.

In conclusion, tailored insurance coverage across these sectors is vital for mitigating risks, ensuring financial security, and fostering growth and resilience in North East India. By leveraging available schemes and policies, stakeholders can navigate challenges effectively and promote sustainable development in the region.

9.4. 10 Vision 2047: North East India's Insurance Sector - A Focus on Growth

The vision for 2047 should include 100% coverage of insurance products in the North East. As the North East envisages the vision for 2047. By 2047, North East India's insurance sector will be a robust and inclusive mechanism, fostering sustainable growth across agriculture, textiles, exports, cultural industries (music and sports), while ensuring human security and resilience against climate and disasters.

- **Agricultural Insurance:**
 - **Micro-insurance schemes:** Affordable weather index-based insurance and crop-specific insurance products for small and marginal farmers.
 - **Livestock insurance:** Products to cover livestock mortality, theft, and disease outbreaks.
 - **Climate-resilient insurance:** Policies that compensate for losses due to climate change-induced events like floods and droughts.
- **Textile Insurance:**
 - Insurance cover for raw materials, machinery breakdown, and finished goods against fire, theft, and natural disasters.
 - Crop insurance for cash crops like cotton and jute to protect against yield losses.
 - Special schemes for handloom and handicraft workers for livelihood security.

- **Export Insurance:**
 - Export credit insurance to protect exporters from non-payment by overseas buyers.
 - Marine cargo insurance to cover goods during international shipping.
 - Political risk insurance to safeguard against political instability in export destination countries.
- **Music and Sports Insurance:**
 - Event cancellation insurance for festivals and tournaments.
 - Public liability insurance for coverage against injuries to attendees and property damage.
 - Accident and injury insurance for musicians and sportspersons.
- **Human Security:**
 - Micro-health insurance schemes for low-income families and vulnerable populations.
 - Life insurance products with a focus on financial inclusion and social security.
 - Cybersecurity insurance for businesses against data breaches and cyberattacks.
- **Climate and Disaster Resilience:**
 - Flood and earthquake insurance products tailored to specific regional risks.
 - Disaster risk management programs in collaboration with government agencies.
 - Promoting insurance as a tool for climate adaptation and mitigation strategies.

Key considerations:

- **Technological adoption:** Leveraging digital platforms for wider insurance access and claim settlements in remote areas.
- **Financial inclusion:** Developing micro-insurance products and educating rural populations about insurance benefits.
- **Public-private partnerships:** Collaboration between government, insurers, and NGOs to design and implement need-based insurance schemes.
- **Regulation and risk assessment:** Strengthening regulatory frameworks and risk assessment methodologies specific to the North Eastern region.

In essence, it is important to provide comprehensive insurance coverage considering the unique risks and challenges faced by different sectors in North East India. From safeguarding event organizers against unforeseen circumstances to protecting farmers against crop failures, the right insurance policies play a critical role in promoting resilience and financial security in the region. By focusing on these elements, North East India's insurance sector can become a key driver of inclusive growth and sustainable development in the region by 2047.

9.4.11 Strategic Moves and Policy Interventions to achieve the 2047 vision

Some of the problems faced by the northeastern states include:

High Debt Burdens and Fiscal Dependence: Northeastern states in India face significant debt burdens and often rely on the central government for financial assistance, affecting

the region's fiscal dynamics (Pandey, 2024). Enhancing insurance coverage in North East India requires multifaceted policies and actions tailored to address specific regional challenges.

Other problems in achieving Vision 2047 are discussed below:

i. Low penetration and density rates

Some North Eastern states have lower penetration than the all-India average. However, low levels of penetration and density are an all-India phenomenon and point to the huge insurance gap in the country.

ii. Rural participation in insurance

Although it was expected that with liberalisation, insurance will spread to rural areas, this has not happened (Prabhakara, 2010). While this is an all-India phenomenon, the NER region as a whole, and some states, in particular, had more health insurance coverage in rural areas (Meitei and Singh, 2021).

iii. Low uptake of insurance

In the Indian case, risk mitigation takes the form of borrowings instead of insurance and this keeps the penetration rates subdued. (RBI Household Finance Committee, 2017). In this context, government insurance schemes such as Pradhan Mantri Jan Arogya Yojana, Pradhan Mantri Fasal Bima Yojana, Pradhan Mantri Suraksha Bima Yojana, and Pradhan Mantri Jeevan Jyoti Bima Yojana are notable contributors in pushing the insurance coverage to better levels.

iv. Inadequate access to insurance products

To increase the penetration rates and density, uninsured rural areas and the urban poor must be brought under the ambit of insurance coverage. In the North East, as has been noted above, rural participation is not low in some states. However, in the crop insurance segment, more coverage is needed.

v. Non-life insurers' product pricing and overcrowding in some segments

Insurance companies have resorted to harmful practices such as undercutting premiums. Most of the non-life insurance premiums come from sectors such as "crop, motor, workmen compensation, fire, marine, third-party liability, etc." (Bajpai, 2019). Major private insurers are not exploring other sectors such as home insurance, or home appliances insurance. Finally, most of these negative impacts are direct or indirect results of low capital issues in India's insurance sector, particularly the non-life insurance sector.

vi. Regulation and innovation

Another area that necessitates regulatory scrutiny is that of the application of technology in insurance.

vii. Issues of crop insurance

Given the special nature of the sector, any kind of agriculture insurance does not just support the farming community against weather and climate related risks; it also protects

the national economy through forward and backward linkages. The government will regulate the allocation of specific crops and areas. Improving the accessibility of insurance products will be of prime importance in this regard. Accessibility of insurance products is related to affordability and comprehension of the products and is critical for the North East.

viii. Prevalence of traditional distribution channels

Diversity in distribution is seen of late, but the traditional distribution channels continue to prevail. New channels, including online and point of sales, are being developed with the support of regulations and guidelines introduced by the IRDAI; their market share is, however, insignificant (IMF, 2018). Enhancing distribution channels holds the key to unlocking growth in penetration and density rates in the Indian insurance sector.

9.4.12 Financial literacy

Dash and Ranjan (2023) note that financial literacy in the North East is not high. Although literacy is high in these states, insurance uptake is dependent on financial literacy. Simultaneously, a complementary thrust will have to be put in by the authorities to build trust, spread awareness, and improve financial literacy.

The region's diverse climatic conditions and susceptibility to natural disasters necessitate targeted strategies:

Awareness and Outreach Programs: Implement comprehensive awareness campaigns to educate the local population about the importance and benefits of insurance. Engage communities through outreach programs, leveraging local languages and cultural nuances to ensure effective communication.

Financial literacy: There is a need for increasing financial literacy in the region, especially among vulnerable groups.

Tailored Insurance Products: Develop specialized insurance products catering to the region's unique agricultural, environmental, and socio-economic conditions. Tailoring policies to cover risks associated with floods, droughts, landslides, and other local calamities is crucial.

Government Incentives: Offer government-backed incentives to encourage insurance uptake, especially in rural areas. Subsidies, tax benefits, or co-payment schemes could make insurance more accessible and affordable for low-income groups.

Public-Private Partnerships (PPPs): Foster collaborations between government bodies, insurance providers, and local institutions to improve insurance penetration. PPPs can facilitate the design of innovative insurance schemes and enhance their distribution in remote areas.

Localized Distribution Channels: Establish robust and accessible distribution channels for insurance products in rural and remote areas. Utilize technology and mobile platforms to reach populations in distant regions lacking physical infrastructure.

Risk Assessment and Data: Conduct comprehensive risk assessments and gather localized data to understand and quantify the unique risks faced by communities in the North East. Tailor insurance offerings based on these insights.

Regulatory Support: Ensure regulatory frameworks support the growth of insurance in the region. Simplify procedures, streamline regulations, and create an enabling environment for insurers to operate effectively.

Capacity Building and Training: Invest in training local agents and professionals in insurance services. Enhance their skills to effectively communicate, sell, and manage insurance products within the region.

By implementing these targeted policies and actions, North East India can witness an increase in insurance coverage, mitigating risks, protecting livelihoods, and fostering economic resilience in the face of uncertainties.

Some ways in which this can be done are discussed below.

- Life insurance - Digital connectivity in North-East India has led to increased use of digital mediums to access insurance. There was no business done till 2014-15 through the digital medium but it has slowly gained some popularity in 2015-16 and claimed a business of 0.77% in the year. Since then, it has been growing. In 2018-19, it approximately doubled as compared to 2015- 16.⁷
- Ayushman Bharat – Digital Mission was launched on 27 September 2021. The objective of the scheme is to create a seamless online platform that will enable interoperability within the digital healthcare ecosystem. Under the ABDM, citizens will be able to create their ABHA (Ayushman Bharat Health Account) numbers, to which their digital health records can be linked. This will enable the creation of health records for individuals across various healthcare providers, and improve clinical decision making by healthcare providers. As of March 28, 2022, a total of Rs. 27,07,588 Health IDs (ABHA number) have been created in the North East.

In line with Vision 2047, as cross-border trade, particularly energy trade becomes more important for the region, the need for insurance will increase manifold. Keeping this in mind, products will need to be designed to cater to the region. Also, private insurance companies will need to be enticed to develop products catering to the needs of the region. One aspect that has to be kept in mind is de-risking which can help private companies assess the region more favourably. The central and the state governments can play an important role in this regard.

⁷ Nagar and Shyam, 2020

Chapter 10

Technological Interventions: Digital North East

10.1 Science and Technology: Research and Development

10.2 Digital North East

10.1 Science and Technology: Research and Development

10.1.1 Brief Background

The establishment of the scientific institutions like the Botanical Survey of India (1890), the Zoological Survey of India (1875) and the Geological Survey of India (1851) by the British in the pre independence period in Kolkata (then Calcutta) had been largely because of the realization of the fact that science and technology are prime movers of economy and development. Scientific research in the northeast region had its early beginning in Assam with the establishment of the Tocklai Experimental Station (the present day Tocklai Tea Research Institute) in Jorhat, Assam in 1911. Research carried out in this institute contributed in big ways in strengthening the Tea Industry in Assam and in Bengal.

The establishment of the tea industry led to two other major developments in the Upper Assam- the railways and the petroleum industry. With the technical expertise of the experienced railway builders of the Assam Railways and Trading Company Ltd (AR &TC)- a British company, one of the most remarkable railway tracks in the history of Indian railways (and perhaps of the whole world), the *Dibru -Sadiya Railway* (DSR) was started in 1882.

Second, H.D. Medicate of the Geological Survey of India, in 1856 made the scientific observation on the Makum oil seepages while reporting on the coalfields of Upper Assam. Again, it was the AR &TC, which played the pioneering role in oil exploration that led to the first successful detection of oil at the Digboi Well No. 1 in 1889. The same year the AR &TC launched a new company the Assam Oil Company (AOC). Soon, in 1900, the first oil refinery of Asia, the oldest refinery in India, also the oldest operating refinery in the world was built at Digboi and was commissioned on 11 December 1901. With the acquisition of the AOC by the Burmah Oil Company (BOC) in 1920s, the oil industry flourished. The BOC was subsequently transformed into the Oil India Limited (OIL) in independent India. The OIL undertook the most challenging engineering project within a decade after the nation became independent -the construction of the 1,158 km fully automated crude oil transportation pipeline from Naharkatiya in Upper Assam to Barauni in Bihar. The advisers to the OIL in this project were the engineers of the BOC. Setting up of this long crude oil pipeline is one of the technological marvels in Petroleum industry. This project also revolutionized the telecommunication technology of India with the installation of the first STD facility in 1962. The automated transportation of the crude oil required integrating the transportation system with 34 channel radio links along the entire length of the pipeline from Upper Assam to Bihar for constant monitoring of the oil flow. This was the world's longest radio link that comprised of telemetering, teleprinter and speech transmission.

10.1.2 S & T initiatives for Human Health and Wellbeing

Apart from the aspect of generating economic wealth, science and technology is also critical for human development in terms of health. The John Berry White Medical School was established in Dibrugarh in 1898 with the initiative and financial support from Dr White who was the Surgeon Major serving in Assam. With the installation of the first two X-Ray machines imported from England to this Medical School in 1900, the Berry White Medical School had the distinction of establishing the first Radiology Department in the country. What is remarkable is that it had been just five years in 1885, Wilhelm Conrad Roentgen, the German physicist and mechanical engineer discovered X-Ray, a truly disruptive technology at that point in time. This Medical School later became the first ever medical college of the northeast region in 1947-the present-day Assam Medical College. The Assam Medical College, Dibrugarh not only imparted medical education in the region but also ushered in research and development in public health in the region.

The British established the Pasteur Institute in Shillong in 1915 to conduct research and use of vaccines for disease control- another disruptive medical technology at that time.

Against these broad general perspectives, we need to understand where the society and the economy of the NER stand today and build a scenario for 2047. For this, there is a need to consider the ways in which we can tackle the understanding at the boundaries of scientific and technological development for transforming in granular ways our production and productivity, harnessing the possibilities of the all-pervasive digital technology.

10.1.3 The Emerging National Scenario

The Indian scenario with respect to science and technology is aptly described as '*The race against time for smarter development*' (UNESCO Science Report- 2022). The Government of India's strategy to Make India Self-reliant-known as the *Atmanirbhar Bharat* is designed to nurture adoption of the emerging technologies across the Indian economy. The eight strategic sectors identified in this for *Atmanirbhar Bharat* to allow greater private-sector participation are – coal, minerals, defence manufacturing, airports and airspace management, power distribution, social infrastructure, space, and nuclear energy. The Department of Science & Technology, Government of India in its Year End Review 2023 mentioned 20 key initiatives that have been launched to propel India into the realm of the top three largest economies of the world. The *Anusandhan National Research Foundation* (ANRF) with a budget of INR 50,000 crores for five years (2023-28) is a major transformational step to boost the research ecosystem of the country with increased private and industry participation in R & D. The National Quantum Mission (NQM) launched with a total budget of INR 6003.65 Cr for eight years is set to make India one of the leading nations in Quantum Technologies and Applications (QTA).

Twenty-five Technology Innovation Hubs (TIH) have been established under the aegis of the National Mission on Cyber Physical System (NM-ICPS) to develop technology platforms for R&D, translational research, product development incubation and for supporting start-ups and commercialization. The TIHs work in the areas of advance technology like Artificial Intelligence and Machine Learning, Robotics, Cyber Security, technologies for agriculture and water etc. Out of 25 TIH's in the country there is only one in the Northeast at IIT Guwahati, which is working on technologies for under water exploration.

The National Super Computing Mission (NSM) has commissioned 28 systems in the country to develop supercomputing infrastructure for meeting the increasing computational demands in the academia, industries and MSMEs and start-ups. Notable of these super computing systems are the PARAM Shivay (838TF) at IIT BHU, PARAM Brahma (1.70 PF) at IISER, Pune, PARAM Kamrupa (838 TF) at IIT Guwahati, PARAM Shakti (1.66 PF) at IIT Kharagpur.

Digital economy is at the core of the Fourth Industrial Revolution (Industry 4.0). Digital economy is driven by data and is associated with seven state-of-the-art technology- Blockchain, Data analytics, AI, 3D printing, Internet of Things (IoT), and cloud computing (UNCTAD,2019). According to the London based blockchain consulting firm Dappro's report, India was next to the USA in terms of blockchain developers in 2018 with 19,627 block chain developers and in the USA the number was 44,979. The Ministry of Electronics and Information Technology, Government of India has come up with the National Strategy on Blockchain in 2021 for creating trusted digital platforms to bolster the e-service systems of the Government and other sectors.

With respect to AI India aims at developing an inclusive leadership through its “#AI for All” approach leveraging this transformative technology for economic growth, social development, and inclusive growth. The NITI Aayog has focused on the following five sectors for application of AI to address the societal needs.

- a) Healthcare
- b) Agriculture
- c) Education
- d) Smart Cities and Infrastructure
- e) Smart Mobility and Transportation.

With the high reliance on newer technologies, India is factoring in the aspects of resource consumption and the socio-economic cost. The country has set the target of achieving 1745 giga watts of green energy capacity by 2022 as a commitment to the Paris Agreement of 2015. Green energy sources are expected to fulfill the nation's electricity requirement up to 40% by 2030. Research and innovation in the country is also focused on developing Zero Emission Vehicles, Flow Battery, as a replacement of Diesel Generators, quantum technology driven green hydrogen production, etc.

10.1.4 The Northeast Scenario- Performers of R & D Activities in S & T

The research and development system in India can be viewed in terms of the institutions and organizations engaged in R & D activities and secondly in terms of the expenditure on R & D activities. The institutions and organizations include the universities, the research institutions, and the non-governmental organizations. The research output of the higher education institutions and research institutes of the region which includes central, state, and private universities, IITs, R & D institutions and other technical and professional higher education institutions during 2001- 2020 can be assessed in terms of the total research publications, citation impact of the publications and patents granted. While Tamil Nadu with 1,47, 699 research publications during 2001-2020 and Maharashtra with 1,36,917 research publications had the highest productivity, the research productivity of

the northeast states are – Assam- 23,670, Meghalaya- 3,644, Tripura- 1735, Manipur- 1,497, Arunachal Pradesh-1,281, Mizoram- 957, Sikkim- 867, and Nagaland-577. With respect to citations of the research publications, the same two states received the highest citations, - Maharashtra- 3,619,174 and Tamil Nadu- 3, 286,345 during the two decades under consideration.

The ratio between research publications to Gross State Domestic Product (GSDP) indicates the correlation between the economic status and the research output of the states. An important finding of the report was that states which were once considered backward or remote, like Bihar, Chhattisgarh, Jharkhand, Mizoram, Tripura, and Nagaland had recorded growth in their research output during 2011-2015 to 2016-2020, in terms of impressive Transformative Activity Index (TAI) which is an indicator to compare areas of different sizes and different levels of financial capabilities with research output.

10.1.5 Innovation:

The first step to tap the technological potential of the nation is to focus on identifying and then including the grassroots innovators to take them forward through an enabling contemporary market-oriented path. The National Innovation Foundation (NIF) was established with this basic objective in 2000. The northeast states with its unique and rich cultural diversity need to have an inclusive innovation strategy in alignment with the goals of the NIF.

It is pertinent to mention that the world ranking of India in the Global Innovation index, 2023 is 46. 14,000 new start-ups were recognized in India in the year 2021-2022 which included 83 unicorns.

The process of India Innovation index has been initiated a couple of years ago for assessing the huge innovation potential of the country. The process is based on the seven basic parameters of human capital, investment, knowledge workers, business environment, safety and legal environment, knowledge output and knowledge diffusion. These parameters have 66 indicators based on which the innovation capacity of the various states of the country has been determined.

The third National Innovation Index, 2021 ranked the country’s innovation capacity under three categories, viz., the major states, the northeast states, and the hilly states of Uttarakhand and Himachal Pradesh, together, and the Union Territories and the City States. The ranks of the northeastern states are as shown below.

Table 10.1.1 Ranks of the North-eastern States in the third India Innovation Index 2021, for the Northeast and Hill States of India

States	Score	Rank
Manipur	19.37	1
Meghalaya	16.00	2
Arunachal Pradesh	15.46	3

Sikkim	13.85	4
Mizoram	13.41	5
Tripura	11.43	6
Assam	11.29	7

Another important indicator of the innovation and R & D outcome of the country is the number of patents filed and granted. The Indian Patent Act, 1970 has been amended multiple times since 1999 in efforts to align it with the international standards and promote innovations in the country. In 2021 India has brought out the amended Patent Rules (2021) that stipulates 80% reduction in the Patent Fees for educational institutions. The latest amendments to the Patents Rules have been notified in March 2024. During 2021-2022, a total of 30,074 patents have been granted and 66,440 patent applications have been filed.

The DST has established a network of 794 Technology Business Incubators (TBI) and Science and Technology Entrepreneurs’ Parks (STEP) across the country under the National Initiative for Developing and Harnessing Innovations (NIDHI) programme. Out of these, there is only one TIB at Mizoram University in the northeast.

10.1.6 Why NER is lagging behind?

Inadequacies in the Human Capital to Drive R & D

An analysis of the total number of arch research workers per million people in a few countries, well known for development in research and development in science and technology shows that India with a total population of 1,400 million has just 255 researchers per million and 3, 41,818 researchers in the country. On the other hand, countries like the USA, China, Germany, and Israel have much higher number of researchers per million populations as shown in the Table below. The critical mass necessary for productive quality research output in the country hardly needs to be reemphasized. *This is a formidable challenge in the northeast that needs to be addressed to augment the research output and to boost the innovation ecosystem.*

Table 10.1.2 Patents granted and transferred to the institutes in Assam during 2004-2023.

Institutions	Patents Granted	Patents commercialised
CSIR- NEIST, Jorhat	143	28
Tezpur University	28	11
Institute of Advanced Studies in Science and Technology (IASST)	20	3
IIT Guwahati	49	20

Table 10.1.3 Number of Researchers per million populations in selected countries in 2017

Country	Researchers per million	Total number of Researchers
USA	4245	13,71,290
China	1225	17,40,442
Germany	5003	4,13,542
Australia	4539	10,0414
Brazil	888	1,79,989
India	255	3,41,818

The proportion of graduates in STEM in India is one in four according to the UNESCO (2021). The NITI Aayog (2018) pointed out that industry-academia interfacing in Indian Universities is still in the nascent stage and there is very poor linkage between research and education in the Indian higher education institutes. The National Education Policy-2020 (NEP-2020) has taken cognizance of this lacuna and strongly emphasizes on research in the higher education institutions with provisions for mandatory industry internship to the graduate students, establishment of incubation centers for innovation and start-ups on the campuses and setting up a National Research Fund for facilitating research and development in the higher education institutions.

India’s R & D expenditure per researcher was \$43 during 2020-2021 which was ahead of the Russian Federation, Hungary, and Mexico (India Innovation Index 2021 of NITI Aayog).

10.1.7 Inadequacies in the NER : Human capital in science and technology

- While the young students of the NER have talents in science and mathematics, their performance is poor compared to peer groups in Maharashtra and call for effective quality science education to remove this disparity. There is significant insufficiency and disparity in the number of Higher Education Institutions in the NER *vis-à-vis* some other states like Uttar Pradesh, Maharashtra, and Tamil Nadu. While the total number of higher education institutions in Uttar Pradesh is 9346, all the 8 states in the NER together have only 1304 HEIs. Most of these HEIs lack modern infrastructure and qualified human resources necessary to develop human capital for S & T.
- A skill gap study reports that, Assam with 60% population of the NER states has a requirement of 5 lakh human resources between 2020-2025 which includes 52,591 in the manufacturing, 2,18,761 in tea and 9346 in IT and its allied sectors.

10.1.8 Investments in Science and Technology Research

As far as funding in R&D activities in science and technology is concerned, India’s expenditure is much low in comparison to other developed countries. The sources of funding are from the central, state governments and the industries that cater to

the R & D expenditures of the public, private and the industries respectively. In 2022-23 the total allocation to the Ministry of Science and Technology was Rs. 14, 217 crores. 99.3% of the allocation to the Ministry was on average revenue expenditure.

The estimated expenditure by the DST and the DBT in the year 2021-22 was 14% and 15% lower than the budget estimates respectively.

The state-wise allocation towards extramural research grants reveals that there has been a steady decline in fund allocation in Assam and Arunachal Pradesh from Rs.103.17 crores to Rs. 67.94 crores and from Rs. 108.90 crores to 29.93 respectively over the years from 2013-2014 till 2016-2017. On the other hand, the grant allocation for R & D increased in the rest of the northeastern states during the period. The state contribution to R & D was only 6% and the major proportion of the R & D funding has been from the central government in the year 2018-2019. State expenditure - especially from the NER states must increase.

10.1.9 Skewed Growth in Expenditure

Growth in the expenditure by the Ministry of Science and Technology over the last decade presents a skewed pattern. While there has been an increasing trend in the expenditure during the period of 2015-2018, the growth declined during 2018-2021.

There has been a significant decrease in the R & D investment from 0.27% of the GDP in 2012-2013 to 0.24 % of the GDP in 2018-2019. The Gross Expenditure in Research and Development (GERD) is a measure of investment in science. In India GERD as a percentage of GDP has been declining since 2009-2010 and includes the expenditure on R & D by the higher education institutions, public and private sector organizations, industries and corporate sector institutions and the non-government organizations.

As percentage of GDP, India's GERD remained at 0.66% and 0.64% during the years 2019- 2020 and 2020- 2021 which was the lowest in comparison to that of the OECD countries (2.57%), Germany (3.13%), the USA (2.83%), China (2.14%), Brazil (1.16%) and Russia (0.98%). The Standing Committee on Science, and Technology recommended for enhancing the GERD as a percentage of GDP to the DST in 2021 by promoting R & D investment of the private sector. Earlier on, the Science, Technology, and Innovation policy in 2013 stipulated that the GERD of 2 % of the GDP can be achieved by 2018- 2019 with matching contribution in R & D investment in the public and private sectors.

In the USA, China, Germany, and Japan, where the R & D investment is more than 2% of the GDP, it is the private sector that contributes the most and is to the tune of more than 50%. In percentage share of public investment in R & D in India, the share of the private sector in R & D expenditure is 37% as against the 63% investment by the Government.

10.1.10 Major Domains of Investments for R & D in India

During 2020-2021, 84% of the R & D expenditure incurred by the central Government sources was for 12 major scientific agencies. Of these, the DRDO accounted for the

maximum share of 31.6%, followed by DoS (19%), ICAR (11.1%), DAE (10.8%), CSIR (9.5%) and DST (7.3%) and DBT (3.7%, ICMR (3.1%), MeitY (0.8%) MoES (2.3%), MoEFCC (0.5%), MNRE (0.5%)

10.1.11 Institutional Drawbacks and Governance Gaps

- Overall poor governance and lack of leadership, poor collaboration among institutions are the major institutional draw backs in the region. There is a lack of linkage between S&T research and social science research in the states which is necessary for identification, need assessment and societal acceptance of appropriate technology.
- Less proportion of students of the region is opting for STEM education. Besides, the higher education institutions lack adequate infrastructure in terms of digital, laboratory and library facilities.
- Poor industrial development of the region and the very nascent and even non-existent Industry-academia interaction is a major retardant in the development of science and technology in the region.
- The poor linkage between research and innovation in the HEIs, lack of innovation ecosystem in most HEIs and absence of facilitation mechanism in the universities for patent filing and technology transfer are the major short comings in the higher education institutions of the region.
- Attitudinal problems and lack of adequate and effective institutional mechanisms for promotion of vocational and skill-based education is another drawback in the region.
- Policy discordance and lack of coordination among the agencies involved with policy implementation are two major flaws in government dynamics. Lack of understanding between the linkages between the thematic strength and resource availability in the states, and the absence of/insufficiency in mapping the capacities of the S&T/R&D institutions in each state is with respect to research output.
- The State Science, Technology and Environment Councils which are steering institutions in the NER states must be restructured and infused with massive funding by the Government as well as the industries.
- While the location disadvantage of the northeastern states due to the region's geography is undeniable, this is accentuated unrealistically by stereotypic mindset about the northeast.

10.1. 12 Markets, Technology, and Infrastructure

India's share in the global R & D exports which was 2.8% in 2019 included i.) Licensing of intellectual property ii.) Technologies embedded in exported goods iii.) Technology transferred through FDI and iv.) Technical services extended to clients abroad. The Economic Advisory Council to the Prime Minister recommended yearly increase of FDI inflow into R & D to US \$ 300 million by 2022. The northeast states can attract FDI into the R & D sphere of the region through proper policy and planning.

The poor R & D investment by the private sector has been one of the challenges in creating an innovation ecosystem in the country as pointed out by the NITI Aayog in 2018. The private sector companies have been allowed to use their CSR funds towards research and development activities by public sector organizations engaged in science and technology research, and the Universities since 2019.

In the northeast, the state allocation of fund for Research and Development in science and technology must increase. The major industries of the region- both public and private are required to promote industrial research in the universities of the region.

10.1.13 NER Vision 2047: The Broad Priorities

The Vision: 2047 for the northeast enjoins three basic priorities of the people of the region- Prosperity, Identity and Security. With these priorities in mind, there is therefore a need to identify strategic paths to posit science and technology as critical instruments to translate the vision for 2047 into realistic possibilities. It is important to point out that enabling technology can be a potent instrument in bolstering democracy ensuring overall human development and the wellbeing of the people.

Against this broad perspective, three focus areas are identified to create visions for the NER till 2047. However, it is pertinent to take note that the possibilities for translating these visions into realities depend on certain conditionalities, viz., (a) Increasing the quality and quantity of research innovation; (b) Human Resource and Capacity in the enabling technologies and (c) Creation of new structure and ecosystem for innovation process and entrepreneurship.

10.1.14 Vision I: Factoring in the 4th Industrial Revolution

The 4th Industrial Revolution presents a significant source of hope for human development in increasing the quality of lives of the people. Three core challenges in this hope are:

- a. Distributing the benefits of technological disruptions
- b. Containing the externalities and
- c. Ensuring that emerging technologies empower rather than determine us as human beings.

A. NER Focus Area: Food Security

Vision Statement: To develop the northeast region as a regional hub of bio-economy

The Northeast region is endowed with rich and unique biodiversity and is one of the 34 biodiversity hotspots identified worldwide. The region with its diverse ethnic groups is also a rich repository of traditional knowledge system. The enormous genetic potential of the unique bioresources can be harnessed through the intervention of modern biotechnology and other enabling technologies like nanotechnology, material science, mechatronics, artificial intelligence, data analytics, block chain technology, etc, and to promote bioeconomy of the region. The major promising sectors of bio economy of the region are:

- Bio Agri
- Biopharma
- Bioenergy/ Biorefinery

In the context of the significant increase in the export of agricultural products to the tune of 85% during 2016-17 and 2021-2022 from the northeast, bio Agri emerges as the most potential sector contributing to the bioeconomy of the region. Export of bio Agri products to the countries of Bangladesh, Bhutan, the Middle East, the UK, and other European countries has risen from \$2.52 million in 2016-17 to \$ 17.2 million in the year 2021-2022. With the intervention of modern biotechnology and other enabling ancillary technologies, it can be projected that this sector can grow to a \$ 22,000 million bioeconomy in the NER by 2047

Table 10.1.4: Projections of Bio Agri Economy (US \$ Million)

2030	2035	2040	2047
176	880	4400	22, 000

The major driver of this growth will be the increasing demand of biobased products made from plant, animal, and microbes in the national and international market. Apart from the food products, the Bio Agri sector also involves the horticultural and the floriculture products along with the increasing demand for wines from fruits like kiwi from the northeast. Sikkim, Arunachal Pradesh, and Assam are contributing majorly to these sectors. With proper policy for attracting private investment to startups by bioentrepreneurs, the bioeconomy of the NER has the potential to grow to a value of \$1.0 billion by 2047.

The other potential sectors which can contribute to the bioeconomy of the northeast are the bioenergy, bio service and the pharma. India’s ethanol production capacity was 947 crores liters in 2023 which had doubled from 427 crores liters in 2020 with a remarkable growth of 2.2 times. The government of India’s goal is to achieve 20% blending with petrol by 2025 through the Ethanol Blended, Petrol (EBP) programme. The Assam Bio Refinery Private Limited (ABRPL) which is joint venture company of Numaligarh Refinery Ltd (NRL) and Fortun has developed a production capacity of six crore liters of ethanol from bamboo biomass. In addition, ABRPL shall also produce 19,000 tons of Furfural and 11,000 tons of Acetic Acid and 144 gig watt hours of green energy. By 2047 the production capacity of Ethanol from Biomass of the Northeast can be projected to reach the level of 200 crore litre by 2047.

Table 10.1.5 Projection of Bio ethanol production 2024- 2047.

Year	2024	2030	2035	2040	2047
Production in Crore Litres	06	24	60	120	200 crore litres of bioethanol

This will be possible when the already decided biorefineries at Bongaigaon and in Meghalaya are set up and operationalised. The scope for establishing at least one

biorefinery in each of the states of the northeast is a distinct possibility with the region generating one of the biggest amounts of biomass. With the projected production of 200 crore liters of bioethanol in the northeast by 2047, more than 200 giga watt of green energy generation will be possible.

The Northeast region has the potential for developing into a regional hub for the pharmaceutical industry contributing to the region’s bioeconomy. India has mobilized remarkable capabilities post COVID-19 pandemic in three sectors, viz., vaccine research and manufacturing, manufacturing of the generic version of major “game -changer” drugs and frugal engineering and technology of medical devices. The growth of biopharma during 2020-2022 was from \$38 billion to \$ 49.79.

According to the Final Report Survey of Pharma Clusters published by the Ministry of Chemicals and Fertilizers, Government of India in 2023, 7,673 pharmaceutical industries are there in 118 clusters with 26% being micro, 31.2% small, 30.4% medium, and 12.4% large industries. The value of the domestic production and the export production from these industries is estimated to be about 4 lakh crores. While Maharashtra leads in the number of pharma clusters with 40, Sikkim in the northeast has the lone cluster in the northeast comprising of 32 industries (1% of the total pharma industry).

It is noteworthy that the Final Report Survey of Pharma Clusters published by the Ministry of Chemicals and Fertilizers, Government of India in 2023 mentions the Sikkim cluster of the pharmaceutical industries as one of the 6 Role Model clusters from amongst the 116 clusters in the country. The other seven sister states of the northeast have vast potential to develop pharma clusters in line with Sikkim by 2047. It is pertinent to mention that Shillong in Meghalaya has one of the oldest premiere institutes of the country- the Pasteur Institute (Established in 1915) involved in research for production of vaccine.

The northeast being in one of the two biodiversity hotspots of the country, has full potential to explore and utilize the region’s invaluable rare medicinal flora and the traditional knowledge system about these resources through establishment of many big pharma industries of the world. With present capacity of domestic production of drugs from Sikkim alone at 8800 tonnes, the region has the possibility to increase its drug manufacturing capacity up to 2,11, 200 tonnes by 2047.

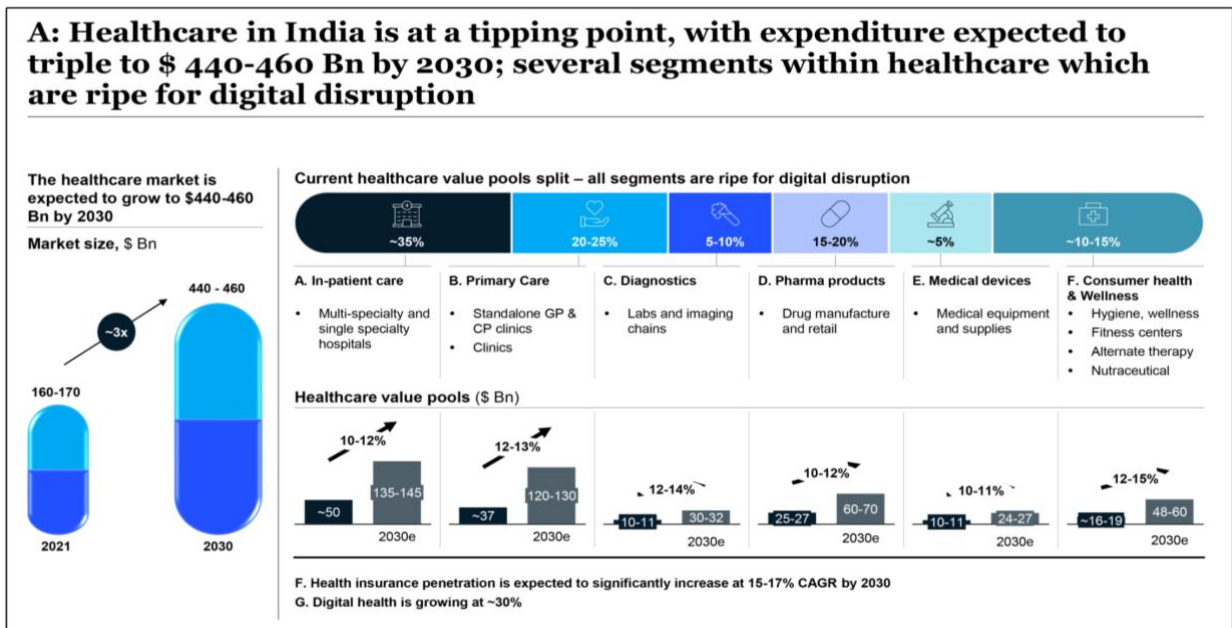
Table 10.1.6 Projections of Domestic Drug Production – 2024-2047

Year	2030	2035	2040	2047
Production (Tonnes)	17,600	52,500	1,05,600	2,11,200

10.1.15 The strategic pathways for this shall implicate-

- Government mechanism for providing project related clearance to the industries expeditiously
- Extending Tax benefits to the industries
- Development of modern research and innovation facilities in the region for application of digital technology and biotechnology.

Figure 10.1.1 D Development of efficient supply chain management systems for improving the current poor marketing capacity



A. NER Focus Area: Medical Technology for Health Care

Vision Statement: To develop Northeast as a Regional Health Care Hub of Southeast Asia

The Northeastern region is home to 3.78 % of India’s total population. The demand for healthcare in the region has enormous potentials and possibilities. The region is also known for the preponderance of several important communicable and non-communicable diseases, notably malaria, tuberculosis, cancer and cardio-vascular diseases, diabetes, widespread, malnutrition, child, and maternal mortality. The pandemic of COVID unfolded new realities. With the intervention of modern medical biotechnology in conjunction with the digital technologies, artificial intelligence, machine learning, internet of things (IOT), mechatronics and data analytics, Metaverse (Augmented Reality and Virtual Reality) Multi Model Digitally Networked Disease Diagnostic and Healthcare Facilities can be developed in the region.

Digitalization has opened several prospects in augmenting the health care sector in India. The healthcare market is expected to grow to \$440-\$460 billion by 2030.

The robust digital platform has revolutionized the way disease diagnosis, treatments and patient monitoring were done. With the launching of the *Ayushman Bharat* programme, digital health card with the *Ayushman Bharat* Health Account (ABHA) number is issued to every citizen. With this number, the electronic health record (EHR) data can be generated, processed, transmitted to advanced diagnostic centers where using AI platforms, accurate and rapid diagnosis has become a reality.

With these basic components, robust multi-modal disease diagnostic facilities can be created in the Northeast covering every citizen, even at the remotest of villages. The multi-modal disease diagnostic facilities shall be a boon to the patients suffering from fast developing diseases like cancer - the preponderance of which is alarmingly high in the Northeast.

Considering the rapid emergence of virulent pathogens and in the context of the looming biowarfare, a sophisticated Regional Central for Disease Control (RCDC) is envisaged by 2030. The Northeast shall require establishment of a modern Regional Centre for Virology and Immunology (RCVI) for virus research and vaccine development.

Creation of a modern healthcare hub in the Northeast shall also involve development of high-end digital infrastructures in the region. Establishment of the projected hospitals with multi-modal digital diagnostic facilities shall involve very conservatively an estimated amount of Rs. 15,000 crores. Additional Rs. 3,000 crores shall be required for RCVI and the RCDC.

Table 10.1.7 Projection for developing Bio medical technology infrastructures

Year	2030	2035	2040	2047
No. of Hospitals with Multi model diagnostic facility (%)	10	12	15	15

A few challenges that need to be addressed to translate the vision of a regional healthcare hub of the region are:

- Inadequate institutional capacity to develop qualified and skilled professionals in medical science and technology.
- Lack of provisions for systematic efforts for conducting drug discovery and development programmes.
- Inadequate investments in developing state of the art medical technology infrastructures.

Technologies that are already developed like alternate fuel-based transportation, alternate fuel- based transportation, green manufacturing, intelligent transportation system, low dust construction technologies, instant potable water quality testing, membrane-based water treatment, technology for run off control, etc., are urgently required to be deployed for providing clean air and potable water to the population.

Strategies need to be developed for transferring technologies from the lab to the field by 2030.

10.1.16 Strategies for Implementation of the Visions

Formidable Challenges and Possible Pull Factors

- Lack of focus and priority in translational research
- Over emphasis on Blue -Sky Research
- Disconnect from societal problems.
- Absence of right people for technological transfer.
- Gross insufficiency of fund for R&D

10.1.17 Policy Interventions and Strategies

- Major policy realignments in the realm of S & T and innovation, STEAM education, promotion of woman scientists, and international collaboration shall be imperative.
- Policy recasting with respect to career advancement of scientists and university faculty members with rigorous emphasis on quality performance of the highest order.
- Policy interventions for enabling creation of vigorous industry-academia interface in the universities.
- India has active bilateral science and technology (S&T) programmes of cooperation with more than 45 countries, including dedicated programs for Africa, ASEAN, BRICS, EU, and neighbouring countries. The universities and the R & D institutions of the NER shall be required to take advantage of these bi and multilateral arrangements.

i) Physical Infrastructures and Human Capacity Building

- Establishing at least 3 Centers of Excellence in domains related to Industry 4.0 by 2027 in collaboration with national institutions of repute like the Indian Institute of Science, Bangaluru, Tata Institute of Fundamental Research, Mumbai, and Jawaharlal Nehru Centre for Advanced Scientific Research, Bangaluru, to name a few and some top universities from abroad.
- Establishment of an Entrepreneurial University in the region in line with the Technical University Munich (TUM) with focus on applied research that drives economic development.
- Establishment of at least one Multidisciplinary Educational Research University (MERU) in each of the Northeastern states and two Indian Institute of Science Education and Research (IISER) in the region.
- Identifying the Technology Gaps.
- Mapping the requirements of highly trained scientists and technologists to cater to the needs of the new S&T institutes in the industry and academia that shall be set up in the wake of Industry 4.0.

ii) Financial Resource Mobilization

- Decreasing the dependence on Government Funding the.
- Universities and R& D institutions to be majorly funded by the industries, for example, the oil industries, TATA, etc.
- The Universities and the R & D institutions are to be established in the PPP mode.
- India has active bilateral science and technology (S&T) programmes of cooperation with more than 45 countries, including dedicated programs for Africa, ASEAN, BRICS, EU, and neighbouring countries which need to be mobilized to realize the vision.

Draft Report

10.2 Digital North East

10.2.1 Brief Background

One of the most disruptive technologies in recent times is digital technology. Digitalization has been affecting the economy and society in an unprecedented way. Digital interventions increase efficiency, improve services, enhance productivity, and spur innovations, thereby bringing greater inclusivity, sustainable growth, and enhanced well-being. Digital intervention is therefore potentially transformative and at the same time disruptive. Digitalization is changing the way people interact with each other in society, the governance system, the nature and structures of organizations, and the markets. These transformations are also raising issues of security, privacy, employment, education, skills, and the overriding concern about the uncertainties about the future of the digital world in the wake of the fast-emerging newer technological innovations.

There is an imperative need to put in place the visions and policies on digitalization which enable societies to prosper in a world that is becoming increasingly digital and data-driven. The government and all stakeholders together must shape a common digital future that makes it possible to make most of the immense opportunities coming in the wake of digital technology to improve the lives of people, promote economic growth for the country, ensuring that nobody is left behind.

10.2.2 Present Status

India launched Digital India in 2015 to use Information Technology to transform the entire ecosystem of public services. Digital India has linkages with all the important Government schemes such as Make in India, Start-up India, and the Smart Cities Mission. The digital economy, which is at the core of Industry 4.0, has been fueled by the rapidly growing digitalization in our country. The digital economy, which is intensively data-driven, is associated with seven disruptive technologies, viz., Blockchain, Data Analytics, Artificial Intelligence (AI), Three-Dimensional (3D) Printing or controlled manufacturing, Internet of Things (IoT), Automation, and Cloud Computing. The G20 countries under the then Indian Presidency declared in 2023 to focus on three areas: Digital Public Infrastructure (DPI) for digital inclusion and innovation, building a safe, secure, and resilient digital economy, and Digital Skilling for building a global future-ready workforce.

The World Bank, in one of its reports on Digital India, while highlighting India's fast progress in digital intervention, mentions that the percentage of micro firms investing in digital solutions has doubled since April 2020. The report highlights India's efforts and progress in reducing the digital divide through massive drives to promote internet literacy, extend affordable data plans, and empower women in high-end digital skills.

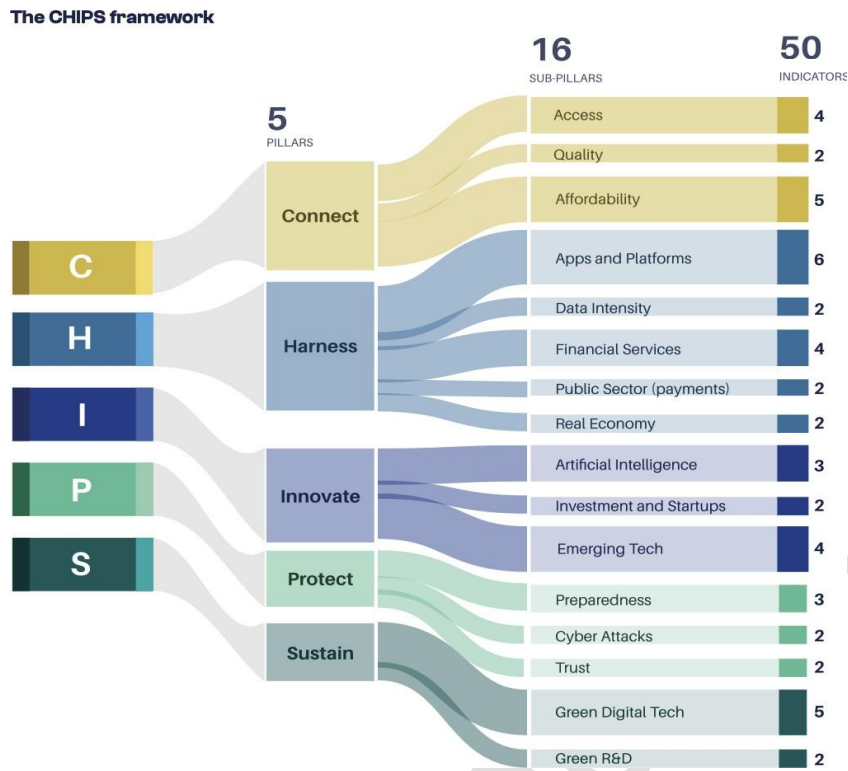
India's Growing Digital Footprint

- **Mobile Subscription:** Of the estimated 8.36 billion global mobile cellular subscriptions, 1.78 billion are in China, 1.14 billion from India, and 372 million from the US.
- **Internet Traffic:** India has the highest average wireless data usage per subscriber per month at 18.39 GB (as of June 2023).
- **5G Deployment:** India's growth in 5G deployment is highest in the world, from 0.1% in September 2022 to 5.5% in January 2023—a 55 times increase in 5G network coverage.
- **Digital Identity:** India has over 1.3 billion biometric IDs as of January 2024.
- **Real-time Digital Payments:** UPI transactions in the year 2022-2023 are followed by China and Brazil.
- **ICT Service Exports:** India is the second largest exporter of ICT services in the world at 15% in 2022, after Ireland (22.5% in 2022).
- **AI Projects:** India, with 23%, has the highest contribution to GitHub for AI projects, followed by the US (14%).
- **Unicorns:** India is third after the US and China in having the highest number of homegrown unicorns as of October 2023.

The Indian Council for Research on International Economic Relations (ICRIER), in its State of India's Digital Economy Report, 2024, ranks India as the third digitalized country in the world after the US and China, surging ahead of Germany, the UK, and Japan. Making a new approach to measure the extent and impact of digitalization within the framework of CHIPS, this is based on the five pillars of Connect, Harness, Innovate, Protect, and Sustain. These five pillars have 16 sub-pillars that are further organized into 50 indicators.

The CHIPS framework has been worked out to do away with the limitations and shortcomings of the three conventionally applied global indices on measurement of digitalization, viz., the E-Government Development Index (EGDI), the Network Readiness Index (NRI), and the ICT Development Index (IDI). India has made remarkable progress in the two pillars of Connect and Harness. At the sub-pillar levels, India is performing at the global frontiers in the six areas of cyber-attacks, affordability, access, public sector (payments), real economy, and trust. India scores moderately with respect to seven sub-pillars of apps and platforms, AI, green digital tech, data intensity, quality, investments and startups, and financial services.

Figure 10.2.1 The Chips Framework



India is recognized as the global leader in digital public infrastructure (DPIs), which is a new way of delivering public service at the population level.

10.2.3: North East Region: CHIPS Framework

It can be seen from the sub-national rankings and scores for CHIPS that among the northeast states, Assam is ranked 15th among the large states with a population of more than a crore, with a CHIPS score of 33.8. Among the smaller states and the Union Territories with less than one crore population, Mizoram ranks 3rd (CHIPS score 49.9), Sikkim 4th (CHIPS score 47.1), Meghalaya 8th (CHIPS score 42.3), Nagaland 11th (CHIPS score 37.6), Manipur 12th (CHIPS score 37.5), Tripura 13th (CHIPS score 33.4), and Arunachal Pradesh ranks last in this category at 14th (CHIPS score 26.5). Among the states of the northeast, Mizoram is performing well across the different CHIPS indicators, while Tripura is leading remarkably in providing digital public services.

Figure 10.2.2: Top Five major states in terms of digitalisation at the sub-pillar level

Top five major states in terms of digitalisation at the sub-pillar level

Pillar	Sub-pillar	#1	#2	#3	#4	#5
CONNECT	Access (Individual)	Maharashtra	Telangana	Kerala	Haryana	Gujarat
	Inclusion (Geography)	Karnataka	Punjab	Maharashtra	Tamil Nadu	AP
	Inclusion (Gender)	Chhattisgarh	Punjab	Telangana	Haryana	Kerala
	Quality	Karnataka	Haryana	Telangana	Tamil Nadu	UP
	Affordability	Rajasthan	Kerala	Uttarakhand	Haryana	Assam
	Access (Government)	Gujarat	Punjab	Kerala	Maharashtra	Jharkhand
HARNESS	Apps and Platforms	Kerala	Maharashtra	Gujarat	Tamil Nadu	Haryana
	Public Services (General)	Chhattisgarh	MP	Gujarat	Uttarakhand	Odisha
	Public Services (DPI)	AP	Telangana	Kerala	Chhattisgarh	Haryana
INNOVATE	Investment & Start-ups	Maharashtra	Karnataka	UP	Haryana	Tamil Nadu
	Business Innovation	Telangana	Maharashtra	Karnataka	Tamil Nadu	Uttarakhand
	Knowledge Production	Tamil Nadu	Karnataka	Telangana	Kerala	AP
PROTECT	Cybercrime Reporting	Uttarakhand	Bihar	Chhattisgarh	West Bengal	MP
	Cyber Resolution Mechanisms	Karnataka	Telangana	Rajasthan	UP	Gujarat

Figure 10.2.3: Top Five smaller states and UTs in terms of digitalisation at the sub-pillar level

Top five smaller states and UTs in terms of digitalisation at the sub-pillar level

Pillar	Sub-pillar	#1	#2	#3	#4	#5
CONNECT	Access (Individual)	Delhi	Chandigarh	Goa	Mizoram	DDNH
	Inclusion (Geography)	Goa	Sikkim	J&K	DDNH	Mizoram
	Inclusion (Gender)	Chandigarh	Goa	Himachal Pradesh	Delhi	J&K
	Quality	Delhi	Chandigarh	J&K	Tripura	A&N Islands
	Affordability	Meghalaya	Delhi	J&K	Chandigarh	Sikkim
	Access (Government)	Delhi	Chandigarh	Goa	J&K	Mizoram
HARNESS	Apps and Platforms	Delhi	Chandigarh	J&K	Goa	DDNH
	Public Services (General)	Tripura	J&K	Lakshadweep	Mizoram	Meghalaya
	Public Services (DPI)	DDNH	Lakshadweep	A&N Islands	Delhi	Chandigarh
INNOVATE	Investment & Start-ups	Delhi	Goa	Chandigarh	Manipur	Tripura
	Business Innovation	Delhi	DDNH	Goa	Chandigarh	Himachal Pradesh
	Knowledge Production	Delhi	Chandigarh	Nagaland/ Sikkim	-	Goa
PROTECT	Cybercrime Reporting	Ladakh	Lakshadweep	Mizoram	Sikkim	Tripura
	Cyber Resolution Mechanisms	Ladakh	Lakshadweep	Mizoram	Sikkim	Tripura

Source: IPCIDE Research | Note: Ladakh and Lakshadweep have only been included in the ranking of sub-pillars where data is available

10.2.4 Laggard Syndrome: Poor Digital Infrastructure

While digital technology is fast emerging as the all-pervasive technology in every sphere of S&T and governance, ironically, the major limitation in the NER is the poor digital infrastructure that affects the overall development of the region. The Telecom Regulatory Authority of India (TRAI) has noted that there is a lack of high-speed mobile-based internet

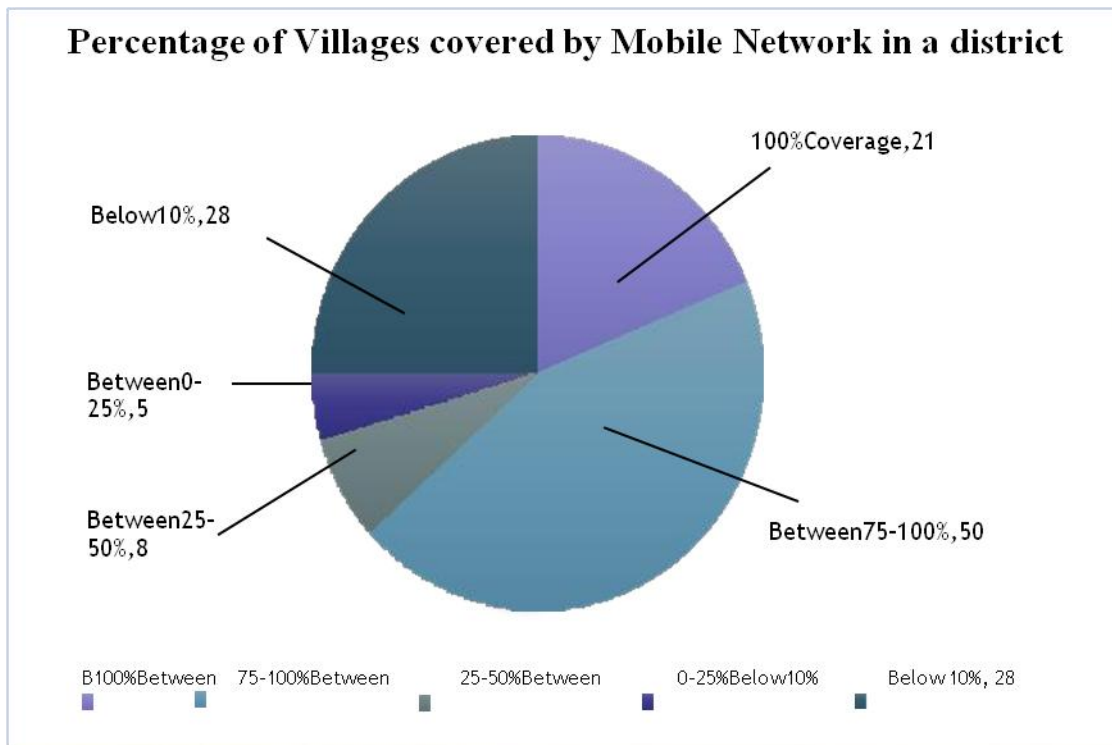
and broadband connectivity in the northeastern states, due to inadequate transmission bandwidth (optical fibre, microwave, and satellite). The region still has the laggard syndrome arising out of the digital divide due to multiple factors like inhospitable terrain, poor availability of power supply, transmission media-related limitations, poor return on investment prospects for TSPs, and Right of Way (RoW) related issues. This is also adversely impacting the socio-economic development of the entire region. It is to be noted that the average tele-density of Assam is 71% and that of the Northeast Licensed Service Area, comprising Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Mizoram, and Tripura, is 79.6%, as against the average tele-density of the country, which is 84.46%.

Particulars	Wireless	Wirelines	Total (Wireless + Wireline)
Broadband Subscribers (Million)	813.08	33.49	846.57
Urban Telephone Subscribers	627.54	26.16	653.71
Net Addition in March, 2023	1.18	0.37	1.54
Monthly Growth Rate	0.19%	1.42%	0.24%
Rural Telephone Subscribers	516.38	2.25	518.63
Net Addition in March, 2023	0.79	0.073	0.86
Monthly Growth Rate	0.15%	3.38%	0.17%
Total Telephone Subscribers	1143.93	28.41	1172.34
Net Addition in March, 2023	1.96	0.44	2.40
Monthly Growth Rate	0.17%	1.58%	0.21%
Overall Tele-density*(%)	82.46%	2.05%	84.51%
Urban Tele-density*(%)	128.45%	5.36%	133.81%
Rural Tele-density*(%)	57.46%	0.25%	57.71%
Share of Urban Subscribers	54.86%	92.09%	55.76%
Share of Rural Subscribers	45.14%	7.91%	44.24%

Source: North-eastern region district SDG index and dashboard baseline report of 2021-22; published by NITI Aayog, Govt. of India.

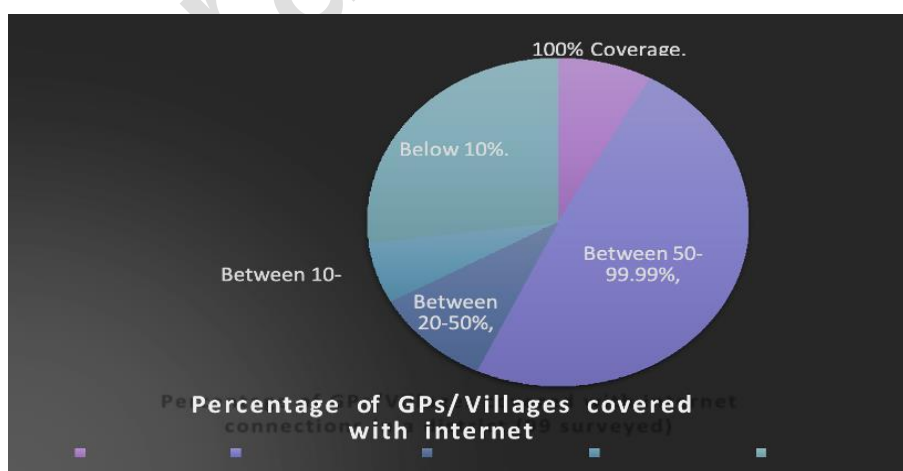
A typical characteristic of the mobile revolution is the dominance of the wireless subscription base. Like other parts of India, the North-Eastern Region has also witnessed a steady increase in the mobile subscriber base over the years, and today, nearly all parts of the NER are connected online. However, recent data has revealed that some parts of the NER continue to be in internet darkness, which needs immediate correction if service delivery is to be satisfactory.

Figure 10.2.4: Percentage of Villages covered by Mobile Network in a district



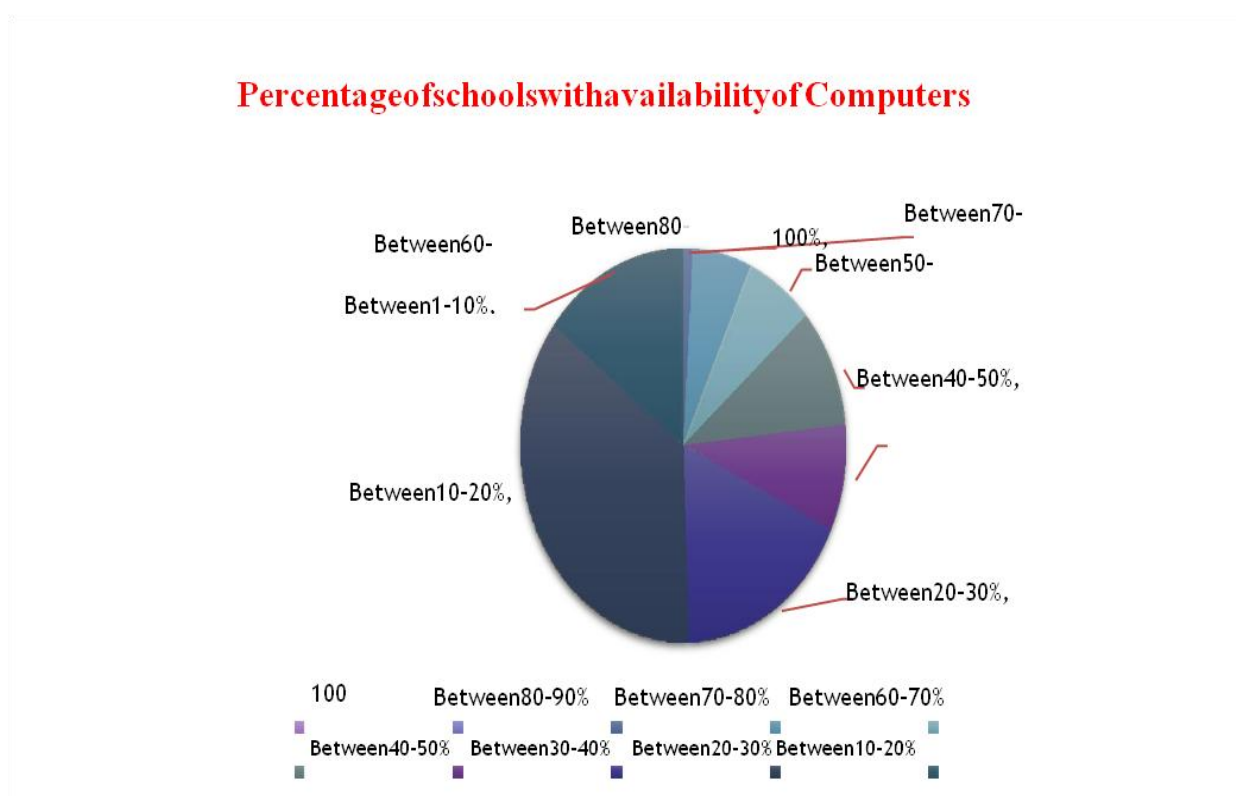
The chart above shows that a significant number of districts in the North-Eastern region lack adequate mobile network coverage, with only about 10% of districts achieving full coverage. In today's internet-driven world, seamless connectivity is essential for progress. The data illustrates the current state of internet coverage in the region, revealing that 27 districts have less than 10% of their villages connected to the internet. Although not directly related to telecommunication networks, the data chart below further highlights the alarmingly low access to basic resources such as computers.

Figure 10.2.5: Percentage of GPs/Villages covered with internet



Out of 120 districts, data for 103 districts indicate that not a single district in the North-Eastern region has computers available in 100% of its schools. In fact, only one district has 70% to 80% of its schools equipped with computers. Additionally, there are 37 districts where only 10% to 20% of schools have access to computers.

Figure 10.2.6: Percentage of Schools with availability of Computers



In the context of telecommunications and related services, the limited internet and mobile coverage in many parts of the North-Eastern region is a significant concern. This lack of comprehensive penetration hinders the government's digitalization efforts, thereby stunting growth in several critical areas.

10.2.5 Vision Statement: Northeast as the Third Regional Digital Gateway of India: Strategic Moves to Achieve the Vision by 2047

The NER is envisioned as the Third International Internet Gateway Link (after Mumbai and Chennai) of high-speed bandwidth connectivity using sea cables through Bangladesh. The leasing of 10 Gbps bandwidth of high-speed connectivity through sea cables from Bangladesh to India has far-reaching implications. Although a majority of the NER states have not yet been able to access this bandwidth, several studies highlight the transforming vision and the vast opportunities and socio-economic changes that digital and frontier technologies will bring to the NER (FICCI-KPMG, 2016; Ministry of Electronics and IT, 2016; ESCAP, 2014).

Supplementing the existing 2000 km connection from Chennai via Kolkata and Assam, high-speed broadband connectivity drawn from alternative sea route cables in the Bay of Bengal will facilitate common service centers, livelihood means, skill development, entrepreneur development, e-commerce, startup innovation hubs, and digital payments from Gram Panchayats to towns and cities. Eight digital thrust areas identified by the Digital North East Vision 2022 (Ministry of Electronics and IT, 2016) are digital infrastructure, services, empowerment, electronic manufacturing, IT/ITeS and BPO industries, payment, innovation and start-ups, and cyber security.

A four-layered digital model is envisioned to act as growth drivers that will substantially induce widespread cascading impact (FICCI-KPMG, 2016). In the first layer, this model will have basic internet infrastructure and the citizen community touching upon various ICT components like

international bandwidth and mobile networks with deeper inroads into education, healthcare, livelihood, disaster management, entertainment, transport, SMEs, skills, entrepreneurship building, and governance. The last-mile connectivity in tough terrains, remote rural areas, and crisis situations would be ensured through reliable and scalable backhaul on optical fibre, balloon-powered internet, and microwaves.

To supplement these, crucial players in the power sector in the NER, like PGCIL, will lay Optical Parallel Ground Wire (OPGW) when power pylons are installed. The COVID-19 pandemic highlighted both the deep digital divide and the highly unprepared nature of ICT-based education in the NER. Besides the signal and electricity gaps, the mere unavailability of communication instruments among a large section of households reflected the growing disparity and deprivation.

The second layer of the IT/ICT industry will focus on high-tech zones and software technology parks, both to harness skilled human resources and connect with cross-border business conglomerates. This will be used to doubly enhance the attractiveness of the NER in natural resource management, textile, sports, tourism, healthcare, banking and financial services, retail, and climate change issues.

In the third layer, the emphasis will be on the extension, improvement, and consolidation in critical areas like wireless networks, cloud technologies, and big data to provide service and technology to the Internet of Things (IoT). All the eight smart cities in the NER would prominently figure in this schematic. The final layer would be the e-business layer that would mobilize the other three layers in consolidating the delivery of services. In this entire four-layered model, private businesses could provide the leadership.

The four supportive components are: i) satellite-based communication along with submarine cables for access to international bandwidth, ii) fast cable upgradation replacing copper cables with optical fibres, iii) steadily moving to higher bandwidth through new submarine cables SEA-ME-WE-4 through Bangladesh to 40–100 Gbps, and iv) acquiring connections to neighboring ASEAN nations through submarine cable express systems for enhanced access to international broadband. These components could clearly reposition the NER in the world of science, technology, business, ecology, culture, and development. This will sufficiently integrate the NER with the rest of India, ASEAN, and East Asian countries in crucial areas of trade, investment, industry, technology, tourism, energy, and other services. The role of the private sector, international conglomerates, and multilateral institutions is of core importance.

10.2.5.1 Qualitative Targets

At present, State Data Centers, with G2C, G2B, G2G services and delivery platforms like Statewide Area Network (SWAN), Community Service Centers (CSCs), and schemes like NeGP have started making primary inroads in many social, economic, and commercial activities. However, the predominantly BSNL-run broadband connectivity is not only intermittently halting and slow but also mainly based on fixed and wired systems. Both the number of cellular base stations and broadband connections provided are relatively very low. The institutional capacity, professional capacity, and operational reach of BSNL have been far below even the minimum required demand.

The quantum leap strategy awaits the NER and its information superhighway vis-à-vis the rest of India and the ASEAN and East Asian countries with the injection of Quantum Dot (QD) Blockchain,

QD solar, and QD LED. This will trigger quantum dots, computing, medical, anti-counterfeit security, and optical signatures on products.

Building and consolidating the digital infrastructure in the NER is critical for the implementation of the envisioned scenario in science and technology for 2047. For a digitally empowered northeast, the region needs to leapfrog into an online, formal, high-productivity economy from the offline, informal, low-productivity economy.

The Vision 2047 for creating the third regional digital gateway in the northeast encompasses the following broad targets to achieve:

- To have broadband for all in the urban and rural areas in the northeastern states through the development of Broadband Highways.
- To cover the uncovered villages of the northeast through intensive network penetration to ensure universal access to mobile connectivity.
- The existing Common Service Centers for delivery of e-services shall be added with sufficient numbers to facilitate public internet access.
- The business processes in the government departments and courts shall be re-engineered to improve e-governance under the *e-Kranti* project.
- Ensuring information to all citizens of the northeast through the creation of Open Data Platforms and online hosting of all information and documents.
- Creating robust capacity-building institutions in each of the northeastern states to impart skills for digital technologies.

10.2.5.2 Quantitative Targets

The Digital Public Infrastructure (DPI) platforms like the India Stack created by the Government of India is a robust all-inclusive ecosystem to facilitate instant public transaction of data and finance to bolster domestic businesses, spur entrepreneurship, and enhance effective governance.

The enabling technologies underpinning the DPI are AI, Web3, IoT, Blockchain, 5G, etc. To propel the nation to an *Atmanirbhar Bharat*, it is projected that out of 28,085 Gram Panchayats in the northeast, by 2047 all Gram Panchayats shall be made operational in terms of e-connectivity through optical fibre cable under *BharatNet* by the Department of Telecommunication from the 5,804 Gram Panchayats that have been made service ready in 2022. This is envisaged as shown below.

Table 10.2.2: Projections of Digital Infrastructure Development for Service Ready Gram Panchayat (GP)

Year	2030	2035	2040	2047
No. of Service Ready GPs	60,000	60,000	50,000	46,859

Table 10.2.3: Projection for increasing Tele Density

Year	2030	2035	2040	2047
Teledensity (%)	80%	85%	90%	100%

It is pertinent to point out that India has one of the fastest growing telecommunications networks in the world. There has been a concerted effort to extend internet access to the rural population. One in three, i.e., 35.5% Indians had internet access in 2017. The number of internet subscribers was 644.08 million in 2019, of whom 87% were broadband subscribers, according to the Yearly Performance Indicators (2019) of the Indian Telecom Regulatory Authority.

10.2.6 Consolidating Cyber Security Capacity

The vulnerability of states to cyber-attacks increases with the increase in the level of digitalization. According to the reports from the Data Security Council of India, malware is the single most security threat to the digital economy of the country. States with the highest incidents of malware attacks are Telangana, Tamil Nadu, Delhi, Gujarat, Karnataka, Maharashtra, and Haryana. Assam in the northeast figures among the top five states where cybercrimes have increased by more than 50% between 2021 and 2022, according to the National Crime Bureau (NCRB). Most of the cybercrimes, according to the reports of the Future Crime Research Foundation (2023)- (77.5%) relate to online financial frauds, with online social media-related crimes, hacking/damage to computers constituting the remaining cybercrimes. These reports identify ten areas in the country as the epicenters of cybercrimes. These places are in close proximity to the areas marked with socio-economic challenges, low digital literacy, high youth unemployment, and underemployment. Alarming, most of these regions are in the northeast region of India.

In the context of the above scenario, a major component of the digital infrastructure development in the NER that needs to be accorded top priority is a robust cyber security system. The National Cyber Security Reference Framework (NCRF) provides the essential guidelines to help organizations and enterprises of the region to create a strong foundation of security posture. By 2047, the NER is projected to develop its own cybersecurity products and tools like firewalls, anti-malware, anti-virus, network security monitoring, vulnerability scanning, etc., to counter various evolving cyber-attack strategies. It is of utmost importance that these systems are developed indigenously in the country rather than importing them.

A few critical issues relating to a foolproof cybersecurity system are:

- Inherent vulnerabilities of cyberspace.
- Innumerable access points to the internet.
- Newer technologies outpacing defense technology.
- Nation-states, non-state actors, and individuals waging cyber-attacks are well-organized.

10.2.7 Challenges Ahead

While digital interventions open immense opportunities for the northeast through bolstering the region’s economy and the standard of living and wellbeing of the people, there are major challenges that need to be considered critically.

First and foremost, as the digitalization of the NER shall facilitate generation of unimaginable volume of data in every sector encompassing public institutions, business and corporate organizations, private individual information, data privacy and protection shall be a huge challenge. Any breach in data security shall seriously compromise the functionality, integrity, and privacy of the digital systems and devices. This in turn shall have consequences for critical infrastructure, public safety, and personal information. This is an overriding concern taking into account the local sensitivity of the NER from the perspective of national security.

Secondly, digital interventions enable small and medium companies to improve market intelligence and access global markets and the knowledge network at relatively low cost. These in turn open new opportunities that would require complementary investments for bringing in operational and organizational changes, process innovations, and in developing new business models and skills. Developing these capabilities in the MSMEs of the region shall present formidable challenges.

Thirdly, digitalization in the region cuts across the different states, international boundaries, and changes the conventional notion of location, distance, and jurisdiction. These call for multi-stakeholder cooperation and coordination, which are critical for facilitating interoperability, compliance, accountability, and governance to ensure multilateral actions in many areas. This challenge is accentuated by the unpredictability of the new emerging technological innovations and the underpinning uncertainty.

10.2.8 : Benefits of Achieving the Vision Targets

Digital intervention in the NER shall give a fillip to the economy of the region and thereby enable raising the contribution of the region in boosting the country’s GDP, which is projected to rise up to 2% through digitalization by 2030, amounting to US\$180 billion. Increased market penetration of digitalization in the northeast shall facilitate the growth of multiple sectors, viz., the bio-agro, bio-pharma, and the bio-energy industry sectors along with health and education of the region. Accomplishment of the vision target shall create new synergy amongst the other emerging technology sectors associated with digitalization like AI, IoT, robotics, edge computing, metaverse, to name a few, which shall enable the region to avail the immense opportunities coming in the wake of Industry 4.0 in the northeast.

10.2.9 Government Dynamics for Cross-Sectoral Collaboration

The Government of India is setting up 100 Test Labs in collaboration with fourteen ministries and departments to explore 5G use cases for the respective industry verticals leveraging communication technologies such as 5G/4G-Adv and IoT. For example, for the Ministry for Housing and Urban Affairs, the role of ICT will be explored in the Smart City Mission; for the Ministry of Power, smart grids and smart metering will be explored for the national Smart Grid Mission.

There is a necessity for the formation of an inter-governmental Centre for Digitalization-Regulation and Data Security with all the Northeastern states to provide an institutional regulatory mechanism to promote effective expansion and use of the cohorts of technologies on the backbone of 5G technologies for the regional development of Northeast.

Chapter 11

The Four-way connectivity: Scope and Opportunities Railways, Transports, Waterways, Airways

The NER share international borders of 5,812 km with the neighbouring countries of China (1,395 km), Bhutan (455 km), Myanmar (1640 km), Bangladesh (1,596 km) and Nepal (97 km), which is about 99 per cent of NER’s geographical boundary (Fig 4). Augmenting infrastructure, including rail, road, inland water, and air transportation to facilitate a two-way movement of people and goods within the region and outside, communication networks including broadband and wireless connectivity, and harnessing of the vast power generation potential, all of which will open up markets for produce from the region, attract private investment, create greater employment opportunities, and expand choices for people of the region. For the Northeast, if the trucks were allowed to transit via Bangladesh, it would reduce distance by almost 65% and transport costs by 68%. The 1,600 km journey from Agartala to Kolkata will be cut short to 450 kms via road through Bangladesh, and a mere 200 kms for direct access to the Chattogram port in Bangladesh.



Fig 4: Connectivity Network in Northeast India (Source: Herrera Dappe; Kunaka, Charles (2021))

The infrastructure deficit remained a major physical constraint in the NER. The situations changed drastically by 2024. In 2018 also the nearest railway station from the state capital varies from zero in Assam to 130 in Mizoram and 216 km in Imphal. In case of the nearest airport it varies from 5 kms in Tripura and Manipur to 68 kms in Arunachal Pradesh and 74 kms in Nagaland. Out of the total national highways of 13658 kms in the whole of NER, Assam and Arunachal Pradesh

constitute as high as 28 and 18 percent as against hardly 4 percent of Sikkim. And out of the total 2830 km of railway line Assam constitutes 90 percent and Tripura (9 percent) with literally negligible presence of railways in other states. Despite Pan-India projects like BharatNet connecting all the 11252 gram panchayats in the NER, it continues to have the lowest bandwidth speed in India. The tele density is 64 % as against India's 83.4 % internet connection is hardly 11 million (2015-16).

Past two decades and more particularly in the last few years the NER has seen a huge surge in the physical infrastructure development and participation of newer players like JICA and ADB. For instance, roads in the NER constitute over 10 percent of India's total roads of 46.90 lakh kms and almost 14 percent of the total national highways of 97.99 thousand kms. In the planned total road projects including East West corridor, two lane roads to the district headquarters and backward and remote areas, 3750 kms have been completed. A total of 3101 kms of highway was built during 2014/15 to 2018/19 at the cost of Rs 26986 crore and another 4407 kms are likely to be added with an investment of Rs 47476 crore.

A range of bridges including long pending 4.94 km Bogibeel (Rs 5900 crore land and rail) was completed. All these projects along with the upcoming mega projects like 1850 km frontier high way in Arunachal Pradesh and new bridges on Brahmaputra would change the entire face of connectivity. Commissioning of and steady implementation of the 870.82 kms railway lines connecting all the state capitals of the NER at the cost of 42239 crores by 2022 are underway. 13 operational airports witnessed the 98.4 lakh passenger and 38094 tons of freight movement during 2018/19.

Connectivity to operationalise India's Act East Policy has recorded massive progress with alignment of Asian High Way 1 and 2 that connect India with Pakistan, Bangladesh and Myanmar and India with Nepal and Bangladesh which pass through the NER. This includes 834 km Moreh (Manipur) and terminate at Dawki (Meghalaya) on Indo Bangladesh border; 1360 km Trilateral Highway connecting Moreh (India) – Mandalay (Myanmar)- Yangon - Mae Sot district (Thailand); Kaladan Multi Modal Transport Project between India and Myanmar (697 km waterway Kolkata to Sittwe port in Myanmar and 220 km roadway Paletwa to Indo-Myanmar Border Zorinpui); connectivity with Bangladesh through Sabroom in Tripura and Tura in Meghalaya and proposed Bharatmala.

To effectively utilize 3839 kms of total navigable water ways, a range of inland water ways including 891 km Sadiya-Dhubri (Bangladesh border) under NW-2 and 121 km Lakhimpur – Bhanga would bring new set of affordable transportation network.

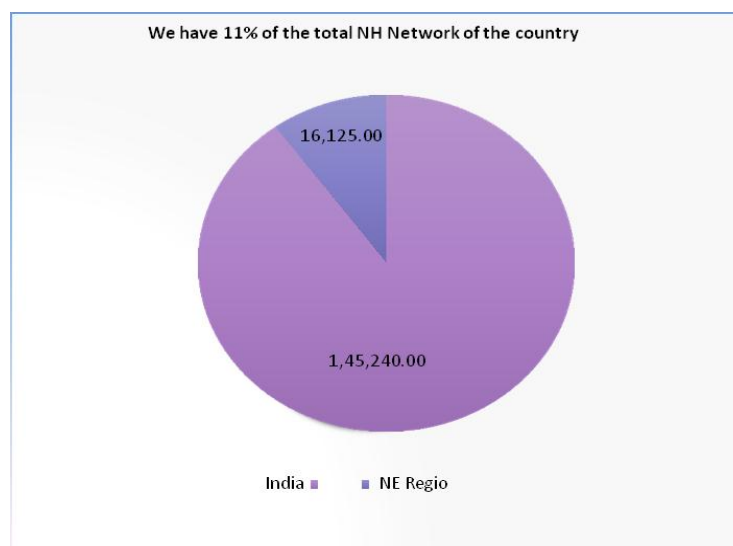
Evaluating the efficiencies / deficiencies in various sectors that add value to logistical facilities is a critical exercise that would bring about improvement in service delivery mechanism and encourage trade & commerce through ease of doing business model. To streamline the processes, identify the deficiencies and take measures for improvement, 2018, the Logistics Division, DPIIT, Ministry of Commerce & Industry, has undertaken an annual "Logistics Ease Across Different States (LEADS)" survey in all States/ UTs to assess logistics ecosystem in the country at State/UT level. Accordingly, the LEADS 2022 survey has categorised the different states as per the following chart.

As per the survey, in the North Eastern Region, the only state to have been categorised as “Achiever” is Assam while Sikkim & Tripura have been categorised as “Fast Mover” and the rest of the five NER states are languishing at the “Aspirer” level. The problems related to logistics specific services as far as NER is concerned have been influenced by mostly difficult terrain, access through a chicken neck to the main markets of India, geographical locations, lack of industrialization and less than anticipated economic activity. More so, NER being a consumption-based economy, its output in terms of products is limited except for a few products such as tea and petroleum leading to high cost of logistics services making it uncompetitive in this segment. However, NER has 98% of its border with the neighbouring countries and therefore cross border trade in larger volumes in future shall open opportunities that would act as catalyst for the region’s development. Since the general road connectivity in the region is good and Assam having an extensive rail connectivity and inland waterways, it is practical to visualize a hub and spoke model for logistical services in the region. The Hub could be developed in the plains of Assam with a Transshipment hub being the focal point of the facilities, different spokes in smaller scales could be developed in the other states of the region. This would allow transshipment of goods from smaller commercial vehicles into larger trailers & vice versa and thereby ensuring servicing the hinterland states of West Bengal, Bihar, Odissa, Jharkhand etc.

Table 11.1 Logistics Ease Across Different States (LEADS)

Categories	Achievers	Fast movers	Aspirers
Landlocked states	Haryana, Himachal Pradesh, Punjab, Telangana, Uttar Pradesh, Uttarakhand,	Madhya Pradesh, Rajasthan	Bihar, Chhattisgarh, Jharkhand
Coastal states	Andhra Pradesh, Gujarat, Karnataka, Maharashtra, Odisha, Tamil Nadu	Kerala	Goa, West Bengal
North-Eastern Region	Assam	Sikkim, Tripura	Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland
UTs	Chandigarh, Delhi	Puducherry	Andaman & Nicobar, Daman Diu & Dadara and Nagar Haveli, Jammu & Kashmir, Ladakh, Lakshadweep

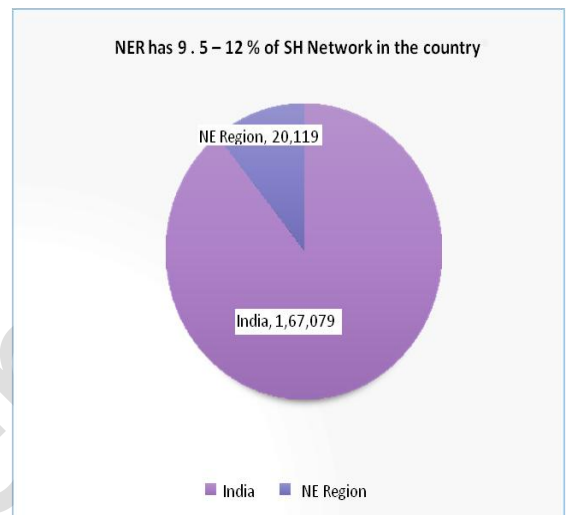
Figure 11.1 Road Network



Roads constitute one of the most important components of infrastructure in any developed country along with other infrastructural facilities. NER being a land locked region, roads provide the most crucial physical connectivity in the absence of extensive rail network except for the state of Assam. As far as volume is concerned road network is extensive whether it is the National Highway or State Highways or District or Rural roads.

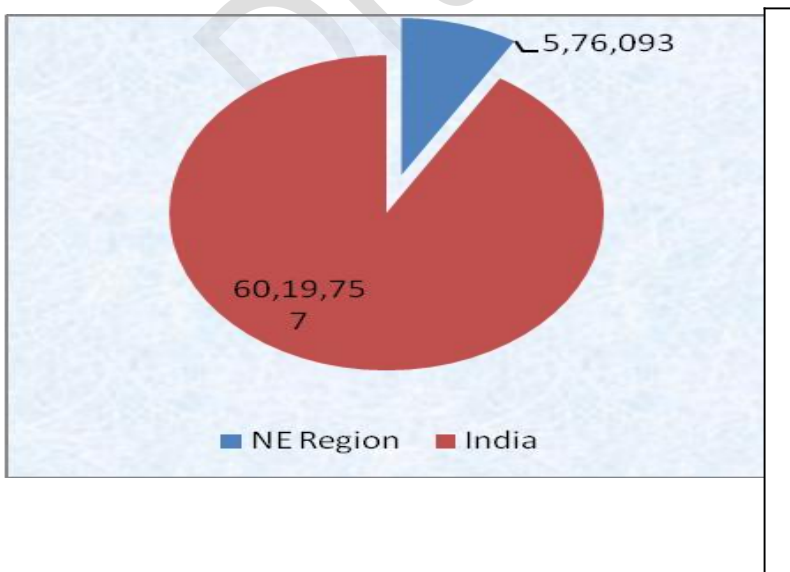
Other road networks, which include District Roads and Rural roads, constitute 9.5% of the national network. In terms of the length of the network, this is quite impressive and connectivity is at par with the rest of the country. These roads are vital and provide connectivity to the deep hinterland. In a difficult region such as NER, such connectivity augurs well for further developing or strengthening the road network. From 2047 perspective, the development or strengthening of the road network to a certain extent will have to be concentrated around this segment as well.

Figure 11.2: NE State High ways Networks



While the road network within the North Eastern region is extensive in line with the national network, what is of concern is the quality of the network at many places. The connectivity in terms of availability of road network looks to be at par with the national road network which provides the basis on which further development can be planned.

Figure 11.3: Other Roads Networks

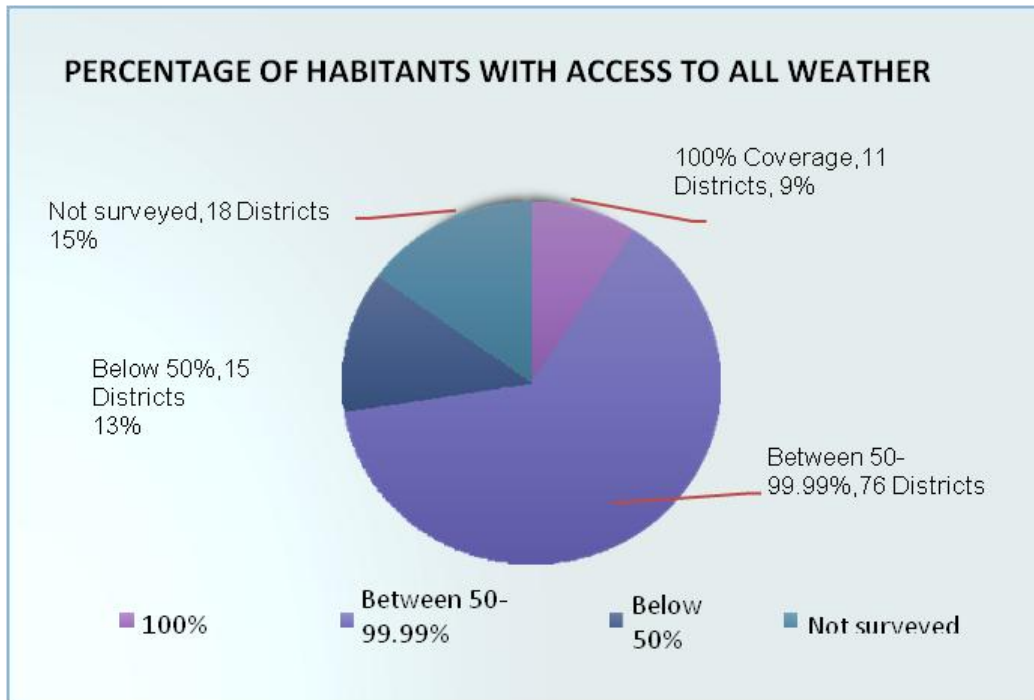


However, the quality aspect in terms of proper motorable conditions especially with respect to State Highways and other roads, has many facets and this paper will try to ferret out the most critical ones concerning the region.

Source: 'Basic Road Statistics of India 2018-19', published by the Ministry of Road Transport & Highways, Govt. of India

Here are a few examples:

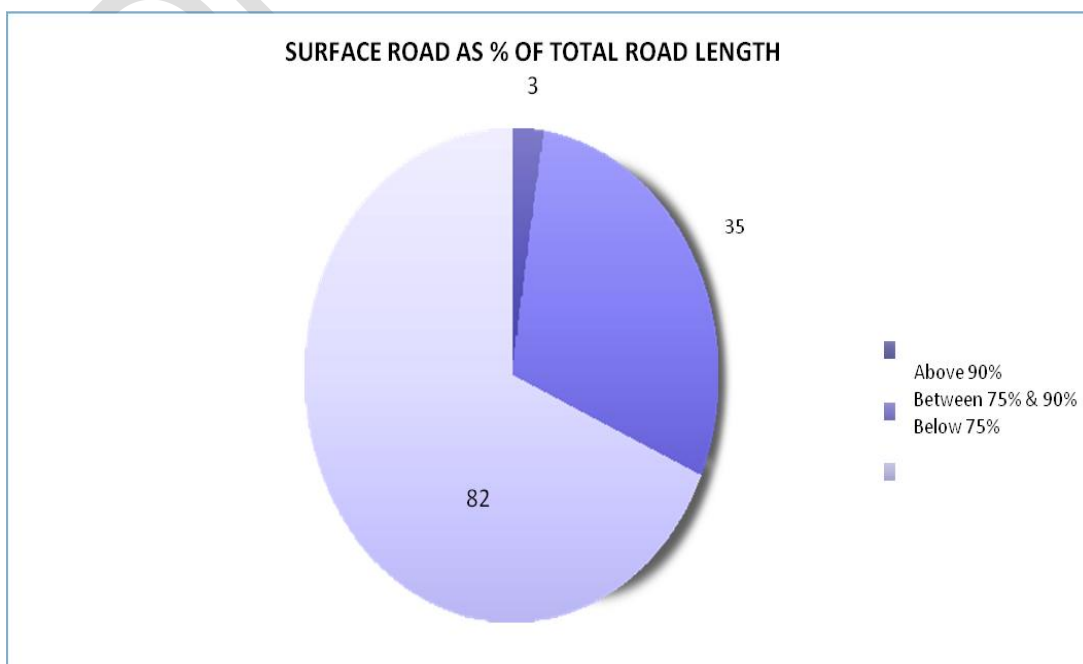
Figure 11.4: percentage of habitants with access to all weather roads



Source: North eastern region district SDG index and dashboard baseline report of 2021-22; published by NITI Aayog, Govt. of India

From the chart above, it is crystal clear that much progress must be made with respect to make all weather roads available across the nook and corner of the region. This aspect is important and has a bearing on the development of all other sectors as well.

Figure 11.5: Surface roads as 5 of Total road length

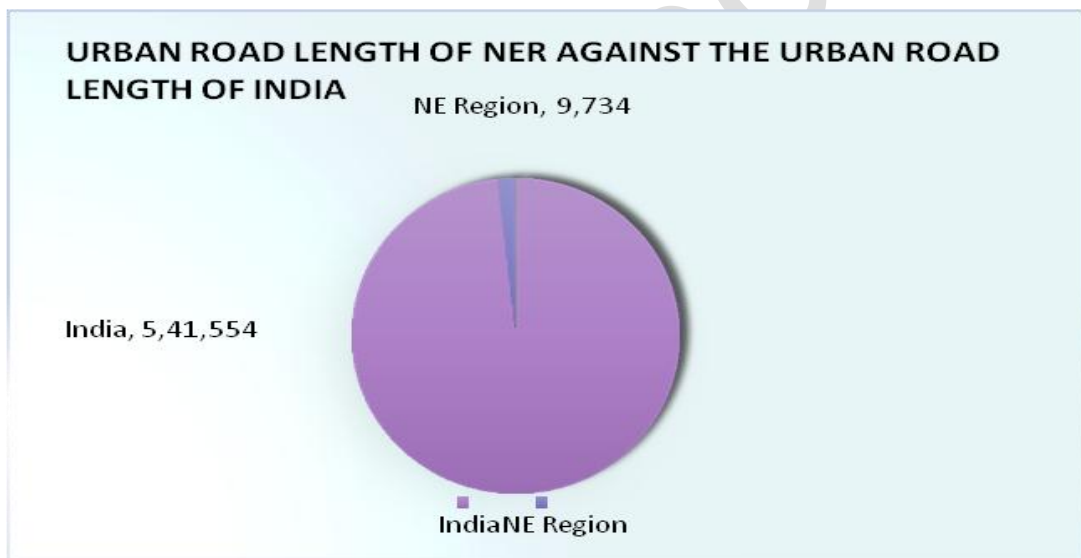


Similarly, surface road as a percentage of the total road length in a district is poor. The chart below depicts many districts in the NER lagging in having proper surfaced roads.

The situation in the urban road segment is somewhat similar. As a total urban road length in the country, the share of North Eastern Region is a meagre 1.79% - a mere 9734 Kms as against the countrywide total urban road length of 5,41,554 Kms.

This is a representative picture of the condition of the road network in the North Eastern Region. While the National Highway network built by the National Highway Authority of India is in good condition, it is the hinterland connectivity that requires acute attention so that economic development of the region can be accelerated. Overall, road connectivity in terms of penetration and length seems to be at par or Even better than many other regions of the country, but the maintenance of such road network needs improvement and constantly worked upon. Based on the difficulties created by climatic conditions, new and durable technological intervention must be introduced to ensure sturdier and all-weather roads throughout the region.

Figure 11.6: Urban Road length of NER against the urban road length of India





Critical Gaps :

For the NER States, limited access points to ROI, primarily because of its long distances and narrowed connectivity through West Bengal, coupled with inadequate logistics development centred primarily on Assam, make cargo movement to/from the region time-consuming and costlier. Moreover, high precipitation in some areas results in frequent landslides and roadblocks. Additionally, Siliguri Corridor is very congested. Furthermore, many bridges connect different stretches due to the various NER waterways, but most are dilapidated and need repair (JICA, 2018). In the case of railways, overutilisation of the Siliguri corridor (the only land connectivity) increases the logistics cost. Another issue with the railway network in NER is that they still work on diesel traction.

The haulage charges to ICD, Amingaon is also considerably high and limited rail container services are provided by CONCOR (Ernst & Young, 2021). The region has inadequate logistics facilities like Container Freight Stations (CFS), ICD, Warehouses, and Cold Storage. Only one ICD (Amingaon) in the region results in overdependence. The inland waterways route faces various challenges, such as navigability issues (where the draft is not even 1.5m in a few stretches), minimal infrastructures at the terminal, unavailability of night navigation facilities, one-way cargo, multiple customs checks (transit cargo from ROI to NER are checked for six times).

The development of road infrastructure, for example, has been delayed due in part to technical and financial difficulties concerning landslide countermeasures such as the reinforcement of mountain slopes and construction of drainage channels. Less than 30 percent of all the roads here are paved (the national average is about 70 percent), and even when it comes to national highways, the proportion comprising at least one lane on each side of the road remains at about 50 percent (80 percent nationally). These challenging conditions hinder the stable supply of goods and access to healthcare and educational facilities for local residents and serve as obstacles to economic development.

The second dimension of transport facilitation relates to the flow of traffic across the seven states of the Northeast. This is important to encourage production value chains among the

NOI states and generate economies of scale to grow exportable surpluses. However, transport movement across state borders (i.e., intra-NOI transport movement) faces challenges of inefficient regulations, lack of technology-use, and disjointed traffic rules, causing delays and raising costs in road transportation.

Limited use of integrated technology leads to bottlenecks in travel, causing delays and raising inefficiency in logistics services. For example, the VAHAN database that was created in 2011 to include all information about a vehicle is limited in scope and is without information on pollution under-control certificate, insurance, validity of different state permits, and taxes.²³ Moreover, there are regular check posts and flying squads on national highways for enforcement that do not register or electronically communicate the reasons for stopping a vehicle or penalizing it. This reduces transparency and builds scope for unofficial payments to bypass mandatory charges. Under the Goods and Services Tax, the Government of India has introduced a new regulation for the e-way bill. It is a complex regulation, with the validity of the e-way bill depending on the distance. It is also complicated when the movement involves intermediate transshipment or multimodal movements, which many feel is adding to the inconvenience.²⁴ Moreover, it excludes over-dimensional cargo.

There are variations in “overweight regimes” across states. While Assam allows passage of overweight cargo against the payment of penalty, other states require vehicles to unload excess cargo before passage. The latter could be a bigger problem if the National Highways Authority of India plaza being used has limited secure storage infrastructure. The states of northeast India are important for the implementation of India’s Act East Policy as they form the pivot for India’s endeavour to integrate with the economies of South Asia and Southeast Asia. However, there are several challenges including infrastructure bottlenecks at the border, low implementation rate of customs modernization measures, inadequate capacity to comply with trade procedures and lack of coordinated trade and transport policies across borders.

VISION 2047:

- Over 33,000 kms of Urban Roads in the North Eastern region will have to be built (Investment requirement would be between Rs 2 Lakh to 3 Lakh Crore)
 - By 2030, all urban areas to be intra-connected
 - By 2040, all urban roads to be made all weather
 - By 2047, NER Urban road segment to be proportionate to the national average
- To have access to all weather roads for the NER, nearly 3 Lakh km of other roads need improvement (Investment requirement Rs 2.5 Lakh to Rs 3 Lakh Crore)
 - By 2030, all important trade points and state capitals be interconnected through all weather roads
 - By 2040, all state highways of the 8 NER states to be made all weather
 - By 2047, each and every single place of the NER will be interconnected through all weather roads whether, district & other roads, state highways or national highways including border roads

NER Railway Network

The railway network in the North Eastern Region has been very Assam centric in the past with the linkage to the Indian hinterland being through the chicken neck of West Bengal. However, in the recent years, Indian Railways have expanded the network to include other NE states including Arunachal, Manipur & Tripura and with the inclusion of these states, the multi-modal transportation of cargo has received tremendous boost. Sikkim is the only NER state where for the first time a railway line will reach by the end of 2025.

Figure 11.7: NER Railways route in km

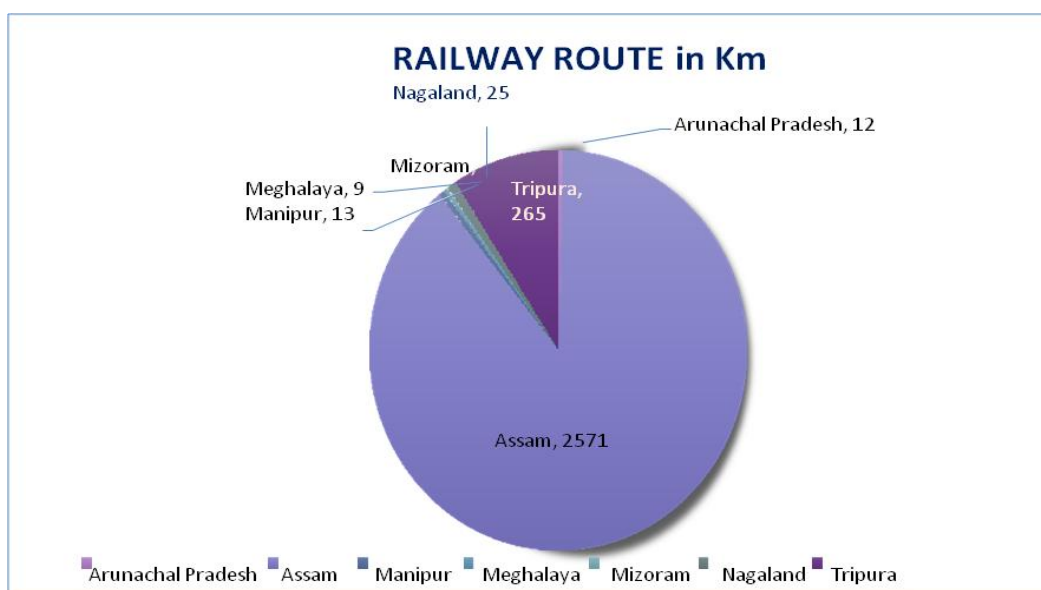


Table 11.2: NER Railways route in km

Region	As on 2022 (in Km)
Arunachal Pradesh	12
Assam	2571
Manipur	13
Meghalaya	9
Mizoram	2
Nagaland	25
Tripura	265
Total NER	2897
All India	68043

Source: Handbook of Statistics on Indian States, Published by RBI, 2022-23



VISION 2047:

By 2030, all states of the NER to be brought under the railway network

By 2040, all state capitals of the NER to be connected by the railway network based on feasibility

By 2047, the region to have rail based mass transit network wherever feasible

Air Cconnectivity

In terms of air connectivity, the NER is well connected despite being part of a difficult terrain. While Assam has since independence contained strong air connectivity with airports both civilian & otherwise and air strips donning its landscape, it was the other NER states which lacked detailed air connectivity.

NORTH EASTERN REGION AIRPORTS: Total airport 22



(Source: AAI)

In logistical terms, most of these airports boast of air cargo terminal thereby making it easier for handling cargo movement.

Logistics Profile:

The logistics profile of the NER states makes interesting reading. While Assam leads nearly on all fronts, Sikkim and Tripura have emerged as fast movers recently. The rest of the region need a lot of catching up to do if competitiveness must be improved and thereby reduce cost of logistics.

Table 11.3: Logistics Profile Assam

ASSAM			
Parameter	Unit	Value	Year
Railway Track	Track-km	3,662	2019-20
Inland Container Depot (ICP)	nos.	1	2021-22
Air Cargo Terminals	nos.	6	2020-21
Railway Goods Sheds	nos.	33	2020-21
Warehouse Capacity (State, Central, Private owned)	MT	4,12,419	2020-21
Cold Storage Capacity	MT	2,33,000	2020-21
Logistics Training Centers	nos.	14	2020-21

Source: LEADS 2022

Table 11.4: Logistics Profile Arunachal Pradesh

ARUNACHAL PRADESH			
Parameter	Unit	Value	Year
Road Length	km	NH=2,537/SH= 4,043	
Railway Track	Track-km	26	2019-20
Air Cargo Terminals	nos.	1	2020-21
Railway Goods Sheds	nos.	5	2019-20
Cold Storage Capacity	MT	6,000	2020-21
Logistics Training Centers	nos.	10	2020-21
No. of Individuals trained in logistics	nos.	2,009	2020-21

Source: LEADS 2022

Table 11.5: Logistics Profile Manipur

MANIPUR			
Parameter	Unit	Value	Year
Road Length	km	NH=1,750	2020-21
Railway Track	Track-km	18	2019-20
Integrated Check Post (ICP)	nos.	1	2021-22
Air Cargo Terminals	nos.	1	2020-21
Railway Goods Sheds	nos.	4	2019-20
Cold Storage Capacity	MT	4,500	2020-21
Logistics Training Centers	nos.	3	2020-21
No. of Individuals trained in logistics	nos.	808	2020-21

Source: LEADS 2022

Table 11.6: Logistics Profile Meghalaya

MEGHALAYA			
Parameter	Unit	Value	Year
Road Length	km	NH=1,156 / SH= 752	
Railway Track	Track-km	13	2019-20
Air Cargo Terminals	nos.	5	2020-21
Cold Storage Capacity	MT	5,055	2020-21
Logistics Training Centers	nos.	2	2020-21
No. of Individuals trained in logistics	nos.	480	2020-21

Source: LEADS 2022

Table 11.7: Logistics Profile Mizoram

Parameter	Unit	Value	Year
Road Length	km	NH=1,423 / SH=170	
Railway Track	Track-km	6	2019-20
Air Cargo Terminals	nos.	1	2020-21
Railway Goods Sheds	nos.	2	2020-21
Warehouse Capacity (incl. State, Central, Private owned)	MT	128	
Cold Storage Capacity	MT	4,001	2020-21
Logistics Training Centers	nos.	1	2020-21
No. of Individuals trained in logistics nos. 33 2020-21			

Source: LEADS 2022

Table 11.8: Logistics Profile Nagaland

NAGALAND			
Parameter	Unit	Value	Year
Road Length	km	NH=1,548 / SH= 650	
Railway Track	Track-km	23	2019-20
Air Cargo Terminals	nos.	1	2020-21
Railway Goods Sheds	nos.	1	2020-21
Warehouse Capacity (incl. State, Central, Private owned)	MT	46,480	2020-21
Cold Storage Capacity	MT	9,500	2020-21
Logistics Training Centers	nos.	1	2020-21
No. of Individuals trained in logistics	nos.	60	2020-21

Source: LEADS 2022

Table 11.9: Logistics Profile Tripura

TRIPURA			
Parameter	Unit	Value	Year
Road Length	km	NH=854 / SH= 1,057	2020-21
Railway Track	Track-km	337	2019-20
Integrated Check Post (ICP)	nos.	1	2017-18
Air Cargo Terminals	nos.	1	2020-21
Railway Goods Sheds	nos.	9	2019-20
Warehouse Capacity (incl. State, Central, Private owned)	MT	50	2019-20
Cold Storage Capacity	MT	35,000	2020-21
Logistics Training Centers	nos.	2	2020-21

Source: LEADS 2022

Table 11.10: Logistics Profile Sikkim

SIKKIM			
Parameter	Unit	Value	Year
Road Length	km	NH=709 / SH= 701	2020-21
Air Cargo Terminals	nos.	1	2020-21
Cold Storage Capacity	MT	2100	2020-21
Logistics Training Centers	nos.	4	2020-21
No. of Individuals trained in logistics	nos.	738	2020-21

Source: LEADS 2022

VISION 2047:

- By 2030, air connectivity within the region to be made affordable for the common man
- By 2040, entire NER to be made accessible to air travel for both human as well as cargo wherever technically feasible
-

Despite majority of cargo being moved by rail, ships, air and road transport, inland waterways continue to play an important role in improving domestic connectivity and lowering logistics costs. The World Bank estimates that in India, for example, it costs Rs

X per kilometer to carry a ton of freight by waterway, compared to Rs 2X by rail and Rs 3X by road. Often, the cost of shipping by an inland waterway in India can be even less— as little as one-seventh of the ground shipping cost.

Affordability is not the only advantage of inland waterway transport. Although ground transport covers the distance better duration wise, waterways move up to four times as much cargo per one litre of fuel, making trade cost-effective. In addition, less energy consumption, low noise, and reduced carbon footprint turn waterway transport into a greener and more reliable way of moving freight.

But in countries that lack enabling frameworks and face fiscal constraints, waterway infrastructure can be slow to develop or modernize. In India, decades of underinvestment in waterways across the country made most shipping channels, canals, and logistics infrastructure unusable. As a result, waterway transport makes up only 0.5 percent of the total freight traffic. Congested road and railway networks slowed the movement of cargo, driving up the logistics costs that now account for 18 percent of the country's GDP.

In the Indian context, there are 111 National waterways recognised by Government of India and developed & maintained by the Inland Waterways Authority of India. Brahmaputra river in Assam from Sadiya to Dhubri is considered one of the most important waterways that can play an important role in the transportation of cargo between Assam/NER and other parts of India through Bangladesh. With the NE states being mostly hilly terrain, despite having numerous rivers and their tributaries, navigability of most rivers is rather difficult.

The Government of India has so far recognized 20 National Waterways in the NE with the most being situated in the plains of Assam. These are:

NW#	Length (km)	NW Name	State/Territory
NW 2	891	Brahmaputra River	Assam
NW 6	71	Aai River	Assam
NW 16	121	Barak River	Assam
NW 18	73	Beki River	Assam
NW 30	114	Dehing River	Assam
NW 31	110	Dhansiri / Chathe	Assam
NW 32	63	Dikhu River	Assam
NW 33	61	Doyans River	Assam
NW 38	62	Gangadhar River	West Bengal & Assam
NW 39	49	Ganol River	Meghalaya
NW 50	43	Jinjiram River	Meghalaya & Assam
NW 57	46	Kopili River	Assam
NW 61	28	Kynshi River	Meghalaya
NW 62	100	Lohit River	Assam & Arunachal Pradesh
NW 82	72	Puthimari River	Assam
NW 93	62	Simsang River	Meghalaya
NW 95	111	Subansiri River	Assam

NW 101	42	Tizu and Zungki Rivers	Nagaland
NW 102	86	Tlwang (Dhaleswari River)	Mizoram & Assam
NW 106	20	Umngot (Dawki) River	Meghalaya

Table 11.11: List of Waterways in NER region

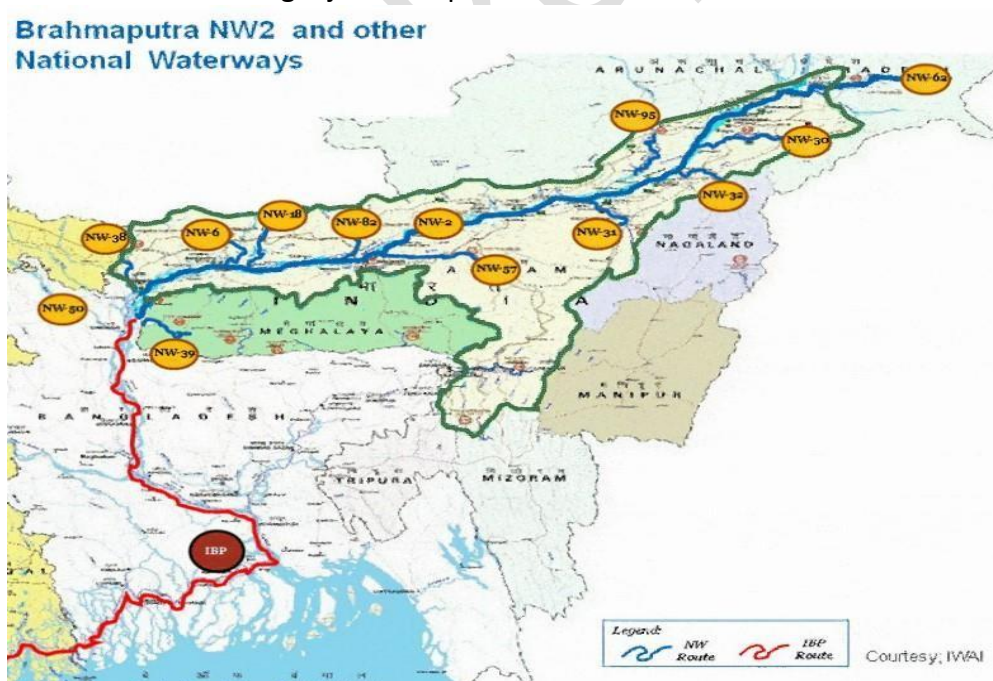
Source: Inland Waterways Authority of India

Waterways are probably the cheapest mode of transport and besides, this mode of transport is not only eco-friendly but also emits minimum pollution.

Some of the projects being undertaken by the Ministry of Ports, Shipping & Waterways, and Government of India with respect to waterways relevant to NER as outlined in the Ministry’s Vision document for 2047:

National Waterway 2 and 16:

- Award of work for construction of Jogighopha terminal
- PPAC approval of Pandu Ship repair facility
- Award of work for construction of Jogighopha terminal
- Award of work for Pandu ship repair facility
- Boundary wall at IWAI parcels at Pandu, Neamati & Dibrugarh
- Signing of Concessionaire agreement of Pandu & Dhubri Terminal
- Upgradation of Badarpur & Karimganj
- Award of Karimganj & Badarpur terminals on PPP basis



- Construction & Operationalization of Pandu Ship repair facility
- Completion of work for construction of Jogighopha terminal
- Widening of road from Pandu to NH including land acquisition
- Award for improvement of existing approach road for Dhubri Terminal
- Completion of improvement of existing approach road for Dhubri Terminal

Further, the Ministry has envisioned capitalizing additional cargo and ferrying potential by building multi- modal connectivity with 4 neighbouring countries through infrastructure development, fairway development and ecosystem development. As far as Bangladesh is concerned, some of the key developments having linkage to NER logistics infrastructure are: (Source – Vision document for 2047 by Ministry of Ports, Shipping and Waterways, Government of India)

- Fairway development from Sirajganj to Daikhowa stretch in Jamuna River and from Ashuganj to Zakiganj stretch in Kushiya
- Award of work for construction of Maia terminal
- Award of work for construction of Sonamora terminal
- Completion of study for undertaking Maia – Aricha fairway development
- Construction and operationalization of Maia terminal
- Construction & operationalization of Sonamora terminal

Issues concerning logistics in the NER states:

- Density of road and railway network across the region is inadequate
- Drafts at NW is an issue and needs dredging (Being undertaken by Assam Govt)
- Inadequate road connectivity with neighbouring countries impedes trade – Time consuming
- Inadequate maintenance of road & allied infrastructure is a worrisome factor
- Industry feedback is that the empty repositioning charges of containers and haulage rates at ICDGuwahati are high compared to other states
- Security of cargo is a major issue in almost all NE states
- Reliability of logistics services, operating & regulatory environment is of concern
- Reasonableness of prices of logistics services and timeliness of cargo at terminal services have been identified as barriers
- Ease of obtaining approvals, skilled manpower, grievance redressal mechanism are other issues in all NE states

VISION 2047:

- By 2030, a transshipment hub to be created at a suitable location in the NER for facilitating inter-state and international trade,
- By 2030, all the waterways of the NER to be made navigable for cargo movement and creation of necessary infrastructure
- By 2030, establishment of a special economic zone in the NER
- By 2030, establishment of an Economic Trade Corridor across the region

Chapter 12

Internalizing Transboundary Opportunities

NER holds significant potential for trade and economic growth, particularly in its relationship with South and Southeast Asia. The geographical contiguity, cultural ties, and complementary economic resources with neighbouring South Asian members (Bangladesh, Bhutan and Nepal) and Southeast Asian countries make a strong case for closer economic integration. The Look East Policy followed by Act East Policy has opened up new possibilities for the region, breaking its landlocked condition and allowing access to the markets of neighbouring countries across the border. Trade integration with the South Asian Association for Regional Cooperation (SAARC) and the Association of Southeast Asian Nations (ASEAN) can bring about significant benefits for the North East region of India.

12.1 Trade, Investment, Supply Chains and Market Access

The export of NER States to world, ASEAN and SAARC has been compiled and is in table 15,1 below. It would be seen that NER's share of exports to world in India's total exports in only 0.12%, however NER's share of exports to SAARC in 2022-2023 (39.25%) is much higher than India's export share to SAARC (6.21%), illustrating that its economic integration as a region with SAARC is better than India. However, NER's linkages with ASEAN in trade in goods is lesser than India's average. The share of export to ASEAN out of its global exports is only 1.29%, as against India's 9.84%.

Table 12.1: NER's Export to ASEAN and SAARC (FY 2022-23)

Region	Exports to the World (in million USD)	Exports to SAARC (in million USD)	Percentage share of export to SAARC vis a vis World	Exports to ASEAN (in million USD)	Percentage share of export to ASEAN vis a vis World
India (2022-23)	451,070.00	28,026.89	6.21%	44,392.92	9.84%
All NER States	543	213.14	39.25%	7.03	1.29%
<i>Arunachal Pradesh</i>	<i>4.55</i>	<i>0.91</i>	<i>20.00%</i>	<i>0.01</i>	<i>0.22%</i>
<i>Assam</i>	<i>497.07</i>	<i>201.98</i>	<i>40.63%</i>	<i>4.9</i>	<i>0.99%</i>
<i>Manipur</i>	<i>0.69</i>	<i>0.02</i>	2.90%	<i>0</i>	0.00%
<i>Meghalaya</i>	<i>10.12</i>	<i>4.86</i>	48.02%	0.01	0.10%
<i>Mizoram</i>	<i>0.04</i>	<i>0</i>	0.00%	0	0.00%
<i>Nagaland</i>	<i>1.36</i>	<i>0.21</i>	15.44%	0.28	20.59%
<i>Tripura</i>	<i>14.64</i>	<i>0.98</i>	6.69%	0	0.00%
<i>Sikkim</i>	<i>19.08</i>	<i>5.09</i>	26.68%	1.84	9.64%

Source: ESCAP, data compiled from DGCIIS India (FY 2022-23) available at <http://www.eximanalytics.dgciskol.gov.in/dgcis/EXIM-Analytics>. Accessed on August 29, 2023.

Note: (i) The zero values do not indicate the absence of trade but can be negligible, which could not be captured in the DGCIS Dashboard. (ii) The ASEAN figures don't include Brunei Darussalam, Laos and Timor-Leste as data for these ASEAN countries wasn't available.

Table 12.2 illustrates the composition of primary, secondary and tertiary sector and their share to GDP. The share of tertiary sector (mostly services) is high, however, their corresponding export values are not available due to lack of trade data in services. This indicates that NER has better potential to integrate trade in services with ASEAN and SAARC especially in several sectors like tourism, health, education, IT&ITES etc.

Table 12.2: NER's composition of GDP (FY 2021-22)

State	Primary (in Rs. Lakhs)	Share of Primary Sector in total GSVA	Secondary (in Rs. Lakhs)	Share of Secondary Sector in total GSVA	Tertiary (in Rs. Lakhs)	Share of Tertiary Sector in total GSVA	Total GSVA (in Rs. Lakhs)
Arunachal Pradesh	686756	36.90%	378549	20.34%	796027	42.77%	1861332
Assam	7537808	29.16%	7864763	30.43%	10445479	40.41%	25848050
Manipur	397872	20.79%	188846	9.87%	1326766	69.34%	1913484
Meghalaya	489762	25.95%	466762	24.73%	930923	49.32%	1887447
Mizoram (2022-23)	316156	17.86%	523338	29.56%	930923	52.58%	1770417
Nagaland	792662	25.90%	344894	11.27%	1922773	62.83%	3060329
Sikkim	145630	6.89%	1308409	61.94%	658272	31.16%	2112311
Tripura	3095645	44.35%	733245	10.50%	3151629	45.15%	6980519

Source: ESCAP, data compiled from Ministry of Statistics and Programme Implementation (FY 2021-22) available at <https://www.mospi.gov.in/GSVA-NSVA>. Accessed on August 29, 2023.

Furthermore, the proposal to integrate South Asia and Southeast Asia through trade, investment, production, and infrastructure connectivity cooperation holds great promise for the region. Integration of the trade and services sectors, such as education, health, tourism, and IT, between North East India and the South Asia and South East Asian regional markets is crucial for unlocking the full potential of the region. By strengthening intraregional integration with South Asian partners while also establishing links to Southeast Asia, North East India can leverage its geographical contiguity and cultural ties to foster economic integration.

From the above table it is evident that NER's share in India's global exports is only 0.12 percent, whereas the share in exports to SAARC is 0.76 per cent, showing that NER has greater potential to export to SAARC members.

North Eastern India shares land border with Bangladesh, Bhutan, China, Myanmar and Nepal and has agreements of overland trade with these countries through Land Custom Stations notified under Section 7 of the Customs Act, 1962. While for trading through LCSs situated

on Bangladesh and Bhutan border, there is a Free Trade Agreement (SAFTA), Border Trade Agreement have been entered into with China and Myanmar. Border trade is different from trade through air, land or sea ports as trade through ports involves clearance through customs and has large volume. Border trade in contrast is "over-land trade" by way of "exchange of commodities" from a bi-laterally agreed list by people living along both sides of the international border.

Successful Stories of Border and Overland Trade

Border and overland trade have played a significant role in shaping the economic landscape of various countries, fostering cross-border relationships, promoting cultural exchange, and driving economic growth. In this essay, we will explore successful stories of border and overland trade focusing on examples from India-Bangladesh, India-Nepal, India-Bhutan, India-Myanmar, China-Myanmar, Thailand-Myanmar, Thailand-Laos, and China-Kyrgyzstan.

India-Bangladesh Trade Relations: One of the most successful stories of border trade is the relationship between India and Bangladesh. The two countries share a long land border that has facilitated extensive trade relations. The Petrapole-Benapole border crossing is one of the busiest land ports in South Asia, serving as a crucial trade route between India and Bangladesh. This border crossing handles a significant volume of goods ranging from agricultural products to industrial goods. The trade between India and Bangladesh has been steadily growing over the years due to improved infrastructure and streamlined customs procedures.

India-Nepal Trade Relations:

India and Nepal share an open border with several major transit points facilitating trade between the two countries. The Raxaul-Birgunj border crossing is one of the key trade gateways connecting India and Nepal. Both countries have historically enjoyed strong bilateral trade relations with a focus on agricultural products, textiles, machinery, and consumer goods. The Indo-Nepal Treaty of Trade and Transit has further bolstered trade ties by providing preferential treatment to each other's goods.

India-Bhutan Trade Relations:

India is a major trading partner for Bhutan, with the Phuentsholing-Jaigaon border crossing serving as a vital link for bilateral trade. Bhutan primarily exports hydroelectric power to India while importing essential goods like petroleum products, machinery, and electronics. The trade relationship between India and Bhutan is governed by the 2006 Agreement on Trade, Commerce, and Transit which outlines the terms for mutual cooperation in various sectors.

India-Myanmar Trade Relations:

The Moreh-Tamu border crossing acts as a crucial gateway for trade between India and Myanmar. Both countries have been working towards enhancing connectivity through initiatives like the Kaladan Multi-Modal Transit Transport Project which aims to improve

transport infrastructure for smoother cross-border trade. Myanmar serves as an important corridor for India to access Southeast Asian markets while Myanmar benefits from Indian investments in sectors like energy, infrastructure, and telecommunications.

China-Myanmar Trade Relations:

China shares a long border with Myanmar which has led to robust bilateral trade relations between the two nations. The Muse-Ruili border crossing is a key trading point facilitating the exchange of goods such as agricultural produce, minerals, machinery, and consumer goods. China's Belt and Road Initiative (BRI) has further strengthened economic ties with Myanmar by investing in infrastructure projects like roads, railways, and ports to enhance connectivity.

Thailand-Myanmar Trade Relations:

Thailand shares a border with Myanmar which has enabled thriving cross-border trade activities. The Mae Sot-Myawaddy border checkpoint serves as an important link for bilateral trade allowing goods to flow seamlessly between the two countries. Thailand imports natural resources like timber and minerals from Myanmar while exporting consumer goods and electronics in return. Both countries have also collaborated on infrastructure projects to improve connectivity along their shared border.

Thailand-Laos Trade Relations:

Thailand's proximity to Laos has fostered strong economic ties between the two nations with several border crossings facilitating cross-border trade. The Nong Khai-Vientiane Friendship Bridge is a vital link connecting Thailand and Laos allowing for smooth movement of goods across borders. Thailand exports machinery, vehicles, food products to Laos while importing agricultural produce in return. Both countries have also cooperated on infrastructure development projects to enhance connectivity.

China-Kyrgyzstan Trade Relations:

China's strategic location near Kyrgyzstan has paved the way for burgeoning trade relations between the two countries. The Torugart Pass serves as a key land route connecting China with Kyrgyzstan enabling the exchange of goods such as textiles, minerals, machinery, and agricultural products. China's Belt and Road Initiative has played a pivotal role in enhancing economic cooperation with Kyrgyzstan by investing in infrastructure projects like roads, railways, and energy facilities.

Successful stories of border and overland trade exemplify how interconnected economies can benefit from seamless cross-border transactions leading to mutual growth opportunities for participating nations.

Agreements and Facilitations

To promote overland trade between neighbouring countries, several essential agreements and institutional arrangements are necessary. These include:

Bilateral Trade Agreements: Establishing bilateral trade agreements between neighboring countries can help in reducing trade barriers, tariffs, and non-tariff barriers, thus facilitating smoother trade relations.

Customs Cooperation: Implementing customs cooperation agreements can streamline border procedures, reduce delays, and enhance the efficiency of cross-border trade.

Transportation Agreements: Developing transportation agreements to improve connectivity through road, rail, and other modes of transport is crucial for promoting overland trade.

Trade Facilitation Measures: Implementing trade facilitation measures such as harmonizing standards, simplifying documentation processes, and enhancing information sharing can significantly boost overland trade.

Joint Border Infrastructure Development: Collaborating on the development of joint border infrastructure like customs checkpoints, warehouses, and transport terminals can enhance the efficiency of cross-border trade.

Successful Examples of Promoting Overland Trade:

European Union (EU): The EU has successfully promoted overland trade among its member states through the establishment of the Schengen Area, which allows for the free movement of goods across borders without customs checks. These provisions aim to enhance connectivity, reduce trade barriers, and facilitate the movement of goods across borders. The EU operates as a customs union, which means that there are no customs duties or tariffs imposed on goods traded between member states. This facilitates overland trade by eliminating border controls and streamlining customs procedures, making it easier for businesses to transport goods across land borders within the EU. The EU's Single Market allows for the free movement of goods, services, capital, and people among member states. This harmonization of regulations and standards within the single market reduces barriers to trade and promotes overland commerce by creating a level playing field for businesses operating across different countries. The EU implements various trade facilitation measures to simplify customs procedures, reduce administrative burdens, and enhance cooperation between customs authorities. These measures help expedite border crossings for goods transported overland, promoting smoother trade flows within the EU.

ASEAN (Association of Southeast Asian Nations): ASEAN has implemented various agreements and institutional arrangements to facilitate overland trade among its member countries, leading to increased economic integration in the region. Within ASEAN, there are intra-regional provisions that also promote overland trade. One example is the ASEAN Connectivity Master Plan, which outlines strategies to improve physical infrastructure within Southeast Asia. By enhancing road networks, border crossings, and customs procedures, the ASEAN Connectivity Master Plan aims to facilitate smoother overland trade among ASEAN member states.

Infrastructure for Overland Trade:

Infrastructure plays a vital role in promoting overland trade. Some key infrastructure developments include:

Road Networks:

Building well-maintained road networks connecting neighboring countries is essential for facilitating the movement of goods and people. For example, European Road Transport Market has regulations governing road transport operations within the European Economic Area (EEA), which includes EU member states as well as some non-EU countries. These regulations aim to ensure fair competition, safety standards, and environmental sustainability in road transport activities, thereby supporting overland trade by road. Similarly, the Asian Highway passes through NER should act as a 'hub' for road connectivity to link various States in NER.

Railway Connectivity:

Enhancing railway connectivity between neighboring countries can provide a cost-effective mode of transportation for bulk goods. For example, Trans-European Transport Network (TEN-T) of EU's policy aims to improve the efficiency and sustainability of transportation infrastructure across Europe. It focuses on developing a comprehensive network of roads, railways, inland waterways, maritime ports, airports, and intermodal terminals to facilitate the seamless movement of goods overland.

Border Crossings:

Developing efficient border crossings with modern facilities can reduce delays and bottlenecks in cross-border trade. For example, European Rail Traffic Management System (ERTMS) is a standardized system for railway signaling and control that aims to improve interoperability and safety in rail transport across Europe. By harmonizing signaling systems and technical specifications, ERTMS facilitates cross-border rail freight movements, promoting efficient overland trade.

Logistics Hubs:

Establishing logistics hubs along key trade routes can improve storage and distribution capabilities for traded goods.

NER : Promoting Overland Trade

To promote overland trade from North East India, the following steps can be taken:

Improved Connectivity:

Enhancing road and rail connectivity between North East India and neighboring countries like Bangladesh, Myanmar, Bhutan, and Nepal is crucial for boosting overland trade.

Trade Agreements:

Negotiating bilateral trade agreements with neighboring countries to reduce tariffs and non-tariff barriers can help in promoting cross-border trade from North East India.

Infrastructure Development:

Investing in infrastructure projects such as road upgrades, border crossings, and logistics hubs will be essential to facilitate smoother overland trade from North East India.

Customs Cooperation:

Strengthening customs cooperation with neighboring countries to streamline border procedures and reduce bureaucratic hurdles will be beneficial for promoting overland trade from North East India.

By implementing these measures effectively, North East India can tap into its strategic geographical location to become a hub for overland trade with its neighboring countries.

Integration of the trade and services sectors, such as education, health, tourism, and IT, between North East India and the South Asia and South East Asian regional markets is crucial for unlocking the full potential of the region. By strengthening intraregional integration with South Asian partners while also establishing links to Southeast Asia, North East India can leverage its geographical contiguity and cultural ties to foster economic integration. In fact, the integration of South Asia and Southeast Asia through trade and investment can lead to improved trade policies, physical and digital connectivity, and harmonisation of rules and regulations. By strengthening intraregional integration with South Asian partners while also establishing links to Southeast Asia, Northeast India can capitalise on the benefits of this two-track approach to economic cooperation. This will not only enhance economic opportunities but also contribute to the overall peace and stability of the region, leveraging the geographical contiguity and cultural ties to foster greater economic integration.

12.1.1 Support measures taken by Government of India and State Governments

(i) Foreign Trade Policy

A new Foreign Trade Policy has been announced by the Government of India in 2023. The Foreign Trade Policy 2023 is being announced to provide the policy continuity and a responsive framework. The new FTP is following the approach of:

- From Incentives to Tax Remission
- Greater Trade facilitation through technology, automation, and continuous process re-engineering
- Export promotion through collaboration: Exporters, States, Districts
- Focus on Emerging Areas – Ecommerce Exports, Developing Districts as Export Hubs, Streamlining SCOMET policy et al.

The FTP gives emphasis on States and Districts as Partners in Export Promotion. It lists certain actions:

- States and Districts as Partners in Export Promotion Districts as Export Hubs aims to boost India's foreign trade by decentralizing export promotion.
- Bring a greater level of awareness and commitment regarding exports at the district level.
- Identification of products/services in all the districts.
- Create institutional mechanisms at the State and District level to strategize exports (State Export Promotion Committee & District Export Promotion Committee).
- Preparation of District Export Action Plans (DEAPs) outlining the action plan to promote identified products and services.
- Make States and Districts meaningful stakeholders and active participants.

The FTP is not specifically designed to promote exports from specific States of India, rather the export promotion schemes are general in nature. Given the special status of NER and the fact that it requires special support for its successful economic transformation, perhaps a NER focussed promotion schemes would be necessary. In this regard given that NER faces challenges relating to infrastructure, connectivity, market access, policy support are required, which include:

- Special Export Zones: Establishing Special Economic Zones (SEZs) or Export Processing Zones (EPZs) in the NER can provide a conducive environment for export-oriented industries.
- Infrastructure Development: Prioritize infrastructure development projects such as roadways, railways, airports, and ports to enhance connectivity within the region and with major trade routes.
- Trade Facilitation Measures: Simplify customs procedures, reduce bureaucratic hurdles, and provide incentives for exporters from the NER to promote ease of doing business.
- Market Promotion: Invest in marketing campaigns to showcase unique products from the NER in international trade fairs and exhibitions to attract foreign buyers.
- Skill Development: Focus on skill development programs to enhance the quality of products manufactured in the NER, making them more competitive in global markets.
- Financial Support: Provide financial assistance, subsidies, and credit facilities specifically targeted at NER exporters to support their growth ambitions.

(ii) Industrial Policy

India, today is a part of the top 100 clubs on Ease of Doing Business (EoDB). Total FDI inflows in the country in the last 23 years (April 2000 - September 2023) are \$953.143 Bn while the total FDI inflows received in the last 9 years (April 2014 - September 2023) was \$615.73 Bn which amounts to nearly 65% of total FDI inflow in last 23 years. In FY 2014-15, FDI inflow in India stood at mere \$45.15 Bn, which increased to \$60.22 Bn in 2016-17 and further to the highest ever annual FDI inflow of \$83.57 Bn reported during the FY 2021-22.

Total FDI inflows in the country in the FY 22-23 is \$70.97 Bn and total FDI equity inflows stands at \$46.03 Bn. Mauritius (24%), Singapore (23%), USA (9%), Netherland (7%) and Japan (6%) emerge as top 5 countries for FDI equity inflows into India FY 2022-23. Top 5 sectors receiving highest FDI Equity Inflow during FY 2022-23 are Services Sector (Finance, Banking, Insurance, Non Fin/ Business, Outsourcing, R&D, Courier, Tech. Testing and Analysis, Other) (16%), Computer Software & Hardware (15%), Trading (6%), Telecommunications (6%) and Automobile Industry (5%)¹. India introduced its new Foreign Direct Investment (FDI) Policy effective from 15 October 2020.

In order to promote economic growth and development in the North East region, the Indian government has introduced various incentives and policies to attract investments, including in the FDI sector.

Special Provisions for North East Region in India's FDI Policy:

North East Industrial Development Scheme (NEIDS): The Government of India launched NEIDS to provide various incentives for businesses investing in the North Eastern states. These incentives include reimbursement of central taxes and duties, income tax benefits, capital investment subsidy, and more. The scheme is closed on 31/03/2022, however, industrial units registered under the scheme will be eligible for the benefits of the scheme up to 31/03/2028. Unfortunately, there is no authentic data available for investments in NER under this scheme.

Priority Sector Lending:

Banks operating in the North East region are required to allocate a higher percentage of their lending towards priority sectors like agriculture, micro, small and medium enterprises (MSMEs), education, housing, etc., to boost economic activities in the region.

Special Category Status: Some of the North Eastern states have been granted special category status by the government, which entitles them to additional benefits and support for industrial development and infrastructure projects.

Exemption from Industrial Licensing:

Certain industries in the North East region are exempted from obtaining industrial licenses under the Industries (Development & Regulation) Act, 1951, making it easier for businesses to set up operations in these states.

Customs Duty Exemptions:

To encourage trade and investment in the North East region, customs duty exemptions or concessions are provided on specified goods imported into these states.

Investment Promotion Subsidy:

¹ Source: Invest India, available at <https://www.investindia.gov.in/foreign-direct-investment#:~:text=Subject%20to%20the%20provisions%20of,%2Dcommerce%2C%20without%20Government%20approval.>

The government offers investment promotion subsidies to attract investments in sectors like tourism, manufacturing, agro-processing industries, etc., in the North East region.

A Start-up India Seed Fund Scheme (SISFS) makes an easy availability of capital for entrepreneurs at the early stages of growth of an enterprise. The capital required at this stage often presents a make-or-break situation for start-ups with good business ideas. The SISFS with an outlay of Rs. 945 crore aims to provide financial assistance to start-ups for proof of concept, prototype development, product trials, market entry and commercialization. As on 31st October 2022, Rs. 442.25 crore has been approved to 123 Incubators.

The North East Industrial and Investment Promotion Policy (NEIIPP) and the North East Industrial Development Scheme (NEIDS) were introduced by the Indian government to promote industrialization and attract investments in the North Eastern Region (NER). However, these schemes did not trigger any major investment in the region due to various reasons.

- (i) **Lack of Awareness:** One of the primary reasons for the failure of NEIIPP and NEIDS to attract significant investments was the lack of awareness among potential investors about the incentives and benefits offered by these schemes. Many investors were not well-informed about the opportunities available in the NER under these policies.
- (ii) **Infrastructure Deficiency:** The inadequate infrastructure in terms of transportation, power supply, communication networks, etc., posed a significant challenge for investors considering setting up operations in the NER. The lack of proper infrastructure made it unattractive for businesses to establish their presence in the region.
- (iii) **Bureaucratic Hurdles:** Complex bureaucratic procedures, delays in approvals, and red tape hindered the smooth implementation of projects under NEIIPP and NEIDS. The cumbersome administrative processes discouraged potential investors from engaging in business activities in the NER.
- (iv) **Geopolitical Factors:** The NER's geographical location, bordering countries like China, Myanmar, Bangladesh, and Bhutan, posed security concerns for investors. The geopolitical factors added a layer of uncertainty and risk, deterring many businesses from investing in the region.
- (v) **Limited Market Access:** The NER's limited market size and connectivity with other parts of India restricted the growth prospects for industries operating in the region. Businesses found it challenging to scale their operations due to constraints related to market access and distribution networks.

Learning from past experiences, there is a need to build an entirely new FDI scheme to promote investment in the NER successfully. Such scheme should have the following essential features:

- (i) Streamlined Procedures: Simplified administrative processes with clear guidelines and timelines can help reduce bureaucratic hurdles and facilitate faster project approvals for investors.
- (ii) Enhanced Infrastructure Development: Prioritizing infrastructure development initiatives such as improving road connectivity, enhancing power supply reliability, upgrading telecommunications networks, etc., will make the region more attractive for investments.
- (iii) Promotion Campaigns: Comprehensive promotional campaigns highlighting the incentives, opportunities, and potential benefits of investing in the NER should be conducted to raise awareness among domestic and international investors. In this regard, special focus must be given to countries like Thailand, Japan and Republic of Korea who are looking for outward investments and also India has FTAs.
- (iv) Incentives Alignment: Ensuring that incentives offered under the new scheme are aligned with industry requirements and competitive compared to other regions will incentivize businesses to consider establishing operations in the NER.
- (v) Risk Mitigation Measures: Implementing measures to address geopolitical risks, enhance security arrangements, and provide stability for businesses operating in sensitive border areas will instill confidence among investors.
- (vi) Skill Development Initiatives: Investing in skill development programs tailored to meet industry demands will create a pool of trained workforce locally available for industries setting up operations in the NER.
- (vii) Market Access Improvement: Facilitating better market access through improved transportation links, logistics support, and trade facilitation measures will enable businesses to reach wider markets efficiently.

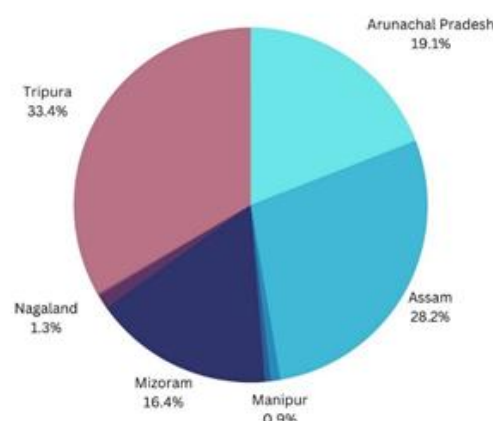
According to the new FDI policy, an entity of a country, which shares a land border with India or where the beneficial owner of an investment into India is situated in or is a citizen of any such country, can invest only under the Government route. A transfer of ownership in an FDI deal that benefits any country that shares a border with India will also need government approval. India shares land borders with Pakistan, Afghanistan, China, Nepal, Bhutan, Bangladesh, and Myanmar.

This policy thus makes it difficult for NER to attract FDI from neighboring countries with whom they have trade interest, but FDI will require prior government approval as this is not covered under automatic route. This could pose major hurdle to investment in NER, especially at borders where the neighbouring countries would like to set up joint ventures., like Bangladesh, Bhutan, Nepal and Myanmar. The non-automatic route of approval is seen as a deterrent by many investors and thus to make it more effective in the board of approval presence of some representatives from NER Ministries

In the last few years there has been a lot of expansion with regard to connectivity and infrastructure in NER. Commencing a mega-infrastructure project that has the potential to stimulate investment in the area, the rapid development and execution of these projects have played a role in the emergence of a "New North East" that attracts investors seeking sustainable development and growth. For the purpose of economic development, waterway

exploration, air connectivity, and railway infrastructure can diminish the geographical obstacles this landlocked region once confronted. In a similar fashion, advancements in the internet and telecommunications networks have enabled easier access to the global market. Both the central and state governments of the respective NER states have exerted ceaseless effort to stimulate private investment and industrial and economic expansion in the region. Stability and tranquillity have returned to the area, and the present emphasis is on establishing a conducive environment for investments. These include the establishment of infrastructure on various dimensions, the facilitation of capital investment, capacity building, marketing assistance, and access to low-cost credit, as well as the development of policies to promote business efficiency³. As per the digitized land record, the total available industrial land in North East is- 1465.45 distributed over 119 nos. of industrial parks Ha as on 10th November, 2023.

Figure 12.1 :Industrial Land Availability



Source: NEC Year Book 2023

North East States have tremendous potential to export to South Asian neighbours (especially Bangladesh, Bhutan and Nepal) as well as ASEAN members in the following sectors:

- (i) **Agricultural Products:** NER is known for its diverse agricultural produce such as fruits, vegetables, spices, and tea. The fertile lands of the North East states support the cultivation of a variety of crops including tea, spices (like turmeric), fruits (such as oranges), and medicinal plants. These agricultural products have a high demand in ASEAN and SAARC countries for their quality and authenticity. The export volume can be substantially increased further with the easing of cross-border trade complexities as these commodities tend to be perishable and trade is impacted by the long travelling time.

² Based ESCAP's study on BBIN, " Potential of Trade Opportunities between Bangladesh and North-Eastern Region (NER) of India, and Benefits for Bhutan and Nepal", Development Paper Series 3 (March 2024) by Ratna and Rana.

³ Source: NEC Year Book 2023.

- (ii) **Agro-Based Products:** Value-added products like oils, jams, jellies, sauces, and pickles could also be exported, which will create a higher value-added products manufacturing in the region.
- (iii) **Bamboo and Bamboo Products:** Bamboo-based products, furniture, and handicrafts which are produced in several NER states, have high demand in ASEAN and SAARC.
- (iv) **Handicrafts and Handloom:** The rich cultural heritage of the North East region is reflected in its exquisite handicrafts and handloom products. Items like bamboo crafts, traditional textiles (like Assam silk), and tribal artifacts have a niche market in SAARC nations.
- (v) **Medicinal Plants and Herbs:** The rich diversity of medicinal plants and herbs that NER produces could be traded for pharmaceutical and healthcare purposes.

12.1.2 Potential of Trade in Services in North-East India

The integration of the trade and services sectors, such as education, health, tourism, and IT, between North East India and the South Asia and South East Asian regional markets is crucial for unlocking the full potential of the region. By fostering closer economic integration, North East India stands to benefit from increased trade and investment, improved infrastructure, and enhanced connectivity. The Look East Policy has not only provided a framework for economic cooperation but also opened up avenues for cultural exchange and community building. This has paved the way for sustained integration through trade, culture, and community, contributing to the mutual prosperity, peace, and stability of the region.

The North East Region (NER) of India holds significant potential in the services sector, which can be leveraged to drive economic growth and development in the region. The unique strengths and characteristics of the NER make it well-suited for specific service sectors that can contribute to its overall prosperity.

A study by World Bank⁴ proposed for creating a Brand North East for the promotion of specific products or clusters; for example bamboo-related cluster with strict technical specifications targeting the eco-conscious consumer. The study further suggested promotion of medical tourism cluster that is based on providing long-duration complex services (such as cancer care, neurological treatment, fertility treatment, or organ transplants). The study, however pointed that these would require coordination between the Departments of Health and Tourism, and between government and private sector entities such as hospitals, hotels, and travel agencies. The findings suggest that by enhancing cooperation and integration within the services industry, the NER can experience substantial economic growth and development. This can be achieved through various measures such as improving

⁴ Kathuria, Sanjay, and Priya Mathur, eds. 2020. *Playing to Strengths: A Policy Framework for Mainstreaming Northeast India*. International Development in Focus. Washington, DC: World Bank. doi:10.1596/978-1-4648-1505-8. License: Creative Commons Attribution CC BY 3.0 IGO

infrastructure, promoting cross-border investments, enhancing connectivity, and fostering collaboration among different stakeholders in the services sector.

Moreover, research by organizations like JICA (Japan International Cooperation Agency), RIS (Research and Information System for Developing Countries), ICRIER (Indian Council for Research on International Economic Relations), and NEDFi (North Eastern Development Finance Corporation Ltd) have also supported the idea that NER stands to gain from services sector integration. JICA studies recommend that NER focus on strengthening collaboration between local health care and non-health care organizations to harness the benefits of service sector integration. These studies have recommended policy interventions aimed at facilitating trade, investment, and cooperation in the services industry to unlock the region's economic potential. Specific recommendations from these studies include creating a conducive regulatory environment for service providers, investing in skill development programs to enhance human capital in the services sector, establishing cross-border partnerships to promote service exports from NER, and leveraging digital technologies to expand service delivery capabilities across borders.

- (i) **Producer Services:** Enhancing producer services such as management services, research and development, financial and accounting services, and marketing can play a crucial role in scaling up key sectors in the NER. These services are essential for supporting various industries and businesses in the region.
- (ii) **Financial Services:** Improving financial inclusion in the NER is vital for spurring regional growth. The sector has both efficiency and equity implications, and innovations from the fintech sector can be explored as a potential export opportunity.
- (iii) **ICT Connectivity:** Information and Communication Technology (ICT) connectivity is crucial for enabling digital transformation and facilitating various services in the region. Enhancing ICT infrastructure can open up new opportunities for trade, cooperation, and innovation with neighboring countries.

Tourism Services: Improved connectivity can boost tourism in the NER, given its natural beauty, religious sites, and historical attractions. Promoting tourism services can attract visitors from neighboring countries and generate foreign revenue through short and long trips. A campaign to promote tourism across Heritage sites in NER can also be promoted.

- (iv) **Education Services:** The NER can capitalize on its educational institutions to attract international students from bordering districts. Developing higher education services, research institutes, and educational technology companies can be a promising area for service exports.

- (v) **Logistics Services:** With infrastructural investments underway, there is a growing demand for logistics services in the region. Developing efficient logistics networks will be essential to support trade activities and economic growth.

i) BIMSTEC : in the 14 sector agenda of cooperation that include trade and investment; technology, energy, transportation and communication; tourism; fisheries; agriculture; cultural cooperation; environment and disaster management; public health; people to people contact; poverty alleviation; counter terrorism; transnational crime and climate change.

ii) AIFT Agreement and iii) MGC Framework

Could MGC countries and NER come together and just start projects on bamboo products. Could the product of this collaboration be given a green channel access to ASEAN market under the ASEAN-India free Trade Agreement ? Could this 'Make in India' product be considered under Article 3 of this agreement which deals with national treatment and Article 17 where a Joint Committee could look into this matter of collective interest. Could the fiscal incentives extended to the Indian private investors in the NER be also partially/fully extended to the first set of seed project investors from the MGC countries? Could this venture be a part of ASEAN Industrial Cooperation (AICO) Scheme of ASEAN and North East Industrial and Investment Promotion Policy (NEIIPP) of India ? Huge opportunities exist in harnessing the potentials of NER and MGC countries in areas like education, health, dairy development and agriculture, fashion designs, folk medicines, horticulture-floriculture management, tourism, plantation like coffee and tea, energy and even in climate change and disaster management areas.

iv) BCIM Framework : BCIM Economic Corridor

v) BBIN Framework : Energy, MVA

vi) Principles of trading must be based on most favored nation treatment (MFN) of GATT/World Trade Organisation which will amount to drastic revision of the list of exports and imports and announcing a negative list so as to match the market realities on both sides of the border.

NER can benefit from various engagements of India like ASEAN, BIMSTEC, MGC, BCIM etc. Many areas of economic cooperation or FTA that are either in place or are under negotiations can bring benefit to NER.

The India ASEAN Free Trade Agreement (FTA) in services can bring several benefits to the North East states of India. The FTA aims to enhance economic cooperation between India and the Association of Southeast Asian Nations (ASEAN) countries by liberalizing trade in services. Here are some provisions that can specifically benefit the North East states:

- (i) **Promotion of Tourism:** The FTA can help promote tourism in the North East states by facilitating easier movement of tourists between India and ASEAN countries. This can

lead to an increase in tourist arrivals, benefiting the hospitality and tourism sectors in the region.

- (ii) **Enhanced Connectivity:** The agreement can promote better connectivity between the North East states and ASEAN nations, leading to improved trade relations and investment opportunities. Better connectivity can also boost infrastructure development in the region.
- (iii) **Skill Development:** The FTA can provide avenues for skill development and capacity building in sectors like healthcare, education, IT, and others. This can help create employment opportunities for the local population in the North East states.
- (iv) **Market Access:** The agreement offers market access to service providers from the North East states to tap into the ASEAN market, which can lead to increased exports of services such as IT, healthcare, education, and tourism.
- (v) **Cultural Exchange:** The FTA can facilitate cultural exchange programs between the North East states and ASEAN countries, promoting people-to-people ties and fostering a better understanding of each other's cultures.

Market access to ASEAN can also be through the Make in India Scheme, however in order to get preferential market access, NER industries need to comply with the conditions of rules of origin which is either a general rule of change in subheading from inputs to finished product or product specific rules.

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is a regional organization comprising seven member states around the Bay of Bengal, including Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand. The North Eastern Region (NER) of India can greatly benefit from integrating with various sectors within BIMSTEC to enhance its economic development and connectivity.

- (i) **Trade and Commerce:** Enhancing trade and commerce within BIMSTEC can open up new markets for the NER states. Improving infrastructure and reducing trade barriers can facilitate smoother movement of goods and services, promoting economic growth in the region.
- (ii) **Connectivity:** Strengthening connectivity through initiatives like the BIMSTEC Transport Infrastructure and Logistics Study (BTILS) can improve physical infrastructure such as roads, railways, and ports. Better connectivity can boost trade, tourism, and overall development in the NER.
- (iii) **Tourism:** Promoting tourism collaboration within BIMSTEC can attract more visitors to the NER's picturesque landscapes and cultural heritage sites. This sector has immense potential for growth and job creation in the region.
- (iv) **Energy Cooperation:** Collaborating on energy projects under BIMSTEC can help address the NER's energy needs by tapping into renewable energy sources like hydropower. This cooperation can enhance energy security and sustainability in the region.
- (v) **Technology and Innovation:** Sharing technological advancements and fostering innovation through partnerships within BIMSTEC can drive economic diversification

in the NER. Embracing digital technologies can also boost efficiency across various sectors.

Utilizing AIFT Agreement of MGC Framework for NER Benefits:

The Asian Infrastructure Investment Bank (AIIB), Informal Group on International Trade (AIFT), under the Mekong-Ganga Cooperation (MGC) framework provides a platform for enhancing economic cooperation among member countries, including India's North Eastern Region (NER). Leveraging the AIFT agreement within the MGC framework can maximize benefits to the NER in several ways:

- (i) **Infrastructure Development:** The AIFT agreement facilitates investments in infrastructure projects critical for the NER's development, such as road networks, bridges, and power plants. This support can improve connectivity within the region and beyond.
- (ii) **Trade Facilitation:** By streamlining trade procedures and reducing barriers to cross-border commerce, the AIFT agreement enables smoother trade flows for NER states. This can lead to increased exports, job creation, and economic growth.
- (iii) **Capacity Building:** Through technical assistance programs under the AIFT agreement, the NER can enhance its human capital by training professionals in areas like project management, finance, and international trade practices. This capacity building is essential for sustainable development.
- (iv) **Market Access:** The AIFT agreement opens doors to new markets for NER products by promoting regional integration and cooperation. Access to larger consumer bases within MGC member countries can boost exports from the region.

In conclusion, integrating with key sectors in BIMSTEC such as trade, connectivity, tourism, energy cooperation, technology & innovation along with leveraging the AIFT agreement of MGC framework can significantly benefit India's North Eastern Region by fostering economic growth, enhancing infrastructure development, facilitating trade opportunities, promoting sustainable practices, and improving regional connectivity.

The North Eastern Region (NER) of India and the Mekong Ganga Cooperation (MGC) countries, which include Cambodia, Laos, Myanmar, Thailand, and Vietnam, can indeed collaborate to start projects focused on bamboo products to promote trade among themselves. Bamboo is a versatile and sustainable resource that holds significant economic potential for both regions. By leveraging their strengths in bamboo cultivation, processing, and product development, they can create a mutually beneficial partnership that boosts trade and economic growth.

Areas of Cooperation:

- (i) **Trade Promotion:** The NER region and MGC countries can work together to identify high-demand bamboo products in each market and facilitate their trade through bilateral agreements or regional trade pacts. This can help in expanding market access for bamboo products from both regions.

- (ii) **Research and Development:** Collaborating on research and development initiatives related to bamboo cultivation techniques, product innovation, quality standards, and sustainability practices can enhance the competitiveness of their bamboo industries. Sharing knowledge and best practices can lead to the creation of higher value-added bamboo products.
- (iii) **Capacity Building:** Investing in capacity building programs such as training workshops, technology transfer initiatives, and skill development programs can strengthen the capabilities of local artisans and entrepreneurs involved in the bamboo sector. This can lead to improved product quality, increased productivity, and better market access.

Steps for Cooperation on Research and Development:

- (i) **Establishing Joint Research Projects:** Setting up joint research projects focused on bamboo species suitable for different climates, innovative processing techniques, value addition methods, and market trends can foster collaboration in research and development.
- (ii) **Creating Innovation Hubs:** Establishing innovation hubs or centers of excellence dedicated to bamboo research can serve as platforms for researchers, industry experts, policymakers, and entrepreneurs from both regions to collaborate on cutting-edge projects.
- (iii) **Forming Public-Private Partnerships:** Encouraging public-private partnerships between government agencies, research institutions, universities, NGOs, and private companies can facilitate the sharing of resources, expertise, and funding for research initiatives in the bamboo sector.
- (iv) **Standardization and Certification:** Harmonizing standards for bamboo products across the NER region and MGC countries can streamline trade processes by ensuring consistent quality levels and meeting international certification requirements.

Cooperation between the NER region and MGC countries on bamboo products can be a strategic move to promote sustainable trade relations while harnessing the economic potential of bamboo resources. By focusing on areas such as trade promotion, research and development collaboration, capacity building initiatives, standardization efforts, these regions can pave the way for a thriving bamboo industry that benefits all stakeholders involved.

Successful Examples of Modern Trade Facilitating Measures in Asia and Europe:

Asia:

Singapore: Singapore is known for its efficient customs procedures, advanced banking services, state-of-the-art warehousing facilities, and robust insurance sector. The country has implemented various trade facilitation measures such as the use of technology for customs clearance, streamlined documentation processes, and digital payment systems in banking.

South Korea: South Korea has made significant advancements in trade facilitation by implementing electronic customs clearance systems, automated warehousing solutions, and modern insurance practices. The country's efficient infrastructure and digitalization efforts have contributed to smoother trade operations.

China:

China has been investing heavily in improving its customs procedures, banking services, warehousing capabilities, and insurance sector. The country has introduced initiatives like the Single Window platform for customs clearance, online banking services, advanced logistics infrastructure, and innovative insurance products to facilitate international trade.

Europe:

Germany: Germany is a leading example of modern trade facilitation measures in Europe. The country boasts efficient customs processes, sophisticated banking services, advanced warehousing technologies, and comprehensive insurance coverage for businesses engaged in international trade. Germany's strategic location in Europe also contributes to its role as a key trading hub.

Netherlands:

The Netherlands is renowned for its well-developed infrastructure that supports seamless trade operations. The country's customs procedures are streamlined through digital platforms, its banking sector offers a wide range of trade finance options, its warehousing facilities are equipped with cutting-edge technologies, and its insurance industry provides comprehensive coverage for goods in transit.

Sweden:

Sweden exemplifies modern trade facilitation practices with its focus on digitalization and innovation across customs, banking, warehousing, and insurance sectors. The country's efficient customs clearance processes, advanced banking solutions tailored for international trade transactions, modern warehouses equipped with automation technologies, and comprehensive insurance offerings contribute to a conducive environment for global commerce.

BCIM Framework:

The BCIM (Bangladesh, China, India, Myanmar) Framework is an economic cooperation initiative among Bangladesh, China, India, and Myanmar. It aims to promote economic integration and cooperation among the member countries through various projects and programs. One of the key focus areas of the BCIM Framework is to facilitate trade and economic development in the Northeastern Region (NER) of India. The BCIM Framework provides several opportunities for facilitating trade between India's Northeastern Region (NER) and other member countries. Some of these opportunities include:

- (i) **Infrastructure Development:** The BCIM Framework focuses on developing infrastructure projects such as roads, railways, and waterways that will connect the NER with other member countries. This will reduce transportation costs and make it easier for businesses to trade across borders.
- (ii) **Free Trade Agreement:** The BCIM Framework aims to negotiate a free trade agreement (FTA) among the member countries. An FTA would eliminate tariffs and other trade barriers, making it easier for businesses to export their goods to other member countries.
- (iii) **Economic Zones:** The BCIM Framework also plans to establish economic zones along the borders of member countries. These economic zones would provide incentives for businesses to set up operations near the borders, making it easier for them to engage in cross-border trade.
- (iv) **Capacity Building:** The BCIM Framework provides technical assistance and capacity building programs for small and medium enterprises (SMEs) in the NER region. This will help these businesses become more competitive and better equipped to engage in international trade.
- (v) **Institutional frameworks required:** For the BCIM Framework to effectively facilitate trade between India's Northeastern Region (NER) and other member countries. In this regard, Joint working groups should be established to oversee specific projects and initiatives under the BCIM Framework, such as infrastructure development or capacity building programs for SMEs.

However, it is essential to address the infrastructure and logistical challenges in Northeast India to fully realise its potential as a gateway to Southeast Asia. Improved transportation networks, including road, rail, and air connectivity, are crucial for facilitating the movement of goods and people. Additionally, investment in border infrastructure and trade facilitation measures can further streamline cross-border trade and enhance economic cooperation between Northeast India and its Southeast Asian neighbours.

Furthermore, the development of special economic zones and industrial clusters in Northeast India can attract investment and stimulate economic growth. By setting up special economic zones and industrial clusters, Northeast India can tap into its potential as an investment destination, leveraging its strategic location for enhanced trade and economic activities with Southeast Asia. The region could focus on promoting sectors such as agro-based industries, tourism, and renewable energy, aligning them with the needs and demands of the South Asian and Southeast Asian markets.

In addition to economic cooperation, the integration of the education and health sectors is equally significant. Collaboration in these areas can facilitate knowledge exchange, medical tourism, and the development of skilled human resources, creating a healthier and more educated workforce in the region. The potential for economic integration between Northeast India and Southeast Asian countries is underscored by the geographical contiguity, cultural links, and complementary economic resources. The Look East Policy has indeed created opportunities to break the landlocked condition of Northeast India, allowing for access to neighbouring markets and facilitating economic ties. This initiative has laid the

groundwork for a multi-faceted approach to regional integration, encompassing not only economic collaboration but also cultural and community exchange. To fully realise the potential of this integration, it is imperative to address the existing infrastructure and logistical challenges in Northeast India.

12.2. Regionalizing Cross-border Interconnections – Common Market Pursuits

India's Look East Policy, launched in the 1990s, aims to break the landlocked condition of Northeast India by opening up markets of neighboring countries across the border. One of the important features of India's approach towards regional integration is to improve physical connectivity between Northeast and Southeast Asia through various projects. The Act East Policy is a strategic effort by the Indian government to enhance its connections with nations in the Asia-Pacific region, namely Southeast Asia. The initiative was introduced in 2014 as a replacement for the Look East Policy, with a revitalised emphasis on improving economic, cultural, and strategic ties with the nations in the region.

The policy seeks to enhance India's involvement with ASEAN (Association of Southeast Asian Nations) and other regional allies by fostering greater commerce, investment, connectivity, and interpersonal interactions. The primary goals of the Act East Policy encompass augmenting economic collaboration, improving connectivity via infrastructural advancement, fostering cultural and interpersonal relationships, and fortifying strategic alliances with nations in the Asia-Pacific area. Additionally, it seeks to utilise India's significant influence as a prominent regional force in order to actively contribute to the promotion of peace, stability, and prosperity within the region.

The Act East Policy has accomplished noteworthy achievements in numerous domains since its establishment. An important accomplishment is the strengthening of business connections with ASEAN nations. India has actively sought trade agreements and partnerships with members of the Association of Southeast Asian Nations (ASEAN), resulting in a rise in trade volumes and investment inflows. The policy has also promoted enhanced connectivity through initiatives such as the India-Myanmar-Thailand Trilateral Highway and the Kaladan Multi-Modal Transit Transport Project, which have bolstered the physical infrastructure connections between India and Southeast Asia. The Act East Policy has achieved notable success in the realm of cultural diplomacy. India has prioritised the promotion of cultural exchanges, educational cooperation, and tourist projects with neighbouring countries. Consequently, there has been an enhanced comprehension of Indian culture and legacy among ASEAN members, and reciprocally.

The Act East Policy has bolstered defence collaboration with nations such as Vietnam, Indonesia, and Singapore, in relation to strategic alliances. These collaborations have encompassed shared military drills, transfers of defence technologies, and cooperation in marine security, thereby enhancing regional stability and security. Moreover, India's involvement with nations such as Japan and South Korea through the Act East Policy has led to substantial investments in infrastructure projects and industrial partnerships. These partnerships have not only enhanced economic cooperation but also contributed to technology transfer and skill development.

The growing regionalism in the multilateral trading system has been a phenomenon which has increased over the years and now drawing greater attention of researchers and policy makers. Regionalism in trade indicates trading with select group of countries on preferential terms. The growth of RTAs has been one of the major developments in international relations in the recent years. Virtually all the countries are members of one or the other block and many belong to more than one. The multilateral trade rules for international trade were created in 1947 with the objectives of securing market access for the post-war recovering economies and supporting their continued growth.

From World War II onwards until around the 1980s, regionalism and multilateralism could be seen as complementing each other rather than being substitutes; as both led towards an increased opening of the global markets. Things started moving in different directions after that, thus opening one of the most debated and complex issues relating to the multilateral trading system which is the proliferation of the 'Regional Trade Agreements' (RTAs).

India had initially adopted a very cautious and guarded approach towards Regionalism and was engaged in some bilateral/regional initiatives, mainly through PTAs like the Bangkok Agreement (signed in 1975) to exchange tariff concessions in the ESCAP region, Global System of Trade Preference (GSTP – aim of increasing trade between developing countries in the framework of the UNCTAD, 1988) and the SAARC Preferential Trading Arrangement (SAPTA signed in 1993) to liberalise trade in South Asia. However, these engagements achieved very limited results in terms of increasing trade volumes with these countries. With smaller neighbours like Bhutan and Nepal, India has free trade arrangements on a non-reciprocal basis mainly with a view towards ensuing social, economic and political stability across the border.

The country's first FTA on a reciprocal basis was signed with Sri Lanka in 1998 and has been in operation since March 2000. Here too Sri Lanka, being a small island neighbour, was given more flexibility in terms of the size of the negative list and the period of tariff liberalisation. Subsequently it has implemented several RTAs with MERCOSUR, Chile (PTAs); Singapore, Malaysia, Japan, Republic of Korea, Australia (Comprehensive Economic Cooperation/Partnership Agreements), and is negotiating CEAs with Canada, EU, EFTA, Indonesia, New Zealand, UK etc. India participated in Regional Cooperation and Economic Partnership (RCEP with 16 members) negotiations, but it pulled out of the group before signing the agreement due to its domestic sensitivities.

India has regional trade agreements with SAARC and ASEAN, both agreements cover India's neighbourhood. However, these agreements have not benefited NER much. While NER can gain better market access to these markets, it can also be an importer to fulfill its many domestic consumption requirements as goods can come duty free and given the geographical proximity it can be sourced cheaply. For example, import of hilsa fish from Bangladesh can be directly imported across borders, rather than taking the present longer time-consuming routes.

The North East region of India holds immense potential for cross-border interconnections, supply chains, common market pursuits, technology interfaces, and investment integration with South Asia and Southeast Asia. These initiatives would enhance connectivity, promote trade and tourism, create employment opportunities, attract investments, and foster overall socio-economic development in the region. It is crucial for governments, policymakers, and stakeholders to collaborate and implement strategic measures to unlock the region's potential and ensure a prosperous future for the North East.

The establishment of cross-border interconnections in the North East region can play a crucial role in promoting trade and connectivity. Improving road connectivity between India and neighboring countries such as Myanmar and Bangladesh would facilitate the movement of goods and people. The construction of the India-Myanmar-Thailand Trilateral Highway is a significant step towards enhancing connectivity with Southeast Asia. Similarly, the Kaladan Multi-Modal Transit Transport Project aims to connect Kolkata (India) with Sittwe (Myanmar) through waterways and roadways. These initiatives would not only boost trade but also promote cultural exchange and tourism.

Creating a common market in the North East region by integrating with South Asia and Southeast Asia would lead to numerous benefits. It would provide a larger market for local products, encouraging entrepreneurship and industrial growth. The establishment of trade agreements and harmonization of regulations would facilitate seamless movement of goods and services across borders. This integration would also promote investments in sectors such as manufacturing, tourism, and agriculture, generating employment opportunities and improving the standard of living in the region.

The Association of Southeast Asian Nations (ASEAN), Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC), and South Asian Association for Regional Cooperation (SAARC) have expressed their intentions to establish a common market or economic union to some extent. However, it is essential to note that each organization has its unique focus and objectives. ASEAN, with ten member states, has been working towards the realization of an ASEAN Economic Community (AEC) since 2015. The AEC aims to create a single market and production base, allowing free movement of goods, services, investment, skilled labor, and freer flow of capital between member countries. The political declaration for this was made in 2007 with the Bali Concord II.

BIMSTEC, comprising Bangladesh, Bhutan, India, Nepal, Sri Lanka, and Thailand along with Myanmar and Malaysia as observers, focuses on cooperation in various sectors like trade and investment, technology, energy, transportation, tourism, and people-to-people contact. While there are no explicit declarations for a common market within BIMSTEC's charter yet, there have been discussions on enhancing economic cooperation among member states through initiatives like the Motor Vehicles Agreement (MVA) and the BIMSTEC Free Trade Area (FTA).

SAARC is an organization consisting of eight member states - Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. SAARC's primary objective is to

promote peace and stability in South Asia through economic cooperation. Although SAARC does not explicitly aim for a common market like ASEAN or BIMSTEC due to political complexities among its members; it has initiated several regional economic initiatives such as the South Asian Free Trade Area (SAFTA) in 2004 which aims to reduce tariffs on goods traded among member countries.

India plays a crucial role in all three organizations - ASEAN through its dialogue partnership status since 1992; BIMSTEC as a founding member; and SAARC as one of its original members. However, most of these agreements have not been successful in integrating India with these countries. Also a multiplicity of same members in different FTAs creates challenges due to different schedules of tariff concessions and other rules. A best possible way will be to have FTA first between SAARC and ASEAN (in which BIMSTEC gets subsumed). The first step will be to create a Customs Union and then a Common Market. However, given the current geo-political conflicts and varying trade interests and conflicts amongst industries makes it difficult to achieve a Customs Union within the region. **12.3 Creating New Supply Chains through Trade Agreements**

Developing robust supply chains is essential for leveraging the North East's geographical advantage. The region is rich in natural resources such as tea, oil, timber, minerals, and agricultural products. Establishing efficient supply chains would enable these resources to be exported to South Asia and Southeast Asia. Additionally, improved connectivity would facilitate the importation of goods from these regions into the North East. This integration would create a win-win situation, promoting economic growth and enhancing the availability of diverse products for consumers.

The growing regionalism in the multilateral trading system has been a phenomenon which has increased over the years and now drawing greater attention of researchers and policy makers. Regionalism in trade indicates trading with select group of countries on preferential terms. The growth of RTAs has been one of the major developments in international relations in the recent years. Virtually all the countries are members of one or the other block and many belong to more than one. The multilateral trade rules for international trade were created in 1947 with the objectives of securing market access for the post-war recovering economies and supporting their continued growth.

From World War II onwards until around the 1980s, regionalism and multilateralism could be seen as complementing each other rather than being substitutes; as both led towards an increased opening of the global markets. Things started moving in different directions after that, thus opening one of the most debated and complex issues relating to the multilateral trading system which is the proliferation of the 'Regional Trade Agreements' (RTAs).

India had initially adopted a very cautious and guarded approach towards Regionalism and was engaged in some bilateral/regional initiatives, mainly through PTAs like the Bangkok Agreement (signed in 1975) to exchange tariff concessions in the ESCAP region, Global System of Trade Preference (GSTP – aim of increasing trade between developing countries in the framework of the UNCTAD, 1988) and the SAARC Preferential Trading Arrangement (SAPTA signed in 1993) to liberalise trade in South Asia. However, these engagements

achieved very limited results in terms of increasing trade volumes with these countries. With smaller neighbours like Bhutan and Nepal, India has free trade arrangements on a non-reciprocal basis mainly with a view towards ensuing social, economic and political stability across the border.

The country's first FTA on a reciprocal basis was signed with Sri Lanka in 1998 and has been in operation since March 2000. Here too Sri Lanka, being a small island neighbour, was given more flexibility in terms of the size of the negative list and the period of tariff liberalisation. Subsequently it has implemented several RTAs with MERCOSUR, Chile (PTAs); Singapore, Malaysia, Japan, Republic of Korea, Australia (Comprehensive Economic Cooperation/Partnership Agreements), and is negotiating CECAs with Canada, EU, EFTA, Indonesia, New Zealand, UK etc. India participated in Regional Cooperation and Economic Partnership (RCEP with 16 members) negotiations, but it pulled out of the group before signing the agreement due to its domestic sensitivities.

India has regional trade agreements with SAARC and ASEAN, both agreements cover India's neighbourhood. However, these agreements have not benefitted NER much. While NER can gain better market access to these markets, it can also be an importer to fulfill its many domestic consumption requirements as goods can come duty free and given the geographical proximity it can be sourced cheaply. For example, import of hilsa fish from Bangladesh can be directly imported across borders, rather than taking the present longer time consuming routes.

Trade agreements have been instrumental in fostering new supply chains and intra-trade block investment flows between countries. By reducing tariffs, eliminating non-tariff barriers, and establishing rules for fair competition, trade agreements facilitate the movement of goods, services, and capital across borders. Here are some examples of successful cases where trade agreements led to the creation of new supply chains and intra-trade block investment flows, sector-wise:

- (i) North American Free Trade Agreement (NAFTA) - Automotive Industry: NAFTA, signed in 1994 between the United States, Canada, and Mexico, has significantly impacted the automotive industry. Prior to NAFTA, only 10% of vehicles sold in the U.S. were produced domestically or in Canada. Today, more than 60% of vehicles sold in the U.S. are built using parts from all three countries. The agreement facilitated the creation of a North American supply chain that allowed automakers to source components from multiple locations within the region to optimize production costs and improve efficiency (Source: USITC).
- (ii) Trans-Pacific Partnership (TPP) - Electronics Industry: The TPP was a proposed free trade agreement involving 12 Pacific Rim countries that aimed to reduce tariffs on goods and establish common regulations for intellectual property rights and labor standards. Although the agreement was never ratified due to political reasons, it would have had a significant impact on the electronics industry by creating a seamless supply chain among member countries. For instance, Taiwanese companies could have sourced components from Japan or South Korea for their electronics products while benefiting from lower tariffs when exporting finished goods to other TPP members (Source: ITIF).

- (iii) European Union - Pharmaceutical Industry: The European Union's single market has enabled pharmaceutical companies to establish a unified supply chain across member states. With harmonized regulations for manufacturing processes and quality control standards, EU countries can easily exchange raw materials and finished products without facing significant regulatory hurdles or tariffs (Source: EFPIA). This has led to increased investment flows within Europe's pharmaceutical sector as companies can leverage economies of scale and improved access to markets across member states.
 - (iv) China-Australia Free Trade Agreement (ChAFTA) - Mining Industry: ChAFTA was signed in 2015 between China and Australia with an aim to strengthen economic ties between both countries by reducing tariffs on various goods sectors including mining products such as iron ore and coal (Source: DFAT). As China is one of Australia's largest trading partners in these commodities, ChAFTA has facilitated increased investment flows into Australia's mining sector as Australian companies can now export their resources more efficiently with lower tariffs into China's market (Source: ABARE).
- United States-Mexico-Canada Agreement (USMCA) - Agriculture Sector: USMCA replaced NAFTA in 2018 with updated provisions that benefit the agriculture sector by addressing concerns related to dairy exports from Canada and sugar imports from Mexico (Source: USDA). For instance, USMCA allows Canadian dairy farmers to sell more milk products into the U.S., while Mexican sugar producers will face higher import duties if they exceed their quota limits under certain circumstances (Source: USITC). These changes have created opportunities for new investment flows within this sector as companies can now optimize their production processes based on these revised trade rules under USMCA.

The vision for 2047 should be to develop a clear-cut strategy for using these agreements for benefit of NER and allow creation of new supply chains for industries in NER. This would require renegotiation with the trading partners to include NER export items in duty free list of exports and imports. Non-tariff barriers must also be effectively addressed in the renegotiated agreement. Each of these agreements also have identified areas of economic cooperation which cover cooperation in technology, transport, customs, non-tariff barriers, education, research and development etc. However, not much progress happens after these areas are identified, therefore a NER focussed approach needs to be built in areas of cooperation.

12.4 Technology Interfaces and Investment Integration.

Northeast India is a region known for its rich cultural diversity and natural beauty. However, when it comes to technology and investment, the region has historically lagged behind other parts of the country. Leveraging technology interfaces can significantly enhance connectivity and development in the North East region. Investments in digital infrastructure, such as high-speed internet connectivity, would enable access to global markets and facilitate e-commerce platforms. Additionally, technological advancements can be utilized to improve transportation networks, logistics systems, and communication channels. This integration of technology interfaces would bridge the gap between the North East region

and the rest of India, South Asia, and Southeast Asia. There have been recent developments that indicate a growing interest in leveraging technology and investment for the development of Northeast India.

The infrastructure for technology in Northeast India has seen significant improvements in recent years. The region now has better internet connectivity and mobile penetration rates compared to previous years. Initiatives like the BharatNet project have aimed to connect even the remotest parts of the region with high-speed internet. While there has been an increase in investment activities in Northeast India, it still falls short compared to other regions in the country. The region has immense potential in sectors like tourism, agriculture, horticulture, and handicrafts which can attract more investments.

The government has launched various schemes and initiatives to promote technology adoption and attract investments in Northeast India. Programs like 'Act East Policy' aim to improve connectivity with Southeast Asian countries and boost trade and investment opportunities. Despite these positive developments, Northeast India faces several challenges that hinder the full realization of its technological and investment potential. These challenges include inadequate physical infrastructure, bureaucratic hurdles, lack of skilled manpower, and security concerns.

NER can benefit from Cross-Border Investments which can lead to Technology Transfer. There are certain success stories in this regard:

- (i) Volkswagen in China: Volkswagen's investment in China is a classic example of successful technology transfer through cross-border investments. When Volkswagen entered the Chinese market, it not only brought in its advanced automotive manufacturing technologies but also collaborated with local partners to transfer knowledge and skills. This led to the development of a robust automotive industry in China, with local manufacturers benefiting from Volkswagen's expertise.
- (ii) Samsung in Vietnam: Samsung's investment in Vietnam's technology sector has been instrumental in transferring advanced manufacturing technologies to the country. Through its presence in Vietnam, Samsung has not only boosted the local economy but has also facilitated the transfer of knowledge and skills in electronics manufacturing, contributing to the growth of Vietnam's technology industry.
- (iii) Siemens in India: Siemens' investment in India has played a crucial role in technology transfer across various sectors such as energy, healthcare, and infrastructure. By establishing research and development centers and manufacturing facilities in India, Siemens has transferred cutting-edge technologies to the country, fostering innovation and skill development among the local workforce.

Further, NER can benefit from technological advancements. For example, AI-powered interfaces have revolutionized investment integration by enabling data-driven decision-making processes. AI platforms analyze vast amounts of data from diverse sources to provide valuable insights for investors looking to optimize their cross-border investment strategies. These interfaces enhance efficiency, reduce risks, and improve overall investment outcomes. IoT interfaces have streamlined cross-border investments by enabling real-time monitoring and control of assets across different locations. By leveraging IoT

connectivity, investors can remotely manage their investments, track performance metrics, and respond promptly to market changes, thus enhancing investment integration and maximizing returns.

In order to leveraging technology and investment for development the following steps will be necessary:

- (i) **Promoting Startups:** Encouraging the growth of startups can be a significant driver for technology adoption and investment in Northeast India. Providing incentives such as tax breaks, incubation centers, and access to funding can nurture a thriving startup ecosystem in the region.
- (ii) **Focus on Digital Infrastructure:** Investing in digital infrastructure such as broadband connectivity, e-governance services, and digital literacy programs can bridge the technological divide in Northeast India. This will not only attract investments but also empower local communities.
- (iii) **Sector-specific Investments:** Identifying key sectors with high growth potential like tourism, agriculture, renewable energy, and healthcare can help channel investments effectively. Targeted policies that incentivize investments in these sectors can lead to sustainable development outcomes.
- (iv) **Skill Development Programs:** Addressing the skill gap by implementing vocational training programs tailored to the needs of emerging industries can enhance employability and attract more investments from companies looking for skilled workforce.
- (v) **Public-Private Partnerships (PPPs):** Collaborations between government bodies and private enterprises can facilitate large-scale projects that require substantial investments. PPPs can help mitigate risks associated with investing in Northeast India while ensuring sustainable development practices.

Promoting investment integration between the North East region and South Asia and Southeast Asia would attract foreign direct investment (FDI) and boost economic growth. The region offers several opportunities for investments in sectors like energy, tourism, infrastructure development, agriculture, and manufacturing. By creating a conducive investment climate through policy reforms, tax incentives, and ease of doing business measures, the North East can attract both domestic and international investors. This integration would not only bring capital but also technology transfer, knowledge exchange, and employment generation.

12.4.1 IT and IT Enabled Services

IT and IT-enabled Services, and Business Process Outsourcing (BPO) are three major export-oriented service sectors of India. They have created employment opportunities for a large

number of educated Indian youth. A significant proportion of the youth in northeast region of India (NER) are literate. It is observed a large number of young people from the NER are employed in IT, ITeS, and BPO firms in other states of India. Therefore, the Government of India has introduced a North East BPO Promotion Scheme to create an ecosystem for IT/ITeS-led growth of the NER. In addition, given its high level of literacy, the region has a high potential to grow its tourism, healthcare, and education sectors. A better ICT infrastructure ecosystem is essential for their development.

ICT has enabled the people of the NE Region to interact with peers across the globe in a meaningful way. It has also enabled a better understanding of the region and its positive aspects. In one way, it has facilitated the flow of tourists to the region, by easing matters like bookings (air tickets and hotel rooms), tour plans, information regarding sightseeing etc. In the Government sector, ICT has enabled Ministries and Departments to interact with citizens (on a G2C basis) including through social media. Further, they have been able to interact with one another (on a G2G basis) as well as with businesses (G2B). Government entities have been able to use innovations like video-conferencing and remote sensing for improving their business processes.

**Table 12.3 : Wireless Subscriber Base in the NE States
(As on 31.3.2023)**

(In Numbers)

Service Area	BSNL	Bharti Airtel.	Vodafone Idea	Reliance Jio	Total
Assam	3184184	11,006,187	2002622	8800862	24993855
North East	1,365,085	5934222	941,136	4110061	12350504
Total – NE Region	4549269	16940409	2943758	12910923	37344359
Total - India	103580534	370910873	236750467	430230251	1143927943

Source: NEC Year Book 2023 (Press Release (No 46 / 2023 dated 22nd May 2023) from Telecommunications Regulatory Authority of India (TRAI), Government of India [Annexure-II at Page No 16]

Notes

1. Other service providers (MTNL and Reliance Comm.) do not have any subscribers in any of the above service areas.
2. Figures for Bharti Airtel include those of and Tata Tele.
3. North East includes both NE-I (Meghalaya, Mizoram & Tripura) and NE-II (Arunachal Pradesh, Manipur & Nagaland). State-wise figures have not been furnished for these states.
4. Total for NE Region excludes Sikkim, which is under the West Bengal Service Area. Separate figures for Sikkim have not been provided.

However, the NER is faced with suboptimal ICT connectivity. The number of internet subscribers is below national average. As on September 2022, in Assam and six other states of the NER (except Sikkim), 46 and 58 persons per 100 are internet subscribers, respectively. The density of internet subscribers is further low in rural areas. While 46 per 100 of village population of six states of the NER (except Assam and Sikkim) are internet subscribers, that number is 34 in the state of Assam.

A total number of 8600 villages of the NER were identified as not covered by mobile connectivity. The Government of India through its BharatNet project has undertaken an initiative to provide broadband connectivity to all uncovered villages. As on February 28, 2022, the necessary infrastructure has been created to provide broadband services to 5795 Gram Panchayats in eight NER states under the BharatNet project.

To exploit the development prospects of the NER, a better ICT connectivity infrastructure ecosystem is an important prerequisite, which is suboptimal at present. However, the NER has many opportunities to strengthen its ICT connectivity. The region is located at a strategically important junction in eastern South Asia, it can act as a conduit for strengthening intra-regional ICT connectivity involving its neighbouring countries.

The Indian Information Technology industry has been a significant contributor to the country's GDP and export earnings. However, the North East Region of India has not fully tapped into this potential due to various challenges such as inadequate infrastructure, connectivity issues, and lack of skilled workforce. To promote IT and ITES in this region, private sector players need to focus on the following key areas:

- (i) **Investment in Infrastructure:** Private sector companies from India and abroad should invest in building state-of-the-art IT parks and technology hubs in the North East Region. These facilities should have world-class amenities and connectivity to attract IT businesses. In order to make them invest in NER, the Government of India as well as State Governments need to provide incentives in terms of tax benefits, creation of IT Zones and enabling infrastructure.
- (ii) **Skill Development:** Collaborating with local educational institutions and government bodies, private sector players can set up training programs to develop a skilled workforce in IT and ITES sectors. This will help create employment opportunities for the local population.
- (iii) **Promotion of Entrepreneurship:** Encouraging entrepreneurship in the IT sector can lead to innovation and growth. Private companies can provide mentorship, funding, and incubation support to startups in the North East Region.
- (iv) **Industry-Academia Collaboration:** Establishing partnerships with universities and colleges in the region can bridge the gap between academic curriculum and industry requirements. This collaboration can facilitate research and development activities.
- (v) **Government Liaison:** Private sector players should work closely with local governments to address regulatory challenges and policy issues that may hinder the growth of IT and ITES industries in the North East Region.

- (vi) **Promotion of Digital Literacy:** Initiatives aimed at promoting digital literacy among the local population can increase awareness about technology and its benefits. Private companies can conduct workshops and training sessions for communities.
- (vii) **Focus on Connectivity:** Improving internet connectivity and network infrastructure is crucial for the growth of IT businesses in remote regions like the North East. Private sector players can invest in expanding broadband services. In this regard, getting optical fibres through Bangladesh to NER
- (viii) **Market Expansion:** Private companies should explore new markets within India as well as globally for their IT services from the North East Region. This diversification can lead to increased revenue streams.
- (ix) **Sustainable Practices:** Emphasizing sustainable practices such as green technology solutions and energy-efficient operations can contribute to environmental conservation while promoting IT growth in a responsible manner.
- (x) **Brand Building:** Creating a positive brand image for the North East Region as an emerging hub for IT services through marketing campaigns and participation in industry events can attract investments and talent.

12.4.2 Energy

The Northeastern region is endowed with vast natural resources such as forest resources, petroleum products, hydroelectric power, and solar potential. As per CEA's 20th Electric Power Survey of India, the NER energy demand is projected to reach around 51,788 (MUs) and peak demand 10,937 MW 2041-42. Presently, in Eastern South Asia, four Countries namely Bangladesh, Bhutan, India and Nepal (BBIN) are interconnected and there is ongoing trend of electricity trade for import and export of electricity. These four countries are trading the electricity on bilateral basis where India is the main hub for import and export of electricity to Bangladesh, Bhutan and Nepal. As Bangladesh, Nepal and Bhutan do not share geographical boundaries together, they need access from India for interconnection and trade of electricity.

Cross border trade of electricity has significantly contributed to economic growth and development of the region. As NER of India is blessed with huge renewable energy reserves viz. Hydro and Solar potential, through its development can become energy hub for import/export of electricity with BBIN countries as well as to other states of India to address climate change and in meeting intermittent load of solar and wind power required for grid stability. Presently, the demand of electricity in NER of India is relatively less as compared to energy resource potential available, therefore these resources can only be usefully developed, if electricity produced in NER of India can be sold beyond NER viz. BBIN and other parts of India. Further, Cross border trade of electricity can potentially reduce the power generation capacity investment requirements thereby can provide access to lower-cost electricity generation, to meet the electricity needs of fast-growing population of the region.

Moreover, NER of India and adjoining neighboring countries viz. BBIN have tremendous diversity in power system profile, power generation mix, Cross Border Electricity Trade

diversity, energy resources endowments and clean/renewable energy resources, load profile and season load diversity etc. which makes a strong case for deepening regional energy cooperation and advancing Cross Border Electricity Trade among them. Improving energy connectivity in NER will help to generate revenues for their states vis-à-vis GDP growth of their states in terms of more jobs, access to energy as well as to address climate change etc.

While Northeast India may have faced challenges in terms of technology adoption and investment inflow historically, there is a growing momentum towards leveraging these aspects for development. By focusing on promoting startups, enhancing digital infrastructure, targeting sector-specific investments, investing in skill development programs, and fostering public-private partnerships, Northeast India can unlock its full potential for economic growth and prosperity.

Despite its huge energy reserves, the NER and many localities of the BBIN subregion suffer from inadequate supply of energy/electricity and poor rural electrification. Development of renewable energy capacities can help to address the region's energy security and environmental sustainability challenges. Enhanced cross-border electricity trade (CBET) can help to harness the renewable energy potential of the subregion by encouraging more electricity generation from such sources and distribute the same through an integrated power grid based on complementarities in seasonal electricity demand and supply patterns between BBIN countries.

NER has the advantage that it shares its boundaries with neighboring countries including Bangladesh, Bhutan and Nepal, with enabling conditions for enhanced CBET. Considering NER's energy reserves and its strategic location, it can potentially serve as a hub for import/export of electricity which will bring revenues for the states, in addition to benefits by way of industrialization and job creation.

Presently, Hydro Power Projects and associated transmission system for wheeling of electricity are being developed by Central Government Power Utilities without being involvement of NER states. To reduce dependency of NER on Central Government, it is important that NER/NEC should develop few small hydro (less than 25 MW), Solar power projects as well as Transmission system themselves.

It is suggested that Northeast Council (NEC) identify and develop long term, phase wise Plan for development of Hydro and Solar Power Projects in the state of NER and can carry out this study through Central Government assistance. NEC can hire a reputable consultancy organization such as WAPCOS, CEA or any other reputable consultants etc. for this purpose. For development of small hydro power projects and Solar projects, NER states can access grants/soft loan from Ministry of New and Renewable Energy, IREDA. Further for soft loan, NER states can access funds from PFC and REC also for development of these projects.

Moreover, Government of India is likely to bring a new policy to provide grant to NER states to pick equity stakes in development of hydro power projects⁵.

The Policy will encourage NER states to develop hydro power projects in their own ownership and to earn revenues through sale of surplus hydro power. NER states can develop these projects on three modes viz. (i) Partnership/jointly with perspective developers/central power utilities etc. NER states can offer equity in the form of land etc.(ii) award projects to perspective developers on competitive bidding route (iii) to develop power projects on their own strength. Further, for development of roof top Solar projects, NER states can utilize MNRE's grants/financial assistance to encourage consumers to install roof top solar projects on large houses, hospitals etc.

Draft Report

⁵ <https://www.livemint.com/economy/centre-may-offer-grants-to-ne-states-for-hydropower-projects-11688321148729.html>

Box 1: Successful stories of micro-hydro electricity
<p>Given the environmental concerns of big-hydro power projects which may lead to ecological imbalance and can enhance the risk of disasters, in certain areas of NER it may be useful to consider promoting micro-hydro power plants. Some of the successful cases are:</p>
<p>Bhutan: A 70-kW micro hydel project at Trongsa in Bhutan has been operating successfully due to its successful community management and ownership scheme as well as the innovative approach of the project.</p> <p>(Source: Yuebo Xie et. Al. (2018). Hydropower Development—Review of the Successes and Failures in the World, available at https://www.sciencedirect.com/science/article/abs/pii/B9780128130162000046)</p>
<p>India:</p> <p>Pico-hydro systems have a significant impact on farmers and villagers who have no access to electricity. A number of such installations are in very remote locations with no electricity. Many installations have been done in isolated places near reserve forests, coastal regions, and national parks where it is not possible to lay transmission lines by DISCOMs. In such places, the pico-hydro systems have been a boon. In hilly areas, grid and solar power are unreliable due to monsoons and therefore, pico-hydro is a convenient solution. Chembu village in the Coorg District of Karnataka has seen a major change due to installation of pico-hydro systems. The village is surrounded by forests and is typically inhabited by poor farmers who had no access to electricity but had almost perennial streams running through their habitation. The villagers laid large pipes into streams to diver the water. They fixed turbines to operate with force when the water falls over them. They connected a generator to the turbines to produce electricity. Thus, the villagers are generating their own electricity.</p> <p>The villagers run the turbine almost the entire day during the rainy season. But during summer, they divert the water to their agricultural farms during the day and re-divert it at night. Thus, they are balancing the water to meet both agricultural and electricity requirements. Now villagers have many necessary electrical appliances like a mixer grinder, refrigerator, television, wet grinder etc., in their home. Having these things in their home was a luxury for them once as they did not have electricity in their village. But, now, they are happily reaping the fruit for their collective efforts, with which they achieved it. They don't have any power cuts, unlike the majority of villages in the country. They are enjoying free electricity round the clock.</p> <p>(Source: This Karnataka Village Has Uninterrupted Free Electricity by Valli Sarvani, https://fusion.werindia.com/incredible-india/this-karnataka-village-has-uninterrupted-free-electricity)</p>
<p>Nepal:</p> <p>The introduction of small hydropower units in Nepal is generally regarded as a very successful example of renewable energy implementation in a developing country. Some 100 plants have been installed and many more are under construction. Most of the units are used for mechanical end-</p>

uses, rather than power production. Two companies (Balayu Yantra Shala PVT Ltd. and Butwal Engineering Works PVT Ltd.), set up by Swiss aid, but run by Nepalis, are making and installing cross-flow turbines to drive agro-processing machines (corn mills, rice hullers and oil seed crushers). As these end-uses are directly income generating for the rural population they are on a sound financial footing and this approach could certainly be used in many remote areas in the developing world.

A decentralized district energy-planning program in Nepal called the Rural Energy Development Programme (REDP) has implemented a number of community-managed micro hydel plants with funding from the Government of Nepal and United Nations Development Programme (UNDP) with the World Bank as project partner.

(Source: <https://www.sciencedirect.com/topics/engineering/micro-hydro-power#:~:text=The%20introduction%20of%20small%20hydropower,many%20more%20are%20under%20construction>)

Sri Lanka:

In Sri Lanka, the Energy Services Development/Renewable Energy for Rural Economic Development (ESD/RERED) has been adjudged as one of the most successful renewable energy projects with coverage exceeding 100,000 households. The project is mainly made up of off-grid micro hydroelectric systems and solar home systems. An extended component of the project also provided 126 MW of grid-connected power plants for 500,000 households. The success of the project stemmed from the minimal utilization of foreign expertise, financial assistance from government via provincial councils, and management of project by private institutions.

(Source: Pervaz, M., Rahma, L. (2012). Review and evaluation of successful and unsuccessful renewable energy projects in South Asia, International Conference on Life Science and Engineering, 45. Pp. 6-11. <https://api.semanticscholar.org/CorpusID:35696212>)

Source: ESCAP, Development Paper 2: Improving Energy Connectivity in the BBIN (February 2024)

12.5 Challenges in North East India for Trade Integration

North East India faces several challenges in integrating its trade with the South Asian Association for Regional Cooperation (SAARC) and the Association of Southeast Asian Nations (ASEAN). The region's geographical location, infrastructure limitations, cross-border trade barriers, limited market access, inadequate trade facilitation measures, and lack of comprehensive connectivity initiatives, political complexities, and historical factors contribute to these challenges. Addressing these challenges requires concerted efforts from governments, regional organizations, private sector stakeholders, and international partners to promote inclusive and sustainable trade integration for North East India.

Geographical Challenges

Infrastructure Limitations

Historical Factors

Cross-Border Trade Barriers

Limited Market Access and product diversification

Inadequate Trade Facilitation Measures

Lack of Connectivity Initiatives

12.6 Vision 2047

1. Vision 2047

NER exports in 2047 to become US \$ 3 billion from \$ 543 million (2022-23) attain an export growth of 7% till 2047. India’s global exports to increase from 451 billion in 2022-23 to 860 billion in 2047 Share of NER exports in India’ global exports to increase from 0.12 % (2022-2023) to 0.34 % in 2047

The exports of NER to the world as a compared with India is as follows:

Table 12.4: Export of NER to Bangladesh

Region	Exports to World (in million USD)
India	450,958.43
All NER States	547.55
Meghalaya	10.12
Mizoram	0.04
Tripura	14.64

Source: ESCAP, data compiled from DGCIS India available at <http://www.eximanalytics.dgcskol.gov.in/dgcis/EXIM-Analytics>. Accessed on August 26, 2023.

The above figure highlights the unrealized trade potential of NER states and thus efforts to promote cross-border trade and economic cooperation, especially is essential for development of NER. As per current trade in goods data analysis of NER and India, it is noted that the share of NER to India’s global exports is around 0.12%. It is also worth noting that the share of exports from the NE states in the total national exports has been declining since 2017-18 (when they accounted for 0.21% of the national exports). In FY 2021-22, the NE states contributed to just 0.12% of the nation’s exports.

The NER exports from 2014 to 2023, as available from the DGCIS database, was extrapolated for 2047 along with India’s global exports. As per linear forecast while India’s global exports

in 2047 will be US \$ 860 billion, the NER exports will be only around US \$ 700 million, which will be only 0.08% share of India's total exports.

This indicates that NER's share by 2047 in India's total exports of 2047 will reduce by 33% from its current share. One of the challenges in this regard is regarding lack of data in trade in services for NER and thus the estimate for services could not be done.

Thus for 2047, if NER has to use trade as engine of its economic growth, it needs to set a very ambitious target of exports from 2047. It is therefore recommended that the Vision of 2047 targets NER's exports in 2047 to reach US \$ 3 billion from existing US \$ 547 million (in 2022-2023). This would mean doubling the share of NER to India's global exports from 2022-2023 to 2046-2047. This can be achieved if the NER exports can have a growth rate (CAGR) of 7% from 2023 to 2047.

12.6 Strategic Moves and Policy Interventions to achieve the 2047 vision

To successfully integrate the trade and services sectors in North-East India with the South Asia and Southeast Asian regional markets, the Vision 2047 must follow the following strategies:

- 1. Developing an integrated regional infrastructure plan:** This involves investing in transportation networks, such as roads, railways, and airports, to improve connectivity within the North Eastern States and with neighbouring countries. Developing a multimodal transport system will be essential for this so as to minimise transport cost and time and thereby the cost of trade.
- 2. Promoting cross-border trade facilitation and reducing barriers:** This includes simplifying customs processes, harmonising trade regulations, and implementing efficient border management systems to expedite the movement of goods and services across borders. In India, even after the implementation of GST, there are certain bottlenecks which remain at the State borders. They need to be identified and removed.
- 3. Promote digitalisation for promoting seamless flow of goods:** Digitalization can help cross-border trade by streamlining processes, reducing paperwork, and increasing efficiency. Through digital platforms, businesses can easily connect with international partners, access global markets, and manage transactions securely. Digital tools such as e-commerce platforms, electronic payments, and digital documentation enable smoother cross-border trade operations. Digitalization optimizes cross-border trade by minimizing barriers, improving transparency, and fostering collaboration across borders.
- 4. Renegotiating FTAs and CECAs to get duty free treatment on NER products:** Most of the items produced by NER, especially agriculture products are not in tariff concession list of India's FTA partners. SAFTA and ASEAN FTA can provide North East Indian exporters with access to a large market of over 1.8 billion consumers, including the member countries of SAFTA and ASEAN. However, given the surge in mega-RTAs in Asia (RCEP, CPTPP, EAEU etc.) it is important that India focuses on other FTAs as well for seeking preferential market access

for the NER products. This can increase the region's exports and help create jobs and economic growth. At the same time, they face non-tariff restrictions relating to plant and quarantine certification, which further makes the trade cost very high as certification of compliance requires testing by designated agencies and this also takes time, which damages perishable agriculture products.

Therefore, Government of India should have a focussed engagement with the SAARC and ASEAN (especially neighboring countries to NER) in removing NER's export potential items from their Sensitive lists and allow them to be imported duty free. Renegotiations should also be held to conclude Mutual Recognition Agreements with such trading partners under FTAs. The agreements can attract more FDI into North East India, particularly in sectors such as manufacturing, agriculture, and services, which can lead to economic growth and job creation

5. Economic empowerment of women-led MSMEs: Supporting women-led MSMEs to get trade finance and market access should be given priority by each of the State Governments of NER. These women also face challenges due to lack of knowledge on how to use digital tools to promote their business through digital marketing and e-commerce. Cluster based approach to train women by using OGOP Scheme would be useful to promote entrepreneurship development and marketing. Women entrepreneurs from NER should also be given special treatment to participate in international trade fairs abroad.

6. Promoting investments in high value-added manufacturing products and services – forming industrial clusters at the border: One of the challenges that most States in NER face relate to lack of long term investments in the region. It is important that finished products manufacturing units are set up in NER. Government should provide some incentives to private sector and also its public sector industries to set up plants. It would also be useful to allow setting up of industrial parks at the borders through joint ventures from neighbouring countries which will provide stable and sustainable supply chain. This involves creating a conducive environment for businesses to thrive, offering incentives and support for private sector enterprises to invest in the region, and facilitating partnerships between local and international businesses.

7. Facilitating the exchange of knowledge and best practices in sectors such as education, health, tourism, and IT: This includes promoting collaboration between institutions, sharing of expertise, and facilitating the exchange of students, professionals, and tourists to foster greater cooperation and growth in these sectors.

8. Ensuring the availability of skilled human resources: This includes investing in education and vocational training programs to develop a skilled workforce that can meet the demands of the regional trade and services sectors.

9. Planning for data capture and dissemination: One of the challenges that is being faced relate to lack of availability of data. Data plays a crucial role in policy making and monitoring as it provides the necessary information for evidence-based decision-making. Data enables effective monitoring of policy implementation and outcomes, allowing for adjustments and

improvements as needed. Reliable data also enhances transparency and accountability in governance, fostering public trust. In essence, data serves as the foundation for informed policy decisions and ensures that government actions are guided by accurate information, leading to more effective and impactful policies. A proper monitoring of progress taking place after the Vision 2047 is adopted will require availability of latest data and wherever it is not available, efforts to be made to generate robust data capture and make it available.

10. Organising international trade fairs and buyer-seller meet in NER itself: International trade fairs provide a platform for businesses to showcase their products and services to a global audience, attracting potential customers and partners. By participating in these fairs, companies can gain exposure to new markets, establish brand presence, and network with industry professionals. The interaction at trade fairs allows businesses to understand market trends, consumer preferences, and competitor strategies, enabling them to tailor their offerings accordingly. Additionally, trade fairs facilitate direct sales opportunities and serve as a launchpad for new products. Overall, participation in international trade fairs can significantly enhance a company's market reach and visibility. Traders from NER can benefit more if these international trade fairs are held in NER, preferably by rotation to each of the NER States.

11. Cultural Exchange and Tourism: Trade integration with SAARC and ASEAN would not only bring economic benefits but also foster cultural exchange and tourism opportunities for the North East region. The region shares cultural ties with several countries in these regional groupings, providing avenues for cultural collaboration and people-to-people exchanges. Moreover, improved connectivity and ease of travel resulting from trade integration can boost tourism in the North East, known for its natural beauty, diverse indigenous cultures, and historical landmarks. Increased tourist inflow would create employment opportunities and stimulate economic growth in sectors related to hospitality and tourism services. Promoting Eco and Health Tourism will be important for the NER to benefit its local population and communities.

12. Harnessing Natural Resources: The North East region of India is endowed with abundant natural resources including oil, natural gas, minerals, and biodiversity. Trade integration with South and South East Asia can facilitate the sustainable exploitation of these resources through partnerships with countries possessing advanced technologies or expertise in resource extraction and management. This collaboration can lead to technology transfer, knowledge sharing, and investment in resource-based industries within the North East region, contributing to its economic development while ensuring environmental sustainability.

13. Role of Government: Coordinated Efforts to be taken by all the Development Partners: There are multiple agencies like ADB, JICA, GIZ, USAID, World Bank etc. are working in NER on infrastructure and other projects. It is noted that often these agencies work alone with State or Central Government Departments. A well-planned coordinated interventions by all such agencies with a well-developed long-term plan will be more effective for NER connectivity and other issues. The government plays a crucial role in coordinating with

different development partners to address scattered and overlapping work. It acts as a facilitator, bringing together various stakeholders to align efforts, avoid duplication, and maximize impact. Government should initiate a multi-agency work plan with well-defined role and projects for each of the agency which can deliver projects in an efficient and coordinated manner.

12.7 Short and medium term strategy

To achieve a target of US \$ 3 billion by 2047, the exports of NER need to increase six folds. Therefore it will be important to have some short term and medium term targets. These can be:

- (i) **Short term: By 2030 the total exports of NER should be US\$ 1.0 billion i.e., doubling of exports from existing level.**

For achieving a target of US 1.0 billion in another 6 years, certain measures would be necessary, which are as follows:

- (a) **Product and market diversification:** A quick study must be commissioned which can look at each NER State and identify the markets for their existing production and related marketing strategy. Government should incentivize the producers to participate in SAARC and ASEAN international trade fairs, so that they can secure some markets. Study should also identify new products that have potential to be exported to South and South East Asian countries. On these products, States should come out with schemes for private sector which can start producing these products in sufficient quantity for exports.
- (b) **Skill development:** Each State should target certain people including women to build their skills which can move them up in higher value-added jobs as well as make them confident of starting their own business, especially in services sector. For NER special drive for trade finance, especially for women entrepreneurs should be initiated.
- (c) **Each state should become State of excellence or specialize in production:** NEC should take lead in organising meeting with all States in NER to discuss and decide how each States can become the center of production in non-competing sectors. This would also be useful to create a value chain at inter-state level. Every year NER should also organise international trade fair and organise buyer seller meetings in each State either covering selective sectors or by rotation. Subsidized stalls can be given to SAARC participants.
- (d) **Brand image building:** Each State should select certain products, get them registered under Geographical Indications (GI) so that they get internationally recognised. A proper strategy for creating brand image for these products with a good media coverage should be developed. Specific agencies should be identified to develop and market the brand image.

- (e) **Eco-tourism:** Promoting eco-tourism for NER is important for economic development. Governments should provide incentives and benefits to private sector to develop sustainable tourism centers which can also have facilities like Yoga and ayurveda
- (f) **Involve in FTA negotiations:** Consultation between Department of Commerce and all States of NER should begin during this period as to how the State agencies could be successfully equipped to participate in FTA negotiations so that products and services of State's interest, rather include in negotiations.
- (g) **Mapping of bottlenecks at border points and addressing them:** During 2024 to 2030, a comprehensive mapping of procedural and policy bottlenecks need to be done and then addressed. There are several studies which have been carried by various agencies from time to time which have identified the Customs, transport, trade policy bottlenecks, including non-tariff barriers to cross-border trade, which vary from State to State and LCS to LCS. An Expert Group must be constituted to map all such impediments and by 2025 Action Plan should be adopted. During 2026 to 2030, 80% of such bottlenecks must be addressed.

12.8 Medium term: By 2040 the total exports of NER should be US\$ 2.0 billion i.e. quadrupling of exports from existing level.

To reach a target of US \$ 2.0 Billion during 2031 to 2040, while the above recommendations need to be continued, additional action will be required to be taken. These would include:

- (a) **Setting up industrial parks at international borders:** State Governments with the help of Central Government should develop industrial parks near border areas. First the land be acquired, all necessary clearances be given under Single Window and then the plots can be allocated to private sector. It will be useful to promote FDIs from neighbouring countries so that there is mutual trade interest from both sides. By 2040 each State should have one such Industrial Park effective and running. Central Government can also be asked to facilitate Public Sector Investments in these Parks. Alternatively, the Industrial Parks can be managed under PPP or SPV provisions. Industrial parks can also be set up by investments coming from two or more States.
- (b) **Skill development and business promotion:** NER should also focus in this period to build skills of local people and communities so that they can be constructively engaged in these Industrial parks and can also develop their own MSME business. Capacity building can be organised on use of IT and digital tools to promote business through e-commerce. A special drive for women entrepreneurs should also be made.

- (c) **Addressing non-tariff measures and removal of NER products from Negative/Sensitive list of trade partners under FTA:** During this period dedicated negotiations be held with FTA partners to enter into effective mutual recognition agreements, conformity assessment and the items on which tariff concessions on NER products are not available, should be included in tariff concession lists.

- (d) **Promote digitalisation for cross trade promotion:** Digital platform should be developed, adopted and implemented for use of paperless flow of information between traders and various government agencies involved in cross-border trade.

12.9 Institutional arrangements:

For these recommendations to be implemented and monitored it will be important to constitute Expert/Focussed group which can have representatives from governments, researchers/think tanks and representatives of international agencies. Each Expert Group can have a Chair, Member Secretary (from NEC or State Government, which will act as Secretariat) and other members. In first year each Group would finalise their Action Plans which would include target, agencies involved and time period of completion. Consultations with various agencies should be held during the period so that each agency's role and responsibility is decided through consensus.

In implementing these recommendations, prior consultations with various development partners (ADB, World Bank, JICA, KOICA, UN etc.) could also be held by the NEC or Expert Groups to identify how their work is supplanting or completing these recommendations. Joint action plans can also be developed in their collaboration and possibility of funding support be also explored.

Chapter 13

Harnessing the Talents of Youths, Power of Women And Strengths of the Communities

13.1 Unlocking the Sunrise Sports Sector in the NER

13.2 Realising the Soft Power of Music of NER an Economic Force

13.3 Youth Mission 2047: Over 100 Scores Strategy

13.1 Unlocking the Sunrise Sports Sector in North East India

13.1.1 Brief Background

Youth and sports are synonymous. India's NER is emerging as a vibrant home to aspiring young sportswomen and men. Despite being geographically isolated and culturally distinct, the NER is turning into a talent hotspot that is creating a new generation of exceptional athletes who are revolutionizing sports in the country including the likes of Hima Das, MC Mary Kom, K Sanjita Chanu, Bhaichung Bhutia and the new lots. With the youth population accounting for more than 5% of the population aged 15–35 years (out of the total population of over 55 million in 2021), the potential to tap this energy pool is tremendous, which has a bearing on addressing unemployment and economic needs.

While this emerging soft prowess in national sports is not accidental, the region is equally housing the talents, from chess prodigies to weightlifting marvels, from football wizards in Mizoram to cricket queens in Assam. Otherwise, in a region, equally hit with social evils, Sports and physical education can help reduce the risk of drug addiction, HIV, alcoholism, terrorism, and other issues affecting the young people, living in a cross-border conundrum.

It is evident that in the transition from the "Look East Policy" to the "Act East Policy," the government has been prioritising and strengthening the much-needed impetus to the region's sports infrastructure and ecosystem at all levels including the establishment of 227 Khelo India Centers (two per district) in the North East and the first National Sports University in Manipur.

The region has its share of sporting issues stemming from insufficient sports and youth policies and funding, increased and improved sports infrastructure, inadequate coordination amongst various sports bodies, professionalism in sports bodies and processes, the need for capacity building to harness schemes and explore new streams of revenues like PPP and CSR funding, etc.

While the region continues to surprise with more sporting talents and its demographic dividends yielding potential benefits for the sports sector here, it amplifies the louder need and scope for promoting the very nascent sports industry, around key notable sports and sportsmanship.

As the Indian sports sector experienced a 49% growth in income in FY 2022, surpassing ₹14,000 crores, the region's sports sector can be a key contributor to this. With important role models for the younger generation, sports sponsorships can gain enormous traction, marketers can have a wider chance to profit and a lucrative market for investors, including vast scope for the sports goods manufacturing industry, even for local consumptions.

At the core, infrastructure development is key. Building and modernising stadiums, synthetic tracks, and specialized training centres across various sports is crucial. Alongside this, establishing regional academies that collaborate with national bodies like the Sports Authority of India (SAI) would provide focused training and scouting. Investing in rural areas through community खेल (khel) complexes and grassroots programs would ensure inclusivity and tap into hidden talent.

13.1.2 Present status (Quantitative and qualitative)

i) Where does NER Stand : National and Global Comparison

- The region has emerged as a breeding ground for exceptional sportspersons. Manipur leads the pack, with iconic figures like Saikhom Mirabai Chanu, an Olympic medalist. Mary Kom, a six-time World Champion boxer, has become synonymous with Indian boxing excellence. From Assam, sprinter Hima Das, nicknamed "The Dhing Express," has blazed across international tracks.
- Lovlina Borgohain, another boxer from Assam, secured a prestigious Olympic medal. Mizoram boasts of Vanlalpeka Guite, a decorated footballer who captains the Indian national team. Archery finds its champion in Tarundeep Rai from Sikkim, while Meghalaya has produced Aniket Guha, a multiple national table tennis champion.
- The region's potential extends beyond established names. Judokas like Shushila Devi (Manipur) and Nayanmoni Saikia (Assam) have garnered international acclaim. Tripura's Dipa Karmakar, a gymnast, continues to inspire with her pathbreaking vaults.

19th Asian Games 2023

- A total of 52 players from the Northeastern region of India were part of the 655 strong Indian contingent taking parts in the 19th Asian Games 2023 in Hangzhou, China.
- Manipur had a total of 38 participants and secured 8 medals.
- Assam had 6 participants who won 2 medals.
- Mizoram was represented by 3 participants and won 1 medal.
- This brings the total number of medals won by athletes from the North East region of India to 11.

13.1.3 National Comparison

Though the national comparison cannot be absolute, as there are differences between leading and other states in terms of sports support system, infrastructure and percentage of youths in real time sports, yet a pattern of comparison gives an idea of sporting excellence in the region despite challenges back home, and the strong potential to excel in years to come. This is not to deny the fact that there exist inter-State and intra-regional differences within

the region in sports support systems that determines the winning streaks from each State within the region. The recently completed National Games 2023¹ in Goa can give a comparative highlight of how the North East Region (NER) and the States faring in the sporting sector in the country.

Table 13.1.1 NER in the National Games 2023 (Goa)

States	Medals Won	No.	%
Manipur	Total medals won by Manipur	82	8.10%
Assam	Total medals won by Assam	56	5.53%
Arunachal Pradesh	Total medals won by Arunachal Pradesh	13	1.28%
Mizoram	Total medals won by Mizoram	5	0.49%
Nagaland	Total medals won by Nagaland	8	0.79%
Tripura	Total medals won by Tripura	1	0.10%
Sikkim	Total medals won by Sikkim	1	0.10%
Meghalaya	Total medals won by Meghalaya	0	0%

Table 13.1.2 NER States with different categories of Medals

States	Medals own in different categories					
	Gold	%	Silver	%	Bronze	%
Manipur	30/366	8.20%	22/294	7.48%	30/352	8.52%
Assam	14/366	3.83%	20/294	6.80%	22/352	6.25%
Arunachal Pradesh	6/366	1.64%	2/294	0.68%	5/352	1.42%
Mizoram	2/366	0.55%	3/294	1.02%	0/352	0%
Nagaland	1/366	0.27%	3/294	1.02%	4/352	1.14%
Tripura	0/366	0%	1/294	0.34%	0/352	0%
Sikkim	0/366	0%	0/294	0%	1/352	0.28%
Meghalaya	0/366	0%	0/294	0%	0/352	0%

¹ National games 2023 medal tally - full table - olympics.com. (n.d.). <https://olympics.com/en/news/national-games-2023-go-a-medals-tally-table>

13.1.4 Comparative of Sports infrastructure and facilities in NER and the Major States in India

- In the recently released report submitted by the Sports Authority of India (SAI), they have around 23 National Centres for Excellence, where three centres are situated in Itanagar, Imphal, and Guwahati. However, the regional centres are lesser in comparison, where their objective surrounds providing training to players who are about to participate in the International Games, and other similar objectives to benefit the players in their games.
- In the North East, there are only two training centres for athletes to prepare for the competition, where they provide opportunities to conduct training and diploma courses, one in Imphal², Manipur and the other is the Guwahati centre³, which has been upgraded further to a regional centre.

Table 13.1.3 NER SAI Sports Infrastructure & Facilities

States	SAI Sports Infrastructure & Facilities ⁴						
	Tennis Court	Football Court	Inbox Hall (1)	Athletic Track	Sports Institute	Rehabilitation Centre	Archery Field
Assam	2	1	2	1	0	0	0
Gujarat	0	1	4	1	0	2	0
Haryana	0	1	2	2	0	1	1
Karnataka	6	1	17	2	0	1	0
Madhya Pradesh	0	1	3	2	0	1	0
Maharashtra	1	0	5	1	0	1	0
Manipur	0	2	5	0	0	3	1
Punjab	0	2	8	4	1	3	0
Uttar Pradesh	0	1	0	2	0	0	0
West Bengal	5	5	5	1	0	0	0

² *Netaji Subhas North-East Regional Centre, Imphal.* Sports Authority of India | Ministry of Youth Affairs and Sports. (n.d.-b). <https://sportsauthorityofindia.nic.in/sai/rc-imphal>

³ *Regional-centre, Guwahati.* Sports Authority of India | Ministry of Youth Affairs and Sports. (n.d.-c). <https://sportsauthorityofindia.nic.in/sai/rc-guwahati>

⁴ *Regional Centres.* Sports Authority of India | Ministry of Youth Affairs and Sports. (n.d.-b). <https://sportsauthorityofindia.nic.in/sai/regional-centres>

1. *The games that are played inside a house or in a room or hall such as Boxing, Martial Arts, Wrestling, etc.*
2. *The Sports Rehabilitation Centre is outfitted with conditioning, post-exercise recovery services, etc.*

13.1.5 Sports Department/ Directorates of NER States and Major States in India in sports promotion:

The following gives a comparative highlight, where the comparison is framed between the states from the North East regions with the states such as Maharashtra, Kerala, and Punjab because of their better performances in the National Games and their representation in the international events for the nation.

Table 13.1.4 Policy Comparative on Youth and Sports of NER States with Major States in India

State(s)	Sports Policy (Highlights in recent years)
Maharashtra	<ul style="list-style-type: none"> ● Maharashtra State Policy 2012 focuses on allotting allowance of Rs. 100 Daily Diet Allowance for Non-Residential Players in Academies. The policy suggested allocating a monthly honorarium of Rs. 15,000 and Rs. 5,000 for Coaches and Assistant Coaches, respectively. ● Best Sports Teacher Award to Physical Education Teachers at the State level and District Level each year for their contribution towards delivering remarkable work.
Kerala	<ul style="list-style-type: none"> ● Sports Policy 2022 aims to bolster the sports sector by preparing young athletes for international competitions under the program, Kerala Olympian Sports Scheme. ● Aiming to promote adventure sports such as Trekking, Water Rafting, Parasailing, and others under Kerala Adventure Sports Games, suggests promoting tourism by organising sports events such as Boat Races, Tug-of-War, etc.
Punjab	<ul style="list-style-type: none"> ● The Sports Policy 2023, the Department of Youth and Sports Services, suggested that the Panchayat or Local Self Government has the responsibility to construct a gym or sporting arena and make an initiative to popularise a sport among the youth of the village. ● A one-time matching grant of Rs. 40,000 per Kms to encourage jogging, walking, and running amongst citizens by constructing 2.5 Kms long.

Assam	<ul style="list-style-type: none"> ● The Integrated Sports Policy 2017-18 shared their recommendation for 75% concession on Bus Travel to sportspersons participating in National and International Games. ● Monthly Pension to retired sportsperson and the rate shall be changed periodically.
Arunachal Pradesh	<ul style="list-style-type: none"> ● The Sports Policy of Arunachal Pradesh recommended establishing top-notch sports infrastructure in every district, providing employment opportunities, offering cash incentives to meritorious sportspeople, and reserving jobs in various departments, including 5% in all departments and 10% in the police force. ● The vision is to make Arunachal Pradesh a vibrant and leading state in the sports arena and to fulfil the basic infrastructure needs for the development of sports by 2030.
Manipur	<ul style="list-style-type: none"> ● The festival is celebrated for 10 (ten) days from 21st Nov. to 30th November every year. Showcases the art and culture, handloom, handicrafts & fine arts, indigenous sports, cuisines & music, eco & adventure sports as well as the scenic natural beauty of the land. ● Opportunities and hot spots to develop many forms of adventure sports like rafting, para-gliding, and angling.
Meghalaya	<ul style="list-style-type: none"> ● The Policy 2019 recommended their work towards 'Broad-basing of Sports', which is one of the key factors for the development of sports culture in any society. ● Parents, local community and schools shall develop programmes to involve the girl child in structured physical literacy and sports programmes.
Mizoram	<ul style="list-style-type: none"> ● The Policy 2019 recommended a progressive Public Private Partnership model brought in by the Department of Sports and Youth Services to undertake the construction and upgradation of district sports infrastructures. ● The State will endeavour to make sports and physical literacy an integral part of the education system.
Nagaland	<ul style="list-style-type: none"> ● The Policy 2020 recommended empowering the sports associations and federations and at the same time making them responsible by bringing them under a monitoring mechanism under the Olympic Association. ● The Hornbill International Motor Rally will be restored and Nagaland will host a national-level Nagaland Cross Country under the aegis of the Athletic Federation of India.

Tripura	<ul style="list-style-type: none"> ● Policy 2022 of the Government of Tripura on Sports suggested Sports Quota in Government Jobs ● Sanctioned more than Rs. 50 crores for robust infrastructural development of the sports sector
Sikkim	NA on their Website

13.1.6 Funds from CSR since 2014 for Sports Development in NER

- Corporate Social Responsibility (CSR) is a concept where it is suggested that companies will contribute voluntarily to improve society and prepare the environment towards a cleaner place to live. This concept has become mandatory since the passing of the Companies Act 2013, where section 135 suggests that the contribution is made to activities suggested under Schedule VII of the Act. The contribution applies to such companies with a turnover of more than 1000 crores, a net worth of Rs. 500 crores, or a net profit of more than Rs. 5 crores⁵.
- In comparison, the spending of CSR's contribution has increased under the development sector of encouraging Sports from 2014-15 to 2020-21. The following table provides information regarding the growth in CSR in the sector of encouraging sports in states such as Maharashtra, Kerala, Punjab, and states from the region of Northeast.

Table 13.1.5 NER: CSR's contribution in Sports

State(s)	2014-15 (FY)	2020-21(FY)	Increase
Maharashtra	4.67 Crores	16.51 Crores	71.71
Kerala	37 Lakhs	9.05 Crores	399.78%
Punjab	33 Lakhs	1.53 Crores	2155.33%
Assam	4 Lakhs	2.53 Crores	98.41%
Arunachal Pradesh	00	NR	-
Manipur	NR	00	-
Meghalaya	NR	00	-
Mizoram	NR	00	-
Tripura	1 Lakh	1 Lakh	0
Nagaland	NR	NR	-
Sikkim	NR	1 Lakh	-

***NR means No Report**

⁵ Corporate Social Responsibility under Section 135 of Companies Act 2013. cleartax. (n.d). <https://cleartax.in/s/corporate-social-responsibility>

CSR Expenditure For Encouraging Sports In 2014-15 & 2020-21⁶.

Table 13.1.6 NER: % share of budget allocation in sports in the State's Total Budgetary Allocations (in Rs Cr)

State	2019-20	2020-21	2021-22	2022-23	2023-24
Tamil Nadu	165.25 (0.062 %)	216.167 (0.072%)	224.66 (0.068 %)	293.61 (0.088 %)	402.288 (0.11 %)
West Bengal	918.14 (0.386 %)	900.36 (0.352 %)	923.077 (0.299 %)	780.93 (0.299 %)	828.575 (0.244 %)
Maharashtra	396.70 (0.098 %)	471.49 (0.132 %)	643.43 (0.133 %)	721.28 (0.146 %)	798.47 (0.153 %)
Arunachal Pradesh	6.5 (0.029 %)	29.5 (0.134 %)	17.5 (0.078 %)	66.72 (0.255 %)	47.03 (0.159 %)
Assam	177.58 (0.178 %)	158.67 (0.153 %)	143.11 (0.133 %)	202.13 (0.176 %)	257.38 (0.19 %)
Manipur		65.68 (0.305 %)	58.36 (0.203 %)	75.19 (0.215 %)	78.96 (0.226 %)
Meghalaya	203.61 (1.41 %)	265.76 (1.529 %)	156.91 (0.83 %)	113.62 (0.602 %)	98.29 (0.47 %)
Mizoram	22.16 (0.20 %)	27.40 (0.28 %)	25.61 (0.229 %)	24.22 (0.173 %)	25.37 (0.199 %)
Nagaland	34.08 (0.189 %)	37.26 (0.177 %)	36.30 (0.162 %)	40.01 (0.165 %)	42.86 (0.186 %)
Sikkim	18.17 (0.21 %)	23.55 (0.259 %)	23.35 (0.237 %)	25.82 (0.255 %)	28.14 (0.232 %)
Tripura	75.75 (0.432 %)	74.62 (0.268 %)	82.38 (0.363 %)	89.19 (0.332 %)	84.02 (0.314 %)

- An absence of an adequate report of expenditure, it would be difficult to conclude states performed better at the national games has a connection with the CSR expenditure by the states.

⁶ <https://www.csr.gov.in/content/csr/global/master/home/ExploreCsrData/dynamic-csr-report-search.html>

- However, the region in the North East needs better financial support to improve the infrastructure to not only prepare but also recover from injuries by undergoing rehabilitation or surgery.

Table 13.1.7 Institutions and physical infrastructures (including stadiums, universities of sports etc)

State	Institutions and physical infrastructures (including stadiums, universities of sports etc)
Arunachal Pradesh	Physical Education and Sport Science, Rajiv Gandhi University; Physical Education and Sports; Arunachal University, Rajiv Gandhi Stadium; Naharlagun, Golden Jubilee Outdoor Stadium; Papum Pare
Assam	Barsapara Stadium; Nehru Stadium; Satindra Mohan Dev Stadium; Nurul Amin Stadium; National Sports Council of Assam Ground; Netaji Subhas Chandra Bose Stadium, Amingaon Cricket Stadium; Amingaon Sri Sri Aniruddhadev University, Dibrugarh; Centre for Studies in Physical Education and Sports; Dibrugarh University,
Manipur	Khuman Lampak Main Stadium; Imphal, Luwangpokpa Cricket Stadium; Imphal, Imphal Hockey Stadium; Imphal, Senapati Town Stadium; Imphal National Sports University; Imphal, Sports Administration and Management, Manipur University; Imphal,
Meghalaya	Department for Sports, Northeast Hill University; Shillong, Centre for Yoga and Naturopathy; University of Science and Technology, Ri-Bhoi; Jawaharlal Nehru Stadium, Shillong; Garrison Ground, Shillong
Mizoram	Department of Sports, Mizoram University, Aizawl Rajiv Gandhi Stadium, Mualpui; Zotlang Sports Stadium, Champai; Ramhlun Indoor Stadium, Aizawl; Chanmari Indoor Sports Stadium, Aizawl
Nagaland	Indira Gandhi Stadium, Kohima; Nagaland Cricket Association Stadium, Dimapur; State Stadium, Dimapur; NAPTC Stadium, Dimapur; Indoor Badminton Stadium, Jalukie
Sikkim	Sports: Paljor Stadium, Gangtok; Bhaichung Stadium, Namchi; Mining Cricket Stadium, Pakyong
Tripura	Sports: The Regional College of Physical Education, Panisagar; Department of Physical Education, Ramthakur College, Agartala Swami Vivekananda Stadium, Agartala; Narsingharh International Stadium, Agartala, Maharaja Bir Bikram Stadium, Agartala; Umakanta Academy for Football, Agartala

From Arunachal Pradesh's Rajiv Gandhi Stadium to Assam's Barsapara Stadium, each state boasts impressive arenas that host competitions and nurture aspiring athletes. Manipur's Khuman Lampak Main Stadium and Meghalaya's Jawaharlal Nehru Stadium stand as symbols of sporting excellence, while Mizoram's Rajiv Gandhi Stadium and Nagaland's Indira Gandhi Stadium showcase the region's commitment to athletic prowess. Sikkim's Paljor Stadium and Tripura's Swami Vivekananda Stadium inspire communities with their passion for sports. Together, these state-of-the-art facilities form the backbone of Northeast India's sporting legacy, fostering talent, promoting unity, and shaping the region's identity on the national and international stage.

13.1. 7 Investment by Private & Non-Government Organisation (NGO) in Sports

There is a vibrant ecosystem of private and non-governmental organizations (NGOs) contributing to various aspects of sports, there seems to be a comparatively lower level of private investment and engagement in sports development initiatives, as evident from the provided information. This observation presents an opportunity for stakeholders to explore avenues for enhancing private sector involvement in sports and youth development across the region.

Table 13.1.8 NER: Private and non-governmental organisations involved in Music/Sports

State	Private and non-governmental organisations involved in Music/Sports
Arunachal Pradesh	Arunachal Pradesh Eco Adventure Sports & Youth Development Society, Itanagar ⁷ ; Arunachal Pradesh State Weavers Coop Federation Ltd.; Babu Welfare Society, Tezu;
Assam	Simply Sport; Guwahati Football Club Private Limited; Reliance Foundation; North East Research and Social Work Networking, Kokrajhar
Manipur	Sports: Go Sports Foundation; Inspire Institute of Sports; Synergetic Movement for Accountable and Responsible Foundation, Tamenglong; Soraisam Sports Infra Pvt.
Meghalaya	Anglian Holdings Pvt. Ltd. (bought a 25% stake ⁸ in Shillong Lajong FC in 2012 through Foreign Direct Investment (F.D.I)); Mawmyriong Sports Social Education and Rural Organisation, Mawkyrwat; Northeast Sports Development Foundation, Jowai
Mizoram	Dinthar Football Club, Dinthar Veng; TT Royte Group, Aizawl
Nagaland	Chophi Welfare Society, Dimapur; Dream Sports Foundation; Sports Live Nagaland

⁷ https://ngodarpan.gov.in/index.php/home/statewise_ngo/220/12/7?

⁸ <http://anglianmanagementgroup.com/anglian-brings-european-football-closer-to-indian-players/>

State	Private and non-governmental organisations involved in Music/Sports
Sikkim	Bharti Foundation
Tripura	Help Foundation, Agartala

ii) Laggard Syndrome: Why & What

- The region has grounds for youngsters to play, but they aren't managed properly by any committee or organisation that has created sports as a hobby and not profession. It is the issue of scouting and tapping talent management that caused better budding sportspersons to leave the game well before they could be scouted by any sports management at different levels, bottom up.
- The region has suffered because of poor connectivity within and between the states with the rest of the states in India and neighbouring countries. This impedes everyday life and livelihoods, but also regional development⁹ in sports and focusing schemes on the youth.

iii) Institutional Drawbacks

- Attitudinal challenges against women in sports have a detrimental impact on female athletes. It shows itself through insufficient funding for training and competitions, impeding their progress.
- Developing a memorandum for the Transport Ministry or State Departments to enhance connectivity could significantly increase rural youth participation in sports competitions organized by the Departments of Sports and Youth.
- The selection process for athletes and sportspeople in national competitions could benefit from increased transparency and fairness. A more open system, with clear criteria for choosing participants, would ensure that selections are based on merit rather than bias.

iv) Governance Dynamics

- **Insurgency and Security Concerns:** Several states in the Northeast have experienced insurgency movements seeking autonomy or independence. While there have been efforts to address these issues through dialogue and negotiations, achieving a lasting resolution remains a complex task. This has impeded organic and institutional growth of sports in the region, as well.
 - **Policy Implementation:** Effective implementation of sports policies at the grassroots level is crucial.
 - **Representation and Inclusivity:** Ensuring representation and inclusivity in sports governance structures is important. There may be challenges related to adequate representation, with the region's enormous tribe and ethnicity diversity, from the Northeast in intra-state, State, regional and national sports bodies, impacting decision-making processes.

v) Limit Resources, Skills, and Capacities

⁹ *Connectivity issues in the North East*. Economic and Political Weekly. (2020, December 7). <https://www.epw.in/journal/2020/48/insight/connectivity-issues-north-east.html>

- There is an absence of knowledge regarding the use of data analytics by sports management and federations to support their athletes who are preparing for their upcoming national or international games in the regional centres of SAI or State's Sports Stadium.
- The Universities in the region that are providing curriculum in Physical Education or any other courses related to Sports aren't framed properly as it is expected from the market to produce skilled youth in sports and related to sports management.
- Awareness Programs on drug violations amongst sportspersons are limited because of which one has seen sportspersons violate the anti-doping rule.

vi) Geography and Connectivity

- The internet bandwidth is inadequate and the poor quality of commercial supply affects the sportspersons to connect with the recent updates about the upcoming sports events or selection at the state or district level. There are still 6,136 villages or 12.89%¹⁰ in the Northeast without mobile coverage.
- Improving road connectivity, where athletes can reach primary health centres to receive initial treatment for their injuries before being transferred to better multi-specialty health centres.
- Sports centres near the district with better-equipped facilities are a necessity, and minimising the dependency on sports academies controlled by influenced individuals in the region.

vii) Markets, Technology, and Infrastructure

- The publicity and planning of an event to attract an audience to participate is absent, and it is evident because they don't have amicable information regarding the venue.
- The expenditure to encourage budding athletes to participate in sports by the state government is lesser in comparison to other developed states of the nation.
- The Sports Talent Management enterprises are lesser in number in this region as there are medal winners who can attract investment for their preparation in national and international events from investors, and these management groups can provide support and prepare plans.
- Technology is an aspect which can be a game changer in the current scenario because many athletes have started to use applications such as AI tools to improve their efficiency and prepare plans for upcoming events in any scenario and environment. However, it has been observed these plans or preparations from skilled professionals aren't been taken by the Sports Federations or Associations in this region, or sportspersons/ athletes haven't been encouraged to opt for this tool.

¹⁰ Goswami, R. (2023, September 26). *Over 6,000 villages without mobile connectivity in northeast: Trai*. EastMojo. <https://www.eastmojo.com/sikkim/2023/09/26/over-6000-villages-without-mobile-connectivity-in-northeast-trai/>

III. VISION 2047: Possibilities, Potentials, and Promises

i) Quantitative Targets
<ul style="list-style-type: none"> ● Increase Youth Participation in Sports: Aim for a 20% increase in youth involvement across all age groups in the region.
<ul style="list-style-type: none"> ● Expand Sports Infrastructure: Construct 100 additional multisport facilities in the Northeastern states by 2047. Ensure each district headquarters has at least one well-equipped and well-maintained indoor sports facility.
<ul style="list-style-type: none"> ● Enhance Sports Academies: Add 30% more sports academies focusing on football, boxing, wrestling, archery, and other promising sports in the region.
<ul style="list-style-type: none"> ● Promote Athletic Success: Target a 50% increase in medal wins by Northeastern Indian athletes at the National Games and a 30% increase in Northeast representation at the Asian Games and Olympics.
<ul style="list-style-type: none"> ● Develop Coaching and Talent Programs: Establish robust coaching and talent-finding programs for key sports, starting at the grassroots level.
<ul style="list-style-type: none"> ● Expand Professional Sports Leagues: Increase the number of professional sports leagues with clubs from Northeast India by 20%.
<ul style="list-style-type: none"> ● Grow Sports-Related GDP: Aim for sports-related activities to contribute 5% of the region's GDP by 2047. This should create 0.1 million new jobs in the sports industry by the same year.
<ul style="list-style-type: none"> ● Attract Private Investment: Secure a total of Rs. 3,000 crores in private investment for sports infrastructure and development by 2047. Create a profitable sports tourism strategy that can generate Rs. 500 crores by 2047.
<ul style="list-style-type: none"> ● Strengthen Sports Education and Research: Develop university and college programs for sports coaching and administration, encouraging collaboration with national and international sports organizations. Create 3-5 new sports research facilities to enhance training techniques.
<ul style="list-style-type: none"> ● Promote Cultural and Gender Inclusivity: Encourage the use of sports as a tool for social and cultural development, with a focus on increasing girls' and women's participation at all levels. Organize frequent athletic events and celebrations in towns and villages. Include athletics in both extracurricular and academic curricula, with sports credits from mid to high school to graduation levels.
<ul style="list-style-type: none"> ● Foster Industry Partnerships and Innovation: Encourage private enterprises to invest in rural sports through subsidized schemes. Introduce sports-related courses in Industrial Training Institutes (ITIs), offering broader career opportunities. Implement Mass Media courses at the National Sports University in Imphal to cultivate graduates skilled in discussing sports and attracting broadcasters as recruiters.
<ul style="list-style-type: none"> ● Host Conferences and Collaborations: Plan regular seminars and conferences for local sports stakeholders, from district level upwards. Promote collaboration with other countries to share best practices and insights.

Table 13.1.9 Sports in the NER Projected Budgetary Expenditures 2047

State	State's budget on Sports and its share in total Budgetary Expenditures. 2023-24 (in Rs Cr)	Projected % share of Sports budget in total Budgetary Expenditures by 2047
Arunachal Pradesh	47.03 (0.159 %)	Between 0.30 % to 3 %
Assam	257.38 (0.19 %)	Between 0.38 % to 3 %
Manipur	78.96 (0.226 %)	Between 0.45 % to 3 %
Meghalaya	98.29 (0.47 %)	Between 1.26 % to 3 %
Mizoram	25.37 (0.199 %)	Between 0.38 % to 3 %
Nagaland	42.86 (0.186 %)	Between 0.37 % to 3 %
Sikkim	28.14 (0.232 %)	Between 0.46 % to 3 %
Tripura	84.02 (0.314 %)	Between 0.63 % to 3 %

ii) Qualitative Targets

- Affordable Facilities and Mentorship: Improve access to low-cost sports facilities and recreational activities, alongside mentorship for budding entrepreneurs in the sports industry. Encourage parents to support young athletes, promoting athletics as a viable career path.
- Culture of Excellence and Inclusivity: Establish a culture of sports excellence in the North East Region (NER), celebrating athletic achievements and inspiring future generations. Combat gender biases by promoting greater female participation in sports. Integrate athletics into school curriculums to foster discipline, cooperation, and physical fitness.
- Strategic Sports Policy and Professional Development: Create a comprehensive North East Sports Policy with clear goals and a robust development plan. Enhance governance at all levels of sports and foster the highest standards of professionalism. Build a network of certified and well-trained coaches and trainers to support athletes.

<ul style="list-style-type: none"> ● Long-Term Funding and Technology Use: Secure sustainable funding for sports development through sources like Corporate Social Responsibility (CSR) initiatives, especially from major public sector undertakings. Leverage technology for performance analysis, coaching, and talent identification, providing online coaching programs and virtual training for remote athletes.
<ul style="list-style-type: none"> ● Regional and Global Collaboration: Organize collaborative sports events with neighbouring countries like Bangladesh, Bhutan, and Nepal, as well as East and South East Asian Nations, to share best practices and build a broader sports community. Host international sporting tournaments in the Northeast to attract global attention and investment.
<ul style="list-style-type: none"> ● Promoting Inclusivity and Cultural Exchange: Foster harmony through cultural exchanges and interstate sporting events. Ensure sports are accessible to everyone, including those with disabilities, through inclusive programs. Support traditional and indigenous sports alongside modern sports to honor the region's heritage.
<ul style="list-style-type: none"> ● Targeted Qualities and Support Systems: Focus on cultivating discipline, mental resilience, strategic thinking, and teamwork in athletes. This requires qualified coaches, sports psychology training, and nutritional guidance to maintain optimal performance. A comprehensive support system will enable the North East to become a leading force in national sports.

iii) Potentials

- Unearthing Rural Gems
- Synergy of Traditional & Modern
- Academy of Excellence
- Public-Private Partnerships
- Sports Tourism Powerhouse
- Multi-specialty Sports Hospital
- Mixed Martial Arts (MMA)
- Integrating Sports into Education
- Scholarship Programs
- Standardized Scouting Systems
- Anti-Doping Awareness Programs

13.1.8 Critical Policy Interventions:

- Sports policy
- Decentralization
- Promoting sports as an industry
- Performance-based funding

- Physical Infrastructure
- Technological Inputs
- Institutional Support
- Legal and Constitutional Linkages
- Finance and Resource Mobilization
- Cross-border Interconnections
- Investment in Sports
- Participation of the Private Investment
- Commercialize Sports in Northeast Region

Mizoram’s lead in according ‘industry’ status to sports

In May 2023, the North Eastern State of Mizoram accorded ‘industry’ status to sports, a first in India. This idea was first proposed in 2019 as part of the state sports policy by the previous Mizo National Front government. The main aim of the decision is to professionalise sports in the state. “We need to sustain sports and games and make it more meaningful to players. Gone are the days where sports are just entertainment and enjoyment — it needs to be more than that so that players can earn a livelihood out of it,” the immediate past Sports Minister said. With the State famously known by now for its love for Football which is played competitively through the Mizoram Premier League, the state’s highest football league. At least 100 Mizo players are part of the Indian Super League, one of the top premier football leagues in India.

It is not just football, the State has other pro-leagues for other sports too: volleyball, basketball, boxing, — these are all played in the league level. There are also a number of indigenous games such as *inbuan* (wrestling), *insuknawr* (stick fighting) etc. Through the new status, the government hopes to commercialise sporting endeavours and woo investors. It aims to attract private companies to invest in sports in the State with subsidy, loans and concessions.

13.2 Realising the Soft Power of Music in NER as an Economic Force

13.2.1 Brief Background

The concept of soft power highlights how cultural appeal and value-based attraction can enhance a nation's influence globally, distinct from the forceful approach of hard power (Nye, 1990, 2004, 2019). This notion, significant in shaping international relations and aiding economic growth, advocates for a blend of soft and hard power, termed smart power. However, soft power's effectiveness, amplified by social media in the digital age, faces challenges like slow impact recognition and potential underinvestment.

Economically, the music and cultural sectors utilize soft power to generate employment and development, especially noticeable in East Asia's evolving community-globalization dynamic. Nye stresses the importance of cultural assets in building soft power, merging culture with moral and ideological values for political economic impact.

The NER, with immense cultural and indigenous diversity, serves as a prime example of soft power's potential in economic, cultural, diplomatic, and political realms. By nurturing the arts and culture, the region not only augers well for career opportunities, but also offers a connecting bond to overcome ethnic strife and frictions, fosters cultural diversity and regional, national and international cooperation, aligning with India's 'Look East' and 'Act East' policies. Strategic investments in cultural infrastructure and music could unlock significant potential, aiming for a sustainable, inclusive and progressive cultural ecosystem by 2047.

13.2.2 Present status (Quantitative and qualitative)

National Comparison

Comparing the North East Region (NER) with states like Tamil Nadu, reveals how NER is faring in key aspects of music promotion as a strategic investment. This includes fostering music culture and diversity through festivals, enhancing music education and appreciation, building music infrastructure, protecting artists' rights and income, leveraging technology, commercializing music, and collaborating with top private, public, and NGO sectors, all supported by adequate cultural funding.

Tamil Nadu

- In Tamil Nadu, music plays a vital role within the broader entertainment sector. The state's musical landscape is primarily divided between film songs, which dominate mainstream culture, and traditional Carnatic music.
- Financial aid for artists, cultural exchange programs, grants for folk artists, and an online registration system for artists are just some of the ways Tamil Nadu supports its cultural ecosystem. The academy's annual December festival, the MarghaziKutcheri, involves over 100 organizations and hosts up to 2,000 concerts.
- The state boasts several institutions dedicated to music and arts education.

- An emerging music ecosystem in Tamil Nadu has seen the rise of various music enterprises involved in music rights, recording, voiceover work, and multilingual compositions, among others.
- Tamil Nadu has also embraced the digital age, with many artists and musical projects finding a platform on YouTube and various streaming services, particularly those associated with Over-The-Top (OTT) media services.
- The independent music scene in Tamil Nadu is vibrant, with bands like Junkyard Groove, Skrat, and the F16s gaining popularity even beyond state borders.
- The KM Music Conservatory represents significant private sector investment in nurturing music talent. It offers a comprehensive education in Western music and music technology and production, preparing students for professional music careers on an international scale.
- The state's annual Policy Notes under the Department of Art and Culture guide the prioritization of programs and activities in the arts.
- Corporate entities like Tips Music are significantly investing in the Tamil music scene.
- The State's budgetary investment in Art and Culture increased from INR 253.29 Crore (which is 0.07698 % of total State's budgetary allotment) in 2021-2022 to 367.809 crore (0.10068 % of total state budget) in 2023-24.

Punjab Music – India's Largest Non-Film Music Industry

Punjabi music has soared to unprecedented popularity, reaching beyond Punjabi-speaking audiences to resonate across India and with desi diasporas in America and Europe. It is India's largest non-film music industry, appealing even to those who don't fully understand the lyrics.

Punjabi music has benefited from the extensive Punjabi diaspora overseas, which provides a vast market for online sales and live shows. The state's rich tradition of music and its distinct production quality, influenced by cities like London and Toronto, have shaped the modern Punjabi sound. Producers in the '80s tied folk sounds like tumbi and dhol with international influences, leading to a unique genre that transcends boundaries.

The Punjabi music industry generates approximately Rs 700 crore annually, significantly outpacing other regional music industries. The sector's success has fostered diverse revenue models, including talent scouting, revenue-sharing, and artists launching their own labels. However, with rapid growth come challenges, such as artists who rise to fame quickly but struggle with consistency.

The Punjab Culture Policy came up in 2017, making the state second in the country after Manipur to have a blueprint. Apart from planning a music reality show 'Punjab Idol', a programme similar to 'American Idol', the Policy focuses on establishing a museum dedicated to folk music wherein visitors can listen to old recordings of Punjabi music. The policy aims to provide a springboard to launch career of new and promising recording artists.

International Comparison

South Korea (East Asia)

The global success of South Korea's cultural exports has highlighted effective government cultural policies, as detailed by Seung-Ho Kwon and Joseph Kim in 2014. The Ministry of Culture, Sports & Tourism is the independent Department to oversee Korea's K-Culture. Key strategies include the partnership of SJA Music Institute with Berklee College of Music since 1998 for career and educational development, and the government's promotion of cultural industries with tech sectors, illustrated by creating Korea Cultural Content Agency (KOCCA) and the HD Production Centre in 2003 for digital content. Additionally, the Korea Record Center Network (KRCNet) supports the music industry, alongside financial incentives for new genres and assistance for international cultural distribution. Inter-ministerial collaboration, especially between the Culture and Information and Communication Ministries, has propelled sectors like gaming and global K-Pop promotion, significantly boosting South Korea's international cultural influence.

The 2024 Policy Implementation Plan of the Ministry of Culture, Sports and Tourism includes – Establishing South Korea as a leading global cultural powerhouse with K-culture, and fostering citizens' happiness through cultural engagement; Support for creators and small-scale businesses; Low-interest rate loans for artists; Broadening the scope for waiving copyright registration fees; Focus on Content, tourism, and sports industries promote a dynamic economy including strong focus on K-content, a leader in the global market, Cultivating game, video, cartoon, and webtoon content, Providing financial support worth KRW 1.74 trillion, Supporting penetration of overseas content market through overseas business centers (25 locations); Twenty million foreign visitor project; Culture & tourism convergence festivals. It emphasizes addressing social issues, such as regional extinction and isolation through culture. The role of AI-based content and technology, Arts and technology convergence through Arts Korea Lab are other initiatives. The Korean National University of Arts and its School of Music has sought to stand shoulder to shoulder with schools such as the Juilliard Music School, Curtis School of Music and Paris National High Conservatory since its foundation. It offers innovative and intensive courses designed to engage talented students and nurture world-renowned musicians.

In one of its latest interventions, as part of its effort to improve the copyright ecosystem of Korea in the form of enhancing the rights of the creators and ensuring fair compensation in the market, the Korean government expanded the scope of business premises which are subject to royalties for the music they play during their business hours¹¹.

Nepal

A blueprint for establishing a music industry with room for diverse artists and catering to a sizeable number of niche audience bases is provided by the neighbouring country of Nepal.¹² Music Nepal, a record label company founded in 1982, has been significant in steering the music industry by actively engaging in the process of establishing copyright laws in Nepal. The record label company supports music from diverse genres and has been key in establishing music as a profitable career in Nepal. Several formal music education and

¹¹<https://www.copyright.or.kr/master/file/downloadFileLibrary.do?filegroupno=19205>

¹² <https://www.himalmag.com/himalayan-melodies-heavy-metal/>

research institutes such as Kathmandu Jazz Conservatory, Nepal Music Center (a unit of Music Nepal, the record label), Surshala Music Academy, Sadhana Kala Mendra, etc. have helped streamline action and develop the music industry further.

13.2.3 Musical Efforts in North East India Region

- **Assam**

The Assam Department of Cultural Affairs provides financial support to artists and their families via pensions and grants, recognizing their cultural contributions. In 2020-21, 100 artists received Rs 8,000 monthly pensions, 75 got one-time ex-gratia grants of Rs 50,000, and families of deceased artists were also assisted. The department leverages funding from national sources for cultural initiatives, fellowships, and the Guru Shishya Parampara Scheme, encouraging the preservation of art through youth training under experts since 2003. The North East Zone Cultural Centre supports young talent with awards to foster folk and creative arts. Assam's 2006 Cultural Policy aims to discover and promote musical talent, celebrating the state's cultural diversity and encouraging employment through various cultural activities and educational programs.

- **Nagaland**

The Nagaland Government established the Task Force for Music & Arts (TaFMA), initially called the Music Task Force (MTF), marking Nagaland as the first Indian state to recognize music as an industry. TaFMA aims to globalize Nagaland's music scene, supported by initiatives like the Regional Centre of Excellence for Music & Performing Arts (RCEMPA), which was launched a decade ago to offer technical training to budding musicians. Efforts to forge international partnerships with prestigious institutions like Berklee College of Music could enhance training and attract more sponsorships from global audio brands. However, despite its longevity, TaFMA and RCEMPA have attracted limited brand investments in Nagaland's music talent.

- **Meghalaya**

In April 2022, the Meghalaya government, in partnership with the state Tourism Department and The Meghalayan Age Ltd., launched the Meghalaya Grassroots Music Programme (MGMP) to support the local music industry. Structured in seasonal phases, with the program now in its second season, MGMP initially aimed to offer local musicians platforms at various venues, including music festivals. It has enabled 1,600 artists to perform in 3,000 locations statewide. The initiative seeks to provide financial support and bolster the music ecosystem, benefiting musicians, composers, event organizers, and technical providers. Funding primarily comes from the state's tourism revenue.

- **Mizoram's Music Industry**

Since 1972, Mizoram's Department of Art & Culture has promoted cultural development through the establishment of a music and arts institute, rural festivals, and short-term arts courses. The 2023 Citizen's Charter further enhances cultural engagement with statewide

events, grants for traditional attire and instruments, and varied arts education. Additionally, in 2021, Aizawl’s Government College initiated a Music Club to cultivate student talent and encourage competition participation.

Table 13.2.1 State wise Music Institutions and physical infrastructures in NE States

State	Music Institutions and physical infrastructures in NE States
Arunachal Pradesh	NA
Assam	Luit Konwar Rudra Barua State College of Music; Shilpgram, Guwahati; JoysingDoloi Auditorium, Diphu;
Manipur	Shri Shri Balmukunda Dev (SSBD) Music College; Manipur State Kala Akademi (MSKA); Jawaharlal Nehru Manipur Dance Academy, a constituent Unit of the Sangeet Natak Akademi, New Delhi; Department of Dance and Music, Manipur University;
Meghalaya	Lariti Centre for Performing Arts, Mawkasiang, New Shillong Township; Centres of Excellence in Indian Classical and Western Music in Shillong and Tura;
Mizoram	Institute of Music and Fine Arts (IMFA); Vanapa Hall, Aizawl; Vaivakawn Cultural Centre cum Auditorium; Multi-Purpose Cultural Complex at Berawtlang; Mizoram Youth Commission;
Nagaland	Nagaland Conservatory of Music; Regional Centre of Excellence for Music & Performing Arts (RCEMPA), Jotsoma near Kohima; Kohima Capital Cultural Center IMC Hall Dimapur;
Sikkim	Department of Music, Sikkim University;
Tripura	Sachin Debbarman Memorial Govt. Music College; Tripura Tribal Folk Music College, Khumulwng, TTAADC, Agartala; Muktaadhara Auditorium, Agartala;

Table 13.2.2 State wise Private and non-governmental organisations involved in Music

State	Private and non-governmental organisations involved in Music
Arunachal Pradesh	PWLO Entertainment Pvt Ltd. ¹³ ; MiO Event Management ¹⁴ ; Tirap Artiste Forum; Pangsau Kaan NGO; Dambuk Orange Festival of Adventure and Music; PHOENIX RISING LLP; NK Works, Itanagar; Basar Confluence; Popil Tunes
Assam	Eastern Beats Music Society; Mir Herai Musical Society; Strings And Strokes Music Institute; Cantabile Music Academy; Qrated; Majuli Music Festival Foundation; Music Malt; Deeproot Studios ¹⁵ ; Neoric Productions; Music Malt; Urban Mantra, Zoo Road; Trend MMS; XomoyInnovatives Pvt Ltd;
Manipur	Thawaihou Arts and Event, Pvt. Ltd.; Progressive Artiste Laboratory (PAL), Imphal; Academy of Indigenous Music, Imphal; 7 Sisters Foundation; Tapta Institute of Fusion Music (TAIFUM); Lamka Music Academy; Tantha

¹³<https://zirofestival.com/>

¹⁴<https://rollingstoneindia.com/aranachal-pradesh-live-music-scene-overdrive-siddhartha-hall/>

¹⁵<https://www.sahapedia.org/lyrical-rongdanis>

	Entertainment Pvt Ltd ¹⁶
Meghalaya	Martin Luther Christian University; Tura Music Academy; Shillong Chamber Choir
Mizoram	Mizo Zaimi Inzawmkhawm (MZI); Zonet Cable TV Pvt. Ltd; Ace Business Group, Aizawl; Darbu: The ultimate music platform;
Nagaland	Native Trax Society (NTS); Nagaland Music Education and Arts Society; Symphony Academy of Music, Kohima; De Operettas Music and Arts Society; The Music Academy Kohima; Musik-A events; Acoustic Club, Wokha; Bravo School of Music, Wokha; Infinity Inc., Nagaland; imagi.NATION, Kohima; Mountain Music Academy, Dimapur; Hope Centre for Excellence, Dimapur; Blend In Events, Mokokchung; Highland Dawn Media & Nagaland Cornerstone TV
Sikkim	TAAL Music, Namchi South Sikkim; Remanti Sangeet Academy; ECHOSTREAM Pvt. Ltd.; Pakyong Music Institute; ELIM Melody Academy; Admerelmart Private Limited ¹⁷ ;
Tripura	NA

13.2.4 Laggard syndrome: Why and what we lack

- **Institutional drawbacks**
 - a. Lack of policy directives and strategies for intra-NER cohesion:
 - b. Government efforts in establishing cultural economy through music:
 - c. Limited institutional presence and support:
 - d. Lack of music publishers and publishing companies:
 - e. Preservation/Conservation Issues:
 - f. Evidence building and promotion:
 - g. Lack of fellowships or scholarships:
- **Unmaintained Libraries of indigenous music:**
 - a. Limits of resources, skills and capacities
- **Lack of supportive ecosystem and consumer-base for original music:**
 - a. Poor Access to Markets, Technology and infrastructures
 - b. Visibility of musical acts from the NER in the mainstream:
 - c. Lack of adequate infrastructure:
 - d. Lack of Commercialisation and Markets:
 - e. Role of technology:
 - f. Inadequate Budget & Investments:

¹⁶[https://www.e-pao.net/epSubPageSelector.asp?src=Tanthapolis Cinema A breather in entertainment business By James Khangenbam&ch=reviews&sub1=movies](https://www.e-pao.net/epSubPageSelector.asp?src=Tanthapolis_Cinema_A_breather_in_entertainment_business_By_James_Khangenbam&ch=reviews&sub1=movies)

¹⁷<https://www.smutbi.com/admere-selvyn/>

Table 13.2.3: State wise budget on art and culture (in Rs Cr) and % share in Total Budget

State	State's budget on art and culture (in Rs Cr) and % share in Total Budget	2019-20	2020-21	2021-22	2022-23	2023-24
Arunachal Pradesh		8.00 (0.0357 %)	6.0025 (0.03 %)	55.9 (0.25 %)	78.7 (0.30 %)	55.98 (0.20 %)
Assam	Education, Sports, Art & Culture	100.19 (0.10078 %)	92.94 (0.09 %)	84.12 (0.08 %)	204.14 (0.18 %)	112.24(0.08%)
Manipur			32.38 (0.16 %)	29.59 (0.10 %)	38.02 (0.11 %)	42.27 (0.12 %)
Meghalaya		63.47 (0.11 %)	133.64 (0.77 %)	98.51 (0.52%)	49.08 (0.26%)	45.92 (0.22 %)
Mizoram		12.57 (0.12%)	15.09 (0.15 %)	12.92 (0.12 %)	11.60 (0.08 %)	11.96 (0.08 %)
Nagaland		19.59 (0.11 %)	20.90 (0.10 %)	19.58 (0.09 %)	25.77 (0.11 %)	96.48 (0.11 %)
Sikkim		17.96 (0.21%)	34.58 (0.38 %)	18.01 (0.18%)	26.46 (0.26 %)	31.49 (0.26 %)
Tripura		26.90 (0.15%) – education, sports, art and culture	2.79 (0.01003 %)	2.20 (0.01%)	4.27 (0.02 %)	3.04 (0.01 %)

NB: The % information is against the total budget allocation in given financial year of the particular State.

13.2.5 Vision 2047: Possibilities, Potentials and Promises

i. Quantitative targets

Quantitative Targets

Quantitative targets	Description
Regular sectoral survey	A comprehensive market survey and a socio-economic survey of creatives and workers involved in the music industry in the region can be used to inform policy interventions towards long-term sustainable career development, safeguarding against precarious working conditions. This can provide necessary empirical support to benefit from disruptive innovation, a common occurrence in this domain.
Better digital presence	Achieving a 200% increase in the number of music tracks by artists from the NER region available on major digital platforms – very little of the musical output in studio recordings is available in major digital platforms (YouTube Music, Spotify, Apple Music, etc.).
Better audience reach	Increasing the audience reach by 300%, measured through online streaming, downloads, and social media engagement. After YouTube, Instagram and Facebook are emerging as platforms of music discovery. ¹⁸
Infrastructure development	Collaborations with experts for designing and upgrading at least 4 recording studios and 12 performance venues in the region. These spaces should be constituted in a manner to allow equitable access to the creatives of the region while also being routinely scrutinized for well maintenance and timely upgradation by experts.
Artist residencies	Artist residencies in at least 2 venues to support early career musicians with fellowships and technical expertise to work on projects.
Education and skill development	Establishing music education programs to train at least 100 indigenous musicians, producers, and technicians within the region.
Economic impact	Increasing the economic contribution of the indigenous music industry to the local economy by 30%, measured through direct and indirect revenue generation

13.2.6 Investing in the Music of the NER Region as a Soft Power and commercialising it both within and outside India

Support for key music festivals such as Hornbill and Ziro is essential for enhancing their national and global reach, ensuring that these cultural events garner the recognition they deserve. In parallel, musicians could benefit from business and career management training through educational programs and subsidized diplomas, equipping them with the necessary skills to thrive in the industry.

International platforms like MusiConnect Asia and the ABU Song Festival could be leveraged for greater exposure of regional music. To support this effort, the creation of a regional network of music managers and consultants is proposed to conduct market research and provide advanced training. Additionally, incorporating professional networking sessions into music festivals would facilitate industry connections and opportunities.

¹⁸ EY-FICCI Media and Entertainment report, April 2023

Supporting careers in music journalism, production, and management through various initiatives is also critical. This includes providing funding for projects that involve international artists and encourage collaborations across different media industries such as theatre, gaming, and films. Encouraging broadcasting companies to feature regional music on radio and television would further promote local talent.

There's a need to curate genre-specific playlists and develop a regional music discovery platform to enhance access to local music. Ensuring fair wages and safe working conditions for musicians is paramount for sustaining a vibrant music industry. Promoting training opportunities at top music conservatories for early career professionals and advocating for more recorded music content on traditional media can help democratize music access, broadening its reach beyond reliance on curatorial efforts or algorithms.

ii. Qualitative targets

- Improved management and governance of music industry
- Increased & Improved Skills and training
- Increased and improved Mentorship, scholarships
- **Increased avenues:** investing in building and upgrading music venues, amphitheatres, and open-air concert spaces throughout the region to provide regular performance opportunities for musicians.
- **Increased and improved infrastructure support:** Enabling the music sector in NER with cutting-edge recording studios that are open to musicians from all around the region and furnished with the newest equipment.
- Increased and improved promotion of music from school levels
- Increased budget outlays

i) Potentials and Possibilities

- Improving visibility of the region's culture of music:
- Constructing Platforms and Infrastructure
- **Increasing Adoption of Technology and Innovation**
- **Strategic Alliances and Cooperation's:** Pushing international outreach by establishing exchange programs and present NER music on a worldwide scale, collaborating with foreign music platforms, cultural festivals, and academic organisations.
- **Creating a Sustainable future:** Ensuring equitable remuneration and safeguarding copyrights of music products of the NER by ensuring strong copyright protection protocols providing artistes and art workers with awareness of licensing and membership with the various agencies and governing bodies operational in India.

- **Leveraging the New Education Policy (NEP) 2020:** The New Education Policy 2020 has given a fillip to the field of music and performing arts besides enabling a curriculum framework for academic studies in educational institutions.
- **East and South East Asia engagements:** With close cultural proximity and affinity between the North East India Region with the East and South East Asian Societies and Cultures, annual and regular networking and engagements in music and culture will propel more joint opportunities and explorations, with the youth taking the leads.

The 4th Asia Music Summit, held in Kohima, Nagaland from February 1-3, 2024, concluded with the adoption of the "Asia Music Summit Kohima Declaration 2024." This declaration aims to promote music across Asia, fostering peace, cooperation, and solidarity among its members. Key highlights included discussions on global music festivals, networking, and the music market, with contributions from international delegates and experts like Sungchun Lee from South Korea and Sonam Dorji from Bhutan. The event emphasized the importance of authentic cultural representation in music and strategic marketing. Participants, including the Tetseo sisters and the band Ooberfuse, shared insights and explored collaboration opportunities, enhancing the cultural and musical bond between the attendees.

ii) Investing in Music as a Soft Power has Immense Possibilities, Promises and Potentials

The important aspect of investing in Music is the budgetary allocations on year-on-year annual outlays with a mid- and long-term plan to develop the nascent music industry. A calculative investment by 2047 in critical areas of investment in music and culture could be strategic for the North East Region, within as well as for national and international gains, giving more opportunities and avenues for music to thrive and provide economic boost to artists and the exchequer.

Table 13.2.4: NER State’s budget on art and culture (in Rs Cr) and share in total budget

NER State’s budget on art and culture (in Rs Cr) and share in total budget	2023-24	2047
Arunachal Pradesh	55.98 (0.20 %)	Between 0.40 % to 3 %
Assam	112.24 (0.08 %)	Between 0.16 % to 3 %
Manipur	42.27 (0.12%)	Between 0.24 % to 3 %
Meghalaya	45.92 (0.22 %)	Between 0.44 % to 3 %
Mizoram	11.96 (0.08 %)	Between 0.16 % to 3 %
Nagaland	96.48 (0.11%)	Between 0.22 % to 3 %
Sikkim	31.49 (0.26 %)	Between 0.52 % to 3 %
Tripura	3.04 (0.01 %)	Between 0.02 % to 3 %

The proposed probable increase in budget allocation by 2047 is a cumulative approach of 0.5 % increase year-on-year budget allocation (based on the past 5 years of budget increase in the range of 0.35-0.48%), against the overall budget of the State.

iii) Formidable challenges and possible pull factors

Lack of certainty of employment avenues and gigs is one factor that has been a deterrent to generations of musicians and artists of the region who do not come from a family background in the arts and culture industry. The costs of training and equipment to arrive as a skilled musician are also a formidable challenge. The reputation of the region as a hub of musical talent and fecundity, as well as the demonstrated evidence that music can be a safe choice of livelihood to pursue can act as a pull factor to invite investments from government and private sector to tide over the marginal opportunity costs incurred in honing one’s talent.

Envision thriving music industries across states, enhancing skills and attracting investments. Artists, empowered by scholarships and mentorships, will captivate national and international audiences with their unique music. Innovations will echo in modern studios and venues, while online platforms amplify their global reach. Music education will nurture future cultural ambassadors, and a revitalized music tourism sector will open new employment avenues. North East India’s music will become a powerful tool for global unity and understanding, leaving a lasting legacy beyond 2047.

13.2.7 Cost of not doing/reaching the targets

Failing to promote North East Indian music by 2047 risks more than financial loss; it risks silencing a unique cultural voice. The region’s soft power would never be fully and optimally explored and utilized for greater regional good in peace and development. Without support, talented individuals may never fully realize their potential, their music unheard beyond local confines. Traditional music, a vital cultural thread, faces extinction with each passing generation. The burgeoning music sector, lacking infrastructure and support, struggles to offer artists diverse opportunities and professional growth. This cultural stagnation diminishes the region’s global engagement and soft power, forfeiting the economic benefits of a vibrant music scene. Ultimately, inactivity means lost dreams and missed opportunities to share the region’s unique sound with the world.

13.2.8 Strategic Moves and Policy Interventions to achieve the 2047 vision

i) What strategic thinking?

To be able to scale music practices in the region to the level of a music industry the musicians, music teachers, technical executives, people responsible for sourcing music products and services, etc. will all have to be supported by way of various tangible and intangible resources. The region’s potential in the tourism and hospitality sector can also be leveraged by optimizing arts and culture events calendar with the holiday calendar of paying

consumers from across the world. A report on India’s media and entertainment industry found that only the top 3%-5% consumers are willing to pay for music experiences like live concerts, music streaming.¹⁹ The region is in need of quality music training and music businessresearch institutes which can help synthesise the best practices from successful music industries across the world and adapt them to regional needs and opportunities.

ii) Critical Policy intervention

- **Music schools and institutes:**
- **Equitable access to recording equipment and studio:**
- **Improving access to high quality live music venues:**

A North East Music Academy / University

A prestigious music institution in the North Eastern region could resemble KM Music Conservatory, fostering the region’s vibrant musical heritage. Imagine a center blending traditional and contemporary music, with faculty representing diverse ethnicities and instruments. Students would learn Hindustani classical or Western music, alongside local music forms. Recording studios and performance spaces would nurture young talent. This institute, collaborating with national and international institutions and artists, could become a hub for music production, research, and cultural exchange, placing the North East’s unique musical voice on the global stage.

- **Leveraging the role of dedicated “middlemen”:**
- **Promoting and supporting voluntary efforts to promote music:**

SPIC MACAY (Society for the Promotion of Indian Classical Music And Culture Amongst Youth) is a pan-India non-political, nationwide, voluntary movement founded in 1977. It seeks to inspire youth through experiencing the mysticism embodied in the rich and heterogeneous cultural tapestry of Indian and World Heritage. For this, the most accomplished artists of the country render programs of Indian classical music and dance, folk, poetry, theatre, traditional paintings, crafts & yoga primarily in schools and colleges. Every year, it arranges more than 5000 programs in more than 1500 institutions, across almost 1000 cities, touching over 3 million students.

¹⁹[EY-FICCI Media and Entertainment report, April 2023](#)

- **Developing cities and towns as venues of select musical genres:** The chart below lists a few of the music festivals in each of the states the organisers of which can be consulted for their expertise and the scope of scaling the music festivals further:

Table 13.2.5: State wise Music Festivals

State	Music Festivals
Arunachal Pradesh	Octover Fest by Arunachal Independent Musicians Forum (AIMF); Orange Festival, Dambuk, Ziro Music Festival
Assam	Majuli Music Festival, Mongeet: The Soul Songs Festival
Manipur	Wahyum Festival of Arts and Music, Sangai Festival
Meghalaya	Krimkro Music Festival; Metropolis Asia; The Hills Festival, Meghalaya
Mizoram	Mizoram Music Festival, Winter Festival [ThalfavangKut]
Nagaland	Nagaland Drums Festival, Hornbill Music Festival
Sikkim	Miryok Music Festival, Mangan Music Festival
Tripura	Neermahal Water Festival, Sambodhi Mahotsav

Investing in Music in NER: Finance and Resources Mobilisation including domestic and foreign investments, start-ups

- Public-Private Partnerships (PPP)
- Music as a Sunrise Industry
- Inviting and facilitating sponsorships for regional musicians with global brands
- Music Collaborative Programmes
- A few recent efforts in cataloguing musical instruments from the NER region

13.3. Youth Mission 2047: Over 100 scores Strategy

The NER has one of the highest youth populations in the country. They have some attractive traits like naturally talented, fast learners, strong family and societal bonds, quicker adaptability, largely English speaking, creative and innovative and higher degree of sociability and cultural assimilations. Despite having serious connectivity problems, thin dispersal of modern institutions, lesser access to technical and technological educations and adversely affected by the conflict, violence and instability in the past, these youths have shown both mental and physical resilience, demonstrated willingness and robustness to move forward and contribute to nation building process.

The new generation of youths all across the NER have developed entrepreneurial ability, outward looking attitude, competitive fervour and modern skills as shown by their large scale presence in the hospitality industry across the country, remarkable performance in sports, music, fashion, media and civil society actions. They are going to be the key actors in directing the NER towards larger goals of sustainable development, institution building and national integration. They are now emerging to be the potent instruments of globalizing the locals in terms of sharing their cultural heritage, development practices, traditional knowledge that so far were overwhelmed by the one way process of localization of globals.

The Vision 2035 has two supplementary alternatives.

Firstly, develop the institutions, infrastructures and capacity building facilities that will mobilize and galvanise the youths as a major force of spearheading the development discourse and actions in the NER. This gels well with the 'Goal 4: Quality Education' of SDGs.

And secondly, the firm and targeted actions by the Union Government along with the state governments to generate and deploy a critical mass of nationally spirited youths with modern scientific outlook across the NER from amongst the varied communities and various echelons of society. The core idea is to give representations to all in the decision making process in the course of next 25 years. This is very much in line with PM Modi's '*Atmanirbhar* Bharat'.

This will put the youths of the NER on the national and global pedestals. Precision targeting of the placement and deployment of youths in the most attractive and influential governance, professional and other occupational platforms will transform the entire orientation of youth force thereby triggering a critical generation of productive, effective and far reaching human resources. This will also give targeted public responsibilities to the State Governments in the NER for achieving goals, strict social accountability in generating quality human resources and tight performance evaluation. This will have a huge demonstration effect in several other sectors in the NER. The 2047 targets could be at least in the following lines. This is subject to discussion and broader consensus:

- 100 international sports persons including for the World Championship, Olympic, Asian and Commonwealth Games
- 100 IAS and IFS Officers

- 100 IPS Officers
- 100 IES and ISS officers
- 100 Indian Forest Service officers
- 100 national and international musicians, film makers, fashion designers, architecture
- 100 PhDs from the top professional institutes from IIM, IIT, NIIT, IIIT, NIFT, IISc and IIMC
- 100 Top medical practitioners and bankers
- 100 Top Civil Society Actors and Community Leaders
- 100 Top Media Professionals
- 100 Top entrepreneurs and Start ups
- 100 Top Scientists, Technocrats and Innovators
- 100 Brigadiers, Commodore and Air Commodore.
- 100 Graduates from FTII-Pune, NSD-Delhi and other film academies

In the past, in the absence of specific targets, the NER as a whole remained under prepared, outside the competitive basket and less focused in terms of achieving educational, professional, technical and governance goals despite Operationalization of full 12 Five-year plans and various other special policies and incentives.

Chapter 14

Newer Architecture of Institutions, Governance and Growth

14.1 Traditional and Modern Institutions: Reorientation and Rejuvenation

14.2 Borderland Connectivity, Cooperation Exchanges and National Security

14.3 Refreshing the Designs Governance Architecture

“We have some very good organizations. NERAMAC, NEHHDC, NEDFi, any NECBDC, I have been to his BCDI Tripura Center also. Bamboo is mostly green and gold, but if you see its value for the area, it is tremendous and we should capture it. Now, we should capture it intelligently. We would like NECBDC and BCDI both to develop. I am happy that IIM, Shillong has given us a DPR. Please think of the clear-cut jobs which he will do and he will do. There should not be much overlap because otherwise, and then we will be so. We can help both the organizations. We would like to help both the organizations because there is room for many more such organizations seeing the potential. You see, if anybody sees 6 million hectares (China) and 15 million hectares (India), 2.5 times area you have under bamboo production or the growing stock you have and you are globally exporting just 2.3 percent, whereas China is exporting 71 percent. You are more in area; they are more in export. So, if you see the factor, 30 times and 2.5, you find almost 75 times gap in the productivity. 75 times! There is something seriously wrong with us and it is not that technologically or mentally we are less than anyone. I simply refuse to accept that anything that can be done anywhere in the world, we cannot.”

- *Comments by Shri Chanchal Kumar, Secretary, MDoNER during the Zero Draft presentation of NER Vision 2047, at NEC on 16th May 2024.*

14.1 Traditional and Modern Institutions: Reorientation and Rejuvenation for 2047

India has ever since its independence experienced a slew of democratic experiences that has in many ways altered the state and civil society. It is an ongoing political and sociological change whose terms of reference are sometimes hazy and may obfuscate more than it reveals. For example, the term ‘democratisation’ is contentious, and many emerging post-colonial countries have severely criticised the West-inspired model, pointing out how the Western style of democracy has been imposed without consensus on societies that have very different political histories and socio-economic characteristics.

14.1.1 Present Status:

The arrival of modernity via the colonial intervention in India and the Northeast put the indigenous socio-economic system and the traditional political structure at loggerheads. This is quite logical since the two systems propagated two very different sets of values that had

developed from very different historical evolutions. The result of this – what we may call the post-colonial predicament – is a constant tension in the polity and society between competing calls for habitual obedience and loyalty.

One way of negotiating this predicament is to fall back upon the consciousness of society and polity as was extant at the time when colonial intervention took place. Going back in time is as everyone will agree a non-possibility, but one may think of reviving and reforming the indigenous institutions to which the local population pays habitual social obedience. The historical memories embedded in the community consciousness, or the collective consciousness will mitigate the often tense and volatile relation between what we may call civil society (in place of a better term) and the state.

There is an imperative need to reorient and reorganize the traditional institutions and blend with the emerging necessities of the society which are being addressed by some new institutions. It must be remembered that the region is suffering from low level of development, unemployment, and civil conflict. The contiguity with the international borders of several countries accentuates these problems creating further complexities. There is also an urgent need for democratic institution building that is sensitive to the dynamics of change in this frontier region.

14.1.2 Cross Border collaboration for conflict resolution, peace, and stability:

The traditional institutions of the Northeast have been engaged in addressing the societal issues and have been successful in resolving conflicts that arise among communities and members of the society. These issues relate to violation of social norms, customary laws and traditions, livelihood, agriculture, and health. With the changing time, newer institutions have emerged to address some of these issues. Consequently, often there arise tensions between these institutions and the larger objectives of these institutions tend to fail. There for there is an urgent necessity to blend these institutions with common policies and agendas on premise of democratic principles.

The policy challenges that these institutions encounter cannot always be addressed through national level decision making alone. These have translational dimensions too. Strategic cross border dialogues with countries like China, Bangladesh, Myanmar, and Bhutan involving these institutions may lead to conflict resolution at the people-to-people level and thereby transform the spaces of unrest and conflict to that of trust and cooperation. These would ultimately augur well for the peace, stability, and economy of the region.

Vision2047:

14.1.3 Possibilities, Potentials and Promises:

The NER is home to a diverse population with significantly different cultural histories. These communities are classified as tribes and are in the news and the researcher's focus due to the insurgencies and ethnopolitical turmoil that they engender. However, there is a demand for recognition of their tribal identity not merely from the point of view of recording them in the census but also by recognizing the traditional institutions that they have nurtured over the centuries. For example, the Dorbars of Meghalaya and other indigenous organisations in Arunachal or the Namghars of Assam.

One can also draw upon how hill tribes have traditionally cultivated crops and sustained themselves by making agriculture a part of the ecological system. These skills, knowledge and institutions can be honed for the future development of the region, keeping in mind our commitment to sustainability and people-first policies. The Northeast is a veritable laboratory for envisioning an entry into decoloniality and its discursive spaces in the run-up to the year 2047.

14.1.4 The Way Forward:

What is required to be charted at this moment is an enquiry about the state of the indigenous institutions that are extant but dormant. A baseline survey would enable us to see where we need to intervene and how that intervention needs to be structured. The coming of robust, dynamic modern institutions based on the idea of equality before the law, the one person one vote doctrine and identification based upon citizenship compete with traditional ideals of hierarchy and value of the person in the historical context. Similarly, modern medicines, technologies and information highways have transformed traditional societies which created and disseminated such ideas originally.

One also must not forget that the sweeping changes in the economy of the NER that brought about the idea of surplus and profit also changed the way the society distributed its resources and provided access to the community and the individual to food, water, and production factors. The sustainability of resources which was at one time taken for granted in the NER has been whittled away by the modern economy resulting in a myriad of changes that require be recording and analysing. To revive the public institutions at this stage of the nation's development would therefore involve a nuanced and thoughtful approach that would lead to its stated goals by 2047.

14.1.5 The Challenges:

While we focus on the matter of rejuvenation and the revival of traditional institutions, we must not lose sight of a few things of critical importance. One, this region lags behind other regions of the country in terms of industrial growth and employment opportunities given the peculiar geo-political features that have long dogged the region. The continuation of this economic disparity would be extremely dangerous for the state and the region in the mid-term to the long term. Economic disparities and cleavages of this kind foster and facilitate the growth of fissiparous tendencies which are met with the might of the state leading to further alienation and marginalization. This vicious cycle must be broken if the rejuvenation of traditional institutions is to be substantive and effective. This calls for a close look at structural change within the context of dominant contemporary socio-economic discourses.

Social change can be either heterogenetic or exogenous and orthogenetic or endogenous. Changes in society have always been seen as a linear progression from norms and structures that are 'traditional' to the 'modern'. In this case, the idea of reviving and rejuvenating traditional institutions runs contrary to this idea of progress both at the level of micro-structures as well as at the level of macro-structures.

We give below two examples, one from the plains of Assam and the other from the hills of what is now Meghalaya to highlight the problematics involved in implementing this ambitious project.

14.1.6 The Namghar:

One of the traditional institutions that we may refer to in this region is the namghar. The namghar emerged as a key institution in the life of the Assamese Vaishnava community. A namghar was traditionally a place of congregation, a community prayer hall where idol worship is not performed. It was also an extended wing of the Vaishnava sattrā where the equality of the person was an ideal. Though the sattrā was originally a monastery of the Vaishnava order, run by celibate monks, it soon evolved into a socio-cultural hub of the community. We may characterize the namghar as a public body, an institution located in the public space in the sense that Habermas had argued. Habermas feels that the notion of the public is related to the notion of the 'common' and the public sphere as a place where critical public debates are held. The public sphere or space is both spatial and normative and is underpinned by the collective body which meets to debate, discuss, and deliberate upon matters of mutual interest.

The namghar by all accounts is a thriving institution in Assam. It is found in nearly all villages and towns. Thus, policy intervention in this institution would have to focus on the issues that inhibit it from truly becoming representative. One such area of concern that needs to be addressed deals with gender equality and the participation of women in the administration of the namghars. The absence of substantive participation of women in this traditional institution has made it less attractive to the younger generation. The prevalence and continuation of certain customs that are seen as obsolete or decadent and are no longer of any relevance in the contemporary world need to be isolated, revised and thought anew.

The other factor that needs to be addressed is one concerning caste. While many namghars are constituted by a single caste there are instances where the 'lower castes' have instituted their namghar to avoid facing caste-based discrimination and other obstacles from those who are 'upper castes'.

It also needs to be rejuvenated in another significant manner. Over the years, the namghar has come to be seen as an exclusively religious institution. This has reduced it from being a multifarious associative body to one that caters to a singular need of the community, i.e. religious and ritual requirements. We may therefore propose that the institution recovers its original mandate and purpose within the contemporary socio-political milieu. This will enhance the quality of life and add to the extant social capital. This form of capital allows the individual to be empowered in a group, work together in a team, and achieve for the person as well as the collective outcomes determined by shared values.

14.1.7 The Khasi Jaintia Dorbar:

The Khasi Jaintia dorbar is another example of an institution that can be reworked and rejuvenated. They have existed for centuries and are an integral part of tribal life and society. The traditional institutions evolved from the pre-colonial clan-based council ka Dorbar Kur with offices and office holders demarcated for performing administrative, legislative, and religious functions. These traditional institutions have over the British colonial period and

after India's independence steadily lost their power and pelf to what Max Weber would call the legal-rational system of administration and governance. Weber identified three sources of authority – the traditional, the charismatic and the legal-rational. The story of modernity is the story of the increasing importance of the legal-rational over and above the traditional forms of authority.

The British colonial authorities abolished the traditional Khasi office of the Syiem in 1835. However, they retained the offices of the Doloj, Pator and Waheh Chnong or the village headman. This allowed the British to run the local-level administration, especially the villages through the established and traditional institutions. The chiefs of the various tribes did not necessarily hold office through hereditary rights only. There are many instances where the chief was elected directly by the people as well as instances where an elected chief was given the title for life based upon shown leadership qualities. However, the British tinkered with this system and created hereditary chieftainship to establish a system of loyalty to the alien rulers.

The erosion of traditional offices and institutions was resented though first the British and then independent India did try to compensate for the loss through certain administrative mechanisms like the Autonomous Councils. These historical events and their contemporary fallouts have created a situation where the institutions exhibit an internal tension between the core politico-social values of tradition and the outer form of modern state-inspired institutions. How one can mediate this tension and recover the traditional yet not lose out on the gains of modernity would be the crux of the problem if the goals are to be achieved by 2047.

14.1.8 Vision 2047: The Way Forward

The following steps are basic to the project of reorientation and rejuvenation by 2047:

- (a) A baseline survey to list the extant traditional institutions in the region.
- (b) Research to understand the population-to-institution dynamics as it holds in the present.
- (c) Sensitization of the government officials, especially those who are not from this region to the intricacies of the traditional system.
- (d) A sustained programme for sensitization of those who lead the traditional institutions, so that divisive tendencies are kept in check.
- (e) A programme of re-education of the leadership that focuses on the requirements of the population in terms of socio-political parameters leading to the achievement of a sustainable model of development incorporating transparency and accountability.
- (f) Incorporating gender inclusiveness as a non-negotiable factor in the rejuvenation of traditional institutions.

The survey should be complemented by oral evidence or history, a vital and critical element in the North-East, where we must acknowledge the existence of pre-literate societies and cultures that are rich in experiences that can provide new insights to the project at hand.

Usually, traditional institutions are opaque and modern institutions, in keeping with their democratic character, are more open and transparent. On the other modern public institutions are usually under a lot of populist pressure that distorts and transmogrifies the

original remit of the institutions. Therefore, a robust transparent institutional framework must exhibit transparency, efficiency, and steadfastness of purpose if it is to be effective. A good case in point may be the toning up of audit practices in the institutions

The planning, implementation, and execution of institutional projects in the NE must be entrusted to local actors. We must energize grassroots organizations and civil society organizations that have close linkages with the community to achieve the goals that have been set for achievement. Local-level leaders may be trained in contemporary technologies involving the use of computers and appropriate software. This will allow for local knowledge to be harnessed along with the use of contemporary globally recognized techniques, allowing the institutions to be deployed in the service of the citizens and society.

A further problem in the efficacious working of the institutions is the pattern and timing of fund flow. Timely release of funds, providing for an adequate and appropriate window of opportunity to implement the projects, and transparency in the disbursement process would go a long way in contributing to the revival, and effectiveness of the organisations that are vital to the implementation of SDGs and other forward-looking plans and programmes. The flow of funds should be rationalised so that time is not wasted and that there is appropriate utilisation of the resources.

It is also necessary to ensure that the institutions are staffed by persons with domain knowledge. Institutions suffer from either overstaffing or understaffing and therefore find it difficult to deliver on their remit.

Decentralisation is crucial to the success of the institutions, and a harmonious blend of the old and the new must be created for this purpose. For example, the crucial question for the region would be this – how do we make provisions for and structurally blend the extant technological advancements into the village-level institutions? The crucial question here would be the building of trust and legitimacy for the new digital technology that would be positioned as a crucial component in the years to come leading onto 2047.

14.1.9 Integration of the North East through the Institutions:

An institutional approach would be effective only when there are inter-sectoral linkages both vertical and horizontal. The vertical links the regional with the national and the international while the horizontal linkages relate to the integration of all institutions of a similar type spread across the region. This matrix of integration is underpinned by a decentralised operation that works within the overarching dispensation of the national requirement. The architecture would also involve the coming together of private, regional, state, and national institutions. This will ensure a dynamic cooperation involving all the major actors required for implementing Vision 2047.

Cooperatives and micro-finance companies can be of great help in this matter and we should explore the possibilities of setting up small and medium-sized businesses. Further, waterways can be revived, whose routes are well known to the local populations and can be linked to the ports in Bangladesh and West Bengal. The landlocked North-East needs several ports and therefore access to overcome the cartographical constraints of the region. This

would lead to rapid development and integration of the region and institutions have to play a dynamic and vital role in this effort to open up the hinterland.

14.1.10 Mid-term Assessment and Institutional Rearrangement:

We suggest that a mid-term assessment be done say, in 2035, to evaluate the process and the result. This is a necessity as that will allow us to calibrate the project and compare it with the baseline survey that we had proposed earlier in the paper. This crucial research – baseline and the interim must be handled by a team of experts situated in the MDONER. We also propose that this ministry be in the region so that accessibility and sensitivity to the problem are maximised.

Draft Report

14.2 Borderland Connectivity, Cooperation Exchanges and National Security

14.2.1: 4 - Way Integrative Matrix

For these transformative vision goals of the NER to be realized, primarily four-way integrative matrix will be used by the Union Government, State Governments, private sector, multilateral institutions, civil society and community organisations. These 4 ways depict actions as: a) within the state; b) interconnections with other states within the NE region; c) reverse integration by the rest of India with the NER and d) cooperation interspersing with immediate trans-border neighbourhood.

Within these matrices, National security considerations have been the key determinant in any of the connectivity projects with the neighbouring countries.

Against this back drop, newer strategies and mechanisms are suggested for the handling of security issues in these borderland connectivity projects.

14.2.2 Double Layer Crossing Point:

This new mechanism will clearly distinguish between micro level exchanges (largely localised and involve borderland communities and institutions) and macro level exchanges (larger scale that relate to the particular state, other states and country as a whole and cross border partners).

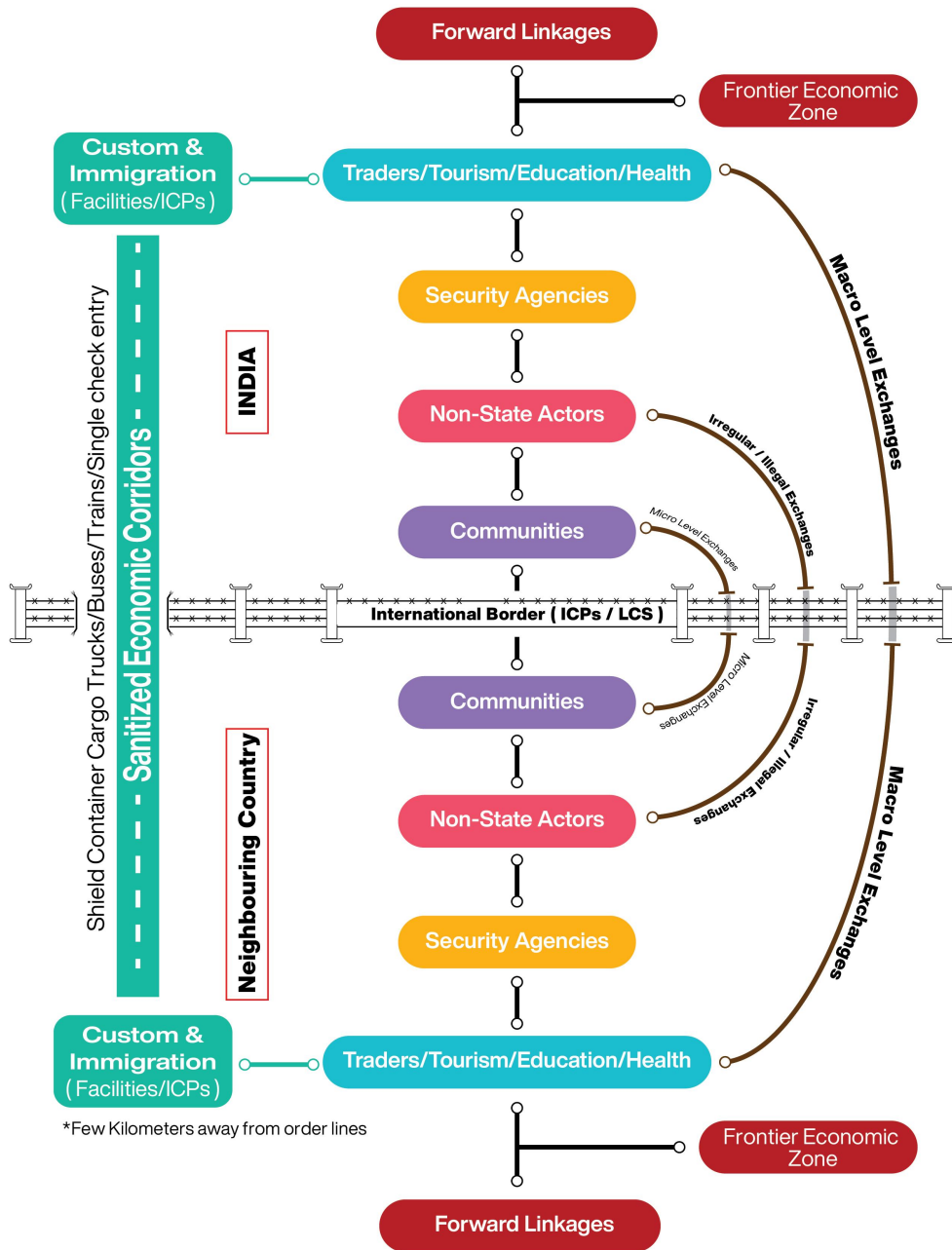
This means designing of a smart border crossing with two distinct set of functional parameters and facilities should be put in place. This double layer crossing point (Fig 1) will provide a securitized/sanitised dedicated fast track transit for the macro level exchanges including in trade, tourism, health, education, investment, energy services etc.

On the other hand, the normal crossing points that already exist would provide services and facilitation of movement for the micro level exchanges among communities and small-time traders, tourism agencies, operationalisation of Free Movement Regimes, Inner Line Permits, and Restricted Area Permits etc.

The sanitized/securitized dedicated economic corridor (SEC) will have two single window clearance points (consisting of customs, immigration, phyto-sanitary/testing/certification stations, banking, insurance etc) at the Indian side and the other connected country side. This will run on the outskirts of the existing border crossing points. This sanitized/securitized economic corridor (SEC) would be comprehensively connected with the ICPs and the production/distribution centres like Frontier Economic Zones (FEZs) that are built/being constructed. Once these macro level trade, movement of people and other services pass through the single window check points in both countries, these goods/buses/ services will be provided national treatment by respective countries and be free to move anywhere in the country like the practices in airports and sea port.

Figure 14.1.1 Potential Smart Border

POTENTIAL SMART BORDER
Double Layer Crossing Points
 Border Exchanges - Security Dynamics



14.3 Refreshing the Designs Governance Architecture

14.3.1 New Institutional Architecture 2035

There are several options of redesigning the institutional architecture to attain these vision goals. The Union Government and the State Governments could think of more accessible, effectively deliverable, accountable and transparent institutional framework. However, some of the newer and more effective, what Prime Minister Narendra Modi describes as out-of box designing of institutional architecture are suggested here. This has to be discussed, deliberated upon and decided on the basis of broader consensus.

14.3.2 National Act East Commission headed by the Prime Minister:

A key instrument of Reverse Integration. The Operationalization of the NER Vision 2035 will be overseen by National Act East Commission headed by the Prime Minister of India where Cabinet Ministers and Secretaries of core Central Ministries; Chief Ministers and Chief Secretaries of the NER states and Vice Chairman of NITI Aayog, National Security Adviser, Secretaries of MDoNER and NEC, eminent professionals, academics, noted civil society actors and community leaders will be the members. This Commission will provide the broad strategic policy vision for the region.

14.3.3 MDoNER Revitalisation

The present MDoNER will be revitalized with an objective of transforming it into the core implementing agency of India's Act East policy from the NER perspectives. For this to happen it would have senior representatives of the pertinent Ministries including Finance, Environment, Water, Agriculture, Home, Defence, External Affairs, Commerce and Industry, Textile, Roads, Railways, Tourism, Civil Aviation and Communications and Science and Technology. Unlike at present where the MDoNER has a limited role of coordinating with the Central Ministries/ Departments and states and implementing a few gap funding infrastructure schemes, this only Ministry with territorial jurisdiction will be the overarching authority and manage all the Central Government missions, schemes and projects. It will undertake region wide strategic thinking, design planning and mobilize resources and coordinate with the private and other development partners.

Other governance efficacy aspects including the physical relocation of the M-DoNER to the NER itself could also be discussed/ considered by the policy makers.

14.3.4 Restructuring of the NEC

The NEC located in Shillong is a statutory body under an Act of Parliament. Its role as an advisory body (under MHA) changed to a regional planning body from 2002 onwards and was brought under the administrative control of the MDoNER since 2004.

The present NEC will have to be restructured, reoriented and reequipped with an exclusive function of a multi-disciplinary monitoring and evaluation agency. In order to provide more viable development space, connectivity flexibility, geo-strategic planning and efficiency dynamism, the possibility of incorporating contiguous geographies including that of

Darjeeling and Jalpaiguri Districts of West Bengal in the NEC could be explored. This has been strongly proposed by the various Parliamentary Committees too.

This will also pave the way for Bangladesh and two Himalayan neighbours Bhutan and Nepal to get durably integrated towards/with the South (north being China) and effectively participate in India's far reaching Act East initiative.

This could provide huge openings for these countries to access South East Asia via the NER and enhance and consolidate their inter-dependence with India under the BBIN sub-regionalism process. This acquires crucial dimension of both limiting/check mating China's access to the Indian Ocean from the northern frontiers (through provinces of Sichuan and Tibet Autonomous region and Myanmar and Bangladesh) under its flagship Belt and Road Initiatives (BRI) and also smoothly realizing the goals of Indo-Pacific ventures of India.

With the induction of range of top class professionals and experts, the new NEC will have the state-of-the-art resource centre of knowledge, skills, research and innovations announced by the Prime Minister Narendra Modi in the plenary session of the NEC in 2016 in Shillong.

14.3.5 Forum of Debate and Discourses

A NE regional platform for intellectual exchanges will be set up primarily aimed at encouraging and soliciting collective and critical thinking in promoting indigenous, regional and national interest.

Chapter 15

Diversifying the Resource Mobilization Avenues

For 2047 Transformation

Supporting a transformative vision for the North Eastern states by 2047, requires significant investment in infrastructure and economic activities. Finding the resources for this transformation, within and outside the budgets of the states requires a review of State Finances as they exist today and identify opportunities available to work towards a more prosperous North East by 2027.

15.1 State of State Finances

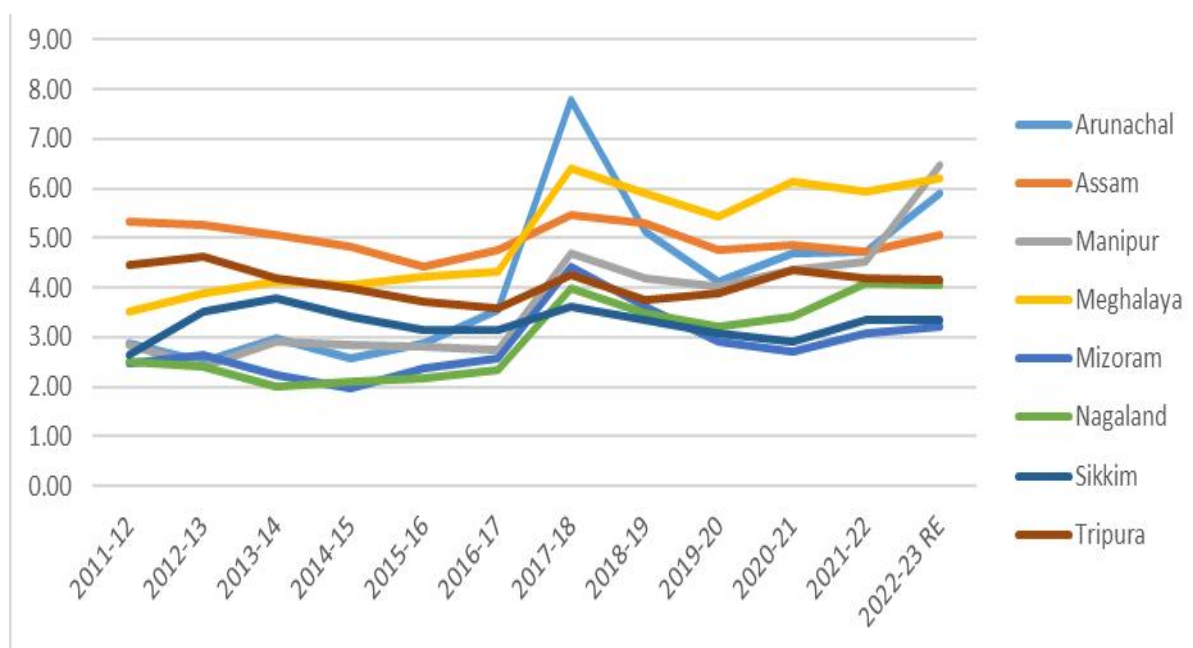
In understanding the fiscal space for supporting augmented capital expenditure required for improving the growth prospects of states, it is useful to focus on two broad aspects of state finances – the revenue receipts and the deficits – together, these represent the resources available to the state. In what follows, a review of trends in revenue receipts and in deficits and debts are presented.

a. Trends in Revenue Receipts:

i. Own tax revenue:

Own tax revenue of the states constitute a major component of the resources available to the states. Figure 1 shows the evolution of own tax revenue as a percentage of GSDP for the North Eastern States. All the states show some increase in own tax revenue. Some states have reported a larger increase in revenues raised – Arunachal Pradesh, Manipur, Meghalaya and Nagaland could increase own tax revenue to GSDP by more than one percentage point 2011-12 and 2022-23 (RE). A comparison of the levels in 2022-23 shows considerable differences between the levels achieved by these states with a maximum of 6.48 percent of GSDP and a minimum of 3.42 percent. State Goods and Services tax constitutes the most important source of revenue for most states accounting for 50-77 percent of total own tax revenue. Sales tax is the second important source of revenue followed by state excise.

Figure 15..1 Own Tax Revenue (% of GSDP)



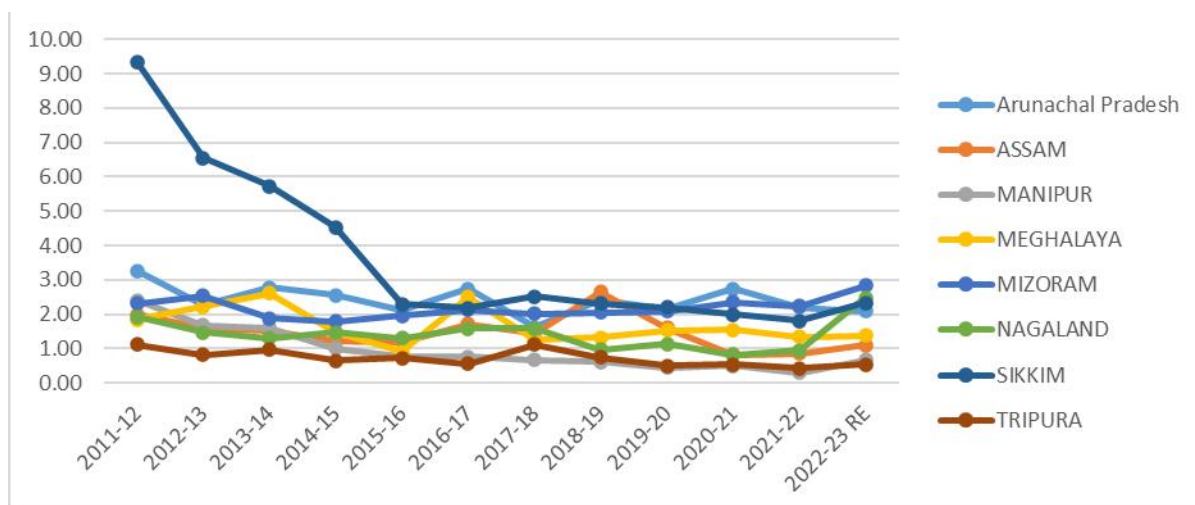
Source: Computed using Finance Accounts, various States, various years and RBI Handbook of Statistics on Indian States

ii. Own non-tax revenue:

Non-tax revenues include three broad categories of receipts – interest receipts from the loans and advances extended by the state government and dividends received from public sector undertakings, royalties from mineral resources and finally, revenues from user charges and fees levied on different services provided by departments of the state government. Figure 2 shows the trends in receipts from own non-tax revenues for states. The revenues remain less than 3 percent of GSDP for all the states, albeit there are differences across states.¹ While Assam gets significant share of revenues from petroleum – royalty from crude, Arunachal Pradesh, Mizoram, Nagaland and Sikkim reported revenue from Power. Arunachal Pradesh and Meghalaya also report revenue from non-ferrous mining and metallurgic industries.

¹ The revenue for Sikkim shows considerably higher level, but with a clearly declining trend – this largely on account of revenues from lottery, which was very high in the initial period and dropped thereafter. In the later period, the revenues for Sikkim are in line with those for other states in the North East.

Figure 15.2 Own Non- Tax Revenue (% of GSDP)



Source: Computed using Finance Accounts, various States, various years and RBI Handbook of Statistics on Indian States

iii. Shared taxes and Grants from Government of India

Share in central taxes together with grants from the Union government constitute a very important part of the total revenues of these states. Share in central tax is determined on the basis of the recommendations of the successive Finance Commissions. The 14th finance commission recommended a significant increase in the share of states in the divisible pool of central revenues – the share increased from 32 percent to 42 percent. This increase was accompanied by a decline in the grants component of transfers to states.

Table 15.1 shows the composition of revenues. For four of the states, transfers from the union government are significant enough to bring the revenue receipts to over 30 percent of GSDP in 2014-15. By 2022-23 (RE), for two of the states – Arunachal Pradesh and Manipur - transfers accounted for over 60 percent of GSDP. For another three - Meghalaya, Mizoram and Nagaland - transfers were over 30 percent of GSDP, supporting revenue receipts at over 40 percent of GSDP. For the other states, the contribution was more modest in comparison.

Table 15.1 Sources of Revenue Receipts (as percent of GSDP)

	2014-15				2021-22				2022-23 (RE)			
	OTR	ONTR	Transfers	RR	OTR	ONTR	Transfers	RR	OTR	ONTR	Transfers	RR
ARUNANCHAL PRADESH	2.57	2.55	45.75	50.87	4.71	2.21	53.53	60.45	5.90	2.09	61.47	69.46
ASSAM	4.83	1.23	13.45	19.51	4.74	0.87	14.17	19.77	5.06	1.10	16.51	22.67
MANIPUR	2.85	1.01	40.25	44.12	4.52	0.29	33.69	38.51	6.48	0.67	61.96	69.11
MEGHALAYA	4.04	1.48	22.15	27.67	5.95	1.35	29.50	36.80	6.20	1.38	33.74	41.33
MIZORAM	1.97	1.79	37.03	40.79	3.07	2.24	27.62	32.92	3.22	2.83	34.58	40.62
NAGALAND	2.11	1.47	38.00	41.58	4.09	0.95	37.11	42.15	4.07	2.49	36.11	42.66
SIKKIM	3.42	4.53	21.01	28.96	3.35	1.81	13.69	18.85	3.36	2.34	15.56	21.26
TRIPURA	3.98	0.66	26.65	31.29	4.19	0.44	23.53	28.16	4.15	0.54	24.58	29.26

Note: Own Tax Revenue (OTR), Own Non-Tax Revenue (ONTR), Revenue Receipts (RR)

Source: Computed using Finance Accounts, various States, various years and RBI Handbook of Statistics on Indian States

The ratio of total receipts to GSDP in a few of the states suggests that activities of governments in these states account for an overwhelming part of the total scope of activities and hence of the Gross State Domestic Product. Expansion in the scope of activities in the non-government space might be critical for creating capacity to raise additional resources for investment purposes as well. The initiatives envisioned as a part of the VISION 2047 strategy should focus on expand the scope of non-government sector. With expansion in the scope of activities, it is possible to visualise an increase in the ratio of own tax and own non-tax revenues as a percentage of GSDP. For example, the average tax to GSDP ratio for major states over 6 percent and that for non-tax revenue is about 1.06 percent.

In the following sub-section, we explore the role played by deficits and the space remaining for augmented expenditures supported by the route of deficits and debt.

b. Trends in deficits: revenue and fiscal deficits:

In early 2000s, recognizing the potential fiscal stress building up in the Union and State budgets, there was a move to introduce fiscal discipline through the adoption of Fiscal Responsibility and Budget Management Legislations – a move supported by the Twelfth Finance Commission. The framework adopted initially set a target of reducing fiscal deficit of 3 percent and elimination of revenue deficit by 2008-09. In subsequent years, in response to various economic shocks, like The Global Financial Crisis and the COVID-19 pandemic, these targets were relaxed somewhat. In the face of the COVID-19 pandemic, the 15th Finance Commission, the targets were revised, with fiscal deficit of 4 percent in 2021-22, 3.5 percent in 2022-23 reduced further to 3 percent during 2023-2026. Some relaxations were offered in conjunction with power sector reforms. (Chapter 12 of Report of the Fifteenth Finance Commission) These proposed limits on the available fiscal space however were not uniformly implemented by all states.

In this context, it is useful to look at trends in revenue deficit and fiscal deficit viewed as a percentage of GSDP in the North Eastern Region. Unlike in the major states, a number of the states in the region have been able to report revenue surpluses. Arunachal Pradesh and Manipur are significant in that they have maintained surpluses throughout the last five years, even with the stress imposed by the pandemic. (Table 15.1.2) Surplus on revenue account supports augmented capital expenditures and hence is sought to be encouraged. For the other states, there is mixed performance – surplus in some years and deficit in others. Assam, Meghalaya and Tripura report deficit in 3 or more years.

Table 15.2: Revenue Deficit as percentage of GSDP

	Revenue Deficit					
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23 RE
Arunachal Pradesh	12.79	14.87	8.89	13.21	15.33	15.09
Assam	-0.48	2.13	-0.38	0.39	-0.23	-3.01
Manipur	4.20	2.97	1.49	1.86	3.96	16.22
Meghalaya	2.88	-1.67	-0.44	-2.41	1.69	3.51
Mizoram	8.77	7.00	0.82	-3.24	2.16	2.00
Nagaland	3.39	1.95	-0.72	1.26	5.12	3.00
Sikkim	4.09	2.44	-4.27	-2.30	1.10	2.00
Tripura	-0.66	0.28	-4.39	-2.01	2.38	0.64

Note: Positive values represent surplus and negative values represent deficits

Source: Computed using Finance Accounts, various states, various years and RBI Handbook of Indian States

Turning to fiscal deficit on the other hand, table 3 suggests considerable fiscal stress. In 2022-23 for instance, the levels of deficit reported are considerably higher than the levels suggested in the fiscal consolidation road map. (Table 15.1.3) Read along with the levels of revenue surplus/deficit, high fiscal deficits can be seen as supporting higher capital expenditure. The trade-off between capital expenditure and increase in committed expenditure in the form of interest payments on account of higher outstanding debt needs evaluation.

Table 15. 3: Fiscal Deficit as percentage of GSDP

Fiscal Deficit	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23 RE
Arunachal Pradesh	-1.39	-7.80	-3.44	-3.56	-3.14	-7.76
Assam	-3.26	-1.54	-4.30	-3.14	-4.38	-8.15
Manipur	-1.32	-3.35	-2.38	-6.35	-4.93	-6.88
Meghalaya	-0.80	-6.30	-3.17	-7.71	-6.08	-4.36
Mizoram	-1.65	-1.61	-4.90	-7.81	-1.34	-6.95
Nagaland	-1.83	-4.08	-4.81	-4.36	-0.82	-5.73
Sikkim	-1.78	-2.26	-6.62	-6.89	-2.41	-4.44
Tripura	-4.74	-2.69	-6.02	-3.57	0.82	-3.10

Note: Positive values represent surplus and negative values represent deficits

Source: Computed using Finance Accounts, various states, various years and RBI Handbook of Indian States

The fiscal impact of debt on the budget depends on the size of debt. Debt levels for all states increased during the period since 2017-18. The level of debt for Assam and Sikkim is comparatively lower than that for other states in the group. This is somewhat surprising given that relatively to other states; Assam and Sikkim have considerably lower revenue receipts to GSDP. Given the suggested medium-term target of 20 percent of GSDP for state debt, high levels of debt and emerging concerns about fiscal sustainability for states as well as for the country as a whole, it is to be expected that going forward, there would be pressure to reduce debt to GSDP levels.

Table 15.4: Outstanding Debt as percentage of GSDP

	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23 RE
Arunachal Pradesh	32.07	33.90	40.41	44.84	39.11	45.38
Assam	17.40	19.21	20.83	25.00	24.89	28.98
Manipur	37.09	38.21	38.26	44.28	41.96	48.33
Meghalaya	32.14	33.02	0.33	40.65	40.57	41.21
Mizoram	37.66	33.39	34.73	41.30	37.99	41.93
Nagaland	42.67	39.75	40.99	45.16	43.63	44.83
Sikkim	20.99	22.30	23.54	27.44	28.92	29.85
Tripura	29.52	29.66	32.96	39.40	34.74	33.02

Source: RBI Handbook of Statistics of Indian States

15.2 Expenditure by GOI in the region:

The NER remained a fulcrum of the Special Category States (SCS) since 1969 and received consistently and hugely staggering funding from the central government in the form of 90 percent grant and 10 percent loan. Even after the provisions of SCS were discontinued by the 14th Finance Commission in 2014, the NER continues to enjoy the 90:10 funding pattern in CS/CSS schemes and 90 percent grant component in EAPs under ‘special dispensations’ categories.

Apart from budgetary support provided to state governments, as a part of the spending activities of central ministries, each non-exempted Central Ministry/Department (54 at present) is mandated to spend 10 % of the Gross Budgetary Support (GBS) on programmes and projects in the North East. The allocations and expenditure since 2014-15 are in Table 5. The table highlights substantial allocations being dedicated to the North Eastern region – over Rs 5.5 lakh crore till budget of 2023-24, with over Rs 90 lakh crore provided in 2023-24. Of these budget allocations, over 90 percent is reported to have been spent during the year. Any unspent balances are to be transferred to a non-lapsable pool of central resources (NLCPR), a pool notionally maintained by the Ministry of Finance. In its reply to the Lok Sabha Unstarred Question No.2243 dated 2.8.2021, the Ministry of Finance has indicated that the accrual to the NLCPR fund was provisionally ₹90,425.49 crores till 31.03.2020

maintained on a proforma basis. Besides these, exempted Ministries/Departments like the Railways make substantial investments out of their resources as well.

Table 15.5 Gross Budgetary Support for expenditures in the North East

Year	Budget Estimates	Revised Estimates	Actual Expenditure	Actual Expenditure as % of RE
2014-15	36,107	27,359	24,819	90.72
2015-16	29,087	29,669	28,674	96.64
2016-17	29,124	32,180	29,368	91.26
2017-18	43,244	40,971	39,753	97.03
2018-19	47,994	47,088	46,055	97.81
2019-20	59,369	53,374	48,534	90.93
2020-21	60,112	51,271	48,564	94.72
2021-22	68,020	68,440	70,874	103.56
2022-23	76,040	72,540		
2023-24	94,679	91,784		
2024-25	91,857			
Total (till 2023-24)	6,35,640	5,14,678		
Total (till 2021-22)	3,73,062	3,50,353	3,36,641	

Source: Written Reply to Lok Sabha by Ministry of Development of North Eastern Region and Statement 11 of Expenditure Profile in Budget of Government of India, 2024-25.

Since December 2017, a new scheme called North East special Infrastructure Development Scheme (NESIDS) has been introduced in place of the NLCPR scheme with continued funding for existing projects under NCLPR. The NESIDS is wholly funded by Government of India and is designed to focus on road and non-road infrastructure. Other programmes providing project based support to the region include PM DevINE and Schemes of NEC. PM DevINE was introduced in 2022 to focus on economic infrastructure, social infrastructure, livelihood activities, and filling social development gaps in various sectors. The programme was to be implemented during 2022-2026. Schemes of NEC were introduced in 2020 where 30 percent of the allocation for NEC was earmarked for development of deprived areas and deprived sections of the North East. All these programmes are fully funded by Government of India.

15.3 Support for capital expenditure:

In the present system, there are three non-budgetary² sources of support for augmenting expenditures, especially capital expenditure in the state – projects based support from DONER and from multi-lateral banks constitute two important sources of support for capital expenditure. A third source could be in the form of guarantees provided by the state government – these can be used by special purpose vehicles or public sector undertakings to raise resources from capital markets to support capital expenditure as well. Table’s 15.1.6-15.1.8 summary the use of these instruments by the states over the last 5 years.

Support through DONER is provided for specific projects. The currently ongoing programmes include North East Special Infrastructure Development Scheme (NESIDS), PM- DevINE and Schemes of NEC. All these programmes are fully funded by Government of India. Table 6 shows the major developmental heads for resource allocation in Union Budget. The utilisation of these allocations by individual states is not readily available, preventing a comparison of the relative performance of states.

Table15. 6: Allocations for Development of North East Region (Rs crore)

	2017-18	2018-19	2019-20	2020-21	2021-22
North Eastern Areas	512.99	536.93	896.8	776.66	998.14
Grants in Aid to State govt.	1687.09	1299.27	1082.15	719.99	954.37
Capital outlay in NE Areas	202.36	91.51	579.6	288.35	621.89
Others	111.52	32.91	99.32	68.66	79.04
Total Expenditure	2513.96	1960.62	2657.87	1853.66	2653.44

Source: Expenditure Budget, Government of India, various years

Externally aided projects refer to projects which receive financial support from multi-lateral development banks as well as bilateral lending agencies. Major sources of support for states in North Eastern region 2023-24, are Asian Development Bank, Asian Infrastructure Investment Bank, Japan International Cooperation Agency, International Bank for Reconstruction and Development and New Development Bank. (Table 19 of Expenditure Profile, in Budget of Government of India, 2023-24) Support for externally aided projects accrues to the North Eastern states as 90 percent grant and 10 percent loan.

As percent of GSDP, this source of funding is very modest in the last five years. Only Meghalaya and Mizoram have been able to secure funding of more than 1 percent of GSDP in more than one year. On the other hand, Arunachal Pradesh and Tripura report little to no fund flows from this source. The projects funded include economic infrastructure like power, bridges and integrated transport networks, social infrastructure like development of health systems and water supply as well as livelihood programmes like agribusiness and rural transformation.

² Non-budgetary here is being used to refer to funding not based on own resources of the state. Given tax devolution can be viewed as committed resources accruing to the state, own resources for the present purpose can be viewed as including own tax revenues, own non-tax revenues, shared taxes as well as non-earmarked grants such as revenue deficit grants.

Table 15.7: Funding from Externally Aided Projects (% of GSDP)

	2017-18	2018-19	2019-20	2020-21	2021-22
Arunachal Pradesh					
Assam	0.26	0.29	0.31	0.31	0.38
Manipur	0.42	0.38	0.00	0.78	1.39
Meghalaya	0.63	0.67	1.20	2.31	0.40
Mizoram	3.52	1.90	3.45	0.81	2.15
Nagaland	0.15	0.20	0.28	0.26	0.48
Sikkim	0.14	0.15	0.21	0.19	0.13
Tripura	0.03	0.01	0.00	0.04	0.10

Note: Figures include total funding, loan component plus grant component.

Source: Finance Accounts, various States, various years.

Turning to guarantees, once again some states have used this facility more than others. Meghalaya and Sikkim appear to have made considerable use of this option with levels of close to 10 percent of GSDP or more while Arunachal Pradesh and Assam report very little usage. It is useful to note that in both Meghalaya and Sikkim, a sizeable part of the guarantee is used for power sector – over 90 percent in Meghalaya and over 60 percent in Sikkim. While the scale of guarantees offered by other states is considerably lower, power sector seems to play important role in all states. Given this scenario, it is possible to argue for some of the states there is some scope to raise additional resources through the guarantee route.

Table 15.8: Outstanding Guarantees (As % of GSDP)

	2017-18	2018-19	2019-20	2020-21	2021-22
Arunachal Pradesh	0.00	0.00	0.00	0.00	0.00
Assam	0.03	0.03	0.02	0.02	0.08
Manipur	1.99	0.39	1.60	2.24	2.35
Meghalaya	3.33	3.61	3.22	9.06	7.68
Mizoram	0.69	0.45	0.57	0.58	0.45
Nagaland	0.45	0.46	0.59	0.59	0.60
Sikkim	2.18	12.16	11.92	12.44	11.99
Tripura	0.75	1.05	1.36	1.44	1.01

Source: Finance Accounts, various States, various years

The analysis in this section demonstrates that the NE states have used the available options differentially for augmenting infrastructure and supporting economic activity. In other words, it is possible to explore the possibility of expanding the utilisation of these options if required.

15..4 Trends in capex, utilisation of budget allocation:

Economic growth and prosperity depend on significant investments being made by both public sector and private sector. Public sector often is focused on creating infrastructure both economic and social, to support expansion in economic activity, the latter requiring private investments. States in the North Eastern region are in the phase of augmenting infrastructure and creating the space for private enterprise. The size of government in most of the states being analysed, as mentioned in the earlier section is substantial suggesting that the role for government in these states continues to be large. Capital expenditure supported by budgets is the main channel through which governments support public investments.

Table 8 summarises the level of capital expenditure in different states. For most states, capital expenditure has been maintained at over 3 percent of GSDP. These are levels higher than those observed in many major states in the country – a sign that infrastructure concerns are well recognised in these states. Arunachal Pradesh reports very high levels of capital expenditure, with the rest of the states reporting more modest levels. The second important feature to note is that there is significant fluctuation in the level of capital expenditure being undertaken by the states over time – for instance, for Mizoram, the ratio of capital expenditure to GSDP has reduced from 10.3 percent in 2017-18 to 3.6 percent by 2021-22. Manipur and Meghalaya show a fall in 2019-20 perhaps on account of the COVID, but there is a sharp increase thereafter. The same is not evident in Sikkim and Tripura. The concerns and needs for these states may therefore be somewhat different.

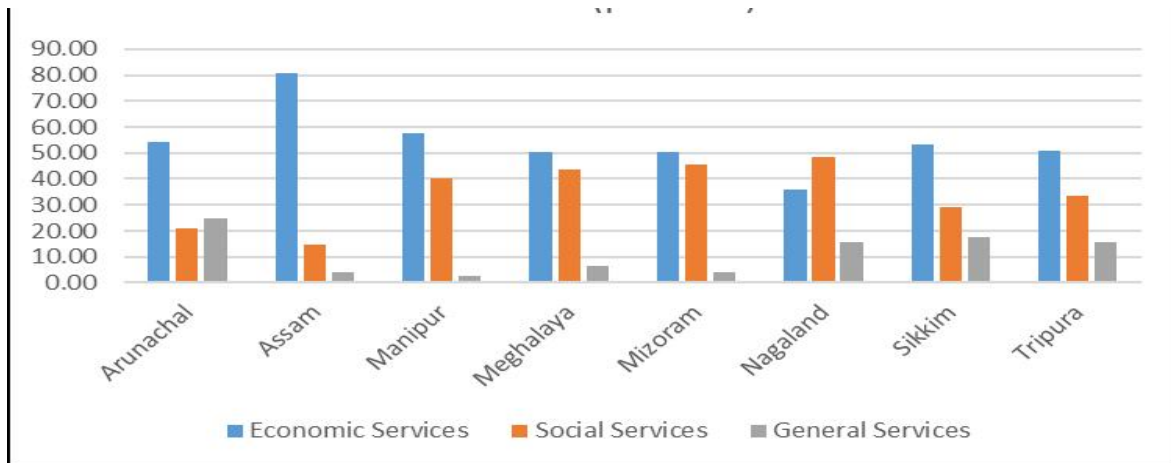
Table 15.9: Capital expenditure as a percentage of GSDP

	2017-18	2018-19	2019-20	2020-21	2021-22
Arunachal Pradesh	14.2	22.6	12.3	16.8	18.5
Assam	2.7	3.6	3.8	3.5	4.9
Manipur	5.5	6.3	3.9	8.2	8.9
Meghalaya	3.3	4.4	2.7	5.1	7.1
Mizoram	10.3	8.5	5.5	4.7	3.6
Nagaland	5.2	6.0	4.1	5.6	5.9
Sikkim	5.8	4.5	2.3	4.6	3.5
Tripura	4.1	3.0	1.6	1.6	2.3

Source: Finance Accounts, various States, various years and RBI Handbook of Statistics of Indian States.

To examine the priorities as reflected in the expenditures, Figure 3 shows the composition of capital expenditure in terms of economic services, social services and general services. The data is presented for 2021-22. Assam is very focused on economic services with 80 percent of capital expenditure being devoted to this group. Most of the other states spend at least 50 percent of the total expenditure on economic services. Manipur, Meghalaya, Mizoram and Nagaland also spend 40 percent or more on social services. The choice of sectors and activities to focus on can influence the short term and medium term impact of the investment on economic growth. The VISION 2047 being developed could provide useful inputs into this choice.

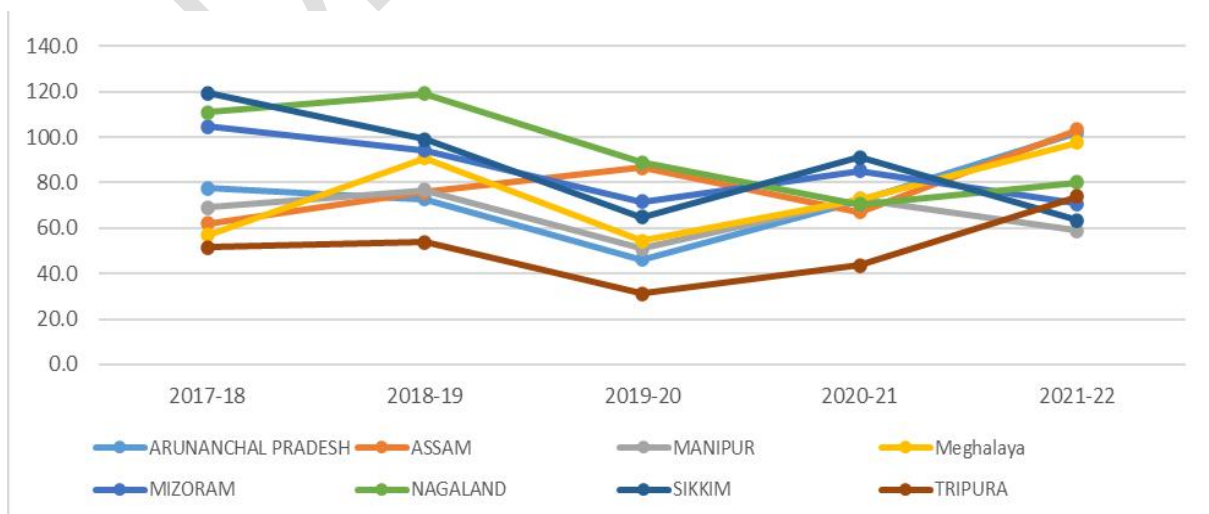
Figure 15.3 Composition of Capital Expenditure in 2021-22 (percent)



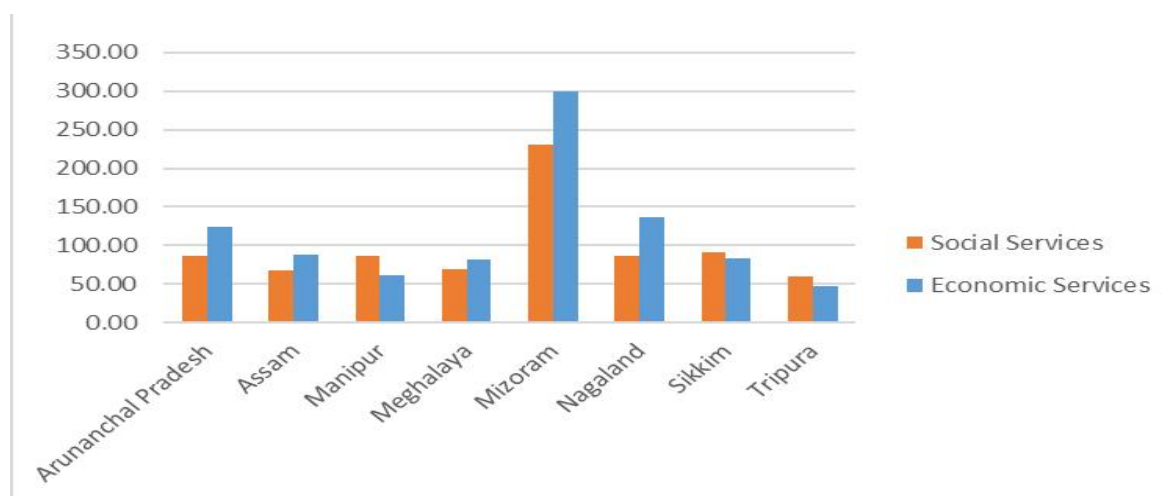
Source: RBI State Finances, various years

To understand whether these high levels are realised through good budgeting and execution, figure 15.1.3 shows utilisation as a percentage of budget allocation. Once again, the picture emerging is one of considerable variation – Tripura shows a consistently low level indicating that budgeting is not effectively translated into spending. Arunachal Pradesh and Manipur too show lower levels. On the other hand Mizoram, Nagaland and Sikkim show better utilisation. Examining the utilisation for economic and social services, for Arunachal Pradesh, Mizoram and Nagaland, utilisation in economic services on average is higher than budget allocation. (Figure 15.1.4) This suggests some uncertainty in budgeting and resource flows. On the other hand, for Assam, Manipur, Meghalaya and Tripura, utilisation for both economic services and social services is considerably lower than budget allocation. It is not clear whether resources serve as a constraint in these states or whether execution of projects and programmes need more focus.

Figure 15.4 Capex: Utilisation of Budget Allocation



Source: RBI State Finances, various years.

Figure 15.5 Average Utilisation of Allocations: 2017-2021

Source: RBI State Finances, various years

15.5 Raising Resources for realising VISION 2047

The categories of revenue receipts that state governments have control over are, own tax revenue and own non-tax revenue. Own tax revenue as a percentage of GSDP is reported to be between 6-8 percent for major states. At present, as shown in Table 1, own tax revenue in the region ranges between 3 percent and 6.5 percent. With development of the economy and improvement in tax administration, the ability of these states to raise revenues should improve. It can be expected that own tax revenues would converge with the levels in the major states, i.e., 6-8 percent. On average this should generate a 2 percentage point increase in own tax revenues. Some areas to focus on can be:

- a. Improvement in tax administration for GST
- b. Reinforcement of the regime for taxation of passenger and goods taxes: with the introduction of GST, there is a sharp decline in collection of this tax in many states. It should be recognised that this tax has not been subsumed into GST.
- c. Efforts to coordinate the taxation regimes for state excise across states can provide an opportunity for the states to avoid cross-border trade in alcoholic beverages for human consumption.
- d. Land and property based taxes are not effectively utilised. With expansion in economic activity, especially if there is focus on high value agricultural produce, there will emerge an opportunity to collect more through agricultural income tax and/or land revenue.

While these initiatives can increase the tax revenues of the states, there are some emerging challenges for revenue generation as well. One of these relates to the combating climate change:

Phase 1: increase in tax on fossil fuels, perhaps also on coal: these can provide some additional revenues from fossil fuels.

Phase 2: with a reduction in the share of fossil fuels in total energy mix, and an increase in renewables, the share of revenue from fossil fuels will reduce. New sources of revenue need to be explored. Increase in tax on electricity can be one source. More effective monetisation of forests as a carbon sink can be another.

Turning to non-tax revenues, the region is rich in a variety of minerals, both major and minor. Royalties on extraction of minerals is an important source of revenue for some states, especially those that have reserves of fossil fuels. Revision of royalty rates are not undertaken on pre-fixed schedule. Requests for periodic review of the royalty rates, particularly for those minerals which have a specific rate of royalty per tonne, should be made an integral part of the policy framework of the region - would provide reasonable returns to the states.

The second component of additional resources as discussed above, can be fiscal deficit, i.e., through debt financing. The trends in fiscal deficit in the last five years show significant volatility. Given the cap on fiscal deficit built into the FRBM legislations of the state, in the medium term, deficits of up to 3 percent of GSDP would perhaps be acceptable. However, the level of outstanding debt is considerably above the target levels proposed for the states in the report of the Fiscal Responsibility and Budget Management Review Committee. The latter suggested a ceiling of 20 percent of GSDP for the states. This ceiling implicitly suggests the need for fiscal consolidation requiring reduced fiscal deficits. In other words, finding resources through fiscal deficit may not be a useful channel.

The third component would be use of guarantees to facilitate resource mobilisation through capital markets. For states other than Sikkim and Meghalaya, there is some space available here even if the notional ceiling of 10 percent of GSDP is adhered to. It should however be kept in mind that if the activities being supported do not generate enough surplus to be able to repay the loans raised, the liability for servicing these loans would fall on the State government.

All other sources of financing investment beyond the above require access to other funding sources – be it general support or project support from Government of India, from Multi-lateral banks or from capital markets and banks within the country.

To kick-start the process of focused and rapid improvement of infrastructure in the region and to create a suitable environment for private initiative to take-off, following up on its Look East policy, a two pronged strategy is proposed.

- i. As discussed in section 2, Government of India, through its commitment of 10 percent of Gross Budgetary Support and the NLCPR, supports significant expenditures in the region. However, there are some identified challenges in utilization of these resources³: first, the average utilisation of the GBS is about 90

³ Committee on Estimates (2022): “Estimates and Policy Aspects of the Ministry of Development of North Eastern Region”, Lok Sabha Secretariat,

percent, indicating that there is under-utilisation by various ministries. The Report of the Estimates Committee records that some ministries have been able to spend less than 50 percent of the committed expenditure. Second, for funds that accumulate in the NCLPR, since the fund is maintained only as a notional proforma, the Ministry and hence the region does not get easy access these resources for taking up projects and programmes, since these projects need to be incorporated into the budget of the Union Government.

The decision-making on taking up new projects and programmes has been given a nudge through the setting up of the North East Forum led by the ministry of DoNER and the Vice-Chairman, Niti Aayog. Five key sectors were identified for focus: bamboo, tea, tourism, pisciculture and dairy. MDoNER has also reported that there are efforts being made to develop sector-specific and state specific development plans through collaboration with NEDFi and IIM, Shillong. Integrating these expenditures into an overall scheme of the VISION 2047 for North East Region would be the first step towards building a comprehensive financing framework for Development of the Region.

- ii. The current expenditures through the 10 percent of GBS as well as the additional allocations through Central sector schemes of the DoNER include not just project and programme expenditures but also revenue expenditures for running ongoing programmes and institutions. All these resources are therefore not available to improve the economic outcomes in the region. For significantly improving the economic and social infrastructure and for creating an environment suitable for attracting private investment in the region, either domestic or foreign, a case may be made for Government of India to provide a significant one time grant or a long term interest free loan of say, Rs 100,000 crore spread over five years⁴.

If these resources are integrated into the programme structured in the rest of the chapters, it can stimulate private investment and with augmented incomes, tax revenues too can improve over time.

The identified resources available at the disposal of the state can be used to incentivise investors or serve as a base for leveraging additional resources from the capital markets. For this process to be effective, it is important to improve on public investment management and financing. The salient issues here are discussed in the next section.

https://eparlib.nic.in/bitstream/123456789/1464489/1/17_Estimates_18.pdf#search=Estimates%20and%20Policy%20Aspects%20of%20the%20Ministry%20of%20Development%20of%20North%20Eastern%20Region

⁴ In the recently initiated programme of 50-year interest free loans to support capital expenditure by state governments, the North Eastern region, by virtue of their shares in finance commission devolution, can get small amounts for capital expenditure, which might not be adequate to attempt a big push in the region. A significant increase in resources can mobilise the eco-system required for effective spending. The amount suggested here is not based on the resource requirements built into the other chapters. A suitable number can be incorporated in line with the analysis in the other chapters.

15.6 Section 6: Public Investment Management and Financing

Proposals to substantially augment capital formation in the state require not only access to resources but also the capacity to utilise the resources available in a timely and effective manner. The steps in the process of good public investment management can be thought of as follows:

- a. Planning: The Vision document being prepared would be providing an overview of the goals and the required investment to achieve these goals. Going beyond these broad statements, the planning process also requires the identification of specific projects and their appraisal and their costing as well as sequencing these interventions for effective utilisation of the infrastructure proposed to be created.
- b. Allocation: Appropriate mechanisms for selection of projects available in a ready to execute pipeline is the first step. For the identified projects, many of which would require investment spread over multiple years, incorporating them into an MTEF adequately supported by resources would be critical.
- c. Implementation: The final stage includes procurement as well as project management and suitable management of flow of funds to limit delays and cost over-runs.

15.7 Reframing the Financial Architecture

The NER remained a fulcrum of the Special Category States (SCS) since 1969 and received consistently and hugely staggering 90:10 funding from the central government. Even after the provisions of SCS were discontinued by the 14th Finance Commission in 2014, the NER continues to enjoy the 90:10 funding pattern in CS/CSS schemes and 90 percent grant component in EAPs under 'special dispensations' categories. Besides the NER draws huge chunk of funds from the NLCPR maintained by the MoF on proforma basis and other specially designed financing vehicles including the NEDFi.

However, despite huge scope for internal resource mobilization the NER has not been able to show any significant increase in revenue mobilization.

With a view to steadily moving towards a regime of self-financing and generate increasing internal revenues for much wider and flexible development space, a new architecture of development financing could be designed with revolving around three critical players viz. MDoNER, multilateral and bilateral institutions and private players.

At present each of the non-exempted Central Ministry/Department (54 at present) is mandated to spend 10 % of the Gross Budgetary Support (GBS) which works out to be Rs 60112.11 crore during 2020-21 and even with the level of present allocation it would be over Rs 3 lakh crore during next five years (2020/21 – 2025/26). Besides these exempted Ministries/ Departments like the Railways make substantial investments out of their resources. However, many of the 54 non-exempted Ministries have not been making optimum use of 10 % GBS like that of Department of Agriculture, Cooperative and Framers Welfare (40 % of its allocated GBS of Rs 10136.70 crore during 2019-20) Ministry of Food

processing (21.8 %), Ministry of consumer Affairs (44.4 %) and Ministry of Coal (7 %) during 2019-20.

The MDoNER has only a limited role of coordinating and monitoring the expenditure under 10 % GBS and recommending to the Ministry of Finance reallocations of the unspent resources to those Ministries who have the additional absorptive capacity. However, the MoF invariably agrees to only few of the recommendations. This has severely affected the funding pattern and also the maneuverability of the MDoNER as a key implementing agency along with the NEC.

However, in more recent years the MDoNER monitors every quarter the 55 ministries in terms of statement 11 in the Government of India's budget. If certain issues crop up, the MDoNER raises and negotiates the same with the State Governments or the Ministries concerned. The revised target in 2023-24 was Rs 92,000 crore and the MDoNER spent 127460 crore, around 111.13%. The cumulative figure in the last 10 years show that as against the budgeted Rs 5.15 lakh crore and 5.22 lakh crore was spent, again 101.43%. This demonstrates that resource is not a problem with Government of India.

However, many times projects that come to the MDoNER, it shows some output but does not show how it impacts, how it is beneficial to the society. Outcome is something which is monitorable. Both NITI Aayog and MDoNER have started monitoring it. It ensures that a road is not built if there is no village to benefit from it. So, the outcome must be identified. And output, outcome, monitoring framework must be thought of when the design of any scheme or design is submitted.

As a result, in the last many years, the absorption capacity of the state is linearly increasing. That is why States are now able to spend more than what have been allocated. Whenever the states build something they have to ensure and address capacity building. If not, they have to add capacity building part also in the scheme. A parallel thinking is essential in building a hospital and appointing the doctors, nurses and other para medical staff. Two processes cannot be done after the time lag of construction of the hospital

Further the NLCPR (transfer of unspent balance of 10% GBS annually of Central Ministries/Departments in the non-lapsable basket) by now has a significant accumulation of over Rs 75000 crore till March 2020 which is not used by the MoF for funding of any state level and regional projects. Besides adjusting budget provision of the MDoNER (which has a total annual resources allocation of a meagre Rs 3000 crore) under certain specified heads, there is a strong case for the MoF to steadily leverage the accumulated NLCPR funds now restructured as North East Special Infrastructure Development Scheme (NESIDS- 2018) to key regional projects.

The NITI Forum (co-chaired by the Minister of DoNER and Vice Chairman, NITI Aayog) has identified these projects in education, health, bamboo, tea, tourism, dairy and pisciculture. Both the MDoNER and the NEC have already identified and designed a shelf of projects worth more than Rs 35000 crore and Rs 34000 crore respectively under the newly floated flagship NESIDS. Many of these projects could be redesigning and modified to cater to the

NER Vision 2047 targets and goals for the un- interrupted long term funding support of NESIDS.

In order to overcome these constraints in utilizing allocated 10 % GBS, the Central Government may constitute an Oversight Committee consisting of NITI Aayog, MDoNER, NEC, Chief Ministers of the NER states and Ministry of Finance to ensure the effective utilization of the funds and also with full authority to reallocate unspent resources to other Ministries and agencies.

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Chapter 16

Operationalization of Vision 2047:

16.1 The Strategies

16.2 Institutions, Approaches

16.3 Options

This chapter is under preparation.

Suggestions are welcome

Please send your views and comments and suggestions on the issues of effective and speedy operationalization of the NER Vision 2047 to:

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