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# Harnessing the Untapped Natural Resources of North East India for Sustainable Development and Growth

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**ABSTRACT**

*North East India, consisting of eight states and abundant in untapped natural resources like biodiversity, hydropower, forests, minerals, and water bodies, offers substantial prospects for sustainable economic growth and development. This paper examines the region's rich resources, highlighting its designation as a global biodiversity hotspot characterised by varied ecosystems, significant hydropower potential (approximately 40% of India's total), extensive forest cover that sustains medicinal plants, bamboo, and wildlife, as well as mineral reserves including coal, petroleum, and limestone. It underscores issues such as underutilisation, environmental deterioration due to deforestation, shifting farming, and anthropogenic activities, along with obstacles to tourist growth, including accessibility and infrastructural deficiencies. The research underscores sustainable management, advocating for measures such as community engagement, environmentally sustainable legislation, reforestation, and the incorporation of traditional knowledge to use resources for employment generation, biodiversity preservation, and regional advancement. By reconciling economic exploitation with ecological care and indigenous empowerment, North East India can serve as a paradigm for inclusive, sustainable development in accordance with India's overarching objectives.*

***Keywords****: North East India, Nature, sustainable development, hydropower potential, environmental protection.*

## I. INTRODUCTION

**"Man is part of nature, and his war against nature is inevitably a war against himself."**

**- Rachel Carson**

Nature has lavished us with numerous gifts. They're frequently referred to as natural resources. Natural resources have made this planet habitable and have aided the evolution and survival of living organisms. Natural resources are critically important to all living organisms, notably

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humans. The natural resources of northeast India are abundant. Significant natural resources, such as land, forest vegetation, livestock, etc., are either underutilised, unutilised, or poorly managed despite being crucial for generating GDP and jobs in Northeast India. Therefore, a strategy for resource utilisation should be implemented in order to increase the natural resources' productivity and build the Northeastern communities' capacity to utilise them to their fullest potential. Moreover, the primary resources have the potential to replenish secondary resources, thereby offering rural residents more job prospects. It is possible to create jobs by promoting sustainable development through the management of natural resources. Additionally, it aids in biodiversity conservation. The parts that follow will focus on the natural resources that can be found in Northeast India.

The North East region of India has a total geographical area of 262,180 km2, and according to the 2011 census, approximately 3.8% of the country's population lives there. This area includes 5,483 km of India's international borders and is home to about 40 million people. The region is made up of eight states: Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Sikkim, and Tripura. The Northeast is known as India's East-Look Policy gateway and possesses a wealth of untapped natural resources. The area's natural resources typically consist of land, hydropower, forests, and minerals. North-East India has the potential to grow economically because of its abundance of resources.

India's northeastern area is situated south of the Himalaya and is measured between 275°7' N and 28°23' N in latitude and 89°46' E and 97°25' E in longitude. There are 329 million hectares in all of India, compared to 26.22 million hectares in the Northeastern Region.[3] North-East states comprise Assam, Meghalaya, Arunachal Pradesh, Nagaland, Tripura, Manipur, Mizoram, and Sikkim. Bhutan, located between the states of Sikkim and Arunachal Pradesh, and China, to the north and northeast, are the region's international neighbours. It also shares a southern and southeast border with Bangladesh and Myanmar. Tripura and Assam are on the plains, but the remaining states are predominantly mountainous with difficult-to-access terrain. The Chicken's Neck, also known as the Siliguri corridor, is a tiny land bridge that connects the western and eastern sides of the area. It runs between Bangladesh and Nepal. The region has a range of climates, from subtropical to quite alpine. January is the coldest month of the winter, whereas June and July are said to be the warmest months. The Himalayan region, particularly Sikkim and Arunachal, has frigid temperatures, with January being the coldest month and staying far below freezing. July is the warmest month and has moderate temperatures. Year-

[3] NEDFi Databank, Available at http://databank.nedfi.com/content/north-east-india (last visited 16.10.24)

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round, the alpine region experiences a lot of heavy fog. The mean annual rainfall in these hill states ranges from 1,400 millimetres to 3,000 millimetres, making them the states with the highest rainfall in the nation. One of the wettest places on Earth is Cherrapunji, Meghalaya. From 1973 to 2012, a total of 40 years, 11,859.4 mm (38.90 feet/466.90 inches) of rain fell on Cherrapunjee annually.[4]

Given its abundance of natural resources, the Northeast region of India is at a turning point in terms of both economic growth and sustainable development. The region offers special prospects in the areas of hydropower, biodiversity, minerals, forests, and agriculture that, when used properly, may greatly advance India's development objectives while maintaining the natural integrity of the area.

## II. Biodiversity: A Critical Asset for Sustainability

Biodiversity indicates the variability among living organisms from all sources including inter alia terrestrial, marine and other aquatic eco-system and ecological complexes of which they are a part; this includes bio-diversity within species, between species and of ecosystems. The three main components of biological diversity are (1) Genetic diversity: The Allelic variation within a species such as different rice varieties, different varieties of Babul, different varieties of cows, sheep etc. (2) Species diversity: This is the most common method of measuring biological diversity which indicates total no. of species and their dominance. (3) Eco-system diversity: The forest eco-systems are mostly highly diverse and within the forest eco-system Rain forests are more diverse than low rain falls areas or mangrove.

India's biodiversity space is greatly influenced by the North-Eastern Region, which ranks among the country's tenth bio-ecographic areas. Bangladesh, China, Bhutan, and Myanmar share borders with the North Eastern Region of India, which is located between latitudes 220N and 2905'N and longitudes 88000'E and 97030'E. The region is one of the richest in biological assets, with plant types ranging from Tropical rain forest in the foothills to Alpine meadows and frigid deserts. It is also the physical "gateway" for most of India's flora and wildlife. As one of the 25 global biodiversity hotspots, the area is recognised as representing a significant portion of the Indo-Myanmar biodiversity hotspot. Due to factors such as floristic composition, the naturalness of the flora, and the local climate, the almost 2,62,379 sq. km. North Eastern region of India has been classified into two bio-geographic zones: North East India and the Eastern Himalaya.[5] Northeast India is a meeting point for the Himalayan Mountains and Peninsular

[4] Cherrapunjee Holiday Resort, Available at http://www.cherrapunjee.com/index.php?mid=7&pid=7( last visited 15.10.24)

[5] Rodgers,W A and Panwar, H S (1988) Planning a Wildlife Protected Area Network in India. Vol.2. Wildlife

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India, as well as the biogeographic transition zone between the Indian, Indo-Malayan, and Indo-Chinese areas. After Gondwana broke apart in the early Tertiary Period, the "Deccan Peninsula," which is drifting northward, made its initial contact with the Asian landmass. Being the "gateway" region for a large portion of India's flora and fauna, North-East India boasts one of the highest biological values. This transition zone between lowlands and highlands is home to the greatest diversity of biomes, or ecological communities, and there are also exceptionally high species diversities within these communities. Northeast India is endowed with a diverse range of ecoclimatic and physiographic characteristics. The State of Assam is home to enormous flood plains, while the Khangchendzonga in Sikkim is 8586 meters tall. While adjacent Mawsynram has the greatest average rainfall in the globe (11,873 mm), Cherrapunjee in the State of Meghalaya holds the records for the most rainfall in a single month (9,300 mm) and the most in a year (26,461 mm) in India. The region's forests combine alpine meadows, freezing deserts, and tropical and temperate forest types, resulting in a remarkably varied structure and composition. Certain areas within the State of Sikkim, for instance, have a swift transition in faunal assemblages from tropical to subtropical, temperate, alpine, and ultimately cold desert forms. The primary area of tropical forests in India, particularly the species-rich tropical rain forests, is found in Northeast India, following the Andaman and Nicobar Islands and the Western Ghats. The lowland tropical semi-evergreen and moist deciduous woods in this area stretch eastward into Southern China and Southeast Asia, and westward into the subcontinent. The subtropical forests of the region follow the foothills of the Himalaya to the west; also extend into Southeast China in the east. Himalayan temperate and subalpine zone forests extend from northern Pakistan and adjacent Afghanistan through Northeast India to Southwest China. Each of the eight States of the region, namely Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland, Sikkim and Tripura, boast of several endemics in flora as well as fauna.

Numerous landslides, resulting soil erosion, and seismic activity have disrupted, altered, and in some cases completely destroyed the main vegetation in large parts of Northeast India. Even while these natural factors have only slightly influenced the type of flora that has changed, human activity is primarily responsible for the irrevocable changes to the landscapes and the enormous loss of biodiversity that has occurred throughout the region. Numerous species have been driven to the verge of extinction by human activity, which has also severely damaged natural ecosystems. Natural habitats are being destroyed practically everywhere in the region,

Institute of India. Dehra Dun. Available at http://indianmedicine.eldoc.ub.rug.nl/id/eprint/56248 (Last access 10.10.24)

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which is extremely concerning. Even more concerning is the fact that the forest's quality is declining, with deep forests being converted to open forests or scrub. Even though there is a sequence of edaphic formations, a sizable portion of the land has already been turned into wastelands that are unproductive and dismal. There are disparities in the overall area under jhum (shifting cultivation) in the region according to various agencies. It is undeniable that other human impacts have resulted in environmental degradation with catastrophic effects and a jhum cycle that is getting shorter.

Often referred to as "India's forgotten corner," northeastern India is thought to have benefited from its isolation in terms of biodiversity preservation. However, most of the region's interior has already seen the introduction of the market economy, dishonest urban traders, and intermediaries to the local population due to the expansion of roadways. Large swathes of rainforest could be submerged as a result of a number of proposed dams located throughout the Northeast. The potential threat that these projects pose to the region's biodiversity is made clear by thorough environmental impact evaluations, which are required by law. The Northeast Indian population possesses impressive ethnobotanical knowledge. But in the name of progress, massive deforestation and species extinction in the area are causes for grave concern.

## III. WATER RESOURCES IN NORTH-EAST INDIA

The region has an abundance of water resources. The two largest river basins in Northeast India are those of the Brahmaputra and Barak rivers. One of the largest rivers in the world, the Brahmaputra flows across 5,80,000 square kilometres, with 33% of its flow falling in India. The river rises 5,300 meters above sea level from the glaciers of Chema-Yung-Dung in the Kailas range of southern Tibet. The Indian states with the greatest river basins include Arunachal Pradesh, Assam, West Bengal, Meghalaya, Nagaland, and Sikkim. Of the whole area of the river, 50.5 percent goes to China, 33.6 percent goes to India, 8.1 percent goes to Bhutan, and 7.8 percent goes to Bangladesh. Beginning in Manipur, India, the Barak River travels through Bangladesh and Myanmar. The whole north, northwest, western, and southwestern parts of the state of Manipur are included in the upper Barak catchment region. As opposed to the lower deltaic segment flowing in Bangladesh, the main section of the river flows through Cachar in southern Assam. Living in their floodplains and depending on agriculture and fishing for a living, the inhabitants of the Brahmaputra and Barak rivers are both essential lifelines. Approximately 40% of the 145320 MW total hydropower potential assessed in the country, or the North Eastern Region (NER), is projected to have huge hydropower potential. The State-wise Hydro Power potential and development status in the North Eastern Region of the country

is as shown in Figure 1 and 2 under:[6]

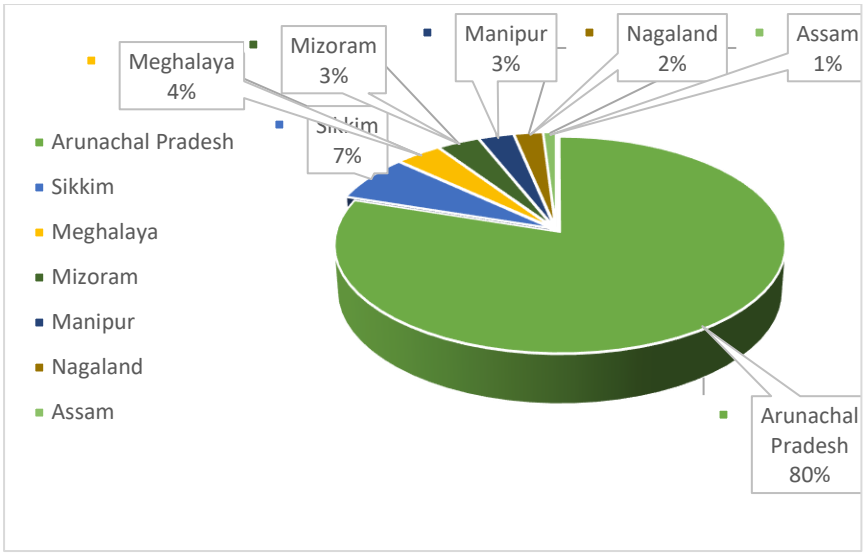


**Fig.1: Exploitable Potential (MW): Hydropower in N.E.**

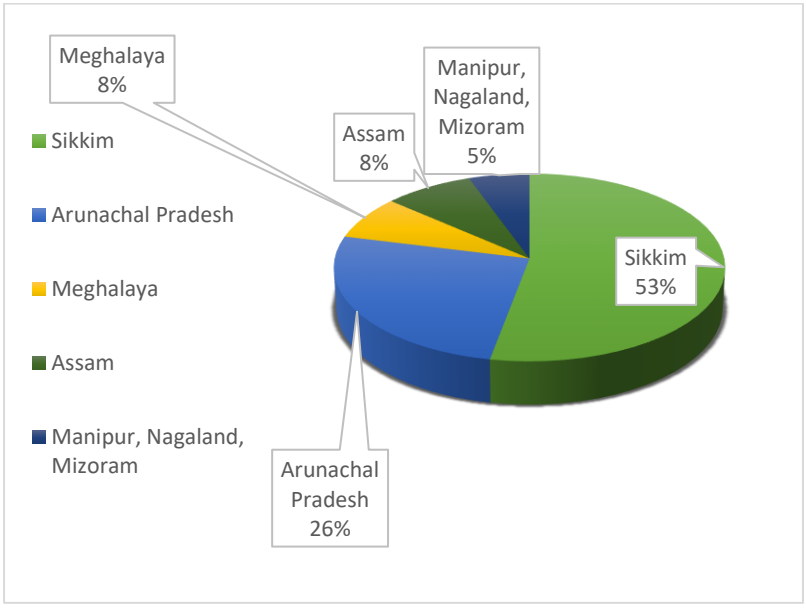


**Fig.2: Developed Capacity (MW): Hydropower in N.E.**

Although the development of hydropower in India began with the construction of a 130 KW plant in Darjeeling, the region neighbouring the NE Region, in 1897, the expansion of hydropower in the region has remained extremely slow. The North Eastern Region's share of hydropower potential is estimated to be just 6.9%, compared to the country's total exploited hydropower potential of roughly 28%. Only Arunachal Pradesh has the lion's share of the NER's hydropower potential—80%, or 50,064 MW. As a result, CPSUs (Central Public Sector

[6] Developing north east region through development of its hydropower potential by Dr. Prashant Prabhakar Deshpande**.** Available at https://timesofindia.indiatimes.com/blogs/truth-lies-and-politics/developing-north-east-region-through-development-of-its-hydropower-potential/( Last access on 11.10.24)

Undertaking) like North Eastern Electric Power Corporation Limited (NEEPCO), National Hydroelectric Power Corporation (NHPC), Satluj Jal Vidyut Nigam (SJVN), and Tehri Hydro Development Corporation Limited (THDC) in Arunachal Pradesh have been selected to receive an aggregate of 29 hydropower projects totaling 32415 MW.

## IV. FOREST RESOURCE IN NORTH EAST INDIA

Forest resources are essential to a great number of hills and plains, especially in Northeastern India. That might be a renewable resource with proper management. In addition to being a huge biodiversity centre, it is also a hotspot. Enormous medicinal and ornamental plants, fruits, vegetables, and precious trees like Sal, Teak, Champu, Sishu, Neem, Agaru, Halokh, Sarol, Bamboo, Cane, Simul, and Gamari are among the abundant natural resources found in the Northeast region. North East India is home to an abundance of both animals and birds. Elephants, Hoolock gibbons, Crapped Langur, Musk deer, Bear, Wild boar, Royal Bengal Tiger, Barking Beer, Bison, Civet cats, Wild cats, Snow leopard, Monitors, Lizards, Python, Cobra, Tortoise, Turtle, Peacock, Storck, Vulture, Eagle, Parrots, Doves, Ducks, Pelican, Python, Cobra The one-horned rhinoceros of Assam's Kaziranga National Park are well-known. UNESCO named the Kaziranga National Park a World Heritage Site in 1985. The locals established modest businesses including plywood mills, paper and pulp mills, raw mills, and a facility for producing matches because to the area's wealth of resources. The woods of the Northeast provide tea, rubber, silk, tobacco, bamboo, and fruits like mango, pineapple, and orange.

Travellers from all over the world are drawn to the North-East's animal reserves. A thriving tourism sector may emerge from the NER's enchanting woodlands. In the northeast, the tourism industry is expanding and has enormous potential to generate income for the states. Both in developing and industrialised nations, there is a growing desire, particularly among young people, for medicinal plants. This is leading to an exploration of forest-based plant products as potential sources of new medications. Remarkably, relatively few species are cultivated, and the majority of marketed material still comes from the wild. China is the top exporting nation, with India coming in second, according to data provided by the International Trade Centre, Geneva. India's Northeast region ranks first among areas having a high concentration of medicinal plants, with an estimated 2000 species. If the medical herbs are grown with the right care and upkeep, this will boost the economy of the Northeast. Additionally, North East India has considerable potential for the establishment of herbal medicine research institutes. Once more, utilising indigenous technology knowledge for entrepreneurship growth may hinge on

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applying a scientific approach to its investigation, utilisation, conservation, and value addition. Though it is underutilised, bamboo is one of the North East Region's most abundant, sustainable, and ecologically friendly resources. The densest bamboos are found in Arunachal Pradesh, Mizoram, and Manipur. Mizoram and Meghalaya are the states with the greatest areas of forest covered in different varieties of bamboo. The greatest bamboo resource in India is found in this region, thus screening is required to identify the most delicate species and create a set of protocols for mass replication. Four Northeastern states—Tripura, Assam, Mizoram, and Nagaland—have each created a distinct plan for protecting forests and growing bamboo. Tribal cultures in the area use this potential resource for a range of ethno-religious purposes as well as for food, housing, furniture, handicrafts, and medicines. Working with bamboo is a reasonably common ability; several ethnic groups have high levels of craftsmanship in this area. Tribal cultures in the area use this potential resource for a range of ethno-religious purposes as well as for food, housing, furniture, handicrafts, and medicines. Working with bamboo is a relatively widespread skill, and many ethnic groups have excellent artisans who can create beautiful pieces using this material. The North East's rich bamboo craft history finds its most innovative expression in the work of the several tribes that make up the Northeast. These artisans use a variety of chisels to construct complicated structures and a wide range of cuts and profiles in their several variations of bamboo crafts. Among the items they make are trays, unique furniture, mats made of bamboo and cane, colourful lamp shades, stools, hand fans, baskets, hand bags, jewellery, and other items. This site may see a rise in the export of canned and steaming bamboo shoots to European countries. They're all labour-intensive industries with lots of job opportunities in developing nations. Because of this, the North Eastern States' bamboo industry has the potential to provide a sizable amount of employment. There are many different types of plants in North East India, most of which are employed in the cosmetic and perfume industries. The fragrance raw materials that are in high demand worldwide can be replicated in the North East. Given its strong ties to local economies, it has the potential to revitalise the Indian economy from the ground up.

## V. TOURISM IN NORTH EAST INDIA

There are many different types of tourist attractions in the North-East States of India, some of which are unparalleled in their allure and draw power. However, these, with a few exceptions, have not developed into well-known tourist sites on a national scale due to their remoteness, accessibility issues, lengthy travel times, security concerns, and a host of other problems. The majority of the other locations are moderately appealing, but not sufficiently so to stand alone as significant tourism attractions. As things are, they are not able to draw both domestic and

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foreign tourists. This region of India is home to numerous national parks, wildlife refuges, and other natural tourism destinations. However, there hasn't been much development surrounding National Parks and Wildlife Sanctuaries; it's either poorly planned or poorly governed. The biggest perennial water system in India, the River Brahmaputra and its tributaries, rare and rich flora and fauna, abundant fruits, vegetables, flowers, herbs, and aromatic plants, as well as horticultural products, plantation crops, vegetables, and spices, are all bestowed upon this region. Particular interest travellers would be drawn to certain locations. To ensure that these medium-level attractions receive tourist attention and grow, it is crucial to create tourism circuits. This is an extremely diverse region, home to about 220 different ethnic groups and an equal number of dialects. Over a third of the biodiversity of the nation is found in the rich biologically diverse region of North-East India.

It is said that this area is where some of the significant gene pools for rice, citrus, and bananas originated. The vast ecological diversity is a result of a wide range of man-made ecosystems, including the alder-based agro-ecosystem, wet rice agro-ecosystem, and jhum (one form of shifting cultivation) agro-ecosystem. Numerous tourism resources, including historical, cultural, natural, and heritage, are available in the North-East Region. Due to the region's incredibly rich tribal culture, travellers from abroad used to come witness it. In North-East India, numerous tribal people continue to practise their cultural customs and traditions. There are only 26 major tribal groups with several subgroups in Arunachal Pradesh. When it comes to crafts, the entire region is incredibly rich, especially handlooms, which differ between the States, bamboo goods, etc. Local arts and crafts are not regarded as a major tourist resource in the current tourism scenario. However, there is growing interest from tourists in this both domestically and outside. Fairs and festivals are large, vibrant events that truly capture the rich cultural legacy of the states in the northeastern region. The Hornbill Festival is held these days with great enthusiasm, and many tourists come by during that time. Trekking, mountaineering, jungle safari trails, adventure activities, ornithological tour programs, Buddhist circuit tours, cultural tours, exquisite sea beaches, pilgrimage tours, tea tours, and many more possibilities that might entice tourists are just a few of the nearly endless tourism activities that the region has to offer. Due to the fact that these resources set this location apart from others in terms of tourism, they must be appropriately managed and conserved.

There are many different tourist destinations in the Region, and every State has unique characteristics of its own. The attractions are dispersed throughout the region and are mostly found in isolated locations within extremely delicate settings. The region's population and these sites make up the region's overall tourism resources. The visual and performing arts, crafts,

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traditional rites and costumes, fairs and festivals, oral literature, way of life and diet, etc. are some of the cultural products that the area offers for tourism. There are numerous fairs and festivals held in each state, which draw large numbers of tourists and each has a distinct message to offer visitors moving from one state to another. These celebrations showcase the rich indigenous culture of the area along with folk music, tribal dances, local cuisine, and handicrafts.

North-East India, with its diverse population and physical landscape, is one of the country's most potential tourist destinations in the context of the rapidly expanding global tourism industry. Despite their breathtaking scenery, India's northeastern states have received less travel attention than the rest of the nation. The Northeast has not yet reached its full tourism potential. The area is referred to as a "paradise unexplored" by the Ministry of Tourism. Forecasts for the future indicate that the surge in global tourism will not abate. Travellers from the younger generations—who are "money rich and time poor"—are becoming more and more interested in unusual experiences. An increasing number of individuals perceive travel as an experience rather than a journey; this development is known as the "experience economy." Since tourism is a multifaceted industry, its success depends on the participation of numerous other organisations. Roads, culture, the forest, and other departments, among others, can all have a significant impact on how the overall tourism offering develops. In order to attain optimal coordination, it is necessary to establish institutional arrangements.

The Northeast is quite alluring due to its diversity and originality. The varied cultural and ethnic mosaic, the rich natural beauty and its diversity, the flora and wildlife, and the tranquilly of the untouched, pristine ecosystems provide visitors the chance to have a completely unique experience. The justification for the North-East integrated "look east" policy and a trade-led economic plan has been thoroughly discussed. It is argued that the landlocked Northeast is in a prime location to connect India with ASEAN from a geographical and economic standpoint. Strong historical and cultural ties between the North East and the East could be used to promote economic cooperation. Regretfully, despite its relative advantage in this field, people do not consider tourism to be a significant source of income. Educating the public about the role of tourism in general and sustainable tourism in particular in the region's socioeconomic planning should be the top priority for the governments. However, such initiatives to raise awareness can only begin when the governments themselves are persuaded of the value of tourism and give it the attention it deserves during the planning stage.

The majority of the region's tourism planning seems to be done on the fly. Moving away from such an ad hoc approach and creating clear action plans that outline future directions is

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imperative. Each state needs to release a practical tourist policy that outlines an actionable goal and isn't just vague. The government's dedication to eco-friendly travel, the position of tourism in overall development plans, and the involvement of other important stakeholders should all be mentioned. The policy should specify the organisational structure that will be used to carry it out as well as a system of oversight and responsibility.

Appropriate use and explanation of tourism resources are promoted by sustainable tourism development, and development should be directed in a way that meets needs both now and in the future. In order for the tourism industry in this region to flourish and be able to sustainably contribute to the local socioeconomic conditions, there needs to be improved management at the local government level. This includes guiding, facilitating, and coordinating the process. Both domestic and foreign tourists have struggled to find their way to the Northeastern region of India. Most of the region is naturally wealthy but rather unstable politically, with a pleasant climate but challenging geography, and a diverse range of cultures but weak economic foundations. According to the current report, the North-East Region's tourism economy is growing, although not at the rate that was anticipated. The North-East Region of India remains a backward region despite the Government of India's special attention to it due to numerous obstacles. When it comes to the increase in tourist arrivals, Nagaland had a greater average rise in 2013–14 than other Northeastern states. The rate of inflows has increased, indicating a notable development in the travel and tourism sector. The North-East Region's tourism development is mostly hindered by a lack of funding, inadequate transit options, ineffective management, safety concerns, permit challenges, and other issues. Thus, it might be inferred that the primary issue plaguing the North-East tourism sector is the absence of sufficient and dependable tourism infrastructure. In the event that tourist amenities, conservation, and upkeep are neglected, the North-East Region would never be able to keep up with the growth of tourism in other regions.

## VI. MINERAL RESOURCES

The mineral resources that are available in North East India include coal, petroleum crude, natural gas, limestone, sillimanite, dolomite, uranium, china clay, kaolin, fuller's earth, feldspar, and other minerals. The states that produce the greatest coal are Assam and Meghalaya. Apart from the vast oil and natural gas deposits of Assam, there are also accessible small amounts of petroleum crude in the Changlang region of Arunachal Pradesh and the Brahmaputra region of Tripura. There is also a lot of natural gas in the region. Access to natural gas is available in Assam and Tripura. For almost 40 years, the IOCL (AOD) Digboi Refinery has used natural

gas for boiler fires and subsequently for the production of electricity. Through its pipeline, Assam Gas Company Limited provides natural gas to a number of Assam Tea Gardens for use in the tea processing sector.

With several states surpassing the national average in terms of socioeconomic growth and economic development, North-East India is drawing interest from throughout the country. The bulk of the Northeast's acknowledged mining sector is accounted for by Assam and Meghalaya. There are a lot of petrochemical components in Assamese natural gas. It is possible to strip and disassemble polymers such as linear low-density polyethylene (LIDPE), high-density polyethylene (HDPE), ethylene, butadiene, and propylene into their constituent parts. These parts are utilised as raw materials to make other items. Up to 3000 polymer-based units with a 100 MTPA processing capacity can be put up in the small and medium sector to address the needs of the population in the area. It will work well as a replacement for wood-based products and jute in Assamese tea sector, which is valued at Rs. 54 billion. Its neighbouring countries, Burma, Nepal, and Bangladesh, offer prospective markets. It is anticipated that this underdeveloped area's industrial landscape would change significantly after the petrochemical plant is completed. The residents of the area will have additional employment opportunities as a result, and downstream small-scale industrial units will experience a major boost. A massive coal resource known as "Black Gold" exists in Assam and Meghalaya. There are reportedly 395 million tonnes of coal in the NER in addition to other important minerals. The three states of Meghalaya, Assam, and Arunachal Pradesh are projected to have a combined coal potential of 1642.64 million tonnes, according to Mulkh Raj Jarngal, additional director general and head of the Department of GSI, NER. Owing to its distinct low-ash composition, Assam coal holds great potential for the growth of numerous industries, hence making a big contribution to the NER's GSI. Assamese coal may be used by steel companies in Assam for metallurgical purposes. In actuality, a number of the nation's steel mills currently use Assam coal to make coke. Sankardev Coke Products Pvt. Ltd. can produce 9450 TPA at its installed capacity. Bee-hive coke is made by Limited Liability Company using coal from Meghalaya and Assam. In the industry that produces graphite, the product is highly sought after. Cement factories and alloy casting for graphite electrodes. It has been supplying 400 MT of coke a month to the graphite business located in Durgapur. Because of its high sulphur concentration and low ash percentage, Assamese coal is perfect for manufacturing fertiliser. Therefore, there is a great deal of potential for coal-based industrial development in the NER. The NER offers great potential for the limestone industries as well. Third-largest uranium deposits are found in Meghalaya, behind Jharkhand and Andhra Pradesh. With more than two thousand uses, limestone is a mineral with

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great versatility. One product made from limestone that is highly sought after and has many uses both locally and nationally is cement. China clay is used in many industries, including ceramics, paper, rubber, textiles, paint, chemicals, and cosmetics. NER's paper mills primarily buy China clay. The market for ceramic goods will only grow due to population growth and desires for higher living standards. High tension and low tension porcelain insulators are desperately needed for the Meghalaya State Electricity Board (ASEB), the post and Telegraph departments, and the potential for significant hydro power production in the Northeastern region. There is a lot of promise in the granite business in the region. Granite blocks can be treated in several ways, one of which is to create granite tiles. As the number of hotels, movie theatres, and public buildings rises, so will the need for polished granite slabs. We can therefore draw the conclusion that NER has a bright future for a wide range of mineral-based businesses. Now that the necessary resources and marketability are available, both the construction of new units and the restoration of suspended ones should be started.

## VII. CONCLUSION: A PATH TOWARD SUSTAINABLE GROWTH

The North East is endowed with significant natural resources, including forests, minerals, hydropower, and water. Forest resources, with their rich diversity of species, have the potential to support industries such as medicinal plants, bamboo, and timber, while also playing a vital role in climate change mitigation. However, unplanned deforestation, shifting cultivation (jhum), and increasing human encroachment pose significant threats to the region's ecological balance. A focused effort on sustainable forestry practices, reforestation, and promotion of agroforestry systems can help rejuvenate the region’s forest cover, prevent soil erosion, and improve livelihoods.

The indigenous communities of North East India are the custodians of the region’s natural resources and traditional knowledge systems. For any development strategy to succeed, it is essential that these communities are actively involved in decision-making processes and that they benefit from the region’s economic growth.

Efforts to harness the region’s natural resources must prioritize the rights and livelihoods of indigenous people. This includes providing them with secure land rights, access to education and healthcare, and opportunities for entrepreneurship. Traditional practices, such as shifting cultivation, should be integrated into modern sustainable agriculture systems to ensure that development does not come at the expense of cultural heritage.

By promoting policies that support indigenous entrepreneurship in sectors like handicrafts, organic farming, and ecotourism, the government can empower local communities to take

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ownership of their development. This will not only ensure that the benefits of resource extraction are equitably shared but also that the development process respects the region's cultural and ecological uniqueness.

Government policies play a crucial role in shaping the future of North East India. To harness the region's natural resources sustainably, there is a need for coordinated efforts between central and state governments, as well as collaboration with the private sector and civil society. The government must prioritize infrastructure development, environmental conservation, and community empowerment in its policy frameworks.

Policy reforms should focus on incentivizing sustainable practices in agriculture, forestry, and mining. At the same time, policies that promote the development of renewable energy, particularly hydropower, should be implemented with strong environmental safeguards. The government must also address issues of connectivity, particularly by improving road, rail, and air transport networks, to integrate the region more fully into the national economy.

A comprehensive development plan for North East India must also include strategies for capacity building and human resource development. Education and skill development programs that equip the local population with the knowledge and skills needed to participate in the region's emerging industries will be critical for long-term success.

North East India holds immense potential for sustainable development and growth, driven by its rich natural resources, biodiversity, and cultural heritage. However, unlocking this potential requires a holistic approach integrating economic development with environmental conservation and social inclusion. By promoting sustainable resource management, empowering local communities, and investing in infrastructure and human capital, North East India can become a model for sustainable development in India and beyond. This journey, though complex, offers the region a pathway to not only greater prosperity but also a harmonious balance between growth and ecological stewardship.

The key to unlocking this potential lies in balancing resource extraction with environmental conservation, ensuring that local communities are active participants in decision-making, and promoting inclusive, sustainable practices. With the right mix of policies, investments, and community engagement, the North East can emerge as a leader in sustainable development, setting an example for the rest of India and the world.

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