GEOPOLITICS OF NORTH EAST INDIA

A STRATEGICAL STUDY

JOYSANKAR HAZARIKA

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GYAN

GYAN PUBLISHING HOUSE

New Delhi 110 002

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(*Geography, Politics, Anthropology, Tribal Studies*)

ISBN : 81-212-0517-4

Published in 1996 in India by
Gyan Publishing House
5, Ansari Road
New Delhi - 110002

Printed at Mehra Offset Press, New Delhi - 110002

ACKNOWLEDGEMENT

This work has come to an end due to my supervisor Professor N.N. Bhattacharyya who motivated and inspired me all through the long period and patiently gave his great self to this end. I express my deep sense of gratitude and shall remain highly indebted to him for ever.

I express my gratitude to my teachers Prof. S.P. Mandal, Prof. S.D. Roy, Prof: M.M. Das, Dr. S. Borthakur, Dr. R. Barman and Dr. A.K. Bhagabati for their valuable suggestions and help.

My sincere thanks to the teachers of Department of Geography, J.B. College—Prof. H.N. Bora, Dr. A.K. Mahanta, K.K. Gogoi and Bimal Borah for their co-operation and suggestions.

I am thankful to my friends, Dr. M. Konwar, Rajib Sarmah, Bolin Hazarika, Bhupen Nath and Surajit Sarmah for their kind assistance in various spheres of the work and shall remain grateful to Haresh Dutta for his efficient typing and related works.

JOYSANKAR HAZARIKA

LIST OF TABLES

Table No.		*Page No.*
Table 1.	Areas of Different States of N.E. India within Different Elevations	22
Table 2.	Distribution of the Average Monthly Temperature and Rainfall	24
Table 3.	Soils of North East India	27
Table 4.	Flood Damage in the Brahmaputra Basin Area	33
Table 5.	River Basins of North East India	33
Table 6.	Hydel Power Projects of N.E. Region	33, 34
Table 7.	Area Under Forest	35
Table 8.	Area Under Forest in the Assam Valley	35
Table 9.	Density of Population in North Eastern Region	38
Table 10.	Family and Language Distribution of North East India	44
Table 11.	Language and Size of Population in North East India	47, 48, 49
Table 12.	Population of North East India	49
Table 13.	Percentage Distribution of Language	50
Table 14.	Population and Dominant Language of the two valleys of North East India, 1901	50
Table 14(a)	Major Ethnic and Linguistics Groups of North East India	51, 52
Table 15.	The Eastern Himalayan Sub-Region or North Eastern Region in the Formation	73
Table 16.	Percentage of District Tribal Concentration North East India	80
Table 17.	Population of the Province of Assam	84

Table 18.	Bengali and Assamese Population in the Province of Assam, 1901	85
Table 19.	1971 Census Figures	88
Table 20.	Population of the Hill Region — North East India 1881 and 1891	96
Table 21.	Some Select Data on Extent of Cultivation and Population Density	96
Table 22.	Exports from Assam in 1809 and Export from Bengal in 1809	98
Table 23.	The Assam Company's Statistics, 1840 -1849	99
Table 24.	Total Area under Tea in Assam Proper, 1859	102
Table 25.	Exports from Select Districts of Assam to Bengal, 1852	102
Table 26.	Factories at Work in the Province in 1921	104
	Assam-Arunachal Pradesh Boundary	116
Table 27.	Areas Claimed by China	135

CONTENTS

		Page No
Acknowledgement		(v)
List of Tables		(vii)
List of Illustrations		(ix)
	PART—I	
	INTRODUCTION	
Chapter 1 : Introduction to the Problem		**1**
1.1	The Statement of the Problem	1
1.2	The Concept of Geopolitics	3
1.3	Review of Relevant Works	7
1.4	Significance of the Topic	9
1.5	Objectives	10
1.6	Hypotheses	10
1.7	Methodology	11
1.8	Organisation of the Study	12
Chapter II: Physical Base of the Region		**14**
2.1	Physiography	14
2.2	The Eastern Hills	17
2.3	Climate	22
2.3	Soil	25
2.4	Geology	28
2.5	Drainage	30
2.6	Natural Vegetation	36
Chapter III : The Population Base of the Region		**40**
3.1	The People	40
3.1.1	The Routes of Migration	40
3.1.2	Peopling Process	42
3.2	Language Distribution	43
3.3	Ethnic Cultural Diversity	50
Chapter IV: Historical Base of the Region		**57**
4.1	Introduction	57

4.2	The Turko-Afghan Invasions	58
4.3	The Advent of the Ahoms	59
4.4	Koch Kingdom	60
4.5	Assam Mughal Relations	62
4.6	Upheaval of Vaisnavism and Saktism	62
4.7	Moamaria Uprisings	63
4.8	Burmese Invasions	64
4.9	Advent of East India Company	64

PART—II

ANALYSIS

Chapter V: State Formation Processes in North East India		**69**
5.1	Politico - Territorial changes in North East India	69
5.1.1	Introduction	69
5.1.2	The Formation of North Eastern Province or Assam	70
5.1.3.	The Transfer Territory to Bhutan and Burma	72
5.1.4	The Scheduled Districts Act and Frontier Tracts Regulations	74
5.1.5	The Inner Line Regulation of 1873	74
5.1.6	The Excluded and Partially Excluded Areas	76
5.1.7	Manipur and Tripura	76
5.2	Emergence of Political Processes in the N.E. India	78
5.2.1	Emergence of Political Processes in the Valleys	79
5.2.1.1	The Revolt of 1857	79
5.2.1.2	Peasant Struggles in Jaintia Hills and Nowgong	79
5.2.1.3	Colonisation Scheme of Jenkins	82
5.2.1.4	Beginning of Modern Political Consciousness in the Plains	83
5.2.2	Emergence of Hills Politics	87
5.2.2.1	Influence of the two World Wars	89
5.2.2.2	Formation of Local Political Parties	89
5.3	The Economic Strength and Weakness During the Pre-British and British Period	92
5.3.1	Economic Relations Between Assam and	

Neighbouring Hill Areas in the Pre-British Period 93
5.3.1.1 Economy of the Plains 93
5.3.1.2 Economy of the Hills 94
5.3.2 Trade Relations Between the Plains and the Hills 95
5.3.3 The Development of Colonial Economy 97

Chapter VI : Geopolitical Problems in N.E. India

6.1 Introduction 108
6.1.1 Boundary Problems in N.E. India — Internal 108
6.1.1.1 Assam - Nagaland Boundary Dispute 110
6.1.1.2 Assam-Arunachal Pradesh Boundary Dispute 113
6.1.1.3 Assam-Meghalaya Boundary Dispute 119
6.2 The Inner Line, The Outer Line and the Birth of McMahon Line and Associated Problems 121
6.2.1 The Inner Line 121
6.2.2 The Outer Line 123
6.2.3 The Birth of the McMahon Line 124
6.3 North East Frontier of India and China's Claim 131
6.3.1 The Diplomacy 137

PART—III
SYNTHESIS

Summary and Conclusion 143
Suggestions 146
Bibliography 148

PART—I
INTRODUCTION

Chapter 1

Introduction to the Problem

1.1 The Statement of the Problem

The North Eastern part of India possesses a distinct regional geopolitical character because of its distant location, diverse physiographic framework with more ethnic diversity, economic backwardness with disparity in levels of development. Moreover, the region is flanked by four foreign countries—China, Myanmar (Burma), Bangladesh and Bhutan. Comprising seven states, namely Assam, Arunachal Pradesh, Meghalaya, Nagaland, Mizoram, Manipur and Tripura—North East India is located between latitudes 22° N and 29°3′ N and longitudes 89°46′ E and 97°30′ E. The region, covering 255,082 square kilometres of uneven surface, supports a population of 31.4 million (1991), which accounts for 7.7 per cent of the total land surface and 3.72 per cent of the total population of the country respectively. While the rest of India either has direct access to the sea or the capital city of New Delhi for contact and trade, India's North East is virtually land-locked. It is connected with the mainland by a narrow corridor of foothill land in North Bengal which is 33 kilometres in width on the eastern side and 21 kilometres on the western side and is subjected to occasional disruptions due to heavy rains and floods. Such terrestrial location of the region converts it into an isolated pocket where feelings of alienation tend to germinate easily among the population.

The terrain conditions of North East India also make it an isolated region. The Himalayas on the North and the Patkai-Barail range on the North-East and East, the Meghalaya and Karbi plateau

in the West and Central region, the Naga, Manipur, Mizoram and Tripura hills, with dense monsoon forests, have great bearing in the development of separatist tendency amongst the people. This tendency is further accentuated by poor levels of transport and communication in this region.

The historical moorings of this region are also charged with diversities. The region was known as Pragjyotisha, a very powerful kingdom with its capital at Pragjoytishpur, where the present Gauhati lies. Some non-Aryan kings ruled the region during the epic period and the name of the region became Kamrupa during the Puranic and Tantric period. After a long period of peace and freedom, the kingdom entered a new phase of unrest and hostilities during the Medieval period. In fact, this period begins with the invasion of Kamrupa by the Muslims (1205-1206 A.D.) and the Ahoms (1228 A.D.). As a result of this, many petty kingdoms emerged in Kamrupa. Thus the kingdom of Koches, Bhuyans, Kacharis, Chutiyas and Ahoms were established during 13th to 15th centuries. During the beginning of the sixteenth century, two powers attained their supremacy in the eastern and western part of Kamrupa and they were the Ahom and Koch dynasties respectively. The British, who came to this region to emancipate the people from the plight it faced due to political instability and the Burmese invasions, appeared in the political field of North East India through the treaty of Yandaboo in 1826.

Since 1826, the British administration took up the reins of development of this region and started exploiting the natural resources and accordingly formulated strategies to achieve its ends. The strategies which were adopted by the British were different in the plains and in the hills. As a result it gave rise to distinct political formations in the two regions. On the other hand modernisation processes led to the emergence of an elite group first in the plains, which realised the exploitative nature of the Colonial administration and raised its voice against it. Moreover, the desparity that the region gained due to the development process widened the gulf between the developing plains and underdeveloped hills.

Against this background of inherited socio-economic inequities, in the post-independence scenario, the Indian nation-state building processes have been facing serious problems of conflict, such as: the sub-national movements, boundary disputes, demands for regional autonomy, etc. But most of these conflicts have their roots

in the historic past i.e. from the pre-colonial to colonial period. Therefore, to understand the geopolitics of North East India it is imperative to analyse the basic legacies that this region inherited along with its attendant conflicts.

1.2 The Concept of Geopolitics

Introduction:

The concept of geopolitics demands some explanations as regards its origin, developments, present trends and its applicability to the present work. It is so because the concept underwent a change after the second World War and in fact got a revival since 1980. Leslie W. Happle rightly mentions in his article, titled 'The Revival of Geopolitics' as 'yet in the last decade the term geopolitics has crept back into use, and geopolitical analysis of both global and regional problems has become more common'.[1] A logical pre-requisite for any revival is a decline from a period of earlier activity. Therefore, here an attempt has been made to examine the concept of geopolitics in the light of its origin, decline and revival and to synthesize all these together for a relevant framework to study the present problem.

Origin:

The term 'geopolitics' entered the English language as a loose translation of Geopolitik, the pseudo-science that had become so highly popular in Germany in the inter-war years, 1919-1939. In its popular connotation, geopolitik denoted "mobilisation of and knowledge for the purposes of the state".[2] It implied "the application of knowledge and techniques of political geography to the problems of international relations—in particular, to the foreign policy of the German State"[3] and all its various shades of meaning related to the utilisation of geography in the service of the national government.

Rudolf Kjellen (1868-1922), the Swedish political scientist, originally coined the German language term 'Geopolitik' in 1898, though it received scholarly attention only during the first World War, particularly after the publication of Kjellen's essay 'The Ideas of 1914—A Perspective on World History' in 1915. In this essay Kjellen discussed the motto of German war-euphoria, and squarely expressed his solidarity with the cause of the German nation. Owing to this scientifically concealed support for German imperialism, Kjellen's

geopolitical ideas and writings (along with the term Geopolitik itself) gained wide popularity in Germany. Kjellen defined geopolitics as the "science which conceives the state as a geographic organism or as a phenomenon in space".[4] He believed that "wars, expansion, and breaches of international law are... not due to some fatalistic and deterministic force standing outside men, nations and their leaders". Kjellen was deeply interested in the geographical processes through which, in the course of the peopling of the earth's surface, or parts of its territories, get transformed from simple geographical areas into well articulated cultural-political regions, each with a distinctive personality endowed with a deeply ingrained instinct for survival, self-preservation and propagation. This process of the socio-cultural transformation of each space gave each region, "in casual sequence, continuity, solidarity, interaction, loyalty, and nationality; that is, the creation of a nation with, what Kjellen called, a geographical instinct".[5]

In a subsequent work, Del Staat als Lebensform (1924), Kjellen attempted to develop a "system of politics" by investigating the state as a form of life in the context of its geographical space (geopolitik), economy (oekopolitik), population (demopolitik), society (sociopolitik) and constitutional structure (kratopolitik). His equation of state and politics was based on the assumption that "the nature of the state is ultimately power ... the law is its servant".[6] In Kjellen's scheme of politics, maximisation of power was the central objective of state action.

Even though the term Geopolitik was coined by Kjellen, the real father of geopolitical thought in Germany (and the modern world) was the German geographer Friedrick Ratzel (1844-1904)—father of the concept of state as an earth-bound organism, and the author of the first ever text on political geography, Politische Geographie in 1897. Ratzel adopted the theme of evolution through environmental adjustment and struggle for survival as the central organising concept of his Politische Geographie, which heralded the emergence of a new subdiscipline focussed on the study of the state as a living organism. Just as the struggle for existence in plant and animal world is centred on the need for space so also the history of nations could be interpreted as a struggle for political territory.

The central point in Ratzel's theory of political geography was that the state is a particular type of spatial organism—an earth-bound

organism—consisting of a piece of humanity and a portion of the earth. According to Ratzel, the state's "geographical and ... political expansion have all the distinctive characteristics of a body in motion which expands and contracts alternatively in regression and progression. The object of this movement is always the conquest of space with a view to the foundation of States".[7]

According to Ratzel, each state occupies a definite territory and, as such, represents a spatial organism with a fixed location. Every state also represents a group of people who feel inseparably attached to the geographical area of the state, and who increase in numbers as the state grows in maturity. As its population grows, the state requires larger land territory to sustain the increasing numbers. This results in a continuous struggle for space in which the more powerful states expand at the cost of their weaker neighbours. This was the basis of the concept of Lebensraum (or living-space), one of the central themes in German geopolitics.

Geopolitics developed as a highly popular subject of study in the inter-war period. Under the leadership of General Karl Haushofer, the Institute of Geopolitik was established in Munich in 1924, and Zeitschrift fur Geopolitik, a journal, served as the mouthpiece of the Institute. Geopolitik was officially defined as "the science of earth relationships to political developments". There were two main aims of German geopolitics, one short-term and the other long-term. The short-term was to secure the revision of the terms of the Treaty of Versailles. The long-term was to educate what the geopoliticians called the `space-consciousness' (German: Raumsinn or Raumauffassung) of the German people, if only to prevent anyone from ever again imposing such an anti-German settlement as Versailles.[8] Geopolitik projected Germany as a state dying of slow suffocation within unfavourable political boundaries enforced by foreign powers, so that Lebensraum—the need for living-space—became a fixed national obsession.

The German geopolitik ended with the defeat of Germany in 1945 and the death of Karl Haushofer in 1946. Apart from the highly supportive role of geopolitik in the German adventurism leading to World War II, a fundamental reason for the decline and complete eclipse of geopolitics in the Ratzelian mould, of state as a living organism possessed of an instinctive drive toward territorial expansion, was the fact that in post Second World War phase of world history the Ratzelian theory of state ceased to represent the

contemporary political reality. In the new post-War world of decolonization, political boundaries became fixed, and each state had to adjust its perspectives, and plan its strategies of development in terms of its fixed territory and its resources.

Geopolitics became a neglected branch of study and had been in disrepute for most of the 40 years since the end of World War II, because of its war guilt. Yet in the last decade the term geopolitics has crept back into use, and geopolitical analysis of both global and regional problems has become more common. The roots of a revival in geopolitical reflection and writing lie in the changing international political and economic environment. This revival has been made up of several different strands, and has attracted conservatives, liberals, radicals and quantifiers.[9] First, there has been a general willingness by 'traditional' political geographers to use the adjective 'geopolitical', and to explore more fully the political implications of their analysis. Cohen's pioneer work on geopolitical perspectives for a multipolar world, first suggested in 1963 at the nadir of postwar geopolitics, has been continued by him (Cohen, 1982) and by others, with renewed enthusiasm and confidence. A second, rather different, strand has been the development of a "behavioural geopolitics", constructing behavioural and statistical models of the international diffusion of wars and conflicts across frontiers. This is an approach being developed by both geographers (O'Loughlin, 1986) and political scientists (Most and Starr, 1980). O'Sullivan's recent text, simply titled Geopolitics (O'Sullivan, 1986), presents a blend of historical and policy oriented discussion of global geopolitical issues, with more behavioural work on linkages, diffusion and game theoretic approaches.[10]

A third strand comes from those influenced by Marxist or neo-Marxist theory. Their theoretical base gives them a perspective for both a critique of earlier geopolitics, and for a reconstruction of contemporary geopolitics based upon economic relationships, and particularly, on the role of capitalism in the world-economy (Taylor, 1985). An alternative approach is based on Wallerstein's 'world-economy' and 'world-systems' approach to the development of capitalism and its geographical expression. This approach has been used by Taylor (1985) in reconstructing a theoretical basis for political geography. For Taylor: "In world-systems analysis of geopolitics is about rivalry (currently East versus West) in the core for domination

of the periphery by imperialism (currently North versus South) (Taylor, 1985 : 37)".[11] Geopolitics has found a place in radical geographical analysis as attention has turned from purely economic to the role of the state and the political superstructure. Debate has increasingly hinged on the extent to which the political is genuinely independent of the economic base: thus Skocpol (1977) argues that it is precisely the significance of 'geopolitical situations' and 'geopolitical circumstances', that Wallerstein neglects in this analysis of European capitalism.[12] But it is in France that the most sustained geopolitical interest has been developed by Lacoste and his colleagues on the journal Herodote. Lacoste and his colleagues on Herodote (published since 1976) have given much attention to a wide range of global and regional geopolitical issues. Many of these studies show how detailed geographical analysis, when sensitively related to historical and political studies, can illuminate geopolitical questions.

In the post-World War geopolitical scenario, to speak of geopolitics apropos superpower rivalries and conflicts between states has become less and less shocking. The concept of 'territorial expansion' in case of modern nation-states has become less relevant, and has been replaced by 'expansion of influence'. "The ultimate goal of geopolitics", no longer, remains "... a fairer and better distribution of the world's living space, and control over that space: a fairer distribution made in accordance with the numbers of each group and their capacity for achievement" (Haushofer, 1944 : 135).

In this situation the question of regional geopolitics has been gaining ground. It is because in a federal or quasi federal state one can easily conceive the necessity for regional geopolitics, since the regions are political and spatial ensembles and are governed and administered by the elected, who have a real power in relation to the centre. Therefore, this study is made on the basis of neo-geopolitical theories, based primarily on regional geopolitics, for which a relevant research framework is yet to evolve.

1.3 Review of Relevant Works

It has been mentioned earlier that the geopolitics became a neglected branch of study and had been in disrepute for most of the 40 years since the end of the Second World War, because of its war guilt. Yet in the last few decades the term geopolitics has crept back into use, and geopolitical analysis of both global and regional

problems has become more common. Since 1980 many books have appeared with 'geopolitics' or 'geopolitical' in their titles, the term is widely used in media and political discussion, and is subject of many academic and policy articles.

Since the late 1970s numerous studies on geopolitical perspectives on global strategy have been published. In 1982 an International Institute of Geopolitics was founded in Paris, and journals like 'Geopolitique' (1985) were published. Geopolitique (1985) A NATO Scientific Division symposium was published in Zoppo and Zorgbibe (1985).[13] This study both reviews 'classical geopolitics', and examines their applicability in the nuclear era. According to Leslie W. Happle[14], the tendency of this literature is to take a rather restricted view of both traditional geopolitics (excluding the Germanic tradition, and limiting it to global issues), and of 'geographical factors' (tending to limit them to physical configurations and space, and ignoring human distributions). It also tends to equate geopolitics to 'power politics', to ascribe an overwhelming role to technology, and so, to assume that geopolitical relationships emerge 'naturalistically', without the intervention of social and political structures and theories.

An alternative perspective, which is more geographical, is given by Jay (1979), who claims that 'Geopolitics is, definitionally, the art and process of managing global rivalry (Jay, 1979 : 486)[15], but he links this to regional politics: 'Good regionalism is good geopolitics; and bad regionalism is bad geopolitics' (Jay, 1979 : 485). Other studies includes Deudnay (1983), the 'geopolitical atlas' of Chaliand and Pageau (1983) which begins with geopolitical world-views, and Freedman's atlas of Global Strategy (Freedman, 1985), which also begins with a consideration of geopolitics. Most of the geographers' contribution to geopolitics concentrate on the geopolitics of global strategy, such as O'Sullivan's highly critical study of the geopoliltics of deterrence (O'Sullivan, 1985)[16], Locaste's study of the geography of the Euromissiles (Cruise and Pershing II) and the risk of 'decoupling' European and American strategy (Lacoste, 1983), and Pepper and Jenkins' study of the geopolitical situations of the USSR and USA in terms of nuclear vulnerability and siting, and the way this affects their perceptions and fears (Pepper and Jenkins, 1984)[17]. In the last few years texts on geopolitics have appeared (G. Parker, 1985; O'Sullivan, 1986), together with lengthy reviews (Brunn and

Mingst, 1985). Cohen (1973) describes geopolitics as the relation of international political power to the geopolitical setting (Geography and Politics in a World Divided).[18] In France, Pierre George (1964) though he rejected both the term geopolitics ('the worst caricature of applied geography in the first part of the 20th century has been geopolitics') and geopolitical analysis (Lacoste, 1981), yet in 1984 published Geopolitique des Minorities19, arguing the case for a geopolitical analysis of minority problems (George, 1984). The study made by the geographers Foucher (1982) and Sanduer (1981, 1985), within the Central American context, shows how a geographical basis can illuminate geopolitical analysis.

In reconstructing a theoretical basis for political geography Peter Taylor defines geopolitics as 'rivalry in the core for domination of the periphery by imperialism' (Taylor, 1985 : 37)[20].

The study of regional geopolitical problems started in France (1981) and was developed by Lacoste and his colleagues through the journal Herodote. They give considerable emphasis on cultural variations in geopolitical studies as well as regional studies. Many of these studies illustrate geopolitical questions by relating historical and political studies to detail geographical analysis. The recent themes include German geopolitics, Near East geopolitics, geopolitics of the sea and the geopolitics of Islam.

In India geopolitical studies have been done mostly by political scientists studying rivalry between super powers vis-a-vis its impact on India. The books titled by the term geopolitics has been almost lacking except the Sen's book on Basic Principles of Geopolitics and History[21]. Also an unpublished thesis by Parihar (J.N.U., 1989) on Ideological Heritage and Trend in Geopolitics[22]. In North East India geopolitical studies have been done by Bhattacharyya[23] on 'Geopolitics of North East India'. Except for Bhattacharyya, regional geopolitical studies made by geographers in India are almost lacking.

1.4 Significance of the Topic

This study of the geopolitics of North East India has been done basically to find out correlation between geography and politics. In doing so emphasis has been given to the past developments of political and economic forces which generally determine present and future politico-territorial ramifications in any geographic space, which is permanent.

The North Eastern part of India is diverse in all respects and these diversities are reflected in the various demands for regional autonomy, socio-economic movements, boundary and insurgency problems, etc., which strengthen the centrifugal forces. Since the primary objective of every nation-state is to maintain and integrate all its diverse areas into national mainstream and to generate centripetal forces to achieve this, in the case of India's North East the problem of integration has been facing severe acid tests due to different factors. These factors are sometimes obvious, like physiographic, racial, cultural and linguistic diversities, which require less cognitive measures. But on the other hand some factors, like jealousy between the plains and hills, backwardness and stagnation in economy, problems of socio-cultural movements, boundary, disputes, etc., need some elaboration, which this study intends to undertake.

1.5 Objectives

The study has been made on the basis of the following objectives—

i) to analyse the basic geopolitical forces working in this region.

ii) to analyse the politico-administrative changes and their consequence.

iii) to study the economic base of the region and the economic relations between the constituent parts of the North East Indian states.

iv) to study the inter-state border disputes and the international boundary conflicts in the context of regional geopolitics of North East India.

1.6 Hypotheses

To achieve the above mentioned objectives following hypotheses have been framed—

i) physiographic and ethnic diversity of the region are the basic causal factors encouraging geopolitical vivisection.

ii) the various administrative policies of the British were responsible for the emergence of diverse politico-territorial formations in this region.

iii) boundary disputes in this region are legacy of the former colonial administration.

iv) economic potentiality of the plain and hill regions of North East India and their different levels of development provided the early push-factor to generate centrifugal tendencies among the plains and the hills population.

1.7 Methodology

The study has been carried out on the basis of both deductive and inductive methods using morphologic, historical and functional approaches.

In achieving the first objective, a morphological approach has been adopted to explain the various physiographic divisions, climatic conditions, soil types, drainage patterns, geological structure and vegetation. In analysing the objective, the various physical factors have been synthesised and tested the hypotheses on the basis of data collected from various journals, topo-sheets and personal investigation at the field level.

Historical approach is adopted in achieving the second and third objectives. Various historical books on North East India by British historians and administrators as well as various Assamese and English history books written by Assamese historians have been consulted. The hypothesis has been tested on the basis of data available from various government publications, government secret documents of State Archives, State Assembly Libraries and the National Library. Though direct communication could not be made with the India Office Library, London, various secondary and authentic data could be collected from the important collections found in Jawaharlal Nehru University Library (J.N.U.), New Delhi, and National Library, Calcutta.

In achieving the fourth objective, historical as well as functional approach have been adopted and analysis made on the basis of historical documents, field study, various government circulars, assembly debate proceedings, etc. A questionnaire has been prepared to analyse the inter-state boundary disputes. The data has been collected, processed and tested the hypothesis. In this regard, it is pertinent to mention that the access to state government documents relating to the sensitive border problems was not possible owing to official unwillingness to open the same to public. Also, personal visits to all the disputed areas could not be possible due to insurgency situations in the North Eastern States. Therefore,

the internal boundary problems have been studied on the basis of personal investigation to a limited extent.

1.8 Organisation of the Study

The entire work is divided into three parts. Part one consists of four chapters, part two of two chapters and part three of one chapter only.

In Chapter I, the introduction to the topic, its scope, the concept of geopolitics, review of literature, the objectives and hypotheses are discussed.

In Chapter II, the physical base of the region is discussed with its physiographic framework, soil and climatic conditions, geological structure, drainage and vegetation.

In Chapter III, the population base of the region is discussed stating the peopling process, various routes of migration to this region, linguistic groups and a critical assessment of the same.

In Chapter IV, the historical base of the region is discussed, stating the evolution of various ethnic communities, the period of their dominance over this region, foreign invasions and the British occupation and annexation.

Chapter V and VI are devoted to the analysis. Here analysis is made of the state formation processes and the geopolitical problems in North East India.

Chapter VII is the concluding chapter, where the summary of the above chapter is written and conclusions are drawn and possible suggestions are made.

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Chapter 2

Physical Base of the Region

2.1 Physiography

Physiography exerts far-reaching influences on the pattern of human activities especially in areas where the available technology is of low level as in the case of North East India. All the three major types of landforms, viz. the Archaean plateau, the young folded mountains of Tertiary origin and the recently built-up alluvial plains, are found in this region. The Meghalaya-Karbi plateau covers an area of 32,821 square kilometre which is 12 per cent of the total area of this region. The hills and mountains cover about 150,000 square kilometre of area, which accounts for about 60 per cent of the total area of North-Eastern region. The Brahmaputra (56,480 square kilometre) and the Barak (6,962 square kilometre) are the plains of this region apart from other two small plains, viz. the Manipur Basin (1,843 square kilometre) and the Tripura Piedmont plain (3,500 square kilometre).

Following Richard E. Murphy's system of landform classification[1], North East India may tentatively be divided into the following physiographic divisions and sub-divisions. These are as follows [2]:

1. The Plateaus

1.1 Meghalaya plateau,

1.2 Karbi plateau.

2. The Hills and Mountains:

2.1 Himalayan Mountainous Region,

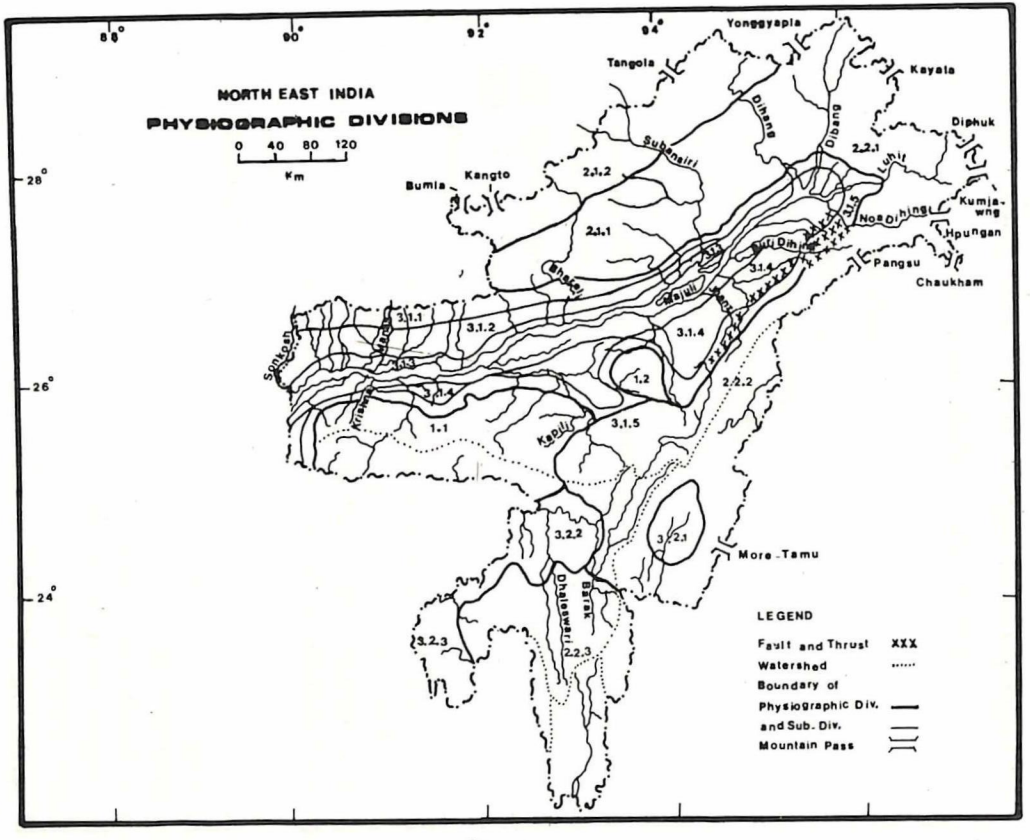
NORTH EAST INDIA
PHYSIOGRAPHIC DIVISIONS
0 40 80 120
Km
88°
90°
92°
94°
28°
26°
24°
Yonggyapla
Tangola
Kayala
Diphuk
Kangto
Bumla
Subansiri
Dihang
Dibang
Lohit
Noa Dihing
Kumja-wng
Hpungan
Pangsu
Chaukham
Bhareli
Buri Dihing
Dhansiri
Kopili
Barak
Dhaleswari
Kapili
More-Tamu
2.1.1
2.1.2
2.1.3
2.2.1
3.1.1
3.1.2
3.1.3
3.1.4
3.1.5
1.1
1.2
2.2.2
3.2.1
3.2.2
3.2.3
2.2.3
LEGEND
Fault and Thrust XXX
Watershed .....
Boundary of Physiographic Div. —
and Sub. Div. —
Mountain Pass

Fig 2.1

2.1.1 The Lesser Himalayan Region,

2.1.2 Great Himalayan Region or Inner Himalayan Region.

2.2 Eastern Hills:

2.2.1 Dibong-Lohit Knot,

2.2.2 Patkai-Tirap-Nagaland-North Cachar and Manipur Hills,

2.2.3. Mizoram-Tripura Range and Valley Country.

3. The Plains:

3.1. Brahmaputra Plain:

3.1.1 Bhabar-Tarai Belt,

3.1.2. Northern Built-up Strip,

3.1.3. Brahmaputra Flood-Plain,

3.1.4 Southern Built-up Strip,.

3.1.5 Southern Foot-hill Zone.

3.2 Intermontane and Piedmont Plains:

3.2.1 Manipur Plain,

3.2.2 Barak Plain,

3.2.3 Tripura Plain.

1. *The Plateaus*

The plateaus in the North East India consist of Meghalaya and Karbi plateaus. Both together covers an area of 32,821 sq. kilometre or about 12 per cent of the region. The Kopili and Dhansiri rivers by their headward erosion separate the Meghalaya plateau from the Karbi plateau.

1.1 Meghalaya Plateau

The plateau faces the Sylhet plain of Bangladesh to the south and the Brahmaputra valley to the north. It rises abruptly from the Sylhet plain for about 1000 miles and maintains a more or less uniform outline throughout the southern front facing Bangladesh, except in places where it is dissected by south-flowing streams through gorges and waterfalls. From this margin the plateau continues to rise slowly north ward till it reached the central parts, where there are east-west alignment like Tura-Kylas Range and Shillong Range. Tura-Kylas range reaches its highest elevation Nokrek (1,412 metres) in Garo Hills, while in the Khasi Hills the highest elevation is at Shillong Peak (1,961 metres). The plateau then begins to lose its

height in successive ranges in all directions. However, western and eastern parts of the plateau i.e. Garo and Jaintia Hills present a deeply dissected and denuded profile that merge with Brahmaputra plain through gentle gradients and isolated hills and hillocks.

1.2 *Karbi Plateau*

On the south bank of Brahmaputra, the Karbi plateau lies to the east of the Meghalaya plateau and is detached from it by the Kopili gorge and by the headwaters of Diyung, Lumding, Lankajan and other rivers. On the south-eastern side, it is separated from the Naga hills by the Dhansiri and its head-streams. It is only in the central portion the plateau attains a height of 1,359 metres at Chengheheson peak and 1,361 metres at Dambukso. 'The Karbi plateau has assumed a roundish shape, giving out numerous streams radially to Dhansiri, Kalang and Kopili that surround it. These streams often extend finger-like plain embayments into the plateau, which otherwise descends to the plain through terraces. Such terraces made of older alluvium and residual soils and support rich tea gardens in Golaghat and Nagaon region'[3].

2. *The Hills and Mountains*

The hills and mountains cover about 150,000 sq. kilometres, which is about 60 per cent of the total area of North East India. This physiographic region can be divided into two major units, viz .the Himalayan Mountainous Range or Arunachal Himalayas, and the Eastern Hills.

2.1 *Himalayan Mountainous Region*

This region extends from Orkhala Range along Bhutan Arunachal Border to Siang-Dihang river. It has two distinct physiographic units, viz. Lesser Himalayan Zone and the Great Himalayan Zone or Inner Himalayan Region.

2.1.1. *The Lesser Himalayan Region*

The Lesser Himalayan Region rises from mere 300 miles along the margin of the Brahmaputra Valley to about 5,000 metres through a confused labryinth of hills and ranges intervened by deep gorges'[4]. This region receives heavy rainfall and hence clothed with a thick vegetation. Bomdila in West Kameng and Apatai plateau in lower Subansiri are two important, although restricted, tablelands and of immense human significance. Towards the north of this region there appears periglacial features made of fluvio-glacial deposits with thick layers of transported boulders, rocks and soil.

2.1.2 *Great Himalayan Zone or Inner Himalayan Region*

This region lies beyond the transitional peri-glacial regions and is characterised by increasing height, devoid of significant vegetal cover, roundish topographic features, rockey surface and snow-capped high peaks. 'This great Himalayan Range, running along the Indo-Chinese boarder has an average height of 6,500 metres in Tawang, West Kameng and Lower Subansiri districts. But its alitude decreases north-eastward in Upper Subansiri and West Siang districts to an average of 5,200 metres.The range regains altitude on entering Tibet and culminates at Namcha Barwa (7,755 metres[5]. Kangto (7,089 metres) is the highest peak in this region.

2.2 The Eastern Hills

2.2.1 *The Dibong-Lohit Knot*

The Eastern Hills appear to start from the Dibong-Lohit hill mass between the Sing and Burhi Dihing rivers. From this hill mass, which can be regarded as Dibong-Lohit mountain knot, Namkin mountain trends eastward and Patkai range towards south. "The hills in this part are relatively low ranging from 1,000 metres towards the Brahmaputra Valley to 5,000 metres towards China'[6]. From Tirap District the hill mass sends out a series of parallel ranges and valleys towards the south-west direction, which eluminates in the Patkai range, that stands out as a wall along the Indo-Burmese border.

2.2.2 *Patkai-Tirap-Nagaland-North Cachar and Manipur Hills*

Patkai range obtains its height from Indian side to Burmese side and reaches its highest altitude at Saramati peak (3,826 metres) in Nagaland. To the west of Patkai there is the high Barail range stretching from Tuensang to the south-west to North Cachar Hills district across Nagaland. The average height of this range is 2,000 metres in Nagaland and it reaches its highest at Japvo (3,016 metres). Barail range divide Nagaland into the north-western and south-western halves. The north-western half has a highly dissected terrain with an average elevation ranging between 600 metres and 1,400 metres. The large tributaries like Dikhow, Janji, Disoi and Dhansiri flowing into the Brahmaputra valley have, through their headward erosion, built up plain embayments that enter into Nagaland. The south-eastern part—consisting largely of Tuensang and Phek areas-is an intermontane tract with elevation between 1,200 and 1,400 metres.

The hills of Nagaland including the Barail range continue westward to divide the North Cachar Hills into two parts—a northern part falling under the Brahmaputra catchment basin and a southern part falling under the Barak basin. Barail range attains a maximum height of 1,953 metres in Mahadeo peak to the east of Haflong. To the west, the tertiary hills of North Cacher gradually sink in the Kopili gorge—structural transition between it and the Meghalaya plateau.

The Patkai and its associated ranges with a north-east to south-west trend extends into Manipur and encloses the inter-montane valley of Imphal. These ranges have an elevation between 750 to 3,000 metres of which Mount Tenipu (2,994 metres) is the highest peak in Manipur. The topography of this region is rendered complicated by the presence of deep gorges and steep slopes and covered more than 90 per cent of the area of the State of Manipur. The Manipur basin area is the largest intermontane basin in the North East India.

2.2.3 *Mizoram-Tripura Range and Valley Country*

Patkai range loses its elevation as it enters Burma to the south of Manipur. It is the western ranges of Manipur that continue southward to form the Mizoram hills in a general north-south alignment. These hills are arranged parallely alternated by deep valleys which are invariably occupied by streams and the estern ranges are higher in elevation. The highest peak in Mizoram lying along the Indo-Burmese border is Blue Mountain (2,157 metres). As the valleys are narrow and deep, the settlements in this area perch on the ridge tops and higher slopes rendering construction of roads difficult.

"This range and valley topography continues westward beyond the boundary of Mizoram to Tripura as also to the Chittagong hill tracts of Bangladesh"[7]. In Tripura the ranges are of lower elevation and are widely separated by flat-bottomed valleys. There are six successive ranges of which Jampai Tlag, Sakhan Tlag, Lanstara and Athara Mura are the main. To the west of Athara Mura, the topography assumes a piedmont character with dissected and isolated hillocks scatterd here and there.

3. *The Plains*

"There are four important plains in North East India, viz. the Brahmaputra Plain (56,480 square kilometre), the Barak Plain (6,962 square kilometre), the Manipur Basin (1,843 square kilometre), and the Tripura Piedmont Plain (3,500 square kilometre)"[8].

3.1 The Brahmaputra Plain

This plain is narrow and alongated with a length of about 660 kilometres and an average width of about 70 kilometre. At its widest part, in the upper portion, the valley is about 90 kilometre and it is 50 kilometre in the narrowest point in the middle part, because of the northward jutting of the Karbi plateau. The plain as a whole slopes towards the south-west and west. The northern margin is very steep with the Himalayas falling suddenly from a height of 500 netres to a mere 200 metres. The southern margin is steep in the eastern part bordering Tirap and Nagaland, while its western part, bordering the Karbi and Meghalaya plateau, is relatively gentle. The north-eastern sector of the plain has an average elevation of about 120 metre and exhibits numerous tributaries of the Brahmaputra. These tributaries like the Dihing, Dibong and Lohit, which together form the Brahmaputra, have eroded their banks and pushed the hilly margins deep into the mountain zone. As a result of this, the plains have extended into Arunachal Pradesh as far north as Dambuk, Nizamghat, and Roing as far east as Brahmakunda. Tributaries like Burhi Dihing has created Margherita-Likhapani platform, similarly Dhansiri, Kopili and Kulsi have created the Dimapur- Borpathar; Dabaka-Lumding and Rani-Barduar platforms respectively. These platforms are elevated terraces with older alluviums and contain occasional hillocks, aggradational and degradational features. The plain is dotted with numerous inselberges of Gneissie hills as in Darrang, Sonitpur, Kamrup, Goalpara, Jorhat and Dibrugarh. Moreover, the Brahmaputra plain is characterised by other topographic features which form some district physiographic units.

3.1.1 The Bhabar-Tarai Belt

In the northern part all along the Himalayan foothills there is a narrow high zone of coalescence of alluvial fans, and is known as Bhabar zone. Here in this zone the numerous rivers and streams that come out from the Himalayas debouche its load on reaching the dead plain. These have, in the course of time, joined with one another to form the Bhabar belt. The longer rivers are braided in this region, while the water of smaller rivers disappears from the surface due to percolation in this zone of unconsolidated and unassorted materials.

To the south of the Bhabar zone and parallel to it, there lies the flat Tarai zone, where the water mentioned above reappears,

keeps the ground saturated, as also collects in the local depressions creating a series of swamps that support tall grasses. The Tarai belt is thus the source region for a large number of seasonal tributaries.

3.1.2 Northern Built-up Strip

A strip of relatively high land lies to the south of the Tarai zone. It is the 'built-up' region of the north bank of Brahmaputra where high density of population and commerical activity is found.

3.1.3 Brahmaputra Flood Plain:

To the south of the 'built-up' zone, lies the flood-plain of the Brahmaputra. It supports a series of swamps and 'beels' in which most of the north bank tributaries lose their track and flow sluggishly and ultimately open into the master stream.

In the south bank, along the foothills of Lohit, Tirap and Nagaland and around the Karbi plateau, a series of terraces are found. In the western side of Karbi plateau, i.e. in the Meghalaya foothill however, these terraces are replaced by a series of swamps. These swamps are particularly found along south Naogaon and Marigaon, south Kamrup and south Goalpara plains bordering the plateau, although many of them are gradually being filled up following deforestation and consequent soil erosion in the plateau and the foothills zone.

The extent of the Brahmaputra flood plain is irregular in the south bank. It is extensive near the confluence of Burhi-Dihing, Disang, Dhansiri, Kolong-Kopili and Kulsi. It is also fairly wide in the Jaleswar-Fakirganj region. The flood-plains in the north bank and south bank together form an extensive physiographic unit containing numerous "Chars" or "Chaparies" (riverine sandy areas subjected to annual floods) shoals and islands (both temporary and semi-permanent) on the wide river bed itself and the famous Majuli Island (929 square kilometre) is regarded one of the world's largest river island.

3.1.4 Southern Built-up Strip

To the north of the foothill terraces and swamps, as mentioned above, there lies a built-up zone, where again, like that of the north bank, population pressure, road density and frequency of towns and commerical centres are high. The south bank is characterised by its discontinuous nature because of the projections like Karbi and Meghalaya plateau to the bank of the Brahmaputra near Burha Pahar and Gauhati respectively.

3.1.5 Southern Foothill Zone

In between the southern built-up strip and the Naga-North Cachar-Manipur hills (2.2.2) there lies the southern foothill zone. It has a gradual inclination towards north and merges with the plains and characterised by thick vegetative cover. Most of the reserved forests are found in this zone.

3.2 The Intermontane and Piedmont Plains

The piedmont nature relief features are found in most the plains owing to the presence of terraces based on the interfluences and linked often to the adjoining hills. The most important plains are as follows:

3.2.1 Manipur Plain

It is of lacustrine origin like the Kashmir valley. The present basin area is 1,843 square kilometre and is roughly oval in outline with a maximum breadth of about 32 kilometre. This intermontane basin slopes from an altitude of 838 metres in the north to 792.5 metres in the south, with an average gradient of 75 centimetres per kilometre. There are local depressions, marshes and lakes in the south central part. The rivers Nambul, Imphal, Iril, Thoubal and Khuga, alongwith their numerous tributaries drain this basin.

3.2.2 The Barak Plain

'The Barak plain is the headward piedmont part of the Barak-Surma-Kushiyara Plain which lies largely in Bangladesh'[9]. In the North East India its area is 6,962 square kilometre. The plain has a gentle slope towards west and the river Barak flows through it in an extremely meandering course leaving a series of Ox-bow lakes and swamps. The immediate neighbourhood of the Barak river represents an active flood plain with extensive marshy tracts and annual inundation and also bears the stamps of both aggradational and degradational fluvial activities.

3.2.3 The Tripura Plain

The Tripura plain is too a piedmont plain, representing a part of the Bangladesh plain. The north-south alignment of hills in Mizoram extended parallely in Tripura with less height and situated wide apart. In the western part of Tripura there are only low isolated hillocks worn down by the tributaries like Gomati which have created this piedmont plain.

2.3 Climate

Climate affects all aspects of human activity. Climate determines to a large extent, the production of commodities and it also controls and creats markets for them by determining the wants of men. On the other hand there are various types of effects of climate on vegetation, house types, industries, human migration, and even on population growth.

Table 1

Areas of different states of N.E. India within different elevations

(Area in square kilometre)

Figures within brackets indicate percentages of the total area of respective states

State	below 150 mtrs.	150-300 mtrs.	300-600 mtrs.	600-1200 mtrs	above 1200 mtrs
Assam	61,821.16	8,778.87	4,632.86	3,030.99	259.13
	(78.73)	(11.18)	(5.90)	(0.86)	(0.33)
Arunachal	1,395.75	6,017.62	8,942.85	13,731.87	53,489.92
Pradesh	(1.67)	(7.20)	(10.70)	(16.43)	(64.00)
Meghalaya	3,719.61	3,622.98	4,284.15	6,962.59	3,899.59
	(16.54)	(16.11)	(19.05)	(30.96)	(17.34)
Tripura	8,766.11	1,629.17	81.72		
	(83.67)	(15.55)	(0.78)		
Manipur	1,182.63	308.51	2,792.26	11,953.75	6,118.84
	(5.29)	(1.38)	(12.49)	(53.47)	(27.37)
Nagaland	685.87	1,953.49	2,921.97	5.053.96	5,911.71
	(4.15)	(11.82)	(17.68)	(30.58)	(35.77)
Mizoram	3,749.27	5,248.55	5,225.36	6,863.82	
	(17.78)	(24.89)	(24.18)	(32.55)	
N.E India	96,939.53	30,374.91	30,578.94	22,341.24	74,802.35
	(38.01)	(11.91)	(11.99)	(8.76)	(29.33)

Source: Calculated by Dr. M.M. Das and L Dutta, from 1:2 million contour map of National Atlas Organisation, Calcutta and taken from North-Eastern Geographer, Vol.18, No.1&2, 1986, p. 41.

The climate of north eastern region though identified as tropical monsoon, its physiographic controls and local influences have transformed the climate into sub-tropical or extra-tropical monsoon climate. The border ranges and the hills and dales topography of the regional extent both mechanical and thermody-

namic influences on the general and seasonal circulation of winds, distribution of pressure, temperature and precipitation. [10]

The weather of North East India may be grouped into four conspicuous seasons on the basis of rainfall, temperature, rainy days, fogs and thunder storms. These seasons are (a) winter (December- February), (b) pre-monsoon or summer season (March-May), (c) monsoon season (June-September) and (d) retreating monsoon season (October-November).

23.1 The Climate of the Plains and Hills

The climate of the plain (3) region of North East India has four well defined seasons though there are some local variations in rainfall, range of temperature and other phenomena like mist and fog. The winter season is characterised by cool weather. The total amount of rainfall in this season seldom exceeds 11.4 cm. and temperature remains well above 12.8° C. The monsoon season of the plains region is characterised by very high humidity, weak variable surface winds and cloudy sky. The weather is sultry and oppressive due to high humidity but most congenial for wet cultivation. The average temperature during this season is 27.17° C with an average diurnal range of over 6° C. The eastern part of the valley experiences high rainfall and low range of temperature whereas the western part receives less rain and is characterised by a relatively higher range of temperature. The average rainfall during monsoon season in different states is as follows: Arunachal Pradesh 185 cm. Assam and Meghalaya 180 cm, Mizoram and Tripura 130 cm, Nagaland and Manipur 170 cm. One of the important characteristics of monsoon weather in North East India is the association of thunder storms. From June to September the frequency of thunder is highest (119 days) over the southern bank of the Brahmaputra and lowest over Arunachal Pradesh (34 days). Over Nagaland, Manipur and Tripura the thundery days vary between 40 and 100 days.

In the Himalayan Mountainous Region (2.1) where Arunachal Pradesh falls, winter rains are regular feature of the region. Snow fall is experienced in most of this region at the height of 1,500 metres and above. Winter is cold and damp, the range of average minimum temperatures being between 0° C and 2° C in the south, going down to below freezing point (–7° C) in the north.The summer season which starts from early May is short and moderate by frequent showers. The temperature in the month rises to 38° C to 41° C. In this

region three major climate zones can be recognised such as — the hot and humid sub-tropical area of the foothills, the cooler or micro-thermal region of the Lesser Himalayas and the Himadri type (Alpine) in the Great Himalaya.[10]

Table - 2

Distribution of the Average Monthly Temperature (° C) and Rainfall (mm.)

Station	Jan.	Feb.	Mar.	Apl.	May	Jun.	Jly.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
Tem.	15.7	18.2	22.0	24.8	26.3	27.3	27.7	27.4	27.3	25.8	21.7	16.8	23.4
Silchar													
Rain	2.0	4.8	17.2	38.5	41.7	58.9	52.1	51.5	38.9	18.4	4.5	1.1	329.6
Tem	12.4	14.7	18.8	22.1	24.0	25.0	25.1	25.1	24.8	22.5	17.6	13.5	20.4
Imphal													
Rain	1.8	2.8	3.2	11.3	26.8	28.3	27.1	15.8	13.1	9.8	3.0	0.4	143.4

Source: R.L. Singh

In the Eastern Hills regions (2.2) the total annual rain-fall varies from a minimum of 100 cms to a maximum of over 300 cms. The north-western part of the Mizo Hills alongwith the adjoining areas of Cachar and Manipur receives the heaviest fall. The Tripura, the rest of Mizo Hills and Cachar, North Cachar and the western half of Manipur Hills receive between 150 and 200 cms. The hills slopes facing the south-western monsoon always receive larger amounts than enclosed valleys.

2.3.2 *The Climate of the Plateaus*

The climate of the Plateau region (1) differs from that of the plains mainly due to its high relief which, in general, makes the climate very salubrious while that of the plains is comparatively much warmer in summer and cool in winter. The climate of the central part of the central and eastern Meghalaya (Khasi and Jaintia Hills) is conducive, whereas in the western Meghalaya (Garo Hills) except for the winter (November to February) it becomes oppressive as a result of high temperature. The climate of the Mikir Hills is uncomfortable except in winter and becomes oppressive during monsoons leading to malarial conditions, which have been bringing unprecedented havoc wrought by Kalazar (Blackwater fever) to the people.

Western Meghalaya, because of its relatively low elevation has a fairly high temperature for most part of the year. April is the

warmest month having the mean maximum and minimum as 34.9°C and 22.1°C respectively. The month of May in spite of its highest rainfall (513 mm) records the second highest temperature in the year with 33.1°C and 22.8°C as the mean maximum and minimum respectively. The temperature of the coldest months, December and January, is 24.9°C and 11.1°C respectively. The average rainfall in western Meghalaya is 2,689 mm. The rainfall decreases from south to north as the moisture bearing south-west monsoon winds strike the southern part first causing heavy downpour. The average annual rainfall in the south-east is above 4,000 mm whereas in the north it is between 2,500 and 3,000 mm.

The Shillong region experiences very cold nights in winter where the temperature goes down to about 1.7°C. The temperature seldom rises above 26°C in any part of the year. There is a great variation of rainfall in the Central and Eastern parts of Meghalaya. Cherrapunji which is located in the structural platform has a rainfall as high as 12,033 mm, while Shillong being located only 50 kilometre to the north with a rain-shadow effect gets only 2,296 mm. Mawsynram, a village situated about 16 kilometre west of Cherrapunji, records the highest rainfall in the world with 13,923 mm[12]. Jowai which is located on the ridge of the eastern section of the central upland receives greater amount of rainfall than Shillong with 3,077 mm., as it does not experience a rainshadow effect.The rainfall decreases further north due to significant rainshadow effect and as such the northern slopes experience 1,270 mm to 2,032 mm rainfall.

The climate of Karbi plateau is characterised by low rainfall even in the monsoon period as the moisture bearing monsoon winds are obstructed by the Barail Range before they could reach this part. This total rainfall in the region is about 1,200 mm. However, the rainfall in the western section is considerably higher than that of the eastern part. July is the hottest month with an average temperature of 28°C and the winter months have a temperature of 14°C on the average.

2.3 Soil

Soil is the most important natural resource. The soil has shaped the destiny of the nations in the past and shaped their culture and outlook. Also soil is the fundamental raw material of agriculture. In north-eastern region different types of soil groups are found depending on physiography and climate. In plains region soil is broadly

alluvial in character. The new alluvial soils are mostly found in the riparian tracts of the valley and are subject to annual floods and renewal. They are suitable for the cultivation of rice, jute, pulses, mustard, potato and vegetables. The new alluvial soils are less acidic and are often neutral and even alkaline (PH 5.5) to slightly alkaline. The old alluvial soils are found above the annual flood level and are more acidic. The acidic character of these soils makes them suitable for tea plantation as well as for sugarcane, fruits, rice and vegetables. The flat land in the plains of Tripura and Cachar is although consisting of sand, silt and clay in different proportions.

In the northern hilly areas of North East India, soil acidity is high, caused by heavy rainfall. Soils in the foothills are alluvial in nature being either loams or sandy loams mixed with pebbles, brought down by rain from higher altitudes [13]. In the eastern hills, the soil cover is generally thin except in the river valleys or along the foothills where comparatively thick layers are found. In the Tirap and Lohit districts of Arunachal Pradesh the soils found on foothills are alluvial in nature. Soils in the valley regions are clayey alluvium and rich in organic content with higher moisture retaining capacity[14]. In Nagaland two types of soils are found, viz.ferruginous red soils and laterites. The former occupy the major part of Nagaland whereas the later occupy a very little part of the region along the border of Sibsagar district of Assam. The central plain of Manipur has thick deposits of sands, clays and silts; whereas the soils in the Manipur Hills, Mizo hills and North Cachar Hills are almost similar to each other being usually associated with reddish loams.[15] The foothills are covered with gravels and sands. Due to prevalance of steep slopes and high rainfall in the region soil erosion is an alarming problem for the cultivation which is further aggravated by jhumming.

In the plateau regions of North East India three main types of soils are found viz. the Red Loam or Hill Soils, the Laterite Soil, and the Old Alluvium. The Red Loam or Hill Soils occupy almost the entire region except a limited tract in the foothills and submontane fringes and a pocket in the south-western Karbi Hills adjoining the Jaintia Hills.[16] These are usually acidic and are good for the cultivation of fruits, potatoes and rice in hill slopes and terraces. The old alluvium is found in the highland areas bordering the plains, all along the northern fringe of the regions. These soils are used for the cultivation of rice, fruits, vegetables and tea in the Karbi plateau region.

Table 3
Soils of North-East

Climatic Type	*Soil Group*	*Soil sub-group*	*Location*
Sub-humid zone with alternating pronounced wet and dry season.	Non-laterised	Mixed red and black soils Ferruginous red gravelly soils.	Major part of Mizoram, Maghalaya parts of Mikir and Cachar hills and isolated hills in Darrang, Kamrup and Dhubri.
High rainfall zones with pronounced dry season.	Laterised	Red soil (Old-alluvium) Laterite and Leterisoils Laterite (ground water laterite).	Parts of Darrang, Tezpur, Golaghat and Cachar district, parts of Mikir and North Cachar hills and parts of Guwahati.
Intra-zonal Hydro morphic.	Organic	Peat soil or Bheel soil.	Swamy low lying areas of Cachar and isolated packets in Goalpara and Kamrup.
	Alluvial	Recent reverine alluvium and old riverine older alluvium.	Along the river bank and flood plains of Brahmaputra and its tributaries. Mainly in the valley regions of Arunachal Pradesh, Nagaland, Mikir and North Cachar hills, Himalayan foothills and isolated hills in lower Brahmaputra valley and the Garo Hills.

Source: 'The North-East India, Land, Economy and Economy and People'—R. Gopala Krishnan, p. 77.

2.4 Geology

The surface features are affected by geological structure, which in its turn have bearing on spatial interaction, Geologic structure and processes of erosion influence the surface appearance of landforms, which are intricately related to man's use of the land. But in this part of the world the natural enviornment has remained inhospitable where adverse surface features have seriously impeded human development over large areas.

Geology of north-eastern region, to a greater extent, corresponds with the overall geological pattern of Extra-Peninsula, Peninsula and Indo-Gangetic systems[17]. Depending on the nature of movements and the thrusts and rock formations, this region can be categorised into the following geological zones.

(i) North and North-Eastern Himalayan Folded Zone:

This highly folded formation of the Himalayan mountain systems covers mostly the Arunachal Pradesh. It consists of diverse group of rock belonging the Palaeozoic (Archean) quartzites, protozoic — Abor volcanics, Permian - Gondwana, Tertiary - Siwaliks as well as recent to sub-recent alluvial and terrace deposits. This region is characterised by great relief features and preponderance of length over breadth of this mountain system, which enabled man at an early date to penetrate a chain that could not be skirted; this factor led to comparatively early settlement and cultivation in the region despite the obstacles of altitude and topography.[18] Most of the soft rock areas have been directly excavated by laterial consequent streams to form longitudinal valleys, some of which have become ribbons of settled life. The main phase of orogeny created overthrusts and nappes in the Arunachal Himalaya. The Subanisiri nappe, including the Apatani plateau is such a nappe, pushed from north. Besides there are extensive intrusions leading to the deposition of granite, gneiss and other intrusive rocks.

(ii) Meghalaya Plateau Zone

The Meghalaya plateau has indeed a chequered evolutionary history of emergence, submergence and peneplanation with several phases of erosion, sedimentation, diastrophism, intrusion, movement of land and sea and emissions[19]. Meghalaya plateau is composed in the north of highly metamorphosed crystalline gneissic complex, granite, quartzite, conglomerate of pre-Cambrian origin, and in the

south of largely mesozoic and tertiary sedimentary out crop. In the ultimate phase of Himalayan orogeny in the late tertiary period, the southern part of the Shillong plateau must have experienced tremendous tectonic impacts and its southernmost part must have sunk down giving rise to the steep scarp which today stands aloft facing the Sylhet plain of Bangladesh[20].

In the easternmost part of Meghalaya there lies the detached Mikir Hills, being surrounded by plains on three sides. Its link with the Meghalaya proper is towards south through a patch of highly denuded and subdued senile terrain. This area has been subjected to extreme weathering and denudation and as a result the resistant sandstones of the Surma series which underlie them have contributed to the characteristic rugged topography with a number of hills purely of relict type[21].

Meghalaya-Karbi plateau is a part of Deccan plateau. The Shillong plateau in its central part contains pre-Cambrian sedimentary rocks in the Shillong series. In the late Palaeozic period the western and southern parts of the Shillong plateau were affected by volcanicity and marine transgression and giving rise to Gondwana deposits in Garo Hills and Sylhet trap in Khasi Hills. The sediments of sandstone, carbonaceous shale, coal, limestone and conglomerate also found to have deposited in southern part of the plateau which underwent marine transgression during Cretaceous to Oligocene period.

(iii) Lohit-Tirap-Patkai-Naga-Hills-North Cachar Hills—Manipur-Mizo-Arakan Zone

During the Himalayan orogeny, alongwith the Himalaya the southern limb of the Tethyas geosyncline produced this zone in the late Tertiary period. Because of their crucial location, these ranges bear immense structural complications. The whole belt of hills from Lohit to the Arakan Yoma is made of parallel ranges with a north-south alignment and a convexial bend towards the Indian landmass. Most of the rocks of these hills are sandstone, shale, slate and carbonaceous shale with occasional presence of limestone [22].

One important tectonic feature of the foreland is the presence of a series of faults and thrusts extending in the north east-south west direction from the eastern margin of the Meghalaya plateau, across the North Cachar Hills to as far as Tirap district. The faults and

thrusts occupy the margin between the present Naga Hills and the adjoining areas of Jorhat, Sibsagar and Dibrugarh districts . Of them the Haflong-Disang thrust extending from the eastern margin of the Jaintia Hills to Tirap, the Margherita thrust extending from near Margherita to Tirap and the Naga thrust extending from the east of the Upper Dhansiri region to the east of Digboi [23].

(iv) The Brahmaputra-Barak Alluvial Plain Zone

It is believed that the Brahmaputra valley was developed on the foredeep between the Tethys Sea and the Deccan plateau. The underground extension of the Karbi-Meghalaya plateaus formed the bottom of the foredeed, which is overlain firstly, by the deposits of the Jaintia Group (Eocene), followed by Barail series (Oligocene), Surma and Tipam series (Miocene) and lastly by the Dihing series (Pliocene). Most of these tertiary sedimentary deposits consist of sandstone, shale, grit, conglomerate and limestone. The Jaintia Group contains, at places, limestone, the Barails (at Naharkatiya, Hoogrijan etc) and Tipam (at Digboi) bear large reserves of petroleum, natural gas (in their anticlinal portions) and coal apart from shale and sandstone.

The Barak plain is a part of Surma plain. It occurs between mountain chain with a north-south trend in Mizoram in the south and Naga Patkai thrust in the north and north-east.

2.5 Drainage:

Drainage plays a significant role in spatial interaction which is the main concern of the study. In the north-eastern region most of the economic activities are concentrated in the river valleys and so also the population concentration. In the drainage system of Assam the Brahmaputra has the most dominant control offering a unique example when condsidered alongwith the other large rivers of India.[24] Though there are five important river basins in the north-eastern region, the Brahmaputra and the Barak rivers are by far the most important. The Brahmaputra basin covers entire Arunachal Pradesh, the greater parts of Assam, Meghalaya and Nagaland. The Barak-Surma-Meghna basin together covers the northern and western margins of Manipur, southern parts of Assam (south of Barail range), northern parts of Mizoram and Tripura and southern part of Meghalaya. The wettest part of the world the Cherrapunji-Mowsynram region falls in this basin. The eastern part of Nagaland (south-east of

the Barail range) and almost whole of Manipur are drained by the headstreams of the Chindwin of Burma. The southern and south-eastern part of Mizoram is drained by Kaladan, and the western margin of this state and southern margin of Tripura are drained by the Karnaphuli of Bangladesh.

The Brahmaputra basin covers an area of about 1,80,000 square kilometre which is 70 per cent of the area of north-eastern region. By its vastness and far-reaching fluvial action, the river dominates the physiography of north-eastern region. Out of 2.55 lakh square kilometre area of North East India, the Brahmaputra dominates over 1.75 lakh square kilometre, most of which receives an average annual rainfall of more than 2000 mm[25]. The river has more than one hundred tributaries of which fifteen in the north bank and ten in the south bank are fairly large. Subansiri, Jia Bharali (Kameng), Manas and Sonkosh are the main north bank tributaries. The headstreams of the north-bank tributaries flow over steep gradients in the hilly part, debouch suddenly on to plain, braid into several channels because of heavy sedimentation and then flow sluggishly to fall into the Brahmaputra[26].

Burhi Dihing, Dikhow, Dhansiri, Kopili, Digaru, Kulsi and Krishnai are the main bank tributaries of the river Brahmaputra and most of these rivers come through graded course. These rivers take a sluggish meandering course over the plains and have left numerous ox-bow lakes on their both banks.

Many of these tributaries are large rivers with sizable catchment areas (Manas—31,000 square kilometre. Sonkosh—26,000 square kilometre, Lohit—21,000 square kilometre, Dihang—13,000 square kilometre etc) and bring in huge amount of water (Lohit—33,800 cusecs; Dihang—27,000 cusecs; Subansiri—16,000 cusecs, etc) and silt particularly when in spate, with the result that the Brahmaputra is rendered into an enormous "slow moving lake" in the rainy season[27].

A significant physical characteristic of the Brahmaputra is that the river itself is highly braided necessarily due to its low gradient. As a result, there are innumerable riverine islands. Majuli (929 square kilometre) is the largest river island in the world[28].

The river is heavily laden with silt and its flow is so sluggish that even the smallest obstruction may lead to form an almond-

shaped bank which, with the next flood, may be entirely washed away or may grow to form a char[29]. Since this river enters the plains of Bangladesh and joins the Padma, a branch of the Ganga before emptying into the Bay of Bengal, it is heavily braided with innumerable permanent and semi-parmanent chars, which happen to be the fertile ground for the Bangladeshi immigrants. A topographic map of this part of the Brahmaputra basin reveals the situation more clearly.

Another significant phenomenon of the drainage system of the Brahmaputra river is the flood which is an annual menace to agriculture and settlement in the valley. The Brahmaputra with its tributaries carries tremendous volume of water and considerable silt, discharge during the rains, when the heavy monsoon downpour in their catchment area is supplemented by the melting of ice and snow over their Himalayan sections. As a result, the rivers get choked up with detritus, and the river bed rises by heavy silt, discharge and fills it every year by lateral erosion and causing flood. A high water discharge in the Brahmaputra influences the water profile of its tributaries as well. Thus, floods in the tributaries alongwith the main river are an usual annual phenomenon.

The damage due to flood and erosion in the Brahmaputra basin area has been quite high and extensive. The following table (Table-4) gives an idea in this regard since 1954.

The Barak basin is the second largest river basin in the North East India, covers about 41,000 square kilometre which is 16 per cent of the total area of the region. The river Barak originates in the southern slopes of the Barail range in Senapati district of Manipur and flows first towards west and then south along the western margin of Manipur to the border of Mizoram where it takes a U-turn to the north for some distance before moving westward building the Barak plain. Over the plain the river takes a meandering course creating numerous Ox-bow lakes and extensive mashes. Barak receives water from the tributaries like Jiri, Sonai, Dhaleswari, Larga, etc. The Barak bifurcates into the northern Surma and southern Kushiyara on entering Bangladesh and it is the northern channel that receives Jedukata from the southern slopes of Meghalaya which have the highest rainfall in the world.

Table-4

Flood Damage in the Brahmaputra basin area

Year	*Flood affected area in in lakh hectare*	*Flood affected people in lakh*	*Flood damaged agriculture in lakh hectare*	*Flood ravaged houses*	*Flood eroded houses*	*Death of cattle*
1954	29.00	13.00	3.05	N.A.	N.A.	8845
1958	12.29	4.04	0.25	2044	2656	419
1962	15.95	39.08	3.61	44018	7085	33845
1966	15.11	36.24	3.69	213	6911	5099
1970	7.58	18.91	2.26	44281	10887	4711
1975	1.24	2.32	0.17	4865	2318	143
1978	3.06	9.17	1.18	N.A.	N.A.	144

Source: 'Prantic'-'Banpanir Samaswa aru Samadhan'—Badan Baruah, 16-31, May, 1989.

Table-5

The various river basins of North-East India with their area

Sl.No.	*Name of the River basin*	*Area in sq. kilometre*
1.	The Brahmaputra River basin	1,80,000
2.	The Barak River basin	41,000
3.	Tezu basin	6,000
4.	Kabow valley	2,000
5.	Manipur River basin	16,000
6.	Kaldan	9,000
7.	Karnaphuli River basin	5,000
Total		2,59,000 sq. kms.

Table-6

Feasible Hydel Power Projects of North-Eastern Region

State	*Projects*	*Installed capacity (MW)*
1. Arunachal Pradesh	1. Dihang...	20,000
	2. Subansiri...	4,800
	3. Kameng...	600
	4. Tipaimukh...	1,500
	5. Ranganadi...	450
	6. Pangin...	1,500
	7. Stalin...	600
	8. Demow...	700
	9. Idipo...	100
		30,250 MW

		10. Karbi Longpi...	100
		11. Karbi Longpi... (Upper stage)...	60
2.	Assam	12. Karbi Longpi... (Intermediate stage)	60 400MW
		13. Lower Kopili...	150
		14. Amring...	31
	Assam/Manipur	15. Barak...	100
	Assam/Nagaland	16. Dayang...	105
			606 MW
		17. Umiam-Umtru Stage IV...	60
3. Meghalaya		18. Lower Umiam-Umkhen...	180
		19. Kynchi...	300
		20. Leshka...	60
			600 MW
4. Mizoram		21. Kolooani...	100
		22. Lungleng...	378
Mizoram/Manipur		23. Tiloi...	200
			678 MW
5. Tripura		24. Gumti...	15 MW
6. Nagaland		25. Tezu...	120
		26. Naginimora...	40
			160 MW
		27. Longtok (NHPC)...	150
7. Manipur		28. Tuivai...	200
		29. Kungpi & Longwallok...	350
			655 MW
Total MW			32, 949

Source: Pankaj Thakur (ed.)—Profile of a Development Strategy for India's North-East, p. 61.

'Power Development Strategy for N.E. Region'—(some Important Aspects)—by P.C. Sarma.

Table-7

Area under Forest, 1976-77

State	*Area (in sq. kms.)*	*Percentage of total area*
1. Arunachal Pradesh	41,540	61.5
2. Assam	28,608	37.0
3. Manipur	15,154	67.0
4. Meghalaya	8,528	33.5
5. Mizoram	12,233	57.0
6. Negaland	2,876	17.5
7. Tripura	6,011	57.0
8. North-Eastern Region	1,24,950	49.0

Source: 'Basic Statistics of N.E. Region, 1980, NEC Secretariat, Shillong.

Table-8

Area under Forests in the Assam Valley, 1964-65 (in acres)

District	*Reserved*	*Protected*	*Unclassified*	*Total*
1. Goalpara	5,80,173	-	4,27,232	10,07,405
2. Kamrup	2,77,120	60	8,24,678	10,01,864
3. Nowgong	2,39,789	-	50,688	2,90,477
4. Darrang	3,86,349	-	18,432	4,04,781
5. Sibsagar	4,90,611	-	1,38,636	6,29,247
6. Lakhimpur	4,87,219	-	4,54,176	9,41,395
Assam Valley	24,61,261	60	19,13,842	43,75,169

Source: Forest Department, Assam.

In the south-eastern part of Nagaland covering parts of Tuengsang, Zunheboto and Phek districts and in Manipur the northern part of Ukhrul district there lies the Tizu basin which contributes to the river Chindwin across the Patkai and Surma tract. Tizu basin claims an area of about 6,000 square kilometre. The eastern margin of Manipur is washed by the head-streams of Khampat and its main tributary, Yu, which together form the famous Kabaw valley and has a basin area of about 2,000 square kilometre.

The Manipur river has a basin area of 16,000 square kilometres and ultimately joins the Chindwin. The southern part of Mizoram

belongs to the Kaldan river basin area (9,000 square kilometres) which is a Burmese river that falls in the Bay of Bengal. The Karnaphuli river of Bangladesh has its basin extended upto the western margin of Mizoram and the southern part of Tripura, covering an area of about 5,000 square kilometre.

2.6 Natural Vegetation

Natural vegetation is the geographic Index of a region. It represents combined effects of climate, terrain and soil of an area. More than that natural vegetation is the source of economic sustenance in under-developed and hilly areas. Other economic uses of natural vegetation are many and varied like uses in industries, construction works, etc. Vegetations check soil erosion, regulate water flow and above all help maintaining proper balance in the ecological condition.

North Eastern Region is rich in forest resources and it is diverse because of different physiographic forms. In the plains region the vegetation is characterised by dense mixed semi-evergreen, evergreen and wet deciduous types owing mainly to the impact of heavy monsoonal rainfall, effective temperature and thick fertile soil cover in the valley. The vegetation in the plains region may be classified as follows: (a) Tropical evergreen and semi-evergreen, (b) Sal, (c) Riverine forests, (d) Mixed deciduous, (e) Savannah, and (f) Bamboo and canes and miscellaneous varieties[30]. Among the evergreens, the most common trees are Hollong, Nahar and Mekai found mainly in the southern part. The Hollong and Mekai provide raw materials for phywood mills in the Upper Assam valley.

Sal tree occupies large areas in the district of Kamrup, Goalpara and the western part of the Nowgong district of Assam. This species has a very high commercial value owing to its long cylindrical bole and absence of middle storey. The most important Sal tract of the Brahmaputra valley is in the Mechpara wards estate of Goalpara district covering 205 square kilometre.

The forest types in the Hills and Mountains of north-east region range from tropical evergreen in the foothills, through temperate evergreen in the middle ranges, to the coniferous in the higher elevations[31]. Altitudinal aspects play an important part in the distribution and nature of vegetation in the mountain areas. The unexploited rich forest resources of this region have suffered from fires and from reckless fellings and burning for jhumming (shifting cultivation).

The eastern hills region is still considered as a treasure land of natural vegetation though its forests have suffered a lot due to century-old jhumming practices. The variations in altitude, latitude, climate and soil have given rise to a diversity of forest types ranging from tropical evergreen to temperate evergreen and the coniferous[32]. Bamboo jungle is found everywhere. The important trees comprising the temperate evergreen and evergreen type forests, which are generally a feature of hill slopes lying above 1,800 metres are Oak, Chestnut, Birch, Magnolia, Cherry, Maple, Laurel, Fig and Moly. Wang is an important structural timber which can be used fresh as it never warps.

In the plateaus of north-eastern region, Meghalaya plateau has less area under forest because of its slopy terrain and structural character of limestone rock beds. The western Meghalaya is characterised by vegetational cover almost similar to the lower Brahmaputra valley region. Here both the northern and southern low hills have mostly dense tropical mixed vegetation with predominence of sal forests and dense thickets of bamboo[33]. The Pine forest of the higher parts of the central and eastern Meghalaya are above 750 metres particularly around the Shillong hills where the main species is pine.

Unlike Meghalaya plateau, the Karbi plateau region has high density of forest areas with vegetation more similar to the central Brahmaputra valley. The vegetation here is characterised by dense reserves of bamboos and grasses with few scattered miscellaneous trees here and there.

The physical parameters in geopolitical analysis of the North Eastern Region have been discussed above. The three broad physiographic portions viz. the Plateaus, the Hills and Mountains and the Plains, with their distinctive characters play a major role in controlling geopolitical forces. The plains portions of the region are the areas of attraction whereas the plateaus and hills are inhabited by less dense population. Climate, soil and mineral deposits favour the concentration of population in the plains, which can be understood from the density figures of Assam and its neighbouring states.

On the basis of above discussion it is strikingly visible that, the diverse physical character of this region is bound to reflect through the diversity in economic strength which ultimately moulds the political character of different parts of this region. Therefore, it can

be concluded that, the physical diversity of the north-eastern region can be regarded as one of the factors generating geopolitical forces in this region.

Table-9

Density of Population in the North-Eastern Region in 1991

State	*Area (square kilometre)*	*Population (persons)*	*Density (persons)*
1. Arunachal Pradesh	83,743	8,58,392	10
2. Assam	78,438	222,94,562	284
3. Manipur	22,327	18,26,714	82
4. Meghalaya	22,429	17,60,626	78
5. Mizoram	21,081	6,86,217	33
6. Nagaland	16,579	12,15,573	73
7. Tripura	10,486	27,44,827	262
Total	2,55,083	313,86,911	123
All India	32,87,263	8443,24,222	265

Source: Basic Statistics of North Eastern Region, 1992.

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