

RIVERS AND Riverine Landscape in North East India

Editors

S. Sengupta, K.R. Sinha
S. Das, W.B. Rani
S. Purkaystha

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This compendium of twelve papers, presented at a national seminar on River Systems in the North Eastern India and their impact upon the Region's Environmental Development, held at St. Mary's College, Shillong, attempts to study the river systems in the North-East India as a whole and the cases of particular rivers along with their overall impact on the natural landscape, rural and urban morphology and regional development.

The contributors deal with the various problems and prospects of the north-eastern rivers as well as progress made by them in the physical, social and cultural aspects of the region. They also make in-depth study of some individual rivers and their tributaries, highlighting their historical, physical, cultural and economic significance.

Dr. S. Sengupta is a senior faculty in Geography in St. Mary's College, Shillong. She has edited a book entitled *Shillong — A Tribal City in Transition* published in 2004. Also, she has to her credit several research articles published in different volumes. She has presented papers on population studies, economic and regional studies in many national and international seminars, workshops and conferences.

Dr. K.R. Sinha is a senior lecturer in the Department of Geography, St. Mary's College, Shillong. Her field of specialization is agricultural geography and agricultural policies. Currently, she is working as the Director in a UGC sponsored project on "Geo-Environment Appraisal of Shillong Urban Agglomeration with Special Reference to Solid Waste Management."

Ms. S. Purkayastha, Lecturer in Geography, St. Mary's College, Shillong, has registered as a research scholar in North Eastern Hill University. Her field of specialization is Geomorphology. She has undertaken research on geo-environmental issues of Shillong town. Also, she is one of the joint coordinators of the UGC sponsored project on "Geo-Environment Appraisal of Shillong Urban Agglomeration with Special Reference to Solid Waste Management".

Ms. W.B. Rani, Lecturer in Geography, St. Mary's College, Shillong, is also a joint coordinator of the UGC sponsored Project on "Geo-Environment Appraisal of Shillong Urban Agglomeration with Special Reference to Solid Waste Management".

Ms. S. Das, Lecturer in Geography, St. Mary's College, Shillong, has to her credit a good number of research articles published in books and periodicals. She has presented papers in many regional, national and international seminars, workshops and conferences. She takes particular interest in urban social studies.

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NORTH EAST INDIA**

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**S. SENGUPTA, K.R. SINHA
S. DAS, W.B. RANI
S. PURKAYSTHA**

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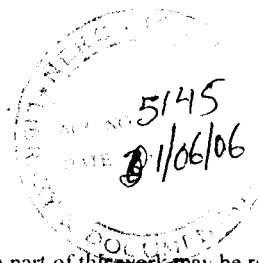
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CONTENTS

<i>Preface</i>	5
<i>List of Contributors</i>	11
<i>List of Figures and Tables</i>	13
<i>Introduction by Prof. Mohammed Taher</i>	15

PART-I GENERAL BACKGROUND

1. Valuing the River — <i>A. C. Mohapatra</i>	27
2. Hydro Power Potential of the River Systems in the North East : Prospect, Progress and Problem — <i>Monomoy Goswami and Aparajit Choudhury</i>	35

PART-II CASE STUDIES

3. Brahmaputra River and Prospective Development of Assam — <i>A. K. Bora</i>	75
4. Steamer Ghats (Ferry Ghats) of Brahmaputra River : Impact on Region's Economy and Environment — <i>B. Saikia and P. Das</i>	85
5. Jia-Dhansiri Irrigation Project : Impact on Agricultural Development in Darrang District — <i>Charu Saharia (Nath)</i>	96

10	<i>Rivers and Riverine Landscape in North East India</i>	
6.	The Giant Confluence Zone of Lohit, Dibang and Dihang : Impact on the Surrounding Regions — <i>Bhuban Gogoi</i>	105
7.	Streams of Shillong — An Ecological Overview — <i>Abhik Gupta</i>	118
8.	Urbanisation and the Streams of Shillong — <i>Subrata Purkayastha and Susmita Das</i>	128
9.	River Umiam and its Role in Hydro-electricity Generation, Tourism Development and Industrial Growth — <i>Uttama Choudhury</i>	134
10.	Geomorphological Characteristics of the Imphal River Basin and their Impact on Development — <i>M. K. Bandyopadhyay</i>	141
11.	Traditional Rice Varieties of Barak Valley : An Under Utilised Germplasm for Sustainable Agricultural Development of Flood-Prone Areas — <i>Dhrupad Chaudhury and Jibendu Datta</i>	144
12.	North Bengal Rivers : Behavioural Pattern and their Impact on Development — <i>M. M. Jana</i>	163
	<i>Annexure</i> : Brief Notes	166
	<i>Index</i>	169

INTRODUCTION

MOHAMMED TAHER

KEYNOTE SPEECH

Honourable President, esteemed scholars, revered colleagues, ladies and gentlemen present. I feel extremely honoured on being called upon to deliver the keynote speech on this very important topic before this august gathering of the luminaries. However, I shall make a brief speech by way of giving a geographical introduction to the river system of the North East India and the status of the environment in which they exist.

North East India falls within the tropical monsoon climate with an average annual rainfall of 200 cm. It may be noted that the region contains the rainiest locality of the world, i.e. the Mawsynram - Cherrapunjee area. Besides, North East India has one of the densest drainage network in the world, due essentially to high rainfall and the character of the topography with hills, mountain and flat land just opposed together. There are seven sets of drainage system covering the region. They are (i) the Brahmaputra in the north, (ii) Barak - surma system in the middle, (iii) Chindwin system fed by the Tizu, Yu and Manipur rivers in the east and south-east, (iv) Chintuipui in the southern part, (v) Karnaphuli in the western part of Mizoram (vi) Gumti in the middle part and (vii) Feni in the southern part of Tripura. All these systems are international in their extension and go either to Bangladesh or Myanmar. Of these seven systems, the Brahmaputra and Barak system are very much extensive, the other five are small, but large or small of all the river systems cut across the international boundary, thus assuming

environmental and strategic importance. For a vivid picture the systems are discussed below individually.

The Brahmaputra System

The Brahmaputra, one of the largest river of the world has 920 km lying within North East India out of its total length 2880 km, the basin of the Brahmaputra within North East India covers 165000 km², including whole of Arunachal Pradesh and major parts of Assam, Nagaland and Meghalaya, accounting for 70 per cent of the total area of the region.

The tsangpo, the main head stream of the Brahmaputra, enters into North East India at Keping la above Tuting, after its long 1700 km of travel over the Tibetan plateau. Here its bed is at an altitude of 3600 m a.s.l. and is full of cascades and cataracts. The river here takes the name of Siang and flows through a highly mountainous country for 200 km through deep gorges and waterfall, until it reaches Pasighat at the southern Himalayan foothills, at an altitude of 350 m. The river in this mountainous course receives several tributaries both on its left and right banks. The average gradient of the river here is 17 m/km. On entering the plain it takes the name of Dihang and meets with Dihong and Lohit, two equally large rivers, and create an extensively low lying flat topography criss-crossed braided channels. From this tri-junction the river takes the name Brahmaputra and begins to flow south-westward for about 150 km upto Dihingmukh and then slowly takes westward course for about 500 km until it reaches Dhubri. Near Dhubri, Brahmaputra takes a sudden southerly turn and flows for about 40 km. before entering Bangladesh.

From its tri-junction near Kobo to Mankachar, where it leaves North East India, the river receives as many as 104 large and small tributaries of which Jia, Dhul, Subansiri, Ranganadi, Dikrong, Buroi, Bargang, Jia Bharali, Gabharu, Jia Dhansiri, Barnadi, Pagladia, Beki, Manas, Champamati, Godadhar and Sankosh, in the north-bank and Dibru, Burhi Dihin, Disang, Dikhou, Janji, Kakadonga, Kopili, Digaru, Kulsi, Dudhnoi, Krishnai and Jinjiram of the south-bank are the main. While the main catchment areas of

the north-bank tributaries fall within Arunachal Himalaya, those of the south-bank tributaries are over Nagaland, North Cachar Hills and the Meghalaya Plateau. The catchment areas of several of these rivers are above 5000 km² each. All these tributaries, apart from the main headstreams of Dihang, Dibang and Lohit, carry down million of tonnes of sediments and spread these over not only the beds of the rivers themselves, but also on the flat Brahmaputra plain, especially during the period of heavy monsoon rainfall. Brahmaputra carries about 402 million tonnes of sediment on the average annually. This phenomenon reflects itself in a number of topographic consequences. *Firstly*, the Brahmaputra plain has become extremely flat, the gradient between Kobo and Dhubri being hardly 14 cm/km. *Secondly*, the sediments deposited on the bed of the Brahmaputra have given rise to numerous riverine shoals and semi-permanent islands rendering the river wide and braided. *Thirdly*, the tributaries themselves, especially the north-bank ones, braid near the foothills and meander sluggishly down-stream. *Fourthly*, in order to accommodate the large volumes of turbulently flowing water in the period of heavy deluge in summer, extensive bank erosion takes place in almost all the rivers including the Brahmaputra. *Fifthly*, the channels of the north-bank tributaries being choked with sediments, often change the course in summer causing immense damage to land and material. *Finally*, there occurs devastating floods in the plain in every rainy season.

To add to the fury of floods, the Brahmaputra has four constrictions in its bed within North East India. The first constriction is at Mahmara Gaon South West of Kobo, the second one is near Silghat, the third one is between Guwahati and North Guwahati and the last one is between Pancharatna and Jogijhopa. The river channel in these places are relatively narrow, hindering a regular flow of rain and snow-melt water in summer, making their upstream areas vulnerable to flooding.

The topography of the Brahmaputra basin is made of high Himalayan mountains reaching an altitude above 6000 m, the Lesser Himalayan hills varying in altitude between 300 m and 400 m and the flat Brahmaputra Plain located at 40 m to 300 m.

The Barak System

The Barak system of rivers lies in the middle part of North East India covering an area of about 52,000 km². The river Barak originates at the border of Nagaland and Manipur, east of Mao and flows westward for some distance forming the boundary between Nagaland and Manipur and then suddenly turns southward and flows through Manipur until it reaches Tipaimukh, south of the tri-junction of Assam, Manipur and Mizoram. Then it takes a northward turn, flows for about 60 km and turns westward at Jirimukh and runs through the Cachar Plain sluggishly. Near Karimganj it bifurcates into the northern branch of Surma and the southern branch of Kushiyara.

The drainage basin of the Barak covers the northern and western parts of Manipur, southern parts of North Cachar Hills and Meghalaya, the plain districts of Cachar, Karimganj and Hailakandi and the northern parts of Mizoram and Tripura. The Barak has a length of 525 km within North East India. Of this, about 400 km of its course is hilly where it falls from a height of about 2000 m to about 150 m and the remaining 125 km is over the Cachar plain over which it flows through a sluggish course. Its important right-bank tributaries include Makru and Jiri in Manipur and Labak, Modhura, Dalu, Jatinga and Larang in the Cachar plain. The major left-bank tributaries are Irong and Tuivai (Tipai) in Manipur and Sonai, Rukni, Katakhal, Daleswari, Singla and Longai in the plains. Besides, several tributaries from northern Tripura fall into its Kushiyara branch in Bangladesh. Similarly, Lubha, Kangs, Jadukata and Someswari fall into its northern branch i.e., Surma in the Bangladesh Plain.

The Barak has its bed graded even inside Manipur hills upto about 150 km upstream from Jiribam (where it enters the plain). Hence, country boats can ply deep into Manipur and Mizoram hills along this river. Over the Cachar Plain, the river has an extremely meandering course, rendering wide areas on both of its banks swampy flood plains gagged with ox-bow lakes.

The Chindwin Drainage System

Although the Chindwin River flows within Mynmar, a large number of its headstreams drain the eastern part of North East India, especially the areas bordering that country. The three important tributaries through which this drainage has been set up are the Tizu, Yu and Manipur rivers. The Tizu drains the south eastern part of Nagaland and north eastern part of Manipur and then falls into the Chindwin. The Yu with its headstreams drains the eastern margin of Manipur and then flows south meeting the Chindwin finally. The Manipur River sub-basin is more important in that it drains the central and southern parts of Manipur including the lowlying Manipur Basin. The tributaries, Imphal, Iril and Thoubal, which originate in the Hills of the North Central part of the State, flow south, descend to the Basin and meet one another south of the Imphal City. The combined water course takes the name of Turel Achouba or Manipur River or Imphal River and flows south by the eastern side of the Loktak Lake and leaves North East India to meet Myittha, a tributary of Chindwin in Mynmar. Near Loktak it is joined to the lake by a channel called Khuga. The area in North East India under the drainage system of Chindwin covers about 24,000 km². While the rivers Tizu and Yu still retain steep hilly character, the main headstream of Manipur River, viz., Iril, Imphal and Thoubal have graded course over the Basin, causing heavy siltation and assuming meandering courses. The siltation so caused has recently led to shrinking of the Loktak Lake and other low lying areas of the Basin.

The Chimtuipui System

The river Kaladan or Chimtuipui has set up its drainage basin over the southern and south-east part of Mizoram in the Lunglei and Chimtuipui districts. Its important tributary is Mangpui Lui. In the central eastern part of Mizoram, its another tributary, Tuichong, drains a part of Champhai sub-division. The drainage basin of Chimtuipui covers an area of about 7000 km². It flows due south to Mynmar across the southern boundary of Mizoram in the name of Kaladan and falls into the Bay of Bengal.

The Karnaphuli System

Although the Karnaphuli is an important river of the south-eastern part of Bangladesh, almost all of its headstreams lie on the western margin of Mizoram. The important ones among them are Phairang, Tuichong, Thega, Doh and Tuiliangpui. They meet one another near Demagiri and flows south-east to Bangladesh in the name of Karanphuli. The drainage area of this river in North East India is about 4000 km².

The Gumti System

Gumti is an important river of the middle part of Tripura draining a large part of West Tripura district and a small part of South Tripura district. The Gumti ultimately falls into Meghna and has about 2500 km² of drainage basin in North East India.

The Feni System

The Feni is a small river, which along with its headstreams, drains the major part of South Tripura district. Its basin in North East India accounts for an area of about 1500 km².

Perspective on Development

We have got a geographical introduction to the river system of North East India. Although there is an overall environmental homogeneity among all the river basins, there are certain differences in the high Himalayan part of the Brahmaputra Basin from the rest because of its altitude cause variation in climatic and geomorphological process. Besides, the hills and mountains on the one hand, and plains on the other, have differences in respect of both environment and human activities. These variations call for an independent assessment of each of the river basin areas. A cursory glance over them reveals the following facts:

The Brahmaputra Basin

This basin of about 1,65,000 km² area, consists of about 100,000 km² of hills and mountains and 65,000 km² of low lying plains. Total population in this basins is about 22.9 million. Although, average density turns out to be about 10 km², there are 3 density zones, the Brahmaputra Plain having density of 350 persons/km² followed by the Arunachal, Nagaland and Meghalaya foot hills with density ranging between 30 to 70 km² and the high Himalayan area where density drops down to less than 6 person/km². The area has land, forest, water and mineral resources and hence there have come up 102 towns of different sizes. The region has the problems of drainage, flood, landslide in the hills and lack of infrastructural development including underdeveloped transport and communication. The towns mentioned above may be taken as growth centres and growth points for prospective development.

The Barak Basin

Of the 52,000 km² of the area of Barak drainage system, only about 9,000 km² is plain while the remaining 43,000 km² is hilly. The total population of this basin is about 4.55 million, accounting for an overall density of 88/km², but it has a 3 tier distribution, while the Manipur hills within the basin has a density of only 20/km², the Mizoram, Meghalaya and Tripura Hills have about 50-60 persons/km² and the Barak plain has to support about 400 souls/km². Resources of the region include land, forest, water and natural gas, coal and limestone. The basin has 27 small and big towns. The problems include flood in the plain, landslide in the hills, isolation and lack of development of transport and communication.

The Chindwin Drainage Basin

This drainage system containing high hill ranges in the eastern margin of North East India spreads over 24,000 km² with only about 2200 km² of plain land represented by the Manipur Basin.

The total population of the drainage is 1.6 million accounting for an average density of 67 persons/km². But here again there is distributional disparity. While the Phek and Tuensang districts of eastern Nagaland has a density of 50/km², the eastern Manipur or Yu Sub-basin has a density of only 20 persons/km² but Manipur Basin has the highest density in North East India with more than 400 persons/km². The resources of the region include land, water, forest and many varieties of minerals yet to be fully explored. There are 27 towns, large and small, which can act as growth points for regional economic development. The problems are of landslides in the hills, flood and poor drainage in the plains, isolation and lack of development of transport and communication.

The Chintuipui System

The whole of the 7,000 km² of this basin is hilly, although hills are not as high as in the case of the previous basin. The total population of this basin is about 1.5 lakhs with an average density of 25-30 persons/km². The resources include land, water and forest. There are 9 towns in this region which have come up as administrative and service centres of Mizoram. This basin area is one of the most isolated in whole of India with extremely poor development of transport and communication.

The Karnaphuli System

It is a small basin with an area of 4000 km² and a population of 25,000 in Lunglei district. Average density is 25 persons/km². Land, forest and water are its resources. The only town worth the name is Tlabung or Demagiri which must be developed as the launching pad of development of the region. Like the above area, this area is also handicapped with isolation, in spite of it being strategically important.

The Gumti Drainage System

Gumti basin covers the densely populated West Tripura district and the marginal areas of Dholai and South Tripura districts (area:

2500 km²). It supports a population of 17 lakhs with a density of 370 persons/km². The resources of the region include land, water, forest and natural gas. The problems are isolation and underdevelopment. There are 12 towns in this area which can be used as growth points.

The Feni River System

This is the smallest river system covering only 1500 km² of the southern part of South Tripura district. It supports about 3 lakh population with an average density of 180-200 persons/km². Like other parts, its known resources are land, water and forest. The only town here is Belonia, which holds the potentiality of being an important commercial centre with Bangladesh. The region's problems are the same as other parts of Tripura i.e., isolation and lack of development of transport and communication.

Conclusion

We have had a brief introduction of the river systems of North East India and their physico-economic environment.

Each of the seven river basins holds out potentiality with land, water, forest and to some extent minerals. But each of them is also handicapped with certain physical problems like flood, ill drainage, landslide, etc., and socio-economic problems like poor development of transport and communication and other infrastructures necessary for development.

River basins are often considered as scientific units for regional development, for they provide important clues for development of land, water and forest resources. As such taking the basins as units and accepting the towns (179 of them) as the growth points and centres, the North Eastern Region can be developed well. But for that two things must be achieved. Firstly, development of a solid transport and communication base and secondly, development of human resource in the true sense of the term.