PART I

GEOGRAPHICAL BACKGROUND

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PHYSICAL SETTING

POSITION AND EXTENT

The Manipur State occupies extreme eastern part of the Indian Union and lies just north of the Tropic of Cancer. It extends between 23°50'N and 24°41'N latitude, and 93°2'E and 94°47'E longitude and covers an area of 22,327 km². The State of Manipur is bounded by Nagaland in the north, Burma in the east and south-east, Mizoram in the south, and the Cachar district of Assam in the west (Map 1). Manipur lies almost half way between the tri-junction of India-Burma-China in the north and India-Burma Bangladesh in the south.¹

PHYSICAL FEATURES

In Manipur, the hill ranges, and intermont basin form parts of the Indo-Burmese mountain arc. The Manipur hills alongwith the Naga and Mizo hills in their immediate neighbourhood to the north and the south, consist mainly of the Tertiary strata. The entire region was formed as a part of the Himalayan orgoney in the early Tertiary period of the earth's history.
TOPOGRAPHY

Structurally, the hills of Manipur along with the enclosed intermont basin belong to the Alpine system. The hills belong to the class of mountains and the valley to the depression, and the Barak basin to the riverine plain. On the basis of its structure, topography and the geomorphic processes, the State can be divided into three major landform divisions (Map 2):

1. The Manipur Hills
2. The Manipur Valley, and
3. The Barak Basin.

Manipur hills: The hills of Manipur form the central part of the Indo-Burmese mountain system with an arcuate trend, convexing towards India. These hills have a marked Jura type structure of very simple anticlines and synclines, with some shallow thrusts. The hill ranges found within the state area generally run nearly north and south with occasional connecting spurs and ridges of lower elevation between them. Maximum height is attained in the northern part of the State where hills rise above 2,500 metres above the mean sea level. The general aspect of the hill
ranges is that of irregular serrated ridges, occasionally rising into conical peaks and flattened cliffs of bare rock\(^3\).

The Manipur hills are the southward extension of the Naga hills, and further south the chain continues in the Mizo and the Chin Hills. These ranges of hills fall into two broad groups - (a) The Manipur Eastern hills, and (b) The Manipur Western hills. In between these two hill ranges, lies the Manipur valley, an intermont basin.

Manipur Eastern Hills: These hills, which form a compact and continuous mountain chain along the Indo-Burma border, have a length of about 200 km. and a breadth of about 50 km. in the north and 30 km. in the south. The average altitude is about 1,500 m but along the border the peaks rise above 1,800 m, namely Khayangbung (2,833 m), and Khachoubung (2,498 m). The Siroi peak (2,568 m), a tourist spot, is located east of Ukhrul. The rocks, constituting the eastern hills, are the Disang shales, Ukhrul limestones and the serpentinites containing a number of minerals like copper and nickel ores, chromite, talc and limestone.\(^4\)

Manipur Western Hills: The Manipur western hills, com-
MANIPUR
PHYSIOGRAPHY

ALTITUDE IN METRES
- ABOVE 2400
- 1800 - 2400
- 1200 - 1800
- 600 - 1200
- 300 - 600
- 150 - 300
- 50 - 150

KILometres

MAP 2
prising of parallel ridges and valleys, and rugged relief have characteristic Appalachian features - resulted from the erosional activities of the Barak river and her tributaries. These ranges are comparatively higher in the northern part (above 2,500 m) - Iso (2,460 m), Leikot (2,831 m) and Tamphaba (2,644 m). The general slope of the area is towards the south and west. These hills are composed of the compact sandstones, shales, and clays of the Barail series but their western slopes are covered with sandstones, sandy shales, mudstones and conglomerates of the Surma series.

**Manipur Valley**: It is a large basin of about 1,843 Km² having a length of 60 km in north-south direction and breadth of 30 km in east-west direction. It is enclosed by the eastern and western hill ranges of Manipur. It is a lacustrine plain, which was subsequently filled up and uplifted to its present position with Loktak Lake (12 km long and 8 km wide) in its south central part. This basin presents a flat land topography formed by the alluvial deposits of the post-Tertiary period. General elevation of the valley ranges between 800 m to 1,000 m. A number of occasional hills such as Langol, Waithou, Nongmaiying, Khoriphaba, Maibam Lokpa Ching,
Langthabal, Chinga, Chingarel Lalembung, Nongmeibung etc. rise above the general level of the valley.

Barak Basin: The Barak basin, which contains rocks of both Surma and Tipam Series, is an extension of Surma Valley of Assam. It is spread over an area of 250 sq. km. and has been carved out by the headward erosion and subsequent deposition by river Barak and its tributaries.

GEOLOGY

Geologically, Manipur belongs to the Alpine system of young folded mountains, which came into existence as a result of the Tertiary foldings of the sedimentary strata formed in the shallow Tethys sea, some 40 to 90 million years ago. The following type of rock formations (Map 3) reveal the geological history in brief.6

(i) The Ukhrul Limestones were formed during the Cretaceous period, about 80 to 90 million years ago.

(ii) The Disang Group belongs to Eocene period, about 40 to 60 million years ago.

(iii) The Barail Group spreads over western portion of the State. It was formed during the Upper Eocene and Oligocene periods, 25 to 40 million years ago.
(iv) The Tipam and Surma Groups were formed in the Miocene period, about 18 to 25 million years ago.

(v) The Imphal Alluviums of Manipur Valley were formed during the last 10,000 years.

**DRAINAGE PATTERN**

Manipur lies between the two drainage systems of Ganga-Brahmaputra and the Chindwin-Irrawaddy. The Barak and her tributaries belong to the Ganga-Brahmaputra drainage system flowing into the Bay of Bengal and the river Manipur and her tributaries form part of the Chindwin-Irrawaddy drainage system flowing into the Andaman Sea.

Manipur is drained by the following river systems (Map 4), of which the first belong to the Ganga-Brahmaputra drainage and the other tow to the Chindwin-Irrawaddy drainage:

1. The Barak river system
2. The Manipur river system, and
3. The Chindwin river system.

1. **Barak River System**: The Barak river originated from the southern spurs of Mt. Japvo, and follows the south-west
course with very sharp turns controlled by topography of the area. At Karong it takes an abrupt turn to north and then to the north-west. Later on, it takes a south-south-west course. It demarcates the inter-state boundary between Manipur and Nagaland, and Manipur and Assam. The Barak receives water from the Makru, Irang, Tipai (Tuivai), Jiri, Iring and Leimatak rivers and their numerous tributaries. River Makru and Jiri are the important right bank tributaries, while Irang, Iring and Tuivai are the left bank tributaries of the Barak river.

2. Manipur River System: The Manipur river system comprises of the Imphal, Iril, Thoubal, Kongba, Nambul, Khuga rivers, which originate from the north and north-western hills and from the north-eastern hill tracts of the state. Imphal river rises from the hills north of Kangpokpi, and flows towards south along the Loktak Lake. The Iril, and Thoubal rivers join the Imphal river at Lilong and Mayang Imphal respectively. Rising from the western hills, the Numbul and Nambol rivers emit into the Loktak Lake. However, the Imphal river joins the Loktak Lake when its water overflows during the rainy season. The Khuga river originates from the Churachandpur hills, flows northwards and joins the Manipur River (Imphal river) at Sugnu. Further down Sugnu, the Manipur river cuts a deep gorge and flows into river Myitha and after a long journey in
the Chin hills joins the Chindwin river.

3. The Chindwin River System: Important rivers flowing into the Chindwin river originate from the Manipur eastern hills i.e. Akonglok and its two tributaries—Chingal and Chamu—rising in the Ukhrul hills, flow north-eastward and turns south-west to join the Chindwin. While river Yu and her tributaries Maklang, Tuyungbi, Lokchao, Lalimlok and Tuiyang, flow south-easterly through the Kabaw valley into the Chindwin. The Chindwin river, which collects its water from both east-flowing rivers of Manipur and Manipur river system, finally joins the Irrawady to emit into the Andaman Sea.

LAKES

Though the state of Manipur is small in area, there are numerous lakes, swamps and marshes mostly in the southern part of the central valley, the Lok-tak lake being the largest among them. It covers an area of about 65 sq. km. in the dry season and 95 sq. km. during the rainy season. The vast expanse of this lake is covered with aquatic vegetation, weeds, reeds, water hyacinths. A number of islands e.g. Thanga, Karang, Ithing, Sendra etc. rising steeply
above the lake surface, provide the best fishing grounds. Keibul Lamjao National Park, the home of the Sangai, the brow antlered deer, found only in Manipur, lies in the south-eastern part of the lake. The lake water is also used for generating hydro-electric power as well as for irrigation purposes.

Besides, there are other lakes and marshes, i.e. Waithou, Ikop, Kharungpat, Pumlen, etc. A number of marshes with enough water during the rains, locally known as Pat, are also found throughout the valley in the inter-riverine tracts. Important marshes are Utrapat, Sangupat, Laphupat, Leingangpat, and Heingangpat, Lamphelpat. However, Lamphelpat has been reduced to the smallest size, found partly as such only during the rains, due to its continued reclamation for the development of a new township to accommodate the Regional Medical College, a large number of State Government offices and residential colonies to reduce the pressure over the old township of Imphal.

CLIMATE

By virtue of its position in the eastern mountainous region of India, Manipur enjoys sub
tropical monsoon type of climate. As per Koppen's classification of climate, Manipur belongs to the temperate rainy (Humid Mesothermal) climatic regime with dry winters and hot summers.

There are a number of factors like the alternating sub-continental pressure cells of northwest India and the Bay of Bengal, the predominating moist marine tropical airmass (mT), the roving periodic western disturbances, local mountain and valley winds, the nature and intensity of the forest cover, the various water bodies, particularly the Loktak lake, influence the pattern of climate in the state.

Under the influence of the outblowing north-east monsoon winds for about half of the year, and the inblowing southwest monsoon winds for the rest, Manipur as in other parts of the Indian sub-continent, exhibits a strong seasonal rhythm in her climatic pattern. The state experiences four main season under the impact of monsoon winds:

A. Seasons of the north-east monsoon

(i) cold weather or winter season (December to February)
(ii) Hot weather or summer season (March to April)

B. Seasons of south-west monsoon

(i) Season of general rains or rainy season  
(May to September)

(ii) Season of retreating monsoon (October to November)

Map 5 represents the average monthly temperature and rainfall for various stations in the state, both in the valley and the hills.

Cold Weather Season (December to February): This season is marked by a steep fall of almost 5°C in temperature during the first month i.e. December. January is normally the coldest month with its mean maximum temperature below 22°C and mean daily minimum below 5°C. In the elevated parts, the temperature drops to one or two degrees celsius below freezing point. In February, temperatures rise gradually. The winter winds are normally weak and variable. There are, however, occasional rains of about 7.0 cm. Fogs are very frequent in this season. December is the driest month of the year.
Hot Weather Season (March to April): The commencement of this season is marked by a sudden increase in temperature, vanishing fog, and occasional thunder showers. The amount and frequency of rains increase as this season advances. The morning is cool and pleasant, while the afternoons are warm. This period also heralds the outset of rainy season. Thunderstorm, squall and hailstorm in the afternoons are the occasional feature in this season.

Season of General Rains (May to September): This season is the longest season in the state. The rain becomes more intense from May, which amounts to 12% of the total rainfall during the season. In early June, the monsoon bursts out with stormy south-west monsoon winds. Rainfall is heavier in June and July, and moderate in August and September. The rains bring a dull, sultry and oppressive weather, due to very high atmospheric humidity, widespread cloudiness, and very weak variable surface winds. Landslides are very frequent in the hills, sometimes blocking the highways, and the occasional floods inundate the valley areas, bringing miseries to the people, destroying their houses and crops.

Season of Retreating Monsoon (October to November): The
south-western winds become feeble during September and the following two months of October and November experience their retreat. In this season, rainfall decreases, temperatures go downwards, and the sky becomes clear. Fogs in the morning appear if the sky is clear. The weather is fair and pleasant, with bright and sunny days and pleasant cool nights.

SOILS

The soil is the surface film of the earth. It is the product of the parent rock materials acted upon by climate and by certain biological factors, for a considerable period of time under particular drainage and topographic conditions. The soil is a dynamic layer in which many complex chemical, physical, and biological activities are going on constantly.

The soils of this state vary greatly in their physical and chemical characteristics, and have resulted into a number of soil types due to impact of the various soil forming factors like parent materials, topography, climate, vegetation and time. However, the following types of soil may be recognised in Manipur.
**TABLE 11**

<table>
<thead>
<tr>
<th>Soils of Manipur</th>
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<tbody>
<tr>
<td>Residual Soils</td>
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<tr>
<td>Non-laterised Red soils</td>
</tr>
<tr>
<td>Laterised Red soils</td>
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</tbody>
</table>

- Ferruginous Red soils
- Red Gravelly soils
- Bamboo forest soils
- Peat soils
- Recent Alluvium (Paddy soils)
- Swampy Lowland soils
- Pineapple & Misc. forest soils

**Source:** Singh, R.P, *Geography of Manipur*, p.41.

Broadly two types of soils can be recognised in Manipur (Map 6).

1) Residual soils, and 2) Transported soils.

1. **Residual Soils:** can further be divided into two groups
   1) Non-Laterised Red Soil (Ultisol) and 2) Laterised Red Soil (Oxisol).

   Non-Laterised Red soil occupies major portion on the Manipur western hills. While Laterised Red soil covers mostly the Barak basin and western part of Manipur.
western hills.

2. Transported Soils: This soil may be divided into two sub-groups. i) Alluvial soil (Entisol) and ii) Organic soil (Histosol).

Alluvial soils occupy major portion of the Manipur valley while the lowland areas and marshy basins are mostly covered by organic soils e.g. areas around Loktak lake and other marshy areas in the valley.

NATURAL VEGETATION

The natural vegetation in Manipur mainly consists of forests, which occupy an area of 15,154 km² or 67.76% of the State's total geographical area⁹. Most of the forests in Manipur are poor in quality as well as in accessibility, and are of mixed type. The distribution of different forest types are influenced by the geological structure, physical and chemical properties of soils, the climatic factors, and relief.

The forests of Manipur belong to four major types¹⁰ (Map 7):

1) Tropical moist semi-evergreen
2) Tropical moist deciduous
3) Sub-tropical pine, and
4) Dry temperate
Tropical Moist semi-evergreen forests: These forests are found in the Manipur western hills, in the Barak basin area, occupying a narrow elongated belt along the Assam-Manipur border. These forests have suffered much by unregulated jhuming (shifting cultivation). Important timber species are Haldi (Adina cardifolia), Siris (Albizia Lebbek), Chaplash (Artocarpus Chaplsha), Agar (Aquilaria agallocha), Toon (Cedrela toona), Jarul (Lagerstroemia flos regina), Bonsum (Phoebe hensiana), Ironwood (Nesua Ferra), Mango (Magnifera Indica) etc. Forests in the Barak basin mainly consist of bamboo, Dalchini, and canes in considerable quantities. Bamboo grows in plenty over an area of 2,500 km² in the Barak river drainage.

Tropical Moist Deciduous Forests: These forests cover an area of about 900 km² along the Indo-Burma border, bound on the east by the Kabaw valley. These forests are mainly composed of Teak (Tectona grandis), Toon, Kangin and Khen. Teak grows well on the alluvial banks of the small streams flowing from Manipur into the Yu River, which drain through the Kabaw valley into the Chindwin river. These forests are the most exploited vegetal cover affected by indiscriminate cutting and forest fires.
Sub-Tropical Pine Forests: These forests occupy a major portion of the north-eastern hilly section of the state covering about 1,300 km² area. Scattered patches of Pine forests are also found along the river sides in the south-eastern hill tracts, which are mostly inaccessible and liable to forest fires. Important species of these forests are pure Khasia Pine (Pinus Khasya) with Oak and Chesnut trees.

Dry Temperate Forests: These forests are found mostly on the isolated hills in the Manipur valley at a height of about 800 m to 2,400 m. They occupy an area of about 1,100 km². Oak and Chesnut trees are found in the northern section and Khasia pine mixed with oak trees are found scattered in the southern part. Over-grazing and extensive cutting as well as jhooming have made these forests poor in quality and quantity.

Out of the total forest area of 15,154 km², reserved forests constitute 9.1%, the protected forests 27.2%, and the unclassed forests the rest. Reserved forests are the property of the Government with the recorded rights of the tribals as to jhuming, wood rights, hunting rights and grazing.
rights. In protected forests, Government declare certain species of trees as "protected trees", and in these types of forests, the tribals have got the rights for jhuming, hunting, cutting and grazing. The unclassed forests are not controlled by any Department of the Government and jhuming is widespread there. In fact, the unclassed forests are largely degraded, unproductive and uneconomic.

The coniferous forests occupy only 6% of the state forests and the broad-leaved forests the rest 94% of the forest cover. Forests of Manipur provide firewood, charcoal, roundwood and timber. Besides fuel, they supply structural timber for public use, match-wood, bamboos and canes, turpentine and resin, gums, oils, fibres, wax, honey, thatching grasses and medicinal herbs. The revenue from the forest products has registered an impressive growth from Rs.29.72 Lakhs in 1979-80 to Rs.47.66 lakhs in 1982-83. Better management of forests, with greater emphasis on scientific exploitation, accelerated afforestation on the wastelands, proper check of forest fires, stress on social and farm forestry
and attempts to phase out the misuse of forests for shifting cultivation will make the forests more productive, both economically and ecologically, and the hill people prosperous and happier.
REFERENCES


