

## Chapter 2

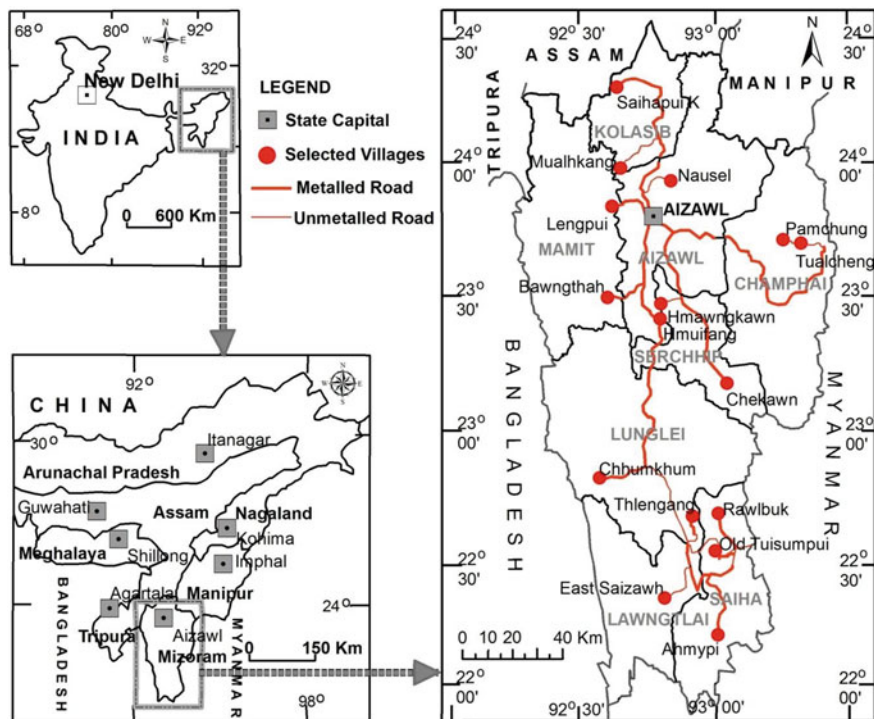
# Geographical Backdrop and Sustainable Livelihoods

Geographical aspects (natural assets)—location, altitude, slope aspects, climate, vegetation, soil fertility, water, arable land, and mineral and power resources—determine economy, development, livelihoods, and food security of a region or an area. These aspects also influence population, human activities/occupation, and farming systems. Economic disparities and changes in development patterns in the world countries are mainly due to availability of these geographical aspects although, institutional assets/human capability also support economic activities. In this chapter, we discuss all the geographical determinants that influence livelihood pattern, food security, and poverty in Mizoram in general and in the case study villages in particular.

### Location and Extension

Mizoram, a state of the republic of India, is located in the extreme northeast part, bordered with Myanmar in the east and south and Bangladesh in the west. It borders with the states of Northeast India including Assam and Manipur in the north, and Tripura delimits its small boundary from the west (Fig. 2.1). Mizoram is the eastern extension of the Himalaya and one among the eight sister states of the Northeast India. Geologically, it is a part of Indo-Myanmar Arc. It has totally eight districts and 26 administrative blocks. Population distribution is sparse and settlements are mostly located in the top of the hills therefore, Mizoram is called the “land of highlanders.”

The hills of Mizoram are highly fragile and called rolling hills. Land degradation in the forms of soil erosion and landslides is common. Its total geographical area is 21,087 km<sup>2</sup>, which shares about 0.64 % of the country’s geographical area. Lying



**Fig. 2.1** Location map of Mizoram state and case study villages

to the south of the Brahmaputra River, it forms part of the Northeast hill states biogeographical zone and is one among the biodiversity hotspots (Stattersfield et al. 1998; Sati et al. 2014a). A landlocked state, Mizoram stretches between  $21^{\circ} 58' - 24^{\circ} 35' N$  and  $92^{\circ} 15' - 93^{\circ} 29' E$ . The average altitude ranges from 500 to 800 m with the maximum altitude of 2157 m found in the Blue Mountain (Phawngpui) (FSI 2011).

## Physical Features

Mizoram mainly has four types of physical features—structured hills, valley fills, flood plains, and linear ridges. Structural hills are further divided into three categories—high structural hills, medium structural hills, and low structural hills (Table 2.1). A detailed discussion on physical features of Mizoram is as follows:

**Table 2.1** Physical divisions of Mizoram

S. no.	Geographical unit	Altitude (M)	Area (Sq. km)	%	Location
1	High structural hill	>1200	1732.1	8.2	Eastern part of the longitudinal half largely and central part of the state with limited distribution
2	Medium structural hill	800–1200	4350.6	20.6	Found in surrounding of the high structural hills and comprises of foothills
3	Low structural hill	<800	13013.3	61.7	They cover almost the entire area of the state
4	Valley fill	Along the valleys	574.3	2.7	The unconsolidated sediments deposited by streams or rivers in a narrow fluvial valley
5	Flood plain	Low-lying plains	78.4	0.4	Formed by deposition of recent alluvium—gravel, sand, and silt
6	Linear ridge	Parallel and linear ridges	1338.3	6.4	Low-dissected, parallel, and linear ridge of uniform heights and dimensions, found along the western and southwestern parts of the state stretching from Lawngtlai district in the south to Mamit district in the north

Source RSAC (2009)

## Structural Hills

The hills of Mizoram are known as structural hills. They characterize undulating, rough, rugged, and precipitous terrain, obtain the highest area of Mizoram (96.9 %). Mizoram has about 21 hill ranges and peaks. The hills are also nomenclature as rolling hills, characterize different length, breath, and direction. Phawngpui (2157 m), located in the "Blue Mountain" in Lawngtlai district, southern most part of Mizoram, is the highest peak. The eastern part of Mizoram mainly the districts of Champhai in the northeast and Saiha in the southeast occupies land above 1000 m while, the western part is comparatively less elevated (Fig. 2.2). Structural hills are further divided into three categories—high structural hills (>1200 m), medium structural hills (800–1200 m), and low structural hills (<800 m). The highest area lies under low structural hills and occupies 61.7 % area followed by medium structural hills (20.6 %) and high structural hills (8.2 %). Structural hills, as a whole, occupy totally 96.9 % geographical area. Population concentration is the highest in this area as it obtains 70 % of the total arable land and climate is feasible throughout year. A large number of rural people are engaged in practicing agriculture.

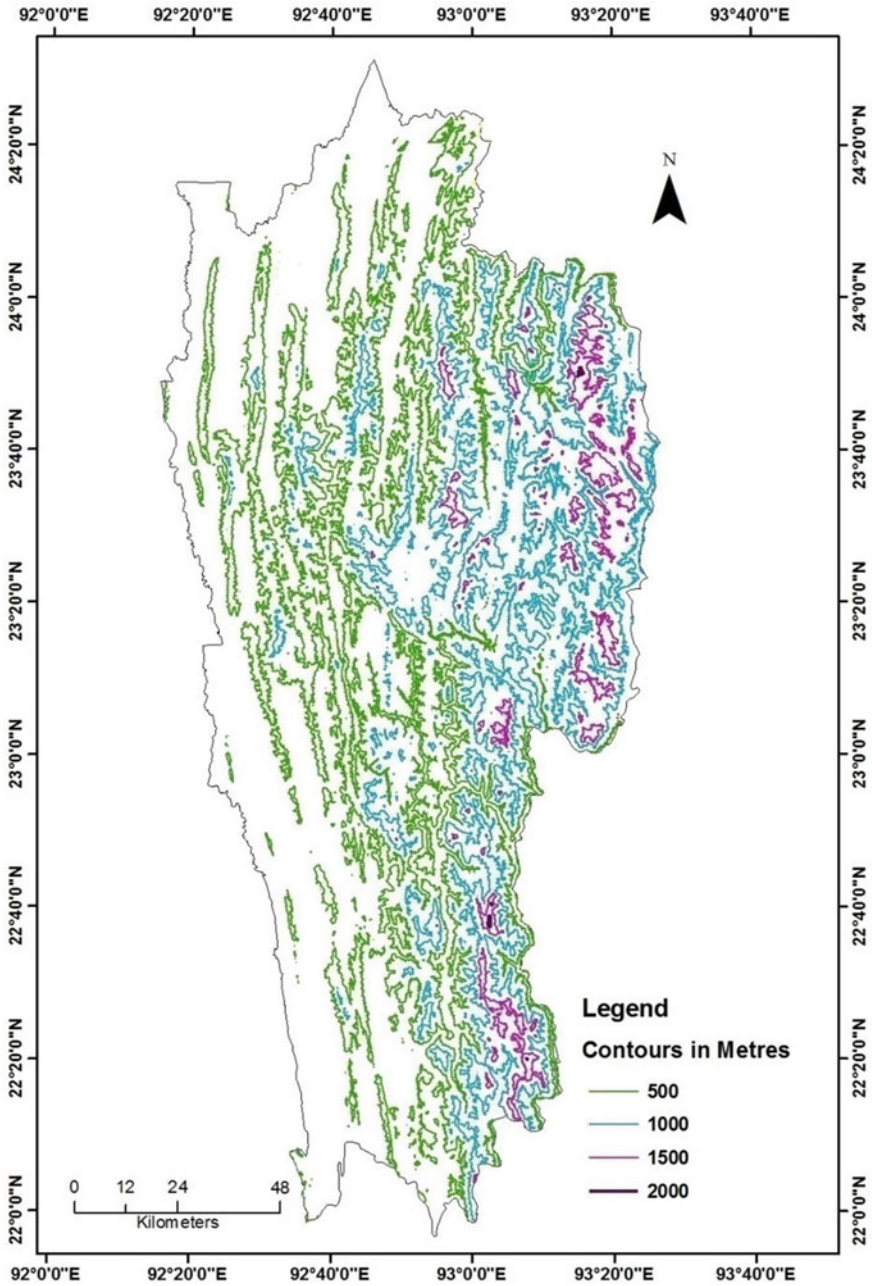


Fig. 2.2 Contour map of Mizoram

## **Valley Fills**

Valley fills lie along the rivers with narrow fluvial arable land and occupy 574.3 km<sup>2</sup> that represents 2.7 % of the geographical area. The area is least populated. Sparse settlements can be found along the arable land. During summer, temperature remains hot and humid.

## **Flood Plains**

Flood plains, occupy only 0.4 % area, are formed by debris deposited by the rivers. These are very fertile plains where wet rice cultivation is practiced. Although, area of flood plains is significantly less, it produces large amount of rice and it has reasonable productivity. Number of people living here is less but population density is high. Temperature is generally hot and humid.

## **Linear Ridges**

The last geographical region is linear ridge which possesses 6.4 % area of the state and comprises mainly forests and grasslands. Linear ridges are characterized by steep slopes where presence of arable land is minimum and thus, it is no man land.

## **Major Rivers**

Numerous rivers and streams originate and drain in Mizoram state. Most of them drain toward north and inlet into the Barak River, a tributary of the Brahmaputra River in the Cachar plain of Assam. These rivers are Tlawng (also known as Dhaleswari or Katakhal), Tut (Gutur), Tuirial (Sonai), and Tuivawl. The biggest river in Mizoram is Kaladan, locally known as Chhimtuipui Lui. It originates from Chin State in Burma and flows through Saiha and Lawngtlai districts in the south of Mizoram. It again enters into Myanmar and inlet into the Bay of Bengal at Akyab, a very famous sea port of Myanmar. A trans-boundary river, it has strategic location in terms of trade between India and Myanmar.

## Major Lakes

Lakes are locally known as *Dil*. Mizoram has several perennial lakes, scattered in all parts of the state. Among them, the famous lakes are Palak Lake, Tamdil, Rungdil, Rengdil, and Rildil. A detailed note on these lakes is as follows:

**Palak Lake:** Located in the southern part of Mizoram, Palak Lake spreads over 30 ha area, formed either by earthquake or by flood. A village was believed to be submerged into the lake during its formation.

**Tamdil:** Lies about 110 km from Aizawl city, Temdil is an important tourist destination of Mizoram. The local people believed that this lake was formed due to a giant mustard plant and thus, it is called a lake of mustard plant. Tropical evergreen and moist deciduous forests surround this lake. Major species are: *Sehenia*, *Wallichia*, *Chikarassia tabularis*, *Albizzia sp.*, *Artocarpus sp.* *Merus sp.*, and bamboo. Wild animals such as bear, deer, and wild pig are the major faunal species found in the surrounding forests.

**Rungdil:** Situated about 14 km from Suangpuilawn village in Aizawl district, Rungdil stretches in 2.5 ha area. It consists of two lakes, separated by a narrow stretch of land. Tropical evergreen forests cover its surroundings.

**Rengdil:** A manmade lake, Rengdil lies about 150 km toward northwest of Aizawl city and about 8 km from Zamuang village.

**Rihdil:** Situated at the Indo-Burma border in Champhai district, Rihdil is the biggest and important lake of Mizoram.

Table 2.2 shows district-wise area of Mizoram. Eight districts consist Mizoram state. Lunglei district covers the highest area (21.5 %) followed by Aizawl district (16.9 %). Champhai district occupies 15.1 % area and Mamit has 14.4 % area. Lungtlai possesses 12.1 % area. The other districts—Kolasib, Serchhip, and Saiha occupy about 6 % each.

**Table 2.2** District-wise area of Mizoram

S. no.	Name of district	Area	%
1	Kolasib	1382.5	6.6
2	Mamit	3025.8	14.4
3	Aizawl	3576.3	16.9
4	Champhai	3185.8	15.1
5	Serchhip	1421.6	6.7
6	Lunglei	4538.0	21.5
7	Lawngtlai	2557.1	12.1
8	Saiha	1399.9	6.6
9	Total	21,087	100

Source RSAC (2009)

## Climate

Mizoram state characterizes feasible climatic conditions. Although, the tropic of cancer falls in the middle of Mizoram state yet, landscape, altitude, and territorial rainfall regulate climate and tend to make it feasible during the whole year. It receives thunderstorm and seldom showers in 3 months—April, May, and June. From July to October, heavy downpour occurs due to monsoon outburst that rises from the Bay of Bengal. Average annual rainfall reaches to about 246 cm. During 4 months of winter—November, December, January, and February, the sky remains cloudless/sunny. Temperature accedes to 30 °C in the months of April and May (Sati et al. 2014b) whereas; rainfall assists to decrease temperature during the summer season. Humid climate characterizes the region. Except 4 months of winter, humidity remains high in throughout year. Rainy days are the longest.

## Temperature

Table 2.3 presents average seasonal temperature (2009). Generally, four climate seasons characterize Mizoram. Winter season starts from November and lasts in January. Average temperature remains 19.78 °C during these months. It follows by spring season (February–April) with 23.24 °C temperature. Summer season occurs between May and August with 24.15 °C temperature. The last season starts from September and it lasts in October and average temperature remains 24.31 °C.

We analyzed rainfall and temperature data of 26 years—from 1986 to 2012 (Table 2.4) and noticed that 1.9 % rainfall decreased and 0.4 % temperature decreased during the period.

**Table 2.3** Average seasonal temperature in Mizoram (°C), 2009

Season	Seasonal temperature		
	Minimum	Maximum	Average
Winter (November–Jan)	14.55	25.01	19.78
Spring (February–April)	17.98	28.50	23.24
Summer (May–August)	20.53	27.77	24.15
Autumn (September–October)	20.33	28.29	24.31

Source RSAC (2009); calculated by authors

**Table 2.4** Changes in rainfall and temperature 1986–2012

Months	Rainfall		Temperature	
	Average of 26 years (From 1986 to 2012) (%)	Rainfall change (%) 1996–2012	Average of 26 years (From 1986 to 2012) (%)	Temperature change (%) 1996–2012
January	9.7	235	1.2	8.6
February	98.1	21.8	0.8	6
March	287.4	35.7	0.6	4.8
April	–28.1	–51.7	0.8	3.5
May	130.1	179	0.7	2.7
June	–13	–14.4	–0.3	–0.5
July	–13.7	3.2	0.5	0.5
August	10.7	28.8	–1	–1.5
September	–1.6	–10.2	0.2	–4.8
October	–28.6	–44.5	0.4	–5.7
November	–36.9	–100	0.2	0.4
December	–64.6	–100	0.6	7.04
Total	–1.9	–4.7	0.4	1.8

Source RSAC (2009); calculated by authors

## Rainfall

Except about 4 months of winter, rain generally occurs heavily in other months of the year. Table 2.5 presents average rainfall during different seasons in Mizoram, 2009. Annual rainfall varies from 42.1 mm (2.1 %) in winter (minimum) to 1278.8 mm (63.5 %) in summer (maximum). Spring season receives 166.4 mm (8.3 %) rain whereas autumn season receives 525.2 mm (26.1 %) rain.

Descriptive statistics—minimum, maximum, and mean values of rainfall (cm) from 1986 to 2012 is shown in Table 2.6. It shows that mean value of rainfall decreased from 215.2 cm in 1986 to 205.2 cm in 2012.

**Table 2.5** Average rainfall during different seasons in Mizoram, 2009

Season	Rainfall (mm)	Percentage to total annual rainfall
Winter (November–January)	42.1	2.1
Spring (February–April)	166.4	8.3
Summer (May–August)	1278.8	63.5
Autumn (September–October)	525.2	26.1

Source RSAC (2009); calculated by authors



**Table 2.6** Rainfall (cm) in Mizoram during the period 1986–2012

Year	Minimum	Maximum	Mean	Standard deviation
1986	7.8	454.6	215.2	172.2
1990	0.5	413.8	222.7	152.4
1995	0.0	577.9	211.1	194.3
2000	0.0	607.8	239.7	207.2
2005	1.6	385.9	172.8	143.6
2012	0.0	585.7	205.2	207.4

Source RSAC (2009); calculated by authors

## Relative Humidity

Humidity is the percentage of water vapor in the air. Meanwhile, relative humidity is the ratio of the amount of water in the air at a given temperature, expressed in a percentage. Presence of humidity in the atmosphere and on the surface depends on the amount of rain and temperature, a place or a region receives. Monthly relative humidity in Mizoram state was recorded as maximum, minimum, and mean in 2009 and 2012 (Table 2.7). Maximum relative humidity varies from 70 % in the month of February to 100 % in the month of August. Similarly, minimum relative humidity varies from 20 % in March to 78 % in August. When we see an average relative humidity in Mizoram state, it is the highest in the month of August (89 %). As a whole, the highest relative humidity (above 80 %) was observed during the monsoon season from May to October. Because Mizoram receives high average annual rainfall thus, humidity remains high (average 50 %).

Table 2.8 shows descriptive statistics of clear sky and rainy days in a year in Mizoram. Variables with minimum, maximum, mean values, and standard deviation were analyzed. Days under clear sky vary from 14 (minimum) to 31 (maximum)

**Table 2.7** Monthly relative humidity in Mizoram (%), 2009 and 2012; n = 12 months

	Relative humidity (%), 2009		Relative humidity (%), 2012	
	Mean	Std. deviation	Mean	Std. deviation
Minimum	92	9.37	80.8	14.4
Maximum	57.3	19.6	59.4	17.2
Average	74.6	12.6	70.1	15.4

Source RSAC (2009); calculated by authors

**Table 2.8** Descriptive statistics (N = 12 months), 2012

Variables	Minimum	Maximum	Mean	Standard deviation
Clear sky	14	31	23.3	6.2
Rainy days	0	28	10.8	11

Source RSAC (2009); calculated by authors

with 23.25 days mean value. Rainy days also vary from 0 (minimum) to 28 (maximum) while mean value was 10.83 days.

Spatiotemporal variation of climate data in Mizoram depicts significant variations. By and large, seasonal variation is minimal but, variation in a long span of time, i.e., 1 year to other is higher as the recent trend shows.

## Forest Resources

One of the major sources of livelihoods, forest resource dominates in the natural resources potential and area cover. Mizoram has very high forest diversity. It forms a part of the Indo-Burma Global Biodiversity Hotspot. Forests diversity characterizes mainly tropical rain forests; as most of the parts of the state lie in the tropical regime. Meanwhile, montane and temperate forests lie above 900 and 1600 m, respectively. Bamboo forests are abundant almost in all the altitudinal zones but restricted up to 500 m. In Mizoram, diversity in forests varies according to altitude, rainfall, and dominant species composition. Table 2.9 shows altitudinal distribution of forests and their characteristics in Mizoram state.

The forestland in the state, based on interpretation of satellite data of January 2009, was 19,240 km<sup>2</sup>, which was 91.27 % of the state's geographical area. India state of forest report 2011 supports this figure. Out of the total forest cover, protected area shares 1240.75 km<sup>2</sup> (5.88 %). In terms of forest canopy density classes, the state has 134 km<sup>2</sup> areas under the dense forests, 6086 km<sup>2</sup> area under moderately dense forests, and 12,897 km<sup>2</sup> areas under open forests. Table 2.10 presents district-wise forest cover in km<sup>2</sup>. It further shows the nature of forestland, i.e., very dense forest (VDF), moderate dense forest (MDF), open forest (OF), and percentage of geographical area. Lunglei Lawngtlai and Saiha districts cover the highest forest area (and 92.72, 92.61, and 92.21 %, respectively) followed by Mamit (91.70 %) and Aizawl districts (91.33 %). Bamboo has more than 27 species identified in Mizoram and bamboo forest covers 31 % (6446 km<sup>2</sup>) area. Estimated growing stock of bamboo in the State is 25.26 million MT. In terms of the forest cover change in Mizoram during the last two decades, 1.4 % increase was registered.

Data on altitude-wise forest cover was gathered from the India State of Forest Report (ISFR) of 2011 (Table 2.11). The highest forest cover lies in the altitude below 500 m (42.4 %) followed by 41.5 % forest that lies between 500 and 1000 m. Area between 1000 and 2000 m altitude, forest covers 16.0 % areas while above 2000 m altitude, forest covers 0.02 %. Out of the total forest cover in the different altitudes, OF covers the highest area (12,897 km<sup>2</sup>) followed by MDF (6086 km<sup>2</sup>). VDF covers only 134 km<sup>2</sup>. We observed that because geographical area above 1000 m altitude is very less therefore, it occupies very less forest area.

**Table 2.9** Altitudinal distribution of forests in Mizoram

Types	Altitude	Characteristics
Tropical wet evergreen and semi-evergreen forests	<900 m	These forests are distributed mainly on the steep slopes, rocky, and steady river banks and areas not suitable for shifting cultivation; where rainfall occurs between 2000 and 2500 mm and temperature remains stable between 20 and 22 °C. However, tropical wet evergreen forests are found in the southern and western part and semi-evergreen forests are found in the northern, northwestern, and central part of Mizoram
Montane subtropical forests	900–1500 m	These areas are characterized by comparatively low temperature and less precipitation and are found in the eastern fringes bordering with Chin Hills of Myanmar. Pine forests are largely grown. The common species are <i>Castanopsis purpurella</i> , <i>Duabanga grandiflora</i> , <i>Myristica</i> spp., <i>Phoebe goalparensis</i> , <i>Pinus kesiya</i> , <i>Podocarpus neriifolia</i> , <i>Prunus cerasoides</i> , <i>Quercus acutissima</i> , <i>Q. semiserrata</i> , <i>Schima wallichii</i> , etc.
Temperate forests	>1600 m	These forests are very distinct from the temperate forests of other parts of the Eastern Himalaya and are mostly found in the Lengteng, Naunuarzo, Pharpak, Thaltlang, and Phawngpui reserve forests. The predominant arboreal forest species are <i>Pinus kesiya</i> , <i>Actinodaphne microptera</i> , <i>Betula alnoides</i> , <i>Exbucklandia populnea</i> , <i>Elaeocarpus serratus</i> , <i>Dillenia pentagya</i> , <i>Michelia doltsopa</i> , <i>M. Champaca</i> , <i>Garcinia anomala</i> , <i>Schisandra neglecta</i> , <i>Photinia intergrifolia</i> , <i>Litsea salicifolia</i> , <i>Myrica esculenta</i> , <i>Lithocarpus dealbata</i> , <i>Rhododendron arboreum</i> , etc.
<i>Quercus</i> forest	1100–1800 m	These forests are distributed in small areas of the eastern part of Mizoram mostly in the Champhai-Baite hill ranges. The main species are <i>Quercus</i> and <i>Lithocarpus dealbata</i>
Bamboo forest	400–1500 m	Bamboos are usually grown as an under-storey to the tree species in tropical evergreen and subtropical mixed deciduous forests, whereas <i>Melocanna baccifera</i> forms dense/pure forests in certain areas in the State. Bamboo forests are more sustainable in the <i>jhuming</i> system of cultivation. Along with bamboos <i>Emblica officinalis</i> , <i>Litsea monopetala</i> , <i>Pterospermum acerifolium</i> , <i>Terminalia myriocarpa</i> , <i>Caryota mitis</i> , <i>Artocartus chama</i> , <i>Duabanga grandiflora</i> , <i>Albizia procera</i> , <i>Gmelina arborea</i> , <i>Syzygium</i> are also grown

Source Sati et al. (2014c) and modified

**Table 2.10** District-wise forestland (Area in km<sup>2</sup>)

District	GA	VDF	MDF	OF	Total	% GA <sup>a</sup>
Aizawl	3575	26	1205	2034	3265	91.33
Champhai	3185	57	1096	1632	2785	87.44
Kolasib	1382	0	175	1046	1221	88.35
Lawngtlai	2557	0	704	1664	2368	92.61
Lunglei	4536	1	1233	2972	4206	92.72
Mamit	3025	45	697	2032	2774	91.70
Saiha	1400	0	568	723	1291	92.21
Serchhip	1421	5	408	794	1207	84.94
Total	21,081	134	6086	12,897	19,117	90.68

Source ISFR (2011)

<sup>a</sup>GA = Geographical Area

**Table 2.11** Forest cover according to altitude (km<sup>2</sup>)

Altitude (M)	VDF	%	MDF	%	OF	%	Total	%
<500	15	11.2	1971	32.4	6129	47.5	8115	42.4
500–1000	56	41.8	2872	47.2	5001	38.8	7929	41.5
1000–2000	62	46.3	1241	20.4	1765	13.7	3068	16.0
>2000	1	0.7	2	0.03	2	0.02	5	0.02
Total	134	100	6086	100	12,897	100	19,117	100

Source ISFR (2011); (Based on SRTM, Digital Elevation Model)

Protected areas, in the forms of national parks and wildlife sanctuaries, cover 1240.75 km<sup>2</sup> areas (5.88 %) (2011). Total three national parks and seven wildlife sanctuaries spread in seven districts of the state. Area of national parks and wildlife sanctuaries varies from 35 to 500 km<sup>2</sup>. The first tiger reserve Dampa established in 1994 is the biggest (500 km<sup>2</sup>) national park, situated in Mamit district. Table 2.12 presents national parks and wildlife sanctuaries of the Mizoram state.

Bamboo covers 31 % land. It grows mainly up to 500 m but can be seen growing up to 1200 m. Although, about 40 % of India's 80 million-ton annual bamboo products are harvested in Mizoram yet, a large area under bamboo forest is unexploited. Bamboo is used for various purposes. Bamboo shoot is a very common food of Mizos. Bamboo is also used for making paper, fuel, vinegar, handi-crafts, and houses.

## Use Pattern and Conservation of Forests

Forest resource has multiple uses as it contributes to generate income and augment employment and is the major source of livelihoods. Mizoram has agrarian economy that characterizes cultivating subsistence crops with low annual output. Thus,

**Table 2.12** National parks and wildlife sanctuaries

S. no.	Name of protected areas	Area in km <sup>2</sup>	Percentage of total area	District	Establishment year
1.	Tokalo Wildlife Sanctuary	250	20.15	Saiha	2007
2.	Pualreng Wildlife Sanctuary	50	4.03	Kolasib	2004
3.	Murlen National Park	100	8.06	Champhai	2003
4.	Lengteng Wildlife Sanctuary	60	4.83	Champhai	2002
5.	Thorangtlang Wildlife Sanctuary	50	4.02	Lunglei	2002
6.	Tawi Wildlife Sanctuary	35	2.82	Aizawl	2001
7.	Khawnglung Wildlife Sanctuary	35.75	2.88	Lunglei	2000
8.	Phawngpui National Park	50	4.03	Lawngtlai	1997
9.	Ngengpui Wildlife Sanctuary	110	8.87	Lawngtlai	1997
10.	Dampa Tiger Reserve	500	40.29	Mamit	1994

Source DoEF, GoM (2012)

most of the people rely on the forest resources for food, fuelwood, and fodder. High dependency on forest degrades environment. Forest depletion is mainly due to large-scale exploitation of timber for construction of houses and also due to practicing shifting cultivation.

Tribal communities are an integral part of forest. They live in forest areas and run their livelihood from the forest products. The United Nations report on “Development of Tribes” states that “tribal people derive either directly or indirectly a substantial amount of their livelihood from forests. They subsist on edible leaves and roots, honey, wild game and fish. They build their homes with timber and bamboo and practice cottage crafts with the help of local raw materials. They use herbs and medicinal plants to cure their diseases and even their religious and folk-lore and woven round the spirits of forests. Commercial transformations are predominantly by barter, trade being left mostly to the outsiders who controlled the money economy.”

Bamboo and bamboo products are the most important food substances to the tribal people as a large proportion of population has full dependency on them. Bamboos are edible and bamboo shoots are very popular among the tribal community. Besides substantially assisting the people for their food need, bamboos are used for constructing houses in both rural and urban areas. In Mizoram, bamboo forest covers 57 % area, lies between 400 and 1200 m. The dominant area, where bamboo grows, lies along the river bank and abandoned *jhumland*. Conservation of forest resources including bamboo forest is inevitable to preserve economy and environment for the present and future generations. Mizo communities have the

practices to conserve forests through their traditional knowledge. They keep a forest area closed for the certain period of times and then open it for its economic uses. The head of a village, which is called 'lal,' frames rules for forest use and its conservation.

## Soil Types

Soils in Mizoram mainly characterize sedimentary formation, generally immature and young and developed from the parent materials of sandstones and shale. Colluviums soil form hills and alluvial soil forms flood plains. In the hilly terrain, soils are dark, highly leached, and rich in iron and pH values, range from 4.5 to 5.5, characterize well-drained soil, deep to vary deep, rich in organic carbon, low in phosphorus content, and high in available potash. Soils are capable of providing substantial oxygen supply for plant growth and are capable to retain moisture to suitable growth of crops. Valley fills and flood plains obtain dark brown, poor in bases, less acidic, medium to high in organic carbon content, low availability of phosphate, substantial potash, and pH value 5.5–6. The soils are deep due to poor drainage.

We conclude from the above analysis of data that the geographical aspects (natural capital) support adequate bases to carry livelihood sustainably in Mizoram. The vast forests, abundant water, fertile land, hard working people and feasible climate in the form of moderate temperature, high rainfall and high humidity open up the scope for biomass-based organic agriculture and establishment of forest-based small-scale industries. Moreover, the suitable climatic conditions and panoramic landscapes also attract tourists—domestic and international. All these determinants can push the State's economy advanced. Meanwhile, a step for proper policy measures is required to enhance the agricultural productivity/capacity so that livelihood sustainability can be attained.

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