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कल्याण मंत्रालय
MINISTRY OF
AGRICULTURE AND
FARMERS WELFARE
सत्यमेव जयते

भाकृअनुप
ICAR

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CAFRI

Promising Agroforestry Models for Mizoram

ICAR-Central Agroforestry Research Institute

Jhansi-284003, Uttar Pradesh, India

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Disclaimer

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Promising Agroforestry Models for Mizoram

Mizoram, meaning *'homeland of the hill people'*, derives its name from the term *'Mizo,'* which refers to people living in the highlands, and *'ram'* which means land. Thus, the name 'land of Mizos' aptly describes the state. Located in the northeastern part of India, Mizoram is a landlocked state bordered by Bangladesh to the west and Burma (Myanmar) to the east. Its northern boundaries are shared with the Indian states of Tripura, Assam and Manipur. Historically, Mizoram was part of Assam and known as the Mizo District. Mizoram occupies an important strategic position having a long international boundary of 722 km. After the partition of Assam, it became a Union Territory in 1972. On February 20, 1987, following the 53rd Constitutional Amendment of 1986, Mizoram achieved statehood becoming a full-fledged state. Geographically, Mizoram is positioned between latitudes 21°58′ and 24°35′ N and longitudes 92°15′ and 93°29′ E, placing it within the lush and hilly terrain characteristic of the northeastern region of India (Government of Mizoram, 2024).

Physiography

Mizoram topography primarily consists of four distinct physical features: Structural hills, Valley fills, Flood plains and Linear ridges.

- **Structural hills**

  The hills of Mizoram, classified as structural hills, dominate the region with their undulating, rugged, and steep terrain, covering 96.9% of the area. Mizoram features approximately 21 hill ranges and peaks with varying lengths, widths, and orientations. The highest peak is Phawngpui (2157 m) in the southern Lawngtlai district known as the "Blue Mountain". The eastern districts, such as Champhai and Saiha, are elevated above 1000 meters, while the western region is lower. Structural hills are categorized into three types: high (>1200 m), medium (800–1200 m), and low (<800 m).

- **Valley fills**

  Valley fills, located along rivers, cover 574.3 km², accounting for 2.7% of Mizoram area. This region, characterized by narrow, fluvial arable land, is sparsely populated, with few settlements along the fertile areas. During summer, temperature remains hot and humid.

- **Flood plains**

  Flood plains, which account for barely 0.4% of land area, are generated by river debris. These are extremely rich plains where wet rice production is conducted. Despite the small area of flood plains, they produce a substantial volume of rice with reasonable yield.

- **Linear ridges**

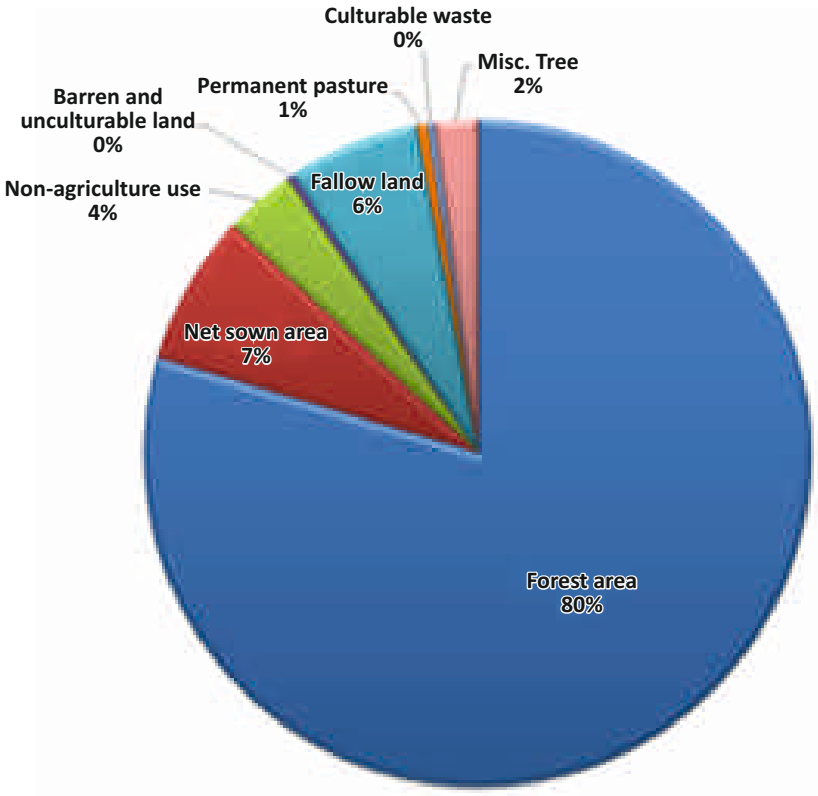
  The linear ridge covers 6.4% of the state and is primarily made up of woods and meadows. Linear ridges have high slopes and little arable ground, making it unsuitable for human settlement.

Climate

Mizoram has a mild climate with cool summers and not too cold winters but has become warmer due to climate change. The region experiences heavy monsoon rains from June to September affecting the climate pattern of moist tropical to moist subtropical. The region is prone to cyclones and landslides, making it a region of weather-related emergencies. The best time to visit Mizoram is from September to April. The upper parts of the hills are cold and cool during summer, while the lower reaches are warm and humid. Storms break out during March-April with the maximum average temperature in summer being 30°C and the minimum in winter around 11°C. The four months between November and February are winter followed by spring. The rainy season is from June to August. The climate is at its moderate best in September and October with temperatures ranging between 19°C to 24°C (Government of Mizoram, 2003).

Land use pattern

Land use is a crucial statistic for agricultural development in Mizoram, where forests dominate the landscape, covering approximately 84.53% of the total geographical area of 21,081 km². The net sown area in the state stands at 206.10 thousand hectares reflecting a slight decrease compared to the previous year.



Source: Land use statistics at a glance (2021)

Forests and its resources

Mizoram is home to six of India's sixteen primary forest types, showcasing its rich biodiversity and ecological significance. These forest types include Tropical Wet Evergreen Forest, Montane Sub-Tropical Forest, Temperate Forests, Bamboo Forests, *Quercus* Forests and Jhumland. This diversity not only contributes to the region's ecological balance but also plays a vital role in supporting local livelihoods and

conserving unique flora and fauna. Mizoram has a total forest cover of 17820.00 km², or 84.53% of its geographical area. Mizoram forest cover is classified as highly dense (156.79 km²), moderately dense (5715.24 km²), and open forest (11947.97 km²). Mamit a tribal hill district has the most forest cover accounting for 89.87% of its entire geographical area (ISFR, 2021). Mizoram Recorded Forest Area (RFA) covers 17556 km², with an additional 264 km² in outside. Mizoram tree cover has slightly grown from 441 km² in 2019 to 444 km² in 2021. TOF covers 708 km², which includes both forest and tree cover. In rural Mizoram the top five tree species in TOF are *Schima wallichii* (9.95%), *Castanopsis spp.* (9.57%), *Quercus spp.* (6.59%), *Macaranga spp.* (6.04%) and *Tectona grandis* (4.48%). In urban areas, the top five TOF tree species are *Areca catechu* (14.72%), *Mangifera indica* (12.97%), *Schima wallichii* (6.30%), *Artocarpus heterophyllus* (5.74%) and *Albizia spp* (4.35%). The entire carbon store of Mizoram forests, including TOF patches larger than 1 hectare, is 158.64 million tonnes, or 2.20% of the country's total carbon pool. *Thysanolaena* maximum*, Imperata cylindrica, Heyotes scandens, Parkia javanica/timoriana* and *Emblica officinalis/Phyllanthus* are some of major Non-Timber Forest Produce (NTFP) species of Mizoram (ISFR, 2021).

Forest types

S.No.	Type of Forest	Area (in sq.km)	% of the total mapped area
1.	Pioneer Euphorbiaceous scrub	74.10	0.41
2.	Cachar semi-evergreen forest	5580.26	30.99
3.	Secondary moist bamboo brakes	6600.03	36.65
4.	East Himalayan moist mixed deciduous forest	5648.50	31.37
5.	East Himalayan subtropical wet hill forest	7.94	0.04
6.	Assam subtropical pine forest	92.75	0.52
7.	TOF/Plantation	2.83	0.02
	Total (Forest Cover & Scrub)	18.006.41	100.00

Source: ISFR (2021)

Soil

Mizoram soils are classified into two main groups: Alluvium soils and Residual soils. Alluvial soils are found at the foothills of the northern and western plains and valleys, dominated by coarse sand. Residual soils, further classified as lateritic brown earth and podzolic, occur on steep slopes in most parts of the state. The soils vary in texture from sandy loam to clayey loam and are generally mature but heavily leached due to heavy rainfall. Mizoram soils are porous with poor water holding capacity and are fertile and responsive to fertilizers. The soils are dominated by loose sedimentary formations and derived soils with red, loamy texture. They are rich in organic carbon but deficient in potassium, phosphorus, nitrogen, and humus content. Uneroded soils have high nitrogen content, enriched by organic matter accumulation. The soils of Mizoram are homogenous in nature but mainly derived from sandstones, shales and siltstones. Jhum or shifting cultivation is the main pattern of agriculture, with maize and rice as main food crops and cash crops such as sugarcane, tapioca, ginger, and cotton.

Water resources of Mizoram

Groundwater serves as a vital resource for irrigation, domestic consumption and industrial applications. It is found in the active recharge zone, which is replenished annually, as well as in deeper storage zones that experience fluctuations in water levels. Dynamic groundwater resources are frequently utilized, while substantial reservoirs exist within deeper layers and confined aquifers. In-storage groundwater resources are primarily accessible during periods of extreme drought, primarily to meet drinking water demands. This distinction underscores the importance of sustainable groundwater management to ensure availability for various uses, particularly in times of water scarcity. The comparison shows that

there has been no change in the Total Annual Ground Water Recharge and the Annual Extractable Ground Water Resources for the 2022-23 estimates. However, there has been a reduction in the Current Annual Gross Ground Water Extraction by 52.80 hectare meters (Ham) and a decrease of 73 Ham in the annual allocation of ground water for domestic water supply projected for 2025. Additionally, the stage of groundwater extraction has decreased from 3.96% in 2022 to 3.70% in 2023. This suggests a slight improvement in the management and extraction rates of groundwater resources. The computation of resource estimation is done through INGRES (INDIA-Groundwater Resource Estimation System) software.

Comparison of Ground Water Resource estimates between 2019-20 and 2021-22

S.No.	Item	Year 2021-2022	Year 2022-2023	Comparison
	Estimation	INGRES	INGRES	(Hectare meters)
1.	Total Annual Ground Water Recharge (BCM)	0.22	0.22	No changes
2.	Annual Extractable Ground Water Resources (BCM)	0.19	0.19	No changes
3.	Irrigation Draft (BCM)	0	0	0
4.	Domestic Draft (BCM)	0.0079	0.0073	Decrease by 0.000528
5.	Stage of GW Extraction (%)	3.96%	3.70%	Decrease by 0.26%
6.	Annual allocation of ground water for domestic water supply as on 2025 (BCM)	0.0087	0.0081	Decrease by 0.001
7.	GW availability for future development	0.19	0.19	Increase by 0.001
8.	No. of O.E. Units	0	0	0
9.	No. of Dark/ Critical units	0	0	0

Source: CGWB, (2023)

Agriculture

Agriculture and allied activities contributed 25.23% to the Gross State Value Added (GSVA) in 2021-22. As over half of the population primarily derived their income from agriculture faster growth is necessary to increase their income and address the rural-urban imbalance. Horticulture and floriculture have shown significant improvement in production.

The Gross Value Added (GVA) in agriculture improved from a negative 2.36 % in 2012-13 to 30.09% in 2014-15 but decelerated to 6.76 % in 2022-23. The fisheries sector showed steady growth since 2013-14 but started declining in 2017-18 and recorded the lowest growth rate at -1.63% during the pandemic (2020-21). The share of agriculture, forestry and fishing in GSVA has seen a steady increase from 20.12 % in 2011-12 to 25.93 % in 2020-21, with a slight decline afterward. The increase was mainly due to the increase in Forestry & Logging from 5.17 % in 2011-12 to 11.78 % in 2022-23. The share of crops and fisheries has also declined, while the livestock share has declined from 4.08 % in 2011-12 to 1.77 % in 2022-23 (Mizoram Economic Survey, 2024).

Major crops in Mizoram

Crops	Production (in Metric tonnes)
Rice (Jhum *Kharif*)	25409
Rice *Kharif*	35791
Rice *Rabi*	982
Maize *Kharif*	11726

Maize *Rabi*	830
Tapioca	2232
Rice bean	605
Arhar	416
Field Pea	1234
Cow Pea	1587
French Bean	1444
Rajmash	15
Soyabean	1980
Sesamum	514
Rape & Mustard	372
Oil Palm	87
Cotton	11
Tobacco	429
Sugarcane	42960
Potato	731
Total	129355

Source: Agriculture Department of Mizoram (2022)

Schemes of Mizoram

The Mizoram government has introduced various initiatives and programs aimed at enhancing agricultural productivity and sustainability. These include the National Food Security Mission (NFSM), which focuses on increasing the production of essential crops, the *Rashtriya Krishi Vikas Yojana* (RKVY), designed to promote holistic agricultural development, the National Mission on Edible Oil-Oilseed (NMEO-OS), aimed at boosting oilseed production, and the National Mission on Oilseeds and Oil Palm (NMOOP), which seeks to expand oil palm cultivation. As reported by the 20th livestock census, the livestock population in Mizoram is 2.40 million (Ministry of Agriculture, Department of Animal Husbandry, Dairying and Fisheries, 2019).

S.No.	Scheme	Objective	Achievement in Mizoram
1.	*Rashtriya Krishi Vikash Yojana*	Aims to make farming a profitable economic activity by supporting farmer efforts, mitigating risks, and encouraging agri-business entrepreneurship.	In 2022-2023, Rs. 191.70 lakh was used to construct 93 Green Houses in Aizawl and Khawzawl districts, 12 Community Water Storage Structures with HDPE pipelines for irrigation water conveyance, 175 dug-out ponds, irrigation infrastructure in newly built WRC areas in ten districts, brick-lined water storage structures in three locations and seven rural market sheds. These projects aim to promote compact area growth and improve water supply.
2.	*Mahatma Gandhi National Rural Employment Guarantee Scheme* (*MGNREGS*)	Increasing job opportunities in rural areas for ensuring household livelihood security involves providing every household with up to one hundred days of wage employment each fiscal year. This program is designed for those willing to engage in unskilled manual labor.	

3.	National Food Security Mission Crops (NFSM- Crops)	Aims to boost rice, wheat, and pulse production through (i) area expansion and productivity enhancement, (ii) soil fertility and productivity restoration, (iii) job creation, and (iv) farm level economic development.	Under this plan, demonstrations of Im- proven Technology were undertaken in 11 districts for various crops, as listed below: Groundnut 100 hectares. Sesame: 575 hectares;, Sunflower: 100 hectares. Rape/Mustard: 700 hectares
4.	*Pradhan Mantri Krishi Sinchayee Yojana* (Per Drop More Crop Other Interventions) (PMKSY	It aims to improve farm productivity and ensure better utilization of re-sources specifically water resources.	The primary actions implemented under this strategy throughout 2022-23 are listed below: 1) Construction of water tanks (266 Nos) 2) Renovation and repair of 356 water tanks. 3) Creating a water supply (water tank) for drip and sprinkler irrigation (339 units)
5.	Rainfed Area Development (RAD)	The initiative aimed to promote an integrated farming system (IFS) that is culturally and socially acceptable to the local population. It is an area-based method for development and protection of natural resources, including farming systems.	The main activities carried out under RAD during 2022-23 are the promotion of integrated farming systems covering 494 ha in various districts for horticulture, livestock and fishing, as well as capacity building on integrated farming systems, with 66 capacity buildings completed.
6.	National e-Governance Plan in Agriculture (NeGP-A)	Its goal is to deliver useful information and services to the farming community, business sectors, and other stakeholders by using information and communication technologies in the agricultural sector.	The project is in its early stages with several actions completed. The Secretary of Agriculture Department chaired the State Empowered Committee on NeGP-A, which included the Secretaries of all line departments and directors. They authorized the 'Farmers Database Collection' at their first meeting. 727 enumerators, 79 supervisors, 11 district-level master trainers and three state-level master trainers were appointed for farmer database collection. State-level training on farmers database collection for district-level master trainers.
7.	*Paramparagat Krishi Vikas Yojana* (PKVY)	The major goal of this strategy is to create agricultural goods free of chemical and pesticide residues by utilising environmentally friendly, low-cost technology.	The Department is now conducting Phase III of the *Paramparagat Krishi Vikas Yojana* (PKVY) initiative in Mizoram's aspirational area, Mamit area, from 2023 to 2024. During 2023-24, the following activities are carried out: Selection and development of five clusters in four villages (Khawrihnim, Reiek, W. Phaileng, and Darlak). Identifying and selecting 354 farmers to cultivate Mizo Chilly on 354 acres in 5 clusters. Capacity-building and exposure tours for field officials.

8.	MIDH (Mission for Integrated Development of Horticulture	The scheme is primarily established to promote the overall expansion of the horticulture sector, which includes fruits, vegetables, roots and tuber crops, mushrooms, spices, flowers, fragrant plants, coconuts, cashew, and bamboo.	Major efforts under this project include establishing a new garden of fruits, vegetables, mushrooms, flowers, spice crops, and aromatic plants. Rejuvenation/replacement of senile planning and canopy control on fruit crops, establishment of water sources for crop irrigation, post-harvest management, etc..
9.	PMKSY (*Pradhan Mantri Krishi Sinchai Yojana*) Per Drop More Crop	The main goal is to improve the efficiency of on-farm water use in order to decrease waste and boost availability both in length and extent.	PMKSY-Per Drop More Crop-Micro Irrigation was introduced by the Department in 2015-16. Micro Irrigation aims at year-round production of vegetables and flowers by the deployment of Sprinkler and Drip Irrigation systems, among other things, to offer water supply to crops during the dry season. Periodic irrigation for life-saving purposes
10.	Integrated Fisheries Development Project in the NER	To promote fisheries for livelihood promotion.	

***Source*:** Government of Mizoram

Biodiversity

India is one of the world's 17 mega-diverse countries, accounting for only 2.4% of total land area yet home to 9.13% of the world's flora and 6.7% of its wildlife. North East India is one of India's most species-rich regions, and it is also part of the Indo-Burma Region, one of India's four biodiversity hotspots. Mizoram has lush woods and a rich range of flora and wildlife. It also offers a diverse range of medicinal plants that are highly valuable for treating a variety of diseases. The Protected Area Network that includes 02 National Parks, 08 Wildlife Sanctuaries and 01 wetland site plays a key role in the in-situ protection of biodiversity (EF&CC Department, Government of Mizoram).

Groups	Number of species in Mizoram
Mammals	96
Angiosperms	2141
Gymnosperms	6
Bryophyta	6
Pteridophyta	211
Epiphytes	52
Orchids	250
Bamboos	37
Fishes	142
Lichens	161
Fungi	200

Wild Mushroom	21
Medicinal Plants	500
Insects	520
Birds	505
Reptiles	117
Amphibians	13
Mollusca	65
Nematoda	74
Trematoda	14

***Source*:** State of Environment Report of Mizoram (2016)

Agro-climatic Zones

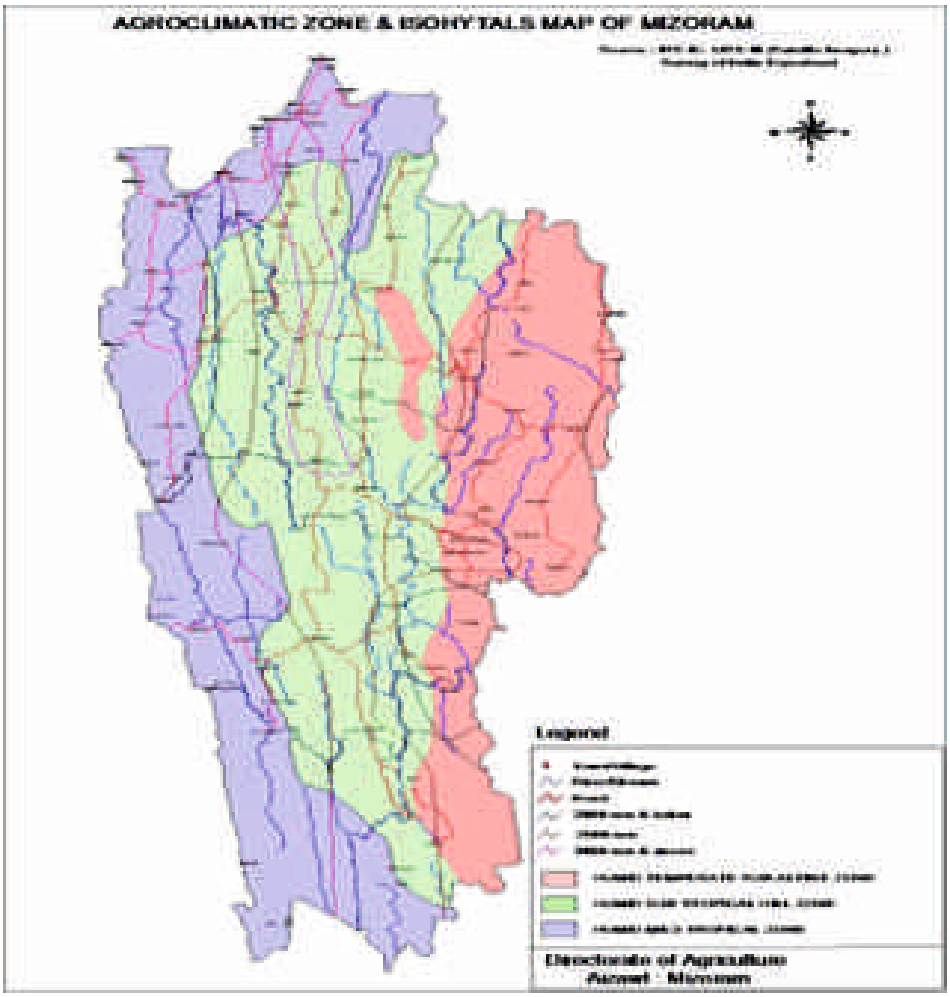
Mizoram can be divided into three distinct agro-climatic zones based on factors such as rainfall patterns, soil characteristics (including texture and depth), physicochemical properties, elevation, terrain, and the primary crops and vegetation. These zones are: Foothills & Lower Hills, Mid-hills, and High-hills.

S.No.	Agro-Climatic Zones	Altitude Range (AMSL, m)	Annual Average Rainfall (mm/year)	Mean Temperature (Max-Min) (°C)	Administrative District
1	Foothills & Lower hills	200-800	2,000-3,000	30 ± 12	Kolasib (North), Mamit (West), Lunglei (West) Laungtlai (West and Centre), Saiha (West)
2	Mid-hills	1000-1500	2,500-3,000	30 ± 12	Kolasib (South),Mamit (East), Aizawl (except Southeast), Serchip (West and Centre) Lunglei (Center), Lawngtlai (East) Saiha (Centre)
3	High-hills	More 1500	2,000-3,000	11 ± 20	Aizawl (Southeast), Champai, Serchip (East) Lunglei (East edge) Lawngtlai (East edge) Saiha (East)

Source: JICA (2015)

Demography

According to the 2011 Indian Census, Mizoram has a population of about 1.097 million people, with 555,000 men and 541,000 women, representing roughly 0.09% of India's total population of 1.21 billion. The population density in Mizoram is 52 people per square kilometer, which is significantly lower than the national average of 382 people per square kilometer. Despite this lower density, the state's demographic profile is notable for other reasons. Mizoram has a literacy rate of 91.33%, indicating a high level of education among its residents. Additionally, the state's sex ratio is 976 females for every 1,000 males, which is slightly higher than the national average of 943 females per 1,000 males. These statistics highlight Mizoram educational achievements and demographic characteristics, reflecting its unique social and cultural landscape (Mizoram Statistical Handbook, 2022).



Source: Department of Agriculture, Government of Mizoram

Administrative profile

In 1986, the Indian Parliament adopted the 53rd amendment of the Indian Constitution, which allowed for the creation of the State of Mizoram on 20 February 1987, as India's 23rd state. Aizawl is the capital of the state and the rural self-government entities in Mizoram include 3 Autonomous District Councils, 26 Rural Development Blocks, 23 Sub- Division, 79 revenue towns, 829 village, 01 Lok Sabha Constituencies and 40 Assembly Constituencies and the Mizoram is divided into 11 administrative districts: Aizawl, Champhai, Hnahthial, Khawzawl, Kolasib, Lawngtlai, Lunglei, Mamit, Saitual, Serchhip and Siaha (Government of Mizoram).

State symbols

Mizoram state symbols reflect its rich biodiversity and cultural heritage. The state animal is the Himalayan serow, known locally as Sarao in Hindi and Saza in Mizo (*Capricornis sumatraensis*). The state bird is Mrs. Hume's pheasant, also called the bar-tailed pheasant (*Syrmaticus humiae*) with local names being Nongin in Manipuri and Vavu in Mizo. The Red Vanda (*Renanthera imschootiana*) referred to as Senhri in Mizo and Kwaklei Angangba in Manipuri is the state flower. The Ceylon Ironwood, also known as the Indian Rose Chestnut (*Mesua ferrea*) is the state tree. The Burmese Kingfish, or Ngahvang (*Semiplotus modestus*) is the state fish. Mizoram official languages are Mizo, English, and Hindi, with Mizo being the primary language spoken among the Mizo people. Besides Mizo various dialects are spoken, including Hmar, Mara, Lai, Paihte, and Darlong. According to the 2011 Census, the major languages spoken are Mizo (734,901 speakers), Chakma (96,972), Lai (51,406), Kuki (45,754), Mara (42,754), Hmar (29,587) and Paihte (23,183) (Government of Mizoram).

Overview of agroforestry in Mizoram

In Mizoram, agroforestry is becoming a more important part of sustainable agriculture a northeastern Indian state known for its hilly landscape and rich biodiversity. This practice integrates trees and shrubs into farming systems offering various ecological, economic and social benefits. In light of the challenges associated with traditional farming methods like shifting cultivation or jhum agroforestry emerges as a viable alternative that boosts productivity while preserving natural resources. A key benefit of agroforestry in Mizoram is its effectiveness in addressing soil erosion which is a significant issue due to the region's steep slopes and heavy rainfall. The root systems of trees and shrubs help to the soil reducing runoff and preventing topsoil loss during the monsoon season. For example intercropping rice (*Oryza sativa*) with Teak (*Tectona grandis*) is a typical method that maximizes land utilization while simultaneously improving ecosystem resilience. This intercropping technique has been proved to be both economically and environmentally giving farmers a diverse source of profits while preserving soil health (Lalaramnghinglova and Jha, 1996).

Homegarden which are traditional agroforestry systems play an important role in diversifying indigenous livelihoods. These systems with their diverse species supply a wide range of food including basic vegetables, fruits, medicines and valuable commodities. Crop diversification improves food security, nutrition, revenue production and rural employment while reducing risk. Homegarden product production varies by garden size with larger gardens producing more than smaller ones. Larger gardens provide a higher overall output but the yield per unit area declines with expansion. Home gardens frequently help families better their financial situation by generating additional revenue and contributing to social and cultural development (Rocky and Sahoo, 2018).

Mizoram agroforestry systems and boundary plantations uses various tree species such as *Alnus nepalensis*, *Gmelina arborea*, *Bamboo spp*, *Albizia lebbeck*, *Lagerstroemia speciosa* and *Bombax ceiba*, to enhance ecological sustainability and economic viability. *Alnus nepalensis* also known as Nepalese alder improves the soil fertility through nitrogen fixation and provides sustainable timber. *Gmelina arborea* (Gamhar) is a valuable species due to its fast growth and high-quality timber making it an attractive option for farmers seeking diversification. Bamboo species are used for construction, handicrafts, fodder and boundary plantation preventing soil erosion and providing wildlife habitat. *Albizia lebbeck* also known as (Siris) improves shade and soil and its leaves are used as fodder for livestock. *Lagerstroemia speciosa* commonly named as -'The pride of India and it is valued for its ornamental appeal and medicinal properties contributing to biodiversity and providing additional income through the sale of its flowers and leaves. *Bombax ceiba* (The silk cotton tree) is significant for its ecological role in providing habitat and traditional medicine. Integrating these species into agroforestry systems not only enhances agricultural productivity but also contributes to biodiversity conservation and local ecosystem sustainability (Handa, 2019).

Exempted tree species for felling

The Governor of Mizoram through Notification No.C.18012/3/91-FST dated July 30, 2004, has approved the inclusion of specific tree species grown on non-forest or private lands in the list of those exempt from felling permission requirements. The exempted species are: *Albizzia stipulata*, *Alstonia scholaris*, *Anogeissus acuminata*, *Baccaurea ramiflora*, *Bauhinia pupurea*, *Bauhinia variegata*, *Callicarpa arborea*, *Drimycarpus racemosus*, *Erythrina subumbrans*, *Erythrina variegata*, *Eucalyptus spp*, *Grevillea robusta*, *Helicia excels*, *Hevea brasiliensis*, *Hibiscus macrophyllus*, *Lannea coromandelica*, *Mangifera indica*, *Melia azadirachta*, *Parkia roxburghii*, *Sterculia urens* and *Trema orientalis*.

Predominant bamboo species of Mizoram state		
S.No.	**Species Name**	**Common Name**
1.	*Bambusa balcooa*	Female bamboo
2.	*B. bambos*	Rawhing
3.	*B. dampeana*	Chinese Dwarf Bamboo
4.	*B. mizorameana*	Talan
5.	*B. multiplex*	Hedge Bamboo
6.	*B. nagalandiana*	Ralleng mau
7.	*B. nutans*	Ankuang
8.	*B. tulda*	Rawthing
9.	*B. vulgaris*	Vairua
10.	*B. vulgaris var. vittata*	Yellow bamboo
11.	*B. vulgaris var. waminii*	Buddha's Belly Bamboo
12.	*Dendrocalamus asper*	Giant bamboo
13.	*D. giganteus*	Bhalu bans
14.	*D. hamiltonii*	Phulrua
15.	*D. hookeri*	Rawpui/ Rawlak/ Rawkhauh
16.	*D. laetiflorus*	-
17.	*D. longispathus*	Rawnal
18.	*Dendrocalamus manipureanus*	Rawchhe changdam
19.	*D. sikkimensis*	Rawmi
20.	*D. strictus*	Tursing
21.	*Melocalamus compactiflorus*	Sairil
22.	*Melocanna baccifera*	Mautak
23.	*Neomicrocalamus mannii*	Siaman
24.	*Phyllostachys edulis*	Moso Bamboo
25.	*P. manni*	-
26.	*Schizostachyum dullooa*	Rawthla
27.	*S. fuchsianum*	Rawneal
28.	*S. mannii*	Rawte/ Chatle
29.	*S. munroi*	Nat
30.	*S. pergracile*	Mau-dang
31.	*S. polymorphum*	Chal
32.	*Sinarundinaria falcata*	Lik
33.	*S. griffithiana*	Phar
34.	*Sinarundinaria longispiculata*	-
35.	*Thyrsostachys oliveri*	Phunkirua

Source: ICFRE (2018) and BDA (2024)

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Agroforestry Business Incubation Centre

ABiC

Institute Technology Management Unit (ITMU) of CAFRI facilitates incubation of new startup/entrepreneurs and enterprises for innovation technologies by providing need based physical, technical, business and networking support, facilities and services to test and validate business ventures of the incubates in agroforestry-based enterprises. Also, the IP/deemed IP are commercialized for creating an ecosystem for entrepreneurship. ABiC activities includes thematic areas like are plant nursery; semi-processed items like juice, jam, pulp, gum & resin, etc.; tree seed marketing; timber and wood-based products; fibre and flosses; biofuels and briquettes; essential oils; mini-clonal technology and agroforestry models.

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