INTEGRATION OF REDD+ IN THE LAND USE PLANNING ACTIVITIES OF NORTH EASTERN STATES OF INDIA WITH REFERENCE TO THE MIZORAM STATE
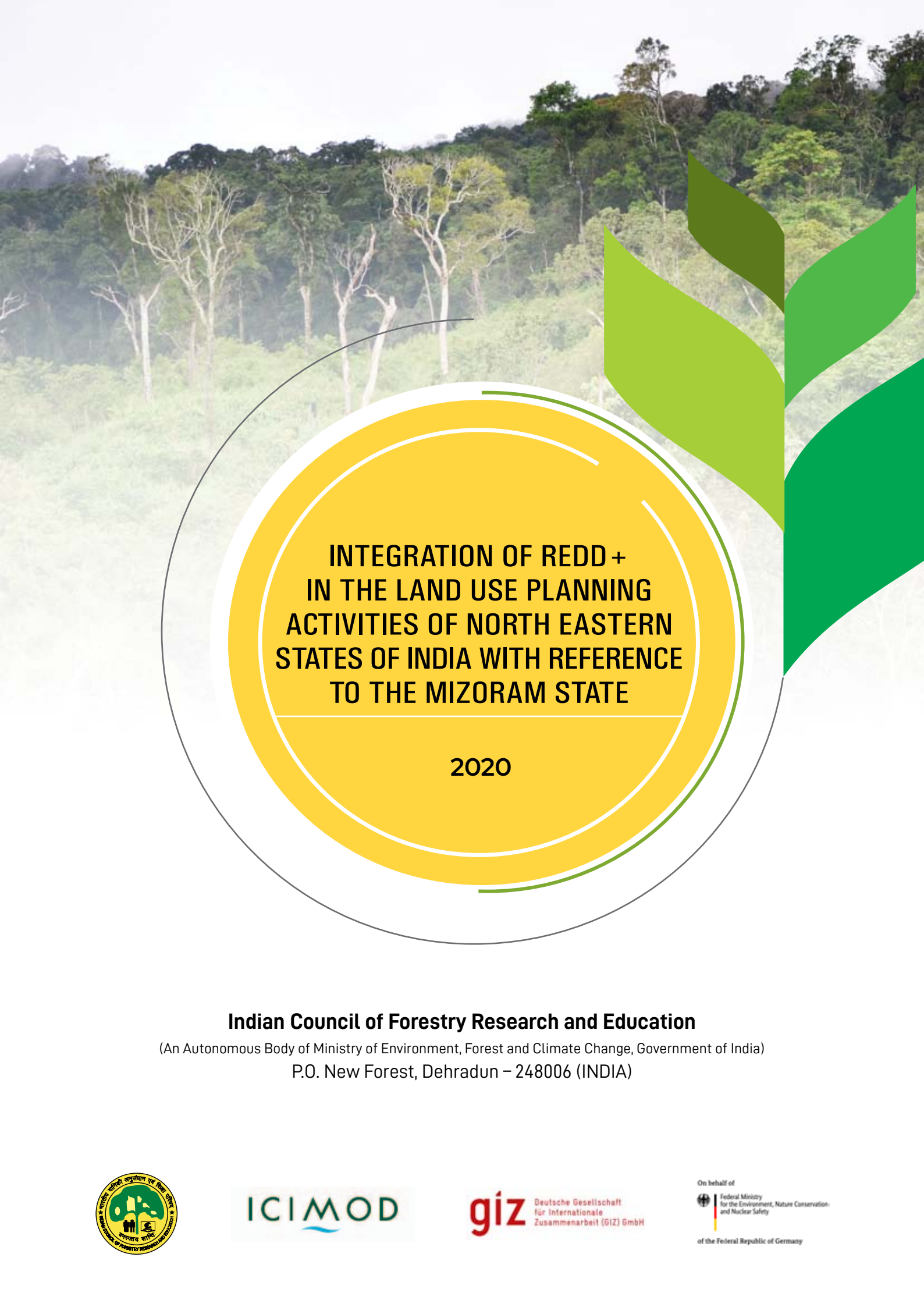
2020

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On behalf of
Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

of the Federal Republic of Germany

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IN THE LAND USE PLANNING
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STATES OF INDIA WITH REFERENCE
TO THE MIZORAM STATE

2020

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ACKNOWLEDGEMENTS

EXECUTIVE SUMMARY

REDD+ mechanism has gained attention in the global climate change debate due to its potential role in mitigating climate change in the forest sector of developing countries though reducing emission from deforestation and forest degradation, conservation and enhancement of forest carbon stocks, and sustainable management of forests. The forests of North Eastern states of India are unique both in terms of structure and function. These states are also rich in biodiversity. Arunachal Pradesh occupies a significant place and is a hot spot for the evolution of flora in the Eastern Himalaya. Out of the 9 important vegetation types of India, 6 are found in the North Eastern states with about 8000 tree species. About two-thirds of forests in the North Eastern states are under the autonomous district councils, and are managed by local communities. Community institutions such as village councils, chieftainships, and councils of elders are responsible for protecting their forest resources.

A study has been conducted for integration of REDD+ in the land use planning activities of North Eastern states by Indian Council of Forestry Research and Education in collaboration with International Centre for Integrated Mountain Development under the trans-boundary landscape project titled "REDD+ Himalayas: Developing and using experience in implementing REDD+ in the Himalayas". The main objective of this study was to analyze relevant land use policies and programmes with the aim to integrate REDD+ in the land use planning activities. The study used secondary data sources from published literature which includes states level policies and programmes, reports, articles, official websites, etc. Additionally, a field study was also undertaken in the state of Mizoram through stakeholder consultation process. Views of the relevant stakeholders and consultation of the published literatures were done to identify the suitable land use planning activities that can be integrated with the State REDD+ Action Plan of Mizoram to get the financial incentive and other benefits of implementation of REDD+ activities. Integration of REDD+ activities with the land use planning activities will be supportive in achieving the objectives of Socio-Economic Development Policy and New Land Use Policy of Mizoram. The study indicated that REDD+ activities need to be integrated in the land use policies and programmes for achieving the objectives of climate change mitigation and sustainable development.

1

INTRODUCTION

Anthropogenic emissions from land use, land-use change and forestry contributes 9-11 % of greenhouse gas emissions owing to large scale deforestation and forest degradation in developing countries. Globally, agriculture, forestry and other land use (AFOLU) activities accounted for around 23% (52 $GtCO_2$ yr^{-1}) of total net anthropogenic emissions of greenhouse gases (IPCC, 2014). Greenhouse gas emissions from deforestation and forest degradation have been reported to be 5.8 $GtCO_2$ yr^{-1} which is 11% of total emission from AFOLU activities (IPCC, 2019). The mitigation potential of forest sector is estimated to be in the range of 8.2 to 13.5% of total mitigation potential, considering all sectors. Forests contribute to climate change mitigation in many ways namely increase in forest area through afforestation, reforestation, conservation of natural forests, increase in carbon density of existing forests at both stand and landscape levels, sustainable management of forests and reduction in emissions from deforestation and forest degradation. REDD+ is an innovative financial mechanism which justifies performance-based financial incentives to the stakeholders including local communities involved in the implementation of REDD+ actions in the developing countries.

In India, around 1,73,000 forest fringe villages are existing where local communities are highly dependent on forest resources for their livelihoods (MoEF, 2006; MoEFCC, 2018). Land use planning is currently gaining significance by recognizing it to be a central part of the formulation and implementation of REDD+ strategies or action plans. Land use planning is one of the cross-cutting issues and provides actions to achieve climate change mitigation and adaptation targets. North Eastern states of India have a unique forestry regime with high forest cover and are a crucial part of Indo-Burma Biodiversity Hotspot. There is also a high extent of community managed forests, ownership and dependency for livelihoods which has a potential to bring large benefits towards conservation of natural forest and biodiversity, and economic development through implementation of REDD+ activities. Land use policies and programmes are the prime instrument for successful implementation of REDD+ activities. For successful implementation of REDD+ activities, readiness phase of REDD+ demands to analyse the existing land based policies and ongoing land use programmes for its integration in the land use planning activities.

2

OVERVIEW OF FOREST RESOURCES OF NORTH EASTERN STATES

North Eastern states of India are comprises of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura has a total geographical area of 262179 sq km which is 7.97% of the country's total geographical area with a population about 45.5 million contributing 3.76 % to national population. Land is considered to be a critical resource with overall geographical land to man ratio in North Eastern states is 0.67 hectare per person and is found to be much higher than the national average of 0.32 hectare per person. The percent utilization of cultivable area in the North Eastern states (62.04%) is less than the national average (73.05%). About 80% of the farmers in the North Eastern states belong to small (less than 1.44 ha) and marginal (less than 0.40 ha) category. Moreover, with the increase in population, the average size of land holding is gradually reduced over the years. This is primarily because the hilly terrain constitutes nearly two third of the geographical area, and large sized holding are not feasible. The average size of land holding for the North Eastern states (1.60 ha) is marginally higher than the all India average land holding (1.57 ha) (DE and Singh, 2017).

The North Eastern states receive an annual average rainfall of 2000 mm accounting for about 10% of the country's total precipitation. The soil of the region is acidic to strongly acidic in nature accounting 70% of the total geographical area. Forest cover of the North Eastern states is 17.05 mha which is about 66.85% of their total geographical area. The maximum forest cover of 85.41% was recorded in Mizoram followed by Meghalaya (76.33%) and minimum was recorded in Assam (36.11%). Moreover, the contribution of scrub is 1.23% of North Eastern states to its geographical area. The forest cover is classified in terms of canopy density classes namely very dense forest, moderately dense forest, open forest, scrub and non-forest. Arunachal Pradesh has the highest area under all the classified categories with 21095 sq km under very dense forest, 30557 sq km under moderately dense forest and 15036 sq km under open forest. Out of eight states, forest cover of six states has decreased may be due to shifting cultivation and developmental activities whereas forest cover of Assam has been increased by 222 sq km attributed to plantations mostly outside of forest areas (FSI, 2019).

Table 1. Forest cover (in sq km) of North Eastern states of India

S. No.	States	Very Dense Forest	Moderately Dense Forest	Open Forest	Total Forest Cover	% Geographical Area	Scrub	Change in FC w.r.t to 2017
1.	Arunachal Pradesh	21095	30557	15036	66688	76.63	229	-276
2.	Assam	2795	10279	15253	28327	36.11	173	222
3.	Manipur	905	6386	9556	16847	75.46	1181	-499
4.	Meghalaya	489	9267	7363	17119	76.33	600	-27
5.	Mizoram	157	5801	12048	18006	85.41	1	-180
6.	Nagaland	1273	4534	6679	12486	75.31	635	-3
7.	Sikkim	1102	1552	688	3342	47.10	307	-2
8.	Tripura	654	5236	1836	7726	73.68	29	0
	Total of North Eastern states	**28470**	**73612**	**68459**	**170541**	**65.05**	**3155**	**-765**
	Total of India	**99278**	**308472**	**304499**	**712249**	**21.67**	**46297**	**3976**

(Source: FSI, 2019)

The forest carbon stocks of North Eastern states contribute about 29.56% to the total forest carbon stocks of the country. Among North Eastern states, the maximum carbon density was observed in Sikkim (171.04 tC/ha) and the minimum in Mizoram (86.95tC/ha). Among the different components of carbon pools, soil organic carbon (58.67%) contributed maximum in total forest carbon stocks followed by aboveground biomass (30.25%) and belowground biomass (8.55%). Forest carbon stocks of North Eastern states is given in Table 2.

Table 2. Forest carbon stocks ('000 tonnes) of North Eastern states

S. No.	States	Area sq km	Aboveground biomass	Belowground Biomass	Dead Wood	Litter	SOC	Total
1.	Arunachal Pradesh	66688	330856 (49.61)	100379 (15.05)	7816 (1.17)	15436 (2.31)	596836 (89.50)	1051323 (157.65)
2.	Assam	28327	85844 (30.30)	21148 (7.47)	1102 (0.39)	7223 (2.55)	154832 (54.66)	270149 (95.37)
3.	Manipur	16847	44723 (26.55)	13317 (7.90)	508 (0.30)	3924 (2.33)	116251 (69.00)	178723 (106.08)
4.	Meghalaya	17119	52302 (30.55)	14963 (8.74)	731 (0.43)	4328 (2.53)	108642 (63.46)	180966 (105.71)
5.	Mizoram	18006	44973 (24.98)	9925 (5.51)	451 (0.25)	4516 (2.51)	96689 (53.70)	156554 (86.95)
6.	Nagaland	12486	35850 (28.71)	9612 (7.70)	522 (0.42)	2897 (2.32)	86646 (69.39)	135527 (108.54)
7.	Sikkim	3342	17645 (52.78)	5372 (16.07)	505 (1.51)	664 (1.99)	32994 (98.69)	57180 (171.04)
8.	Tripura	7726	25061 (32.44)	5513 (7.14)	297 (0.38)	2169 (2.81)	43017 (55.68)	76057 (98.44)
Total of North Eastern states		**170541**	**637254 (37.36)**	**180229 (10.56)**	**11932 (0.69)**	**41157 (2.41)**	**1235907 (72.46)**	**2106479 (123.51)**
Total of India		**712249**	**2256533 (31.68)**	**700824 (9.84)**	**35842 (0.50)**	**127902 (1.80)**	**4003575 (56.21)**	**7124676 (100.03)**

(Value of carbon stock density tonne per hectare given in parenthesis)   *(Source: FSI, 2019)*

Additionally, the area under different forest type groups of North Eastern states are given in Table 3. Owing to larger geographical area and high biodiversity along with the climatic and edaphic factors, topography, and elevation, the maximum forest type groups are reported in Arunachal Pradesh (10) and minimum in Tripura (2). Amongst 12 forest type groups, Tropical Dry Deciduous Forests found only in Assam. Arunachal Pradesh is part of the "Himalaya biodiversity hotspot" which is one of the 35 biodiversity hotspots in the world. Arunachal Pradesh is the richest terrestrial biodiversity region in India with about 6,000 flowering plants and half of the bird species known from India. The State is home to about 400 species of pteridophytes, 23 species of conifers, 35 species of bamboos, 20 species of canes, 52 species of Rhododendron and more than 500 species of orchids. Due to this, Arunachal Pradesh is also known as "Paradise of the Botanists" (Mishra and Dutta, 2007).

Table 3. Area (sq km) under different Forest types Groups of North Eastern States

S. No.	Forest Type Group	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
1.	Group-1 Tropical Semi-Evergreen Forests	1002.56	3346.91	-	1793.33	-	68.03	-	-
2.	Group-2 Tropical Moist Deciduous Forests	46687.51	14371.12	4250.20	330.96	13440.73	2243.37	-	908.68
3.	Group-3 Tropical Moist Deciduous Forests	3635.32	7126.02	522.89	10579.92	5120.17	6512.67	186.73	7305.32
4.	Group-5 Tropical Dry Deciduous Forests	-	25.40	-	-	-	-	-	-
5.	Group-8 Subtropical Broadleaved Hill Forests	2273.54	-	9065.85	3041.18	6.82	2137.29	911.89	-
6.	Group-9 Subtropical Pine Forests	570.95	124.63	1450.26	1423.61	116.28	1028.37	-	-
7.	Group-11 Montane Wet Temperate Forests	5044.88	-	1791.23	-	-	1742.08	898.17	-
8.	Group-12 Himalayan Moist Temperate Forests	1027.30	-	-	-	-	-	233.68	-
9.	Group-13 Himalayan Dry Temperate Forests	6996.64	-	-	-	-	-	-	-
10.	Group-14 Sub-Alpine Forests	622.37	-	-	-	-	-	978.63	-
11.	Group-15 Moist Alpine Scrub	12.27	-	-	-	-	-	344.09	-
12.	Group-16 Dry Alpine Scrub	-	-	-	-	-	-	-	-
	Total	**67873.3**	**24994.1**	**17080.4**	**17169**	**18684**	**13731.8**	**3553.19**	**8214**

(Source: FSI, 2011)

As per Champion and Seth (1968), the determining factors of the forest types are climate, soil, vegetation and the past treatment (including biotic interference). The State of Assam is a constituent unit of the Eastern Himalayan Biodiversity Region; one of the two biodiversity Hot Spots in the country[1]. Nagaland also shares one of the two biodiversity hotspots under Eastern Himalaya, i.e. the Indo-Burma Biodiversity Hotspot. North Eastern states have 68 protected areas (national parks and wildlife sanctuaries) which are the habitat of the rare and threatened endemic floral and faunal species.

[1]Source: http://asbb.gov.in) accessed on 14-07-2020.

Mizoram is known as one of the leading producers of bamboo in India supplying 14% of the country's commercial bamboo. Around 80% of the total bamboo area is occupied by *Melocanna baccifera* in Mizoram (Rawat *et al*., 2018 a).   Arunachal Pradesh has 46 bamboo species and important bamboo species in the state are *Dendrocalamus giganteus, D. hamiltonii, D. hookerii, Melocanna baccifera* and *Phyllostachys bambusoides*. Assam is known to have 28 species of bamboo. Bamboo forests of Meghalaya is known to have diversity including both clump forming as well as non-clump forming types. The important clump forming species include *Dendrocalamus strictus, Dendrocalamus hamiltonii, Bambusa arundinacea, Bambusa pallida* and *Bambusa tulda,* whereas *Melocanna bambusoides* is the important non-clump forming species. It has been reported that 36 species of bamboo from 14 genera are found in Meghalaya. In Nagaland bamboo is found extensively with 16 species, 46 species are found in Manipur and 17 bamboo species in Tripura (Loushambam *et al*., 2017).

3

LAND USE AND LAND COVER OF NORTH EASTERN STATES

The statistics of land use/ land cover of North Eastern states for two time periods (2011-12 and 2015-16) given by National Remote Sensing Centre under Natural Resources Repository Programme on 1:50,000 scale using multitemporal Resourcesat-2 terrain corrected Linear Imaging Self Scanning Sensor (LISS)-III data for the period are given in Table 4 and 5. The classification under different classes shows that the area has increased under built up land and agricultural class, whereas mixed results were found under forest class. Though the area under shifting cultivation decreased in North-Eastern states except Manipur but still needs attention for being the driver of deforestation and forest degradation stressors.

Table 4: Land use land cover data (sq km) of North Eastern states for the year 2011-12

Class	Sub class	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
Agriculture	Cropland	2508.03	23370.18	1534.14	1289.31	181.69	574.06	588.69	1404.68
	Current shifting cultivation	916.32	123.09	451.23	233.74	790.39	1160.42	–	730.87
	Fallow	74.34	626.40	8.88	1.32		20.68	0.57	32.26
	Plantation	55.18	3825.61	38.14	565.14	83.50	9.84	4.42	125.61
Barren/ unculturable /wasteland	Barren rocky	183.77	8.05		263.03	5.14	0.86	927.80	
	Gullied/ Ravine land	–	6.78	–	–	–	–	–	0.08
	Rann	–	–	–	–	–	–	–	–

Class	Sub class	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
	Salt Affected land	-	-	-	-	-	-	-	-
	Sandy Area	9.13	217.10	-	4.40	-	-	3.72	4.68
	Scrub land	2297.0	3780.27	3055.59	2835.55	139.68	2355.57	20.64	617.83
Built-up	Mining	0.63	60.57		1.78		8.89	0.09	
	Rural	411.73	616.93	308.28	775.07	124.33	251.08	5.66	493.51
	Urban	125.91	580.25	102.79	85.82	65.24	90.23	18.72	342.70
Forest	Deciduous	147.23	23722.18	11669.49	9705.09	7233.73	9527.72	182.84	1933.98
	Evergreen/semi evergreen	59711.05	7814.48	2784.06	750.02	6984.55	340.33	2573.05	3864.21
	Forest plantation	24.76	124.01	1.58	13.70	105.84	126.82	3.87	307.42
	Scrub forest	1386.83	2187.39	1823.61	615.01	5093.17	1890.93	53.01	511.30
	Swamp/ Mangroves	0.00	-	-	4943.21	-	-	-	-
Grass/ Grazing	Grass/Grazing	5499.48	3053.55	2.58	0.03	112.18	19.33	621.26	-
Snow and Glacier	Snow and Glacier	8776.33	-	-	-	-	--	2024.52	-
Wetlands/ water bodies	Inland Wetland	5.42	1496.65	287.32	55.40	0.04	-	-	5.52
	Coastal Wetland	0.00	0.00	-	-	-	-	-	-
	River/Stream/ Canals	1572.73	6750.84	145.18	273.42	136.07	181.10	46.95	50.63
	Water bodies	37.11	73.67	116.70	17.98	25.47	21.14	20.65	55.34

(Source: https://bhuvan-noeda.nrsc.gov.in/gis/thematic/index.php)

Table 5: Land use land cover data (sq km) of North Eastern states for the year 2015-16

Class	Sub class	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
Agriculture	Cropland	2657.63	24416.90	1922.55	1363.49	176.71	743.82	586.85	1396.91
	Current shifting cultivation	688.55	58.36	638.82	180.61	687.41	869.44		30.66
	Fallow	71.65	500.54	9.41	0.63		38.77	0.57	28.89
	Plantation	56.29	3822.19	22.15	567.57	76.84	12.11	4.42	772.69
Barren/ unculturable /wasteland	Barren rocky	259.41	-	1.80	-	-	4.04	1109.05	-
	Gullied/ Ravine land	-	-	1.44	-	-	-		0.47
	Rann	-	-	-	-	-	-		-
	Salt Affected land	-	-	0.22	-	-	-		-
	Sandy Area	60.69	42.09	-	5.01	-	-	3.62	3.49
	Scrub land	2885.62	4091.09	3628.12	2741.91	981.51	3146.36	23.08	302.55
Built-up	Mining	0.99	136.01	0.03	67.08		17.46	0.09	5.78
	Rural	362.34	640.09	439.67	758.98	148.82	281.50	5.80	564.18
	Urban	137.30	743.55	105.86	87.92	72.97	142.55	18.42	320.96

Class	Sub class	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
Forest	Deciduous	116.11	27237.11	10213.66	14462.39	6727.70	9580.10	184.35	2567.81
	Evergreen/semi evergreen	57793.12	4366.70	2599.71	753.91	8562.33	174.79	2527.85	3655.37
	Forest plantation	28.35	83.81	1.63	12.98	93.47	230.57	3.84	291.92
	Scrub forest	2095.66	1280.81	2172.26	800.64	3303.80	1120.14	75.19	432.48
	Swamp/ Mangroves	-	-	-	0.58	-	-		-
Grass/ Grazing	Grass/Grazing	4907.09	3032.65	2.76	0.06	91.30	5.94	553.34	--
Snow and Glacier	Snow and Glacier	10136.89	-	-	-	-	-	1930.12	-
Wetlands/ water bodies	Inland Wetland	0.46	1152.70	118.47	56.20	-	-		4.76
	Coastal Wetland	0.01	-	-	-	-	-		-
	River/Stream/ Canals	1453.43	6746.30	133.10	278.65	126.09	187.46	46.95	49.60
	Water bodies	31.40	87.11	315.41	18.11	31.13	23.95	22.47	57.48

(Source: https://bhuvan-noeda.nrsc.gov.in/gis/thematic/index.php)

4

OBJECTIVE OF THE STUDY

The main objective of this study is to analyse relevant existing land use policies and programmes of North Eastern states to explore the possibility for integration of REDD+ activities for sustainable land use planning with the goal to boost actions to curb emissions from deforestation and forest degradation and also to get the financial incentive.

5
METHODOLOGY

All relevant published reports and other technical documents related to land use policies and programmes of North Eastern states were reviewed and compiled to identify the suitable strategies to integrate REDD+ actions in the activities related to existing land use policies and programmes in the North Eastern states with special reference to the Mizoram state. A stakeholder consultation meeting was organised to get the inputs of the stakeholders for integration of REDD+ activities in the land use policies and programmes of the state of Mizoram on 17 December 2019 at Forest Research Centre on Bamboo and Rattan, Aizawl (Mizoram) in collaboration with Department of Environment, Forest and Climate Change, Govt. of Mizoram and International Centre for Integrated Mountain Development under REDD+ Himalaya Project. The meeting also contributed to sensitize forest officers, officers of other line departments and other stakeholders of Mizoram on REDD+ related issues. In addition, State REDD+ Action Plan of Mizoram state was launched during the meeting. Minutes of the meeting is annexed as Annex 1.

Policies and programmes related to land use are currently gaining ground and have attained centre point in planning and developing strategies for implementation of REDD+ activities. National Forest Policies at different time period after independence have emphasised the crucial role of forests in ensuring environmental stability and maintenance of ecological balance. In 1952, the first forest policy was enunciated after independence of India by Government of India. Over the years, forests in the country have suffered degradation. The major drivers of degradation such as demand for fuel-wood, fodder and timber; inadequacy of protection measures; diversion of forest lands for non-forest uses without ensuring compensatory afforestation and essential environmental safeguards; and the tendency to look upon forests as revenue earning resource. This brought the necessity to revise the Forest Policy and replaced by National Forest Policy, 1988 ensuring environmental stability and maintenance of ecological balance including atmospheric equilibrium which is considered to be the prime objective and aim. The policy also highlighted the role of local communities in forest conversion and protection.

The North Eastern states has issues of uneven topography, soil erosion, small landholdings, shifting cultivation practice, and opportunities of fertile land, high and dependable rainfall and agricultural friendly climate (Barah, 2001). This needs a good management planning in different land use practice and transforms the challenge into an advantage by taking an assistance of various schemes/ programmes. Suitable land-use planning can prove to be a practical tool for determination of allocation to different land uses for maximization of the sustainability of existing natural resources for maintenance in present and future generations and foster synergies across sectors for win-win solutions.

Land use planning is a constant process aiming for its sustainable use involving an altering of the land area allocations for alternative uses through suitable technological and institutional devices like supplies of the various commodities and service. It is an integrated and participatory approach for balancing food production, environmental, social, and economic values to reach low-emission and resilient development. Large stock of natural resources,

abundant water resources and the precious human capital are under-utilised in North Eastern states of India (Baruah *et al*., 2014). This demand for the effective utilisation of natural resources in North Eastern states of India. To operationalise REDD+ programme, it requires effective horizontal and vertical integration of REDD+ actions in the ongoing and planned programmes at multiple levels to promote transformational change.

In recent years, there has been synergy between mission/programmes with land use planning for example Mahatma Gandhi National Rural Employment Guarantee Act Scheme, *Atal Awas Yojana*, Prime Minister's *Gram Sadak Yojana*, Accelerated Irrigation Benefit Programme, *Sampoorna Grameen Rojgar Yozana*, *Deen Dayal Upadhyaya Antyodaya Yojana* etc. focusses to build holistic infrastructure and services to improve socio-economic status of the communities. *Pradhan Mantri Krishi Sinchai Yojana*, Integrated Watershed Management Programme, *Rashtriya Krishi Vikas Yojana*, Mission for Integrated Development of Horticulture, National Food Security Mission and National Afforestation Programme are the centrally sponsored programmes which are launched to enhance ecological security along with to build livelihood security of the communities. Moreover, National Programme for Conservation of Aquatic Ecosystem aims at holistic conservation and restoration of wetlands and lakes for achieving the desired water quality enhancement, besides improvement in biodiversity and ecosystems through an integrated and multidisciplinary approach and a common regulatory framework. *Deen Dayal Upadhyaya Antyodaya Yojana* and National Urban Livelihood Mission aims to reduce the poverty and risk of urban poor families by enabling them to utilize gainful self-employment and skilled wage employment opportunities, resulting in a commendable improvement in their livelihoods on a sustainable basis by building strong grassroots. The scheme also aims to provide shelter equipped with essential services for the urban homeless in a phased manner. Border Area Development programme launched in 2003-04 with an objective to meet the special developmental needs of the people living in remote and inaccessible areas. National Mission on Medicinal Plants promotes cultivation and provides an opportunity for value addition through processing and trade through market initiatives. These schemes are also executed in the North Eastern states for rehabilitation of degraded areas, conservation of the natural resource base and improvement of productivity to bring poverty reduction and livelihood security.

Other specific programmes implemented in the North Eastern states include Nagaland Beekeeping & Honey Mission which was launched in 2007-08 to provide strong government policy support and implement for the development of the beekeeping in the state leading to sustainable livelihood with a vibrant and self-reliant economy in a participatory mode. Nagaland Bio-resource Mission aims to provide an alternative source for the livelihood of the people by adopting holistic approach to conserve, develop and utilize bio-resources of the state with three main objectives such as conservation of bio-resources, sustainable use of bio-resources and equity sharing benefits. Government of Tripura has taken a new initiative called Peoples Plan of Tripura with the objective to give a clear direction to policy formulation and planning process for all round development. Government of Manipur has introduced the Green Manipur Mission to develop and protect forests in each village of the state by improving and maintaining the green cover of the state. Moreover, Biodiversity Conservation Programme has a component of plantation and conservation of river basin and reserve forest showing activity of reducing local pollution of air, water and land. In Arunachal Pradesh, Chief Minister's *Adarsh Gram Yojana* in 2017 has planned to create model villages in the state in order to equip basic amenities. Additionally, Chief Minister's *Krishi Rinn Yojana* is provide a facility of Zero interest crop loan to farmers of the State to enable them easy access to formal credit through banking channels and *Deen Dayal Upadhayaya Swalamban Yojana* is to provide direction and encourage unemployed youth to gain access to low cost capital for entrepreneurship etc. *Deen Dayal Upadhayaya Bunkar Yojana* is to encourage the women weavers to access affordable credit from banks for working capital requirements. Apart from state specific interventions, relevant policies of North Eastern states of India brings socio-economic improvements in the wake of ecological stability which would be an indicator of successful implementation of REDD+ activities are given in Table 6. Ongoing land use related programmes/ projects of North Eastern states are given in Table 7.

Table 6: Land use related policies of North Eastern states of India

S. No.	State policy	Objectives/goals/vision
Arunachal Pradesh		
1.	Industrial Policy of Arunachal Pradesh, 2001	It has encouraged the establishment of industrial undertakings in the private and cooperative sectors for the sustainable development of the state. Moreover, employment opportunities and gainful self-employment in industrial and allied sectors for the local populations of Arunachal Pradesh are being given priority.
2.	Arunachal Pradesh Disaster Management Policy	The aim of the Policy is to establish necessary systems, structures, programmes, resources, capabilities and guiding principles for reducing vulnerability to various hazards and preparing for and responding to disasters and threat of disasters in the State in order to save lives and property, avoid disruption of economic activity and damage to environment and to ensure the continuity and sustainability of development of the State.
3.	Hydro Power Policy, 2008	This policy aims to have proper balance between the need for hydropower development to meet the acute shortage of power as well as the development needs on one hand and ecological and community interests need on the other.
Assam		
1.	Assam Forest Policy, 2004	The aim of this policy is to ensure progressive sustainable development of the forests of Assam, to meet the twin objectives of environmental stability and ecological balance together with improved livelihood support system for her people.
2.	Bamboo and Cane Policy, 2019	This policy aims at sustainable development and utilization of bamboo and cane resources in the state through scientific management and stakeholder's participation
3.	Assam land Policy, 2019	This policy envisaged to safeguard the landless indigenous people in order to regularize the long occupations of Government land and disposal of large number of petitions pending for settlement of land. For example, allotment and settlement of government land for cultivation, homestead purpose, allied agricultural cultivation, special cultivation in rural area, village grazing reserve and professional reserve and other reserve land etc.
4.	Biotechnology Policy, 2019	The vision is to attain high capability in biotechnology education research and commercialization and utilizing biotechnology to build up a sustainable industry, ecosystem for creation of wealth, income and employment generation and promotion of equity.
5.	Draft Agriculture Policy, 2018	The foremost aim of the policy is to strengthen farm economy and more precisely the economy of the farmers. Moreover, to accelerate growth in each sector of agriculture to pave the way for at least doubling production and income in precise timeframe. Another aspect is employment generation in farming sector is the key to provide incremental income across different regions and classes of farmers. Keeping in view the twin importance of income and employment generation as primary objective of the policy, several issues associated with agricultural development in Assam, will be dealt with appropriate policies to bring vibrancy and dynamism.
Meghalaya		
1.	Meghalaya Tourism Policy, 2011	The vision of this policy is to position Meghalaya as a preferred tourist destination by taking advantage of its rich cultural heritage and natural beauty and biodiversity of state.
2.	Meghalaya Industrial and Investment Promotion Policy, 2012	The policy is designed to facilitate investments in new sectors across the State and thus ensure accelerated and sustained growth. The Policy focuses to attract, facilitate and promote wider expectations and highend investment. Keeping in view special/ unique land tenure system is required to adopt appropriate policy for facilitating availability of land for investment which will provide adequate safeguard.

S. No.	State policy	Objectives/goals/vision
3.	Meghalaya State Water Policy 2019	This policy intends to achieve sustainable development, management and use of water resources with community participation to improve health and livelihoods, reduce vulnerability, while assuring good governance for the present and future generations by promoting Integrated Water Resources Management. Environmental sustainability and conservation, social inclusion and equity, techno economic viability will be duly considered in relation to all aspects of governance, management and consumptive use of water resources to ensure inter-generational equity.
Mizoram		
1.	New land Use Policy	A primary objective is to provide sustainable income to farming families by weaning away the destructive and unprofitable shifting cultivation practices.
2.	Socio Economic Development Policy	The aim is to bring self-sufficiency in food items, improving social life, bringing happiness and peace to people. To promote and yield sustainable development having both short term and long-term visions and bring balanced growth and development in different corners of Mizoram. The policy is divided in two components economic and social development policy and programme.
3.	State Bamboo Policy	The aim of this policy is to promote bamboo cultivation and bamboo-based industries and development of local people. The major target is to develop bamboo plantation in both private and government lands and to establish bamboo nurseries and promote research for high yield and strength varieties.
Nagaland		
1.	State Policy of Environment and Forest, 2015	On the line of National Forest Policy, state forest policy has evolved a conscious strategy for forest conservation. Rehabilitation of jhum, preservation, maintenance, sustainable utilization, restoration, and enhancement of the natural environment.
2.	Nagaland Bamboo Policy, 2004	The main goal is to get benefit, growth and development of the people by using bamboo in a planned, scientific and holistic approach for the cultivation and management of bamboos on a sustained basis. This help in boosting the economy of the State and facilitate the entry of Nagaland into the world economy.
3.	Industrial Policy of Nagaland, 2000	The mission is to facilitate rapid and sustained industrial development in the State through enhanced investment, an investor friendly environment, provision of infrastructure and institutional support, attractive incentive package and optimum utilization of existing resources in order to gainfully exploit emerging opportunities in the national and international markets and generate substantial income and employment avenues for the people of Nagaland.
Sikkim		
1.	Industrial Policy of Sikkim, 1996	The objectives of this policy are speedy industrial development and generation of adequate employment opportunities through self-employment.
2.	Sikkim State Policy on Organic Farming, 2004	The aim is to make Sikkim an organic state, building on the following pillars of opportunities namely accreditation of Sikkim Organic brand, Meeting demand of Sikkim consumers by famers, make viable low cost opportunity of food security and economic viability and make promising agribusiness opportunity attractive for educated unemployed youth
3.	State Policy of Environment, Forests and Land Use	Due to great demand of land for non forestry purpose from various sectors. Optimal utilization of land resources through land use planning and land management is very important.
4.	Sikkim Ecotourism Policy, 2011	The vision of the policy is to establish Sikkim as an ultimate and unique ecotourism destination offering memorable and high quality learning experiences to visitors, and to contribute to poverty alleviation as well as to promote nature conservation.
Tripura		
1.	State Afforestation Policy	The main goals of the policy are biodiversity conservation, ecological restoration of degraded forests and fragile areas, expanding forest cover beyond traditional forest areas, and enhancing the productivity of the forests and tree cover to meet the growing requirements of multiple use products.

S. No.	State policy	Objectives/goals/vision
2.	State Bamboo Policy, 2001	Main goals of this policy are development and implementation of a sustainable community based production model with concomitant benefits from forest conservation, economic development program using bamboo for spurring industrial development and enhancing employment and income generating opportunities for tribal and rural poor using bamboos as the prime resource.
3.	State Policy on Medicinal Plants, 2006	To develop the medicinal plant sector in such a manner that the state becomes a leading grower of all medicinal plants, which occur under the climatic and edaphic factors of the state. In addition to this it should become one of the major economic activities and may play a vital role in providing employment, income generation to the people
4.	Draft State Non-Timber Forest Products Policy, 2020	The Draft Non-Timber Forest Products policy is aimed at developing a long-term strategy, for creating an executive framework and to enumerate strategic interventions for an integrated development of non-timber forest produce sector in the state of Tripura.
5.	State Industrial Policy, 1991	The Industrial Policy made emphasis on rural employment through processing of bamboo and other natural resources. Driven by market forces, the communities are extracting more and more NTFP and bamboo to feed to the expanding requirements of herbal and bamboo processing industry.

Table 7: Ongoing land use related programmes/ projects in North Eastern states of India

S. No.	Programmes/ Projects	Objectives
Arunachal Pradesh		
1.	Chief Minister's *Adarsh Gram Yojana*	To develop 60 model villages in Arunachal Pradesh, which are equipped with all basic amenities such as 24x7 piped drinking water, electricity at household level, primary school, primary health infrastructure, internal roads, avenues of employment generation and are open defecation free.
2.	Chief Minister's *Krishi Rinn Yoiana*	To provide a facility of zero interest crop loan to farmers of the state to enable them easy access to formal credit through banking channels.
3.	*Deen Dayal Upadhyaya Bunkar Yojana*	To encourage the women weavers to access affordable credit from banks for working capital requirements
4.	*Deen Dayal Upadhyaya Swalamban Yoiana*	To encourage unemployed youth to gain access to low cost capital for entrepreneurship.
5.	Chief Minister's *Sashakt Kisan Yojana*	To double farmers' income by 2022 and this scheme has subsumed two flagship programmes viz. Agri -Mechanization Programme & Flagship Programme on Tea & Rubber.
6.	Support for Oil Palm Development	To encourage extensive adaptation of oil palm crop by both small and marginal farmers of the state and aid oil palm farmers in erection of protective fencing around their oil palm plantation.
7.	Chief Minister's *Krishi Samuh Yojana*	To empower the famers through cooperative approach, by institutionalisation of Farmers Producers Organisation and infusing timely support of good agriculture practices and marketing interventions for better price realisation and doubling the farmers' income.
8.	State Food Security Programme	To ensure food for all and to create an environment of food security among the masses and level of food crop production needs to be increased to meet up the food requirement of the state as a whole.
9.	Cash Crop Development Programme	The objective is to bring higher production and productivity of all popular cash crops like potato, ginger, oil seeds, seasonal vegetables and species crops. The per unit productivity of these crops are comparatively lower and enhance productivity.
Assam		
1.	Chief Minister *Samagra Gramya Unnayan Yojana*	To bring the desired changes in the rural areas of the state and double the farm income in five years.

S. No.	Programmes/ Projects	Objectives
2.	*Mukhya Mantri Krishi Sa Sajuli Yozana*	To promote farm mechanization for cultivation of different crop. Transfer of technology to the farmer's field. To increase the production and productivity of different crops through farm mechanization. To increase profitability of farmers besides saving in labour and time. To promote the scientific cultivation practices by encouraging farmers in procuring scientific farm tools.
3.	Swami Vivekananda Assam Youth Empowerment Yojana	Government will provide financial support to the youths to take up income generating activities in manufacturing, trading and service sector and encourage entrepreneurship.
4.	Assam *Orunodoi* Scheme	To empower women and provide financial assistance to economically vulnerable families.
5.	Assam *Mukhya Mantri Krishi Sa-Sajuli Yojana*	To foster holistic development by implementing several farm mechanization schemes. This scheme also aims to increase the farm productivity in the limited land to meet the expanding demand of farm produce and ensure higher income for farmers.
Manipur		
1.	Micro irrigation and farm ponds perennial plantation programme	Promote water conservation and productivity enhancement through sustainable utilization of natural resources
2.	North Eastern Council Fund for Resource Mobilisation Scheme	Promote diversified agricultural and allied livelihoods, including livestock and horticulture.
3.	Economic Development Programme	Skill development of all eligible youth for self-employment and placement, also providing support to rural people working in large cities.
Meghalaya		
1.	North East Climate Change Adaptation Programme	To strengthen the adaptive capacities of target groups, therewith reducing their vulnerability to climate change in a target-oriented manner. This is to contribute to lower the risks of climate change and to contribute to the adaptation to climate change.
2.	Integrated Basin Development and Livelihood Promotion Programme	To create institutional ecosystem for ecologically sustainable and inclusive development in Meghalaya. It aimed to put Meghalaya on higher growth trajectory and redefine the relationship between the citizen and state and bring a paradigm shift by moving towards a demand driven partnership model of development.
3.	Shyama Prasad Mukherji Rurban Mission	To stimulate local economic development, enhance basic services and create well planned Rurban clusters
4.	Special Rural Works Programme	For active involvement of village community in the process of development right from the grass root level upto the implementing stages which is in consonance with the policy programme of the Government
5.	Social Forestry Programme	To carry out afforestation programme in the areas outside the Government control forest areas.
6.	Vegetable Development Scheme	To promote vegetable production through high yielding variety seeds/ hybrids/ improved/ open pollinated seedlings, including assistance to farmers.
7.	Fruit Development Scheme	To make available to the farmers good quality planting materials in convergence mode and sale at subsidised rates.
8.	Floriculture Development Scheme	To motivate the farmers to take up floriculture as commercial venture through distribution of planting materials and other inputs.
9.	Post-Harvest Management Agricultural Marketing Schemes	Collection and reporting of reliable and accurate data on market intelligence and market sentiments for important agricultural commodities for utilization of the state as well as central government.
Mizoram		
1.	Technology Mission for Horticulture in the North East	The main objective is to address issues related to production and productivity, post-harvest handling, marketing and processing of horticultural crops in the North Eastern states.

S. No.	Programmes/ Projects	Objectives
2.	Chief Minister's Rural Housing Scheme	To strengthen the local level institutions / agencies / civil societies so that the framework for mobilizing additional land, finance for housing purposes and community infrastructure building is created.
3.	Integrated Housing and Slum Development Programme	This programme aims to have an integrated approach in ameliorating the conditions of the urban slum dwellers who do not possess adequate shelter and reside in dilapidated conditions
Nagaland		
1.	Pulses development programme	To popularize both traditional and non-traditional pulses production in the state.
2.	Oil seeds development programme	To popularize oil seed cultivation in the state with modern technologies to achieve self-sufficiency and improve economic condition of the farmers.
3.	Feed and fodder programme	To demonstrate good management practices in feeding through establishing farms.
4.	Piggery development programme	To improve quality of local pigs ruminants through supply of superior quality piglets.
5.	Compact Area Fishery Development Programme	To convert the traditional intensive cultures by way of diversifying modern technologies.
6.	Mechanised land development scheme	To control soil erosion, recharge ground water for sustainable crop production and land development.
7.	Maize development programme	To encourage farmers to take up both high yielding varieties as well as local cultivars.
8.	Watershed development project in shifting cultivation areas	To protect the jhum land with soil and water conservation measures.
9.	Nagaland Beekeeping & Honey Mission	To implement programmes and policies for promotion and development of beekeeping in the state.
Sikkim		
1.	Chief Minister Rural Housing Scheme	To bring about a qualitative improvement in the housing status of the poor by providing them a housing grant. This will result in achieving the status of a "*Katcha* House Free State" and reach an important milestone in the Mission: Poverty Free State.
2.	Dairy Development Programme	To develop infrastructure, strengthening of man-power in the department and in the self sufficiency in the livestock products and participate in the process of development for their sustainability and rural prosperity.
3.	Fisheries Development Programme	To increase fish production/productivity from all culturable water resources.
4.	Green School Programme	To encourage and support schools to build up an environmentally aware, active and skilled community of teachers, students and parents.
5.	Yak Development Programme	To improve the indigenous yak through this genetic up gradation programme in terms of quantity and quality of breed in the field.
Tripura		
1.	Tripura Urban Employment Programme	To provide employment opportunities in urban areas.
2.	Tripura Rural Livelihood Mission	To build the capacity of the people to fully participate and contribute to local development.
3.	Tripura State Government Housing Scheme	To make *pucca* houses for all houseless poor/poor living in *kuccha* houses, land rights and land records transparency.
4.	*Bidhayak Elaka Unnayan Prakalpa*	To maintain internal all weather roads with covered drains

Government of India had released National Action Plan on Climate Change, in 2008, subsequently State Governments were also asked to develop their State Climate Change Action Plans for addressing the climate change issues in all the sectors. Forestry related objectives of the State Action Plan on Climate Change of North Eastern states are given in Table 8. Policy level intervention is highly essential for integration of REDD+ activities at both planning and implementation stage of the state action plans on climate change. States are in the process of revising their climate change action plans in the context of achieving Nationally Determined Contribution targets, targets of sustainable development goals etc. so REDD+ activities can be integrated as one of the climate change mitigation option under forestry sector in the State Action Plans on Climate Change.

Table 8: State Action Plans on Climate Change of North Eastern states of India

States	Forestry related Objectives of State Action Plans on Climate Change
Arunachal Pradesh	- To Increase more forest cover and eco-restoration of degraded forests - Social forestry programmes through distribution of seedlings and creation of *Apna van* through involvement of people. - Development of non-timber forest produce - Strengthening of forest protection measures including protection against fire - Intensification of scientific management of the forests for sustainable optimum yield - To improve and extend protected area network for conservation, protection and development of biodiversity and wild life and also to involve communities in wildlife conservation in high altitude areas through setting up community conserved area and promotion of eco-tourism

States	Forestry related Objectives of State Action Plans on Climate Change
Assam	• Reducing forest degradation by closure of areas with promising regeneration and root-stock of natural species • Improving density of cover in degraded forest areas • Safeguarding against encroachment in reserve forest areas and protected areas • Building climate resilience of forest based livelihoods • Promoting alternate sources of energy for wood substitution as fuel by energy plantations, solar plants and bio-gas plants • Providing LPG connectivity to forest villagers and to fringe dwellers reducing fuel-wood dependencies • Securing identified wildlife corridors and improving their habitat status by compensating the communities for conservation • Procuring crucial areas surrounding Protected Areas for extended protection to threatened and endangered species • Improving protected area management by control and eradication of invasive species, enrichment planting, micro-ecosystem improvement • Conserving biodiversity in a changing climate scenario • Improving tree cover outside Forest areas • Protection against forest fires specially in hill areas
Manipur	• Research on the non-cash contribution of forests • Sustainable management of forests by implementation of working plans • Protection of state forest resources and creation of State Forest Protection Force • Ensuring long term forest rights and tenure • Enhancing improvement of state forest quality and ecological restoration • Green city in Manipur concept and increasing of tree coverage outside forests • Increasing biomass and creating carbon sink through agro-forestry and social forestry • Biodiversity conservation • Restoration, conservation & protection of sacred groves/ landscapes • Reduction of fuelwood and carbon emission
Meghalaya	• Assessment of biodiversity and preparation of micro plans for conservation • Assessment of afforestation-reforestation for emission reduction and sustainable livelihood Institutional capacity building, implementation and evaluation for forest development and management for climate change • Undertaking studies and investment promotion of non-timber forest products and indigenous forest resources for adaptation of climate change • Undertaking study on valuation of forest resources and monitoring of carbon stock and biodiversity at regular intervals • Study on climate change impact on forest cover and indicative adaptation measures • Site identification and survey demarcation and participatory rural apprisal for community forest land • Adaptive species identification for effective plantation through establishment of tissue culture and permanent nursery • Ecotourism promotion for biodiversity protection and sustainable livelihood through pre-investment feasibility study, Detailed Project Report (DPR) preparation, pilot implementation in two regions • Increase plantation and ecological restoration on non-forest land through different plantation and soil conservation programme • Assess additional threats to biodiversity and wildlife and mitigation of man- animal conflicts due to Jhum cultivation in elephant corridors • Encourage continuance of community forests by way of giving inputs towards sustainable livelihood options

States	Forestry related Objectives of State Action Plans on Climate Change
Mizoram	• Improvement of forest quality and density in degraded lands and abandoned jhum lands • Improvement of the productivity of bamboo and promotion of local value addition through establishment of market linkages • Assessment of climate vulnerability and climate change impacts on state biodiversity and forest resources • Undertaking studies on climate change impacts on non-timber forest products productivity, investment promotion and indigenous harvesting practices for adaptation of climate change • Undertaking study on valuation of forest resources (non-traded) and climate change impacts on the vulnerable ecosystems • Restructuring land use policy for jhum cultivation and habitation on notified forest lands • Policy formulation on transportation subsidy or development of low cost transportation for primary forest products of the state • Capacity building of communities/community forest management institutions for climate change adaptation • Prevention and control mechanism for forest invasive species and its utilization strategies • Promotion of forest based industries • Formulation of conservation strategies for orchids and establishment of market linkages for value addition • Livelihood improvement activities for forest dependent communities
Nagaland	• Convert 25% of total jhum area to secondary forest • Protecting existing forests/ conserving existing carbon pool • Increasing forest area/ expanding carbon sink • Reducing dependence on forests by energy saving devices - improved *chullahs* and LPG connection • Evolving environmental disaster & ecological management strategy • Value addition & marketing of non-timber forest products and medicinal plants by Joint Forest Management Committees
Sikkim	• To increase substantially the forest/tree cover in the state through massive afforestation, social forestry programmes • Spring recharge and enhancing ground water recharge at areas within the forests that are vulnerable to climate change • Enhancing quality of moderately dense forest, open forests and degraded forests • Linking protected areas to secure corridors for species migration to adapt to climate change • Effective disaster risk reduction and management-forest fire prevention and management • To promote sustainable forests for the wild life to thrive within the limits of forests
Tripura	• Enabling adaptation of forest dependent communities to climatic variability • Promotion of urban forestry • Agro-forestry and social forestry promotion in to enhance Carbon Sinks • Rehabilitation of shifting cultivators and the restoration of shifting cultivated areas • Conservation and promotion of scared groves • Valuation of existing forest wealth of state • Improvement of tree canopy covers by enrichment plantations • Promoting rural households to adopt fuel wood efficiency and improved *chulhas*, biogas etc. • Forest fire management • Strengthening local level institutions about forest management climate change adaptation including community forests • Increasing plantation activities on outside forest land • Enhancement of community livelihood through biomass and non-timber forest products

Mizoram has moist tropical to moist sub-tropical climate and receives rainfall from both north-east and south-west monsoons. The total population of Mizoram as per Census of 2011 is 10,97,206 with a population density of 52 persons per sq.km. About 60% of the rural households in Mizoram are engaged in the practice of shifting cultivation. Their main source of livelihood is agricultural and allied activities. Economic Survey of 2019-20 of Government of Mizoram highlighted that 38.94% is the total rice production under jhum areas during 2018-19. The area under jhum cultivation has declined from 19,851 hectare during 2015-16 to 18,957 hectares during 2018-19 which accounts for about 20.74% reduction. Implementation of oil palm development programme, sugarcane cultivation programme, and other State Flagship programme and Centrally Sponsored are the reasons for decrease in jhum cultivation areas (Government of Mizoram, nd).

Forest cover of Mizoram with respect to its total geographical area is high (85.41%) but the contribution of the open forest was also found to be highest (57.15 %) among all the North-eastern states (FSI, 2019). Representation of forest canopy density classes from the year 2013 to 2019 is given in Figure 1.

As per India State of Forest Report 2019, the forest and tree cover of Mizoram is 18,441.51 sq km where open forests having forest canopy density less than 40% constitutes 57.15% of the geographical area and that is 12,047.71 sq km (FSI, 2019). Very dense forest (>70% forest canopy density) contribution is the least with 0.74% of the geographical area covering an area of 157.05 sq km Medium dense forest (40-70% forest canopy density) represented 5,800.75 sq km covering 27.52% of the geographical area. The scrub with an area of 0.90 sq km was also reported. Forest cover in the state had shown a decrease of 180.49 sq km from 2017-2019 period. Figure 2 has shown the forest cover change in terms percentage within forest canopy density classes from 2015-2019.

A study to identify the drivers of deforestation and forest degradation in Mizoram was conducted by Indian Council of Forestry Research and Education under REDD+ Himalaya Project and identified shifting cultivation, fuel wood collection, over exploitation of non-timber forest products as direct drivers of deforestation and forest degradation whereas unemployment, lack of industries, lack of knowledge and awareness, and low connectivity of roads were
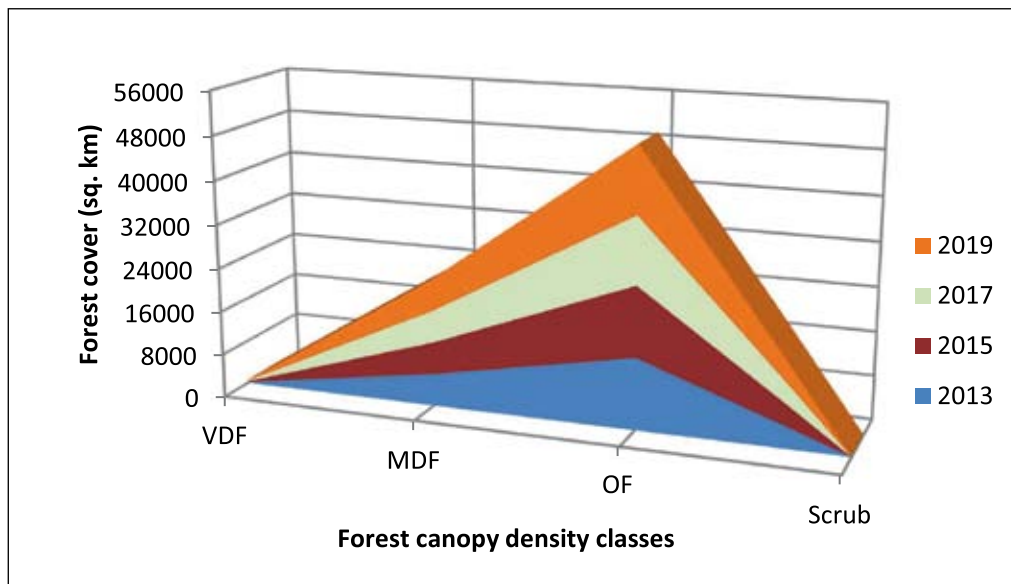
Figure 1. Representation of forest canopy density classes from the years 2013 to 2019

identified as indirect drivers of deforestation and forest degradation in the in the study area. These direct and indirect drivers of deforestation and forest degradation are also responsible for loss of biodiversity in the state of Mizoram (Rawat *et al*., 2017). Suitable strategies have also been identified for addressing the divers of deforestation and forest degradation (Rawat *et al*., 2018 b).

8.1 Mizoram State REDD+ Action Plan: One of the functional elements of land use planning activities

Status of forest cover change in different canopy density classes in Mizoram is given in Figure. 2. It is needed to identify and address the drivers of deforestation and forest degradation and barriers to forest carbon enhancement. The focus for addressing the drivers under REDD+ activities which further advocates and bring the necessity to modify and adapt to land use policy. This is fundamental for the development of effective and efficient policies and measures that aim to alter current trends in forest activities toward a more climate and biodiversity friendly outcomes.
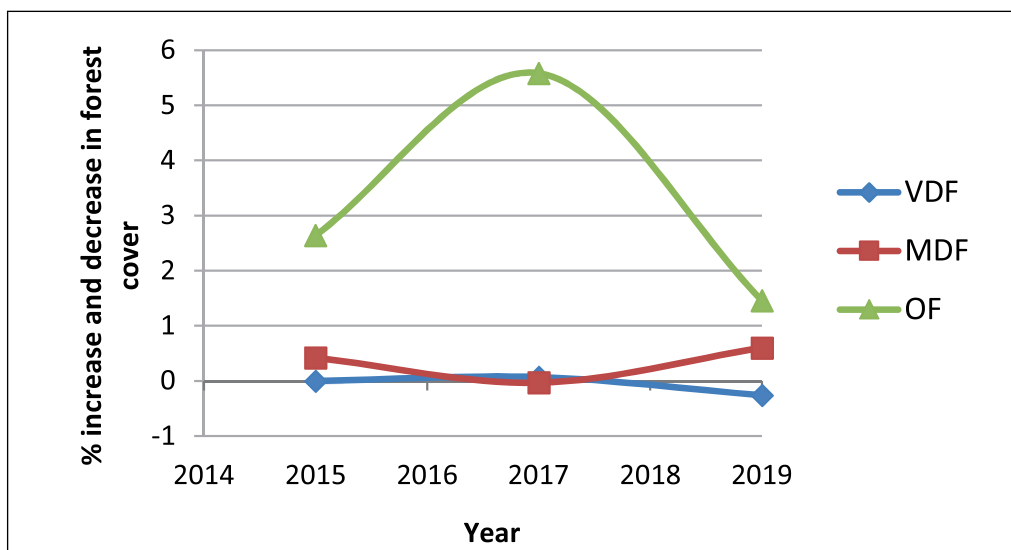

Figure 2. Change in forest cover from 2015-2019 in different forest canopy density classes

According to National REDD+ Strategy, State REDD+ Action Plan (SRAP) should be focussed on land tenure issues, forest governance issues, gender considerations and safeguards in order to ensure full and effective participation of all the relevant stakeholders, *inter alia* indigenous peoples and local communities (MoEFCC, 2018). One of major components of SRAP is to address the drivers of deforestation and forest degradation and ensure effective participation of all stakeholder including local communities in implementation of REDD+ activities. Outputs and activities to be achieved in implementation of the intervention packages identified for addressing the drivers of deforestation and forest degradation, and barriers for enhancement of forest carbon stocks as per Mizoram SRAP (ICFRE, 2018) are given in Table 9.

Table 9. Outputs and activities of identified Intervention Packages for Mizoram (expert consultation in Mizoram SRAP)

Name of Intervention Packages	Outputs	Activities
Sustainable cropping pattern and land management	1. Terracing/contour and permanent farming system adopted 2. Vermi-compost/organic manure produced 3. Agroforestry and enrichment plantation promoted 4. Wet rice cultivation with fish farming expanded	• Site survey, selection and preparation of land. • Capacity building/ training on terracing/contour and permanent farming system • Development of irrigation channels • Construction of vermi-compost/manure collection tank (pit-holes etc.) • Awareness campaigns on agroforestry systems. • Development of nurseries to promote agroforestry and enrichment plantation • Selection of appropriate paddy varieties • Financial and technical support for the establishment of wet rice cultivation cum fish farming
Adoption of horticultural crops	1. High value cash crops promoted 2. Value addition of horticultural crops	• Selection of appropriate cash crop varieties • Capacity building on plantation and management • Plantation of horticulture/cash crops • Financial and technical support • Development of cottage industries and establishment of market linkages
Creating mosaic habitat for biodiversity conservation	1. Jhuming cycle regulated 2. *In-situ* conservation of flora and fauna improved 3. Nature based tourism promoted	• Awareness campaigns on management of jhum cycle • Jhumming in cluster • Identification and selection of sites • Financial and technical assistance • Establishment of eco-parks, nature trails and homestays • Initiation of adventure tourism such as zip-liners, paragliding
Livelihood improvement	1. Skill development programmes and trainings imparted 2. Improved land entitlement to forest dependent local communities (direct dependent users that depend on forest for *bona fide* livelihood needs) 3. Supported cooperatives/self-help groups/micro-finances for livelihood improvement	• Training/capacity building activities for Income Generation Activities • Vocational and value-added trainings for youth including 'Green Skill Development' programme • Poverty reduction programmes through skills development trainings • Issuance of temporary land use passes • Establishment of market linkages • Establishment of storage facilities/common facilities centers for non-timber forest products

Name of Intervention Packages	Outputs	Activities
Forest fire control and management	1. Management mechanism for forest fire mitigation established 2. Boundary demarcation of government notified forest area and community land carried out	• Effective enforcement of forest rules and regulations (targeting checking of illegal felling) • Plantation of fire-resistant tree species • Deployment of modern tools such as drones, global positioning system etc. • Capacity building programmes for front line staff and communities • Advanced research and management of forest fire. • Land zoning and implementation relating to forest sector • Effective coordination between government, line agencies, and local communities
Sustainable energy supply	1. Improved supply of LPG and ICS promoted 2. Firewood supply for local communities better managed 3. Agroforestry and enrichment plantation promoted	• Frequent coordination between supply agencies and transport agencies • Awareness programmes to encourage the local communities to adopt improved cook stoves • Trainings on management and maintenance of improved cook stoves • Enrichment plantation activities in supply reserve areas • Creation of firewood lot and monitoring visits • Awareness programmes on agroforestry and biomass energy • Selection of agroforestry species (firewood species such as *Derris robusta, Anogeissus acuminata, Schima wallichi, Pinus* species*, Quercus* species etc.) • Development of nurseries to promote agroforestry
Market linkages for agriculture produce	1. Financial and technical assistance provided 2. Improved market access to cooperatives 3. Market identified and linkage established	• Awareness and capacity building programmes/ trainings in sustainable agriculture practices • Demonstration plots of suitable agricultural practices • Procurement of tools and machinery suitable to hillside agriculture • Soft loans and financial assistance to farmers • Strengthening cooperation and coordination between cooperatives and farmers • Financial assistance for development of cooperative infrastructures (office, storage facilities etc.) • Value addition for agricultural produce • Developing communication amongst farmers, agriculture experts and, institutes, and markets • Development of mobile apps • Development of toll-free/helpline numbers
Demonstration of private plantation and agroforestry	1. Agroforestry and private plantation including multi-tier agroforestry developed and demonstrated. 2. Commercial horticulture farming demonstrated	• Demonstration plots on appropriate agroforestry models. • Promotion of homestead/kitchen garden • Selection of suitable horticulture crops • Watershed conservation for irrigation facilities • Exposure visits to farmers

8.2 Land Use Policy of Mizoram: Past, Present and Future

The rural economy of the state is 60% dependent upon agriculture. As per National Forest Policy 1988, in the hills and in mountainous regions like Mizoram, the aim should be to maintain two-third of the area under forest cover in order to prevent soil erosion and land degradation and to ensure the stability of the fragile ecosystem. At present, the notified forests (reserved/ protected forests) constitute about 38% of its geographical area and even most of these are open, degraded and subject to pressure of shifting cultivation, encroachments, fire, illicit felling etc. For hundreds of years, Mizo people have practiced shifting cultivation. The ownership of land was declared by the government and enacted laws to establish different categories of ownership namely permanent land settlement certificate, periodic land pass, land lease and revenue pass. Shifting cultivation and forest land are governed by the Lushai Hills District (Jhumming) Regulation Act, 1954 and Mizo District (Forest) Act, 1955, respectively. Under the Village Council Act, 1953, village councils were given wide ranging powers for the management of land. This was first empowerment of local government for land management in Mizoram. In 1984, the idea of New Land Use Policy was developed. Since then it was implemented in a small scale between the periods of 1985-1992 and was implemented on a larger scale during 1993-1998.

Further, Government of Mizoram brought the New Land Use Policy on 14th January, 2011 for addressing the issues of providing stable economy for the state along with the environment protection, land reforms and reclamation. Following are the primary aims and objectives of New Land Use Policy (NLUP):

1. Provide sustainable income to farming families who comprise nearly three-fourths of the total population of Mizoram by weaning them away from the destructive and unprofitable shifting cultivation practice.

2. Provide urban poor with livelihoods by encouraging small scale industries and petty trades.

3. Converging schemes funded by the Government of India (Centrally Sponsored Schemes) to NLUP for better utilization of funds and avoidance of duplication of works.

4. Land reclamation and forestation by introducing permanent farming systems and land reforms.

5. Environment protection and restoration through various means such as expansion of catchment areas for recharging rivers, springs and underground water, encouraging rearing of domestic animals and poultry for increased meat production to discourage hunting to protect the fauna etc.

Synergies between outputs of intervention packages of Mizoram State REDD+ Action Plan and activities under NLUP of Mizoram are given in Table 10.

Table 10. Synergies between SRAP outputs and NLUP's activities in Mizoram

S. No.	Intervention Package	Outputs	Dense Forest	Catchment Areas Forest	Community Supply Reserve Forest	Habita-tions, roads, etc area	Land-based NLUP activities	Implementing agencies
1	Sustainable land management and cropping pattern	Terracing /contour and permanent farming system adopted		✓			✓	AD, LRSWC, LRSD & DWR
		Vermi-compost/Organic Manure Generated		✓			✓	AD, HD & AMFU
		Agroforestry and enrichment of plantation promoted		✓	✓	✓		FD, LRSWC & AD
		Wet Rice cultivation (WRC) with fish farming promoted					✓	FD, AD, DoI & LRSWC
2	Adoption of horticulture crops	Horticulture/Cash crops planted and promoted		✓			✓	HD & LRSWC
		Value addition for Horticulture crops promoted				✓		TCI & HD

S. No.	Intervention Package	Outputs	Dense Forest	Catchment Areas Forest	Community Supply Reserve Forest	Habita-tions, roads, etc area	Land-based NLUP activities	Implementing agencies
3	Creating habitat mosaic for biodiversity conservation	Jhumming cycle regulated					X	LAD, AD & AMFU
		In-situ conservation of flora and fauna promoted		X	X	X	X	FD
		Nature-based tourism developed and promoted	X			X		TD, FED, NGOs, CBOs & Private sectors
4	Livelihood Improvement	Skill development trainings and programmes conducted					X	FD, AD, HD, ID & TD
		Land titles issued to forest dependent local communities		X	X			LR & LAD
		Improved cooperatives/ self-help groups/micro-finances				X		AD, HD, AMFU, TC
		Integrated Farming system		X	X			AD, HD, VD & FD
5	Forest fire control and management	Mechanism for forest fire mitigation and management established	X	X	X		X	FD, LAD, AD & GAD
		Boundary demarcation of government notified forest areas and community land conducted	X	X	X	X	X	FD & LRD
6	Sustainable energy supply	Supply of LPG improved and Improved Cook Stoves (ICS) promoted				X		FCS & ZEDA
		Firewood supply for the local community managed		X			X	VC & FD
		Agroforestry promoted			X			FD, HD, AD & LRSWC
7	Market linkages for agriculture produce	Financial and technical assistance for sustainable agriculture provided				X		AD, TCD, HD & AMFU
		Agriculture produce promoted through cooperatives					X	CD, AD, HD & AMFU
		Mechanisms for market identification and linkages developed					X	CD, AD, HD & AMFU

S. No.	Intervention Package	Outputs	Dense Forest	Catchment Areas Forest	Community Supply Reserve Forest	Habita-tions, roads, etc area	Land-based NLUP activities	Implementing agencies
8	Demonstrations of private plantation and agroforestry	Agroforestry & Private plantation including multi-tier agroforestry developed and demonstrated			███	███	███	AD, FD, HD, LRSWC, AMFU & VD
		Commercial horticulture farming demonstrated					███	HD, AD & LRSWC

Note: AD-Agriculture Department; AMFU-All Mizoram Farmer Union; CBOs-Community Based Organization; CD-Cooperative Department; DoI-Department of Irrigation; DWR-Department of Water resources; FCS-Food and Civil Supply Department; FD-Fishery Department; FED-Forest and Environment Department; GAD-General Administrative Department; HD-Horticulture Department; ID-Industry Department; LAD- Local Administrative Department; LRD-Land Revenue Department; LRSD- Land Revenue and Settlement Department; LRSWC-Land Resources, Soil and Watershed Conservation; NGOs-Nongovernmental organization; SWCD-Soil & Water Conservation Department; TCI-Trade, Commerce and Industry; VD-Veterinary Department ; ZEDA-Zoram Energy Development Agency

Current policy named Socio-Economic Development Policy (SEDP) was released by the Government of Mizoram in May 2019 which envisages promoting and yielding sustainable development having both short term and long term visions. The SEDP and its programme lay down the objectives of the Government and strategies to achieve its visions for bringing development in Mizoram. The strategy encompasses, among others, protection and conservation of the land, exploration as well as proper and judicious use of the resources, transparent administration and self sufficiency in food. This policy is broadly divided into two components mentioned below:

1. Political & Administrative Policy, which has two sub-components viz. Political Policy and Administrative Policy

2. Socio-Economic Development Policy, which has two sub-components viz. Economic Development Policy and Social Development Policy

The important goals of the SEDP are eradication of poverty, upliftment of economically deprived people and to provide employment opportunity for them, bringing down infant mortality rate and maternal mortality rate. Further, creation of basic infrastructures is an important objective as it is the basics of development. SEDP will also be converged with central schemes wherever possible. Beneficiary based schemes under SEDP will be guided with proper training and capacity development.

The common vision of all the policies was to attain the development of Mizoram. The ultimate goal is to help communities and gain awareness of the legal, environmental, social and economic issues surrounding their land use, skills and capacities for sustainable planning and development by recognizing their traditional knowledge and rights. With the challenges faced by the communities in the form of drivers of deforestation and forest degradation of Mizoram and further by unpredictable impacts resulted from climate change.

REDD+ targets both local and national actions and brings an expected outcome in global emission reduction and simultaneously benefitting local communities. REDD+ has an ability to connect the disjointed spatial and social units and has gained ground in scientific and policy spheres. Under SEDP, programmes which define spatial scope of REDD+ integration with its activities in various ways are enlisted in Table 11.

Table 11. Scope of REDD+ integration with the programmes of Socio-Economic Development Policy of Mizoram

S. No.	Programmes mentioned under SEDP Policy	Description
1.	Self-sufficiency in agriculture-horticulture and allied sectors	Efforts have been made to converge the schemes/ projects for its successful implementation of projects and benefit to farmers
	a) Self-sufficiency in rice/ agricultural production	Center point will be on utilization of lands to its full potential by mechanization and increase production of rice. Focus will be on production of rice on a larger scale. Establishment of a rice mill including dehusking and polishing machinery is also suggested.

S. No.	Programmes mentioned under SEDP Policy	Description
b)	Improving shifting cultivation practice	Farmers will be encouraged to practice farming using improved farming technology such as hill slope terracing, contour trenching, green terracing etc.
c)	Improvement of agriculture linked road and irrigation system	Planning to create improved agricultural link roads for easy transportation of farm products. Creation of better irrigation facilities and rainwater harvesting structures for farmers on sharing basis.
d)	Fruit and food processing	Creation of Food Processing Department/ Food Processing Wing under Horticulture or Industry department have been suggested to preserve food products. Establishment of cold storage and food processing units for betel nut, oranges, oil palm, pineapples, ginger, tea, coffee etc is needed.
e)	The initiative of contract farming	Introduction and upgradation of the contract farming system like red oil palm plantation.
f)	Marketing and price support	Support is extended by the government in marketing and selling of fresh farm products and price support by government. Moreover, there will be establishment of regulated market and terminal market schemes.
g)	Processing and marketing of ginger	Other than price support, establishment of market chain analysis for a better market to sell ginger.
2.	Bamboo cultivation and processing	Government has shown commitment to improve bamboo based activities like usage of tissue culture techniques for mass production, training on bamboo processing technology, employing youths during bamboo cultivation. Price support and transport subsidy, strengthening of bamboo development agency and establishment of Bamboo Development Corporation etc have shown importance by Government.
3.	Rubber Plantation	Encouragement of large scale rubber plantation program in the state is stated in the policy and facilitation by providing road linkages with transport systems with reliable financial systems.
4.	Cultivation and processing of broom grass	Policy encourages large production of broom, promotional activities like construction of godowns for storage, procurements of tools to farmers etc. Reduction of royalty on broomgrass for farmers to make this business profitable.
5.	Promotion of sericulture	Stress is given in strengthening the department for sericulture with better schemes for financial supports, procuring tools to farmers, advanced monitoring systems, better technology systems etc. Necessary tools and machineries to the farmers shall also be provided for production of silk.
6.	Animal husbandry and fishery department	Policy aims to promote animal husbandry such as cow and mithun rearing, piggery, poultry farming, goat rearing, etc. along with the biogas will be made. Preservation and storage of in fisheries will also be promoted.
7.	Industrial Development	It is important for generating employment for youth by growing industries. Following are the shortlisted initiatives
a)	Agro based Industries	Preservation and processing of the local vegetable products using latest technologies and technical know-how for sustainable market initiatives will be taken
b)	Forest Based Industries	Huge resources for industry use are a wide variety of Bamboos, Rubber, Canes, Broom grass, and Herbs (medicinal and non- medicinal).This policy focuses on the promotion of forest based industries This includes higher technique like wood seasoning and processing, bamboo treatment plant under the supervision. Development of Forest Research laboratory and botanical labs is also encouraged
c)	Tourism Industry	Ecotourism is the main focus with the aim of promoting job opportunities and preserving cultural/historical sites.
d)	ICT Industry	Improvement of Information and Communication Technology like Internet connections, e-learning techniques accessible to public, e-governance to public services, etc. by introducing new measures like privatization schemes, entrepreneurships, and new promotion schemes.

S. No.	Programmes mentioned under SEDP Policy	Description
8.	Environment Conservation	Emphasis has been given to make carbon neutral state which requires measures like conservation of forests, wildlife, etc. Moreover, steps like soil erosion prevention, river course conservation, air and water pollution prevention, riverine forest reservation, etc. will also be prioritized.
9.	Employment and Welfare	Following initiatives taken under employment and welfare
	a) Insurance scheme for farmers	Introduction of new insurance schemes such as crop insurance, micro insurance schemes against the natural calamities, crop damage, dead of domestic animal, etc. to farmers and manual labourers along with National Family Benefit Scheme and Workers Welfare Scheme
	b) Provide basic needs to people	Adequate supply of basic needs like electricity, water supply, cooking gas, petrol & diesel, food items, etc. to the public. Special attention for better supply of LPG distribution system

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CONCLUSION

Forests of North Eastern states of India are facing constant pressures resulting in forest degradation and deforestation. Deforestation, shifting cultivation, forest land encroachment, grazing, human wildlife conflict, forest fires, illegal extraction of forest products, increasing commercial plantations, uncoordinated infrastructure development, mining and construction of mega dams are considered as some of the threats to biodiversity in North Eastern states (Murthy *et al*., 2013). It is needed to establish State REDD+ Cell in all North Eastern States as per the National REDD+ Strategy 2018 for implementation of REDD+ Activities. Integration of REDD+ activities in the land use planning activities of North Eastern states are need to be done for effective implementation of REDD+ activities in a comprehensive manner as a nature based solution for climate change mitigation and adaptation as well as providing the livelihood opportunity to the local communities.

Improved land use policy coherence with REDD+ activities is an evident approach for enabling environment for REDD+ implementation in Mizoram. State REDD+ Action Plan is an important connecting link which has a potential to synchronize well with the current land use policy specifically focusing on

the identified drivers of deforestation and forest degradation. The Socio-economic Development Policy design process allows integration of the existing state programmes with REDD+ actions.

Establishment and strengthening of State REDD+ Cell in Mizoram State Department of Environment, Forest and Climate Change is an important approach which can coordinate and extend their support to synthesis approach for integration of REDD+ activities with the land use planning activities in the state of Mizoram. To diverge from shifting cultivation, implementation of suitable land management is required to enhance the food security and increase income of the community people. This brings a necessity to improve local communities' knowledge of their land's economic, ecological and socio-cultural values, and their ability to balance and make use of those values. Capacity building through regular skill development trainings for various nursery establishments, fire protection, non-timber forest products management, integrated farm management, agroforestry, biodiversity and ecotourism management activities etc. There is also need of scientific research on forest food products to ensure the sustainability, balance in tree plantation

for commercial and ecological services which will enhance the livelihood, food security and also maintain ecological function of the area. Support to the market infrastructures for forest product is also needed which might lead to conserve and enhance the forest services.

Global climate change threatens to impact the livelihoods of the people especially forest dwelling communities. Mitigation of climate change through implementation of REDD+ activities is a good opportunity for providing livelihood to the communities.

REDD+ behave as a financial instrument and incentivize for conservation and sustainable management of forest by reducing greenhouse gas emissions from deforestation and forest degradation.

To design REDD+ related actions, all the land use policies and programmes should aim at enhancing carbon sink, conserving the natural ecosystem & biodiversity of the country and addressing drivers of deforestation and forest degradation.

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**Stakeholder Consultation Meeting for Integration of REDD+ in the
Land Use Planning Activities in the state of Mizoram**

Minutes of Meeting

Date 17 December, 2019; Venue Forest Research Centre for Bamboo and Rattan, Aizawal

Stakeholder consultation meeting for 'Integration of REDD+ in the Land Use Planning Activities in the state of Mizoram' was held on two sessions viz. i) Inaugural session and ii) Technical session. During formal programme, inauguration was done, followed by the launch of State REDD+ Action Plan (SRAP) of Mizoram state.

The chief guest of the programme was Mr. TjLalnunlunga, Honourable Minister of Ministry of Environment, Forest and Climate Change, Government of Mizoram. The programme started with welcome remarks from Dr. Bhaskar Singh Karky, Programme Coordinator of ICIMOD's REDD+ initiative. In his welcome remarks, he described the objectives of the programme and highlighted the importance of integration of SRAP in land use planning, operationalization and materialization of REDD+ finance to implement. Mizoram has the highest percentage of forest cover in India; however, the rate of deforestation and forest degradation are also higher compare to other state which can be attributed to complex human-environmental interaction. Therefore, this SRAP is a policy instrument to reduce deforestation and forest degradation and promote sustainable management and conservation of forest. Moving ahead, he explained that this plan is intended to implement the National REDD+ Strategy of India and contribute to Nationally Determined Contribution (NDC).

Dr. R. S. Rawat, Scientist from ICFRE has also given the welcome remarks through video conference. During his speech, he underlined the impact of climate change in India and also highlighted the mitigation actions that are being implemented by the Government of India. He also pointed that sustainable land management is only the way to address the likely impact of climate change, therefore, this programme intended to integrate the REDD+ intervention on land use planning of Mizoram state. He also acknowledged ICIMOD/GIZ's REDD+ Himalaya project for fostering the REDD+ preparedness in India. Finally, he expressed thanks to responsible line agencies of Government of Mizoram, academia and others participated stakeholders including the technical team of ICFRE and ICIMOD for preparing Mizoram's SRAP.

Mr. Liandawala, Principal Chief Conservator of Forests (Wildlife), Mizoram delivered his remarks. Stretch back to 30 years, the forest conservation efforts were mostly focused on planting tree and harvesting, subjected to more revenue generation processes. Now conserving and managing forest is being mainstreaming as climate mitigation action, bringing everyone as a stakeholder of forest, starting from the grassroot level (villagers) to different line agencies of state and federal Government and even beyond the country boundary. He also acknowledged REDD+ mechanisms for contributing to bring together all stakeholders of forest including those beyond the forestry sectors.

Mr. Liandawala: REDD+ is bringing every one as a forest stakeholder

The keynote was delivered by Dr. K. Kire, Additional PCCF, Mizoram. In his note, he described the State REDD+ action Plan process and acknowledged on active participation of all stakeholders including experts from ICIMOD and ICFRE. Emphasizing the current deforestation and forest degradation rate of Mizoram, lost 571 sq km during 2015-2017, SRAP has timely came which may adverse the situation. Though recommended intervention activities in SRAP are similar to the regular activities of liner agencies of government of Mizoram, provision of getting result based payment that should be measured, reported and verified (MRV) will increase the transparency, accountability and creditability of proposed programmes. He also requested ICFRE and ICIMOD including GIZ to support the government of Mizoram for implementation of SRAP.

Dr. K. Kire: Forest are crucial for food security and livelihood of Mizo population

Launch of Mizoram State REDD+ Action Plan

Mr. TjLalnunlunga, honorable minister of Ministry of Environment, Forest and Climate Change, Government of Mizoram together with Mr. Liandawala PCCF Wildlife, Mr. Valbuanga, Director of Land Resources, Soil and Water Conservation, Dr. Bhaskar Singh Karky and Dr. H. R. Bora, Head, FRCBR, Aizawl, Mizoram jointly launched the State REDD+ Action Plan (SRAP), Mizoram.

SRAP launching

Honorable Minister, Mr. TjLalnunlunga, delivered key notes and he highlighted the importance of state REDD+ action plan for Mizoram government as it has opened avenue for getting the carbon and non-carbon benefit under Climate finance mechanism. He also acknowledged the collaborative and consultative efforts of ICFRE in collaboration with ICIMOD's REDD+ Initiative, Department of Environment, Forest and Climate Change and other departments of Mizoram Government to prepare SRAP. He underlined that the proposed actions are well arranged and synchronized with state governmental priorities. Therefore, there is need of mainstreaming the contribution of REDD+ activities to achieve overall goal of prosperity of Mizoram Government. Finally, he suggested to integrate SRAP in land use policies and seeks fund for the implementations. The inaugural session was ended with vote of thanks by Mr. Sandeep Yadav, scientist, FRCBR.

The technical session was started with key note address by Mr. Valbuanga, Director, Land Resources, Soil and Water Conservation, Government of Mizoram. Proper integration of SRAP with prioritize activities of line department of Government of Mizoram is perquisite for proper implementation. Nonetheless, the important part is how efforts will convergence development and conservation in a time. He also pointed that the people of Mizoram are living within forest, getting food, shelter and other essential materials. Therefore, this programme is timely organized to aiming to integrate SRAP and NLUP from the planning stage with better understanding. He recommended to implement the cluster development modality with specific temporal and spatial scale for prosperous Mizoram state.

Moving ahead, Dr. Karky highlighted the ICIMOD's contribution on ecosystem management in Hindu Kush Himalayan region. Additionally, he shared the initial concept note on proposal that is being prepared by ICIMOD's REDD+ Initiative to submit for IKI proposal call and requested to participants to contribute on concept note on "Forestry for Prosperity: Ecosystem Restoration in the Himalayas".

Dr. Karky: Grow more- Use more

Overview of REDD+ and REDD+ Himalaya Project implementation in India was presented by Mr. Nabin Bhattarai, ICIMOD. Emphasizing the key components of the project, Mr. Bhattarai, mentioned that it has contributed to enhance capacity of stakeholders at different levels through appropriate means of training, research and communication. Also, he underlined implementation mechanism of the SRAP with potential funding sources of inside and outside the country.

The programme was continued by plenary discussion focusing on synchronization between New Land Use Policy (NLUP) and each intervention packages and their output indicators proposed in SRAP.

Plenary discussion: How and where SRAP' s interventions fit on NLUP

Dr. H.R. Bora, Head FRCBR, Aizawl, Mizoram in his concluding remarks recognized the contribution of the participants for enabling to integrate SRAP in NLUP working priorities.

Way forward and recommendations

At the workshop, the participants from the different Line-Department of Government of Mizoram provided their ideas and feedbacks for integration of SRAP and NLUP. At the same time, they requested ICFRE, ICIMOD and GIZ for continuous support for implementation SRAP as well. Also, ICIMOD has been asked to coordinate the recommendations where feasible in collaboration with appropriate partners in Mizoram. Following are the key recommendations made by the workshop:

- Scientific research on forest food products should be conducted to ensure the sustainability

- Balance in tree plantation for commercial and ecological services not only will enhance the livelihood and food security but also maintain ecological function of the area

- SRAP and NLUP are synchronize well to contribute in gradual diverging from shifting cultivation in Mizoram

- Implementation of suitable land management to enhance the food security and increase income of the community people

- Afforestation/Re-forestation & rejuvenate the biodiversity to sustain the cultural ecology of the state

- Supporting the market infrastructures for forest product may lead to conserve and enhance the forest services

- Establishment of regional co-operation in the form of learning-sharing mechanism will create the opportunities to replicate the good practices from the other part of Hindu Kush Himalayan region. For this ICIMOD shall form south-south learning platform.