

MICRO PLAN

**For**

KAWLKULH FOREST RANGE  
{L2 Landscape}

**For implementation of**  
GREEN INDIA MISSION

**For the period**  
**2016 – 2017 to 2022 – 2023**

LANDSCAPE (L1)	-	MIZORAM.
SUB-LANDSCAPE (L2)	-	Kawlkulh Range.
WORKING UNITS (L3)	-	(1) Kawlkulh Ram. (2) Hliappui Ram. (3) Pawlrang Ram. (4) Changzawl Ram. (5) Saichal Ram. (6) Dul te Ram. (7) Pui lo Ram. (8) Chhawrtui Ram. (9) Vanchengpui Ram.

**Prepared and submitted by**

Micro – Plan Working Group  
Pui lo : Kawlkulh Range  
Champhai Forest Division

## Executive Summary

- (a) Chapter - 1 : Introduction, Scope and Objectives**
- (b) Chapter - 2 : Details of Identified Landscapes**
- (c) Chapter - 3 : Process undertaken for preparation of Micro-Plan/Sub-Landscape Plan**
- (d) Chapter - 4 : Activities proposed to be undertaken in the Sub-landscape (L2)**
- (e) Chapter - 5 : Activities proposed under convergence**
- (f) Chapter - 6 : Institutional Set-up for implementation in the landscape**
- (g) Chapter - 7 : Livelihood Issues**
- (h) Chapter - 8 : Baseline Survey**
- (i) Chapter - 9 : Status of reforms proposed**
- (j) Chapter – 10 : Mission Cost**

## Annexure

- Year Wise cost of the mission for various work items(work programme) - Annexure - A**
- Annual Plan of Operation (2017-2018) - Annexure - B**
- Approval from concerned Village Council - Annexure - C**
- Constitution of Village Level GIM Committee - Annexure - D**
- Map of L1 Landscape - Annexure - E**
- Drainage Map of L3 - Annexure - F**
- Landuse Map of L3 - Annexure - G**
- Proposed Landuse Map of L3 - Annexure - H**
- Contour Map of L3 - Annexure - I**
- Geographical Map of L3 - Annexure - J**
- Vegetation Map of L3 - Annexure - K**
- Estimation of Total Carbon Stock - Annexure – L**
- Calculation of Shannon Diversity Index - Annexure - M**

# Chapter 1

## Introduction, Scope and Objectives

### 1.1 About the State (Landscape - L1)

#### 1.1.1 Introduction

Mizoram was earlier a part of the British India since 1895. In 1898, the district called “Lushai Hills” was created with Aizawl as its headquarter. After independence in 1947, the district was renamed as “Mizo District” and also the autonomous Mizo District Council was established on 25<sup>th</sup> April, 1952. Subsequently, Mizoram was made a Union Territory in 1972 and finally, it became the 23<sup>rd</sup> State of India on 20<sup>th</sup> February, 1987.

#### 1.1.2 Location, Extent and Topography

Mizoram, which is one of the Seven Sister States in the North-Eastern India, is located between 21°56` and 24°35` N Latitude and 92°16` and 93°26`E Longitude. It shares the boundary with Assam and Manipur on the North, Myanmar on the East and the South, and Tripura and Bangladesh on the West. The long international boundary (about 630 miles) of Mizoram with Myanmar and Bangladesh makes it strategically located.

The geographical area of the State is 21,087 sq. km. with mostly hilly terrains. Most of the hills have moderate to steep slopes and are separated by rivers flowing either to the North or South direction. These rivers have created deep gorges between several hill ranges. In fact, Mizoram is “a land of rolling hills, valleys, rivers, and lakes” (Environment & Forest Department, 2010, p.5). The plains occupy comparatively a very small portion of the total geographical area and are mostly located at places such as Champhai, North Vanlaiphai etc. on the eastern part of the State.

#### 1.1.3 Climate

The whole of Mizoram enjoys a pleasant climate with cool summer and moderate winter. The temperature varies from 11°C to 21°C during winter and 18°C to 29°C in summer. The State gets rainfall from both the North-East and the South-West Monsoon. It receives heavy rains from May to September. The average annual rainfall is about 254 cm. As such, the climate in Mizoram is conducive to conservation and sustainable development of forests.

#### 1.1.4 Soil

The soil in Mizoram, in general, is fertile and rich in organic contents. However, the soil depth is found less at few places, particularly at very steep slopes, due to the effect of heavy run-off in degraded forests. The contents of potash and phosphorus in the soil are low, whereas the content of nitrogen is normally high because of the accumulation of organic matters over the years. The fertile soil is generally found at low to moderate slopes, on river banks and in the valleys. The soil at such places is responsive to the vigorous and healthy growth of the forests and thus supports rich biodiversity.

#### 1.1.5 Demography

The population of the State was 10,91,014 as per 2011 census, of which 5,52,339 (51 percent) are male and 5,38,765 (49 percent) are female. The population density has increased from 33 to 52 persons per sq. km. during the decade, 1999 - 2011. Most of the people in the State belong to several culturally-linked ethnic tribes which are collectively called “Mizos” (Mi: People, Zo: Hill). These people are highly educated. Mizoram has a literacy rate of 91.58 %, which ranks it second among States in India. “Mizo” and “English” are the main languages spoken by the majority of the people.

## 1.1.6 Socio-economic life of the people

Since signing the “Peace Accord” on 30<sup>th</sup> June, 1986, the State has effectively implemented several developmental schemes. Peace and development have resulted into comparatively better Human Development Index (HDI). The HDI in Mizoram was found 0.67, the highest among the north-eastern States and more than the national average (Government of Tripura, 2007, p.28).

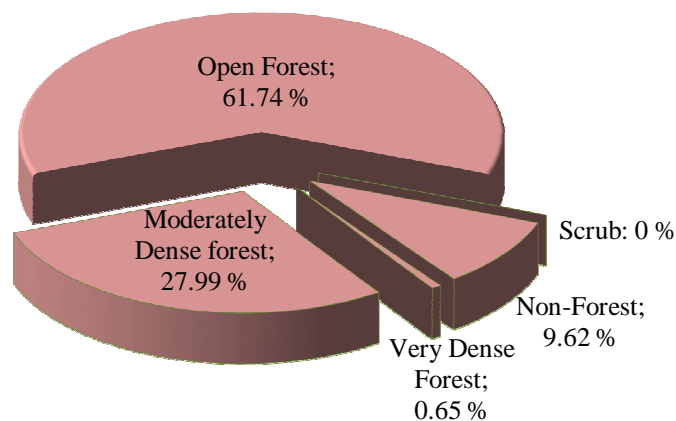
Agriculture is the dominant source of income and employment for the people in Mizoram. As per 2001 census, 61 percent of the working population in the State was dependent on agriculture. In rural areas, most of the people are engaged in “Jhumming” (shifting cultivation). 89,454 households, 57.85 percent of total 1,54,643 households, were cultivators and further, 78,195 households, 87 percent of all cultivator households, were practicing shifting cultivation (Government of Mizoram, 2004, p.17). The “Jhumming” practice has adversely affected the rich forest cover of the State. Planned efforts are now being made to control and transform the practice of shifting cultivation into settled agriculture. Technical and financial assistance is being given to the rural people enabling them to leave the practice of shifting cultivation and get engaged in other sustainable livelihood activities such as horticulture, piggery, settled cultivation etc.

## 1.2 The forests in Mizoram

### 1.2.1 Forest cover

A large area - 19,277 sq. kms. (91.44 percent of the State’s total geographical area) - is covered under forests i.e. Forest and Tree cover (Forest Survey of India, 2013). However, the forests have suffered serious depletion and degradation due to the traditional practice of shifting cultivation, uncontrolled fire, unregulated felling etc. As per the “India State of Forest Report 2013” published by the Forest Survey of India, the State has 13,016 sq. kms. open forests which is 67.70 % of the total forest cover and 61.74 % of the total geographical area. The density-class of forests found in the State has been shown below graphically in Figure 1.

Figure - 1



Source: Forest Survey of India, 2013

### 1.2.2 Forest types

The forests in Mizoram are very rich in biodiversity. As many as 6 important forest types have been reported to occur in the state (Forest Survey of India, 2011). These are:-

- **Cachar Tropical Semi-Evergreen Forest (2B/C2):** Mostly found in all districts of the State. The important species are *Dipterocarpusturbinatus*, *D. tuberculatus*, *Terminaliachebula*, *Emblicaspp*, *Careyaarborea* etc.
- **Secondary Moist Bamboo Brakes (2/2S1):** Dominant species of bamboo like *Melocannabambusoides*, *Dendrocalamushamiltonii* etc. are present.

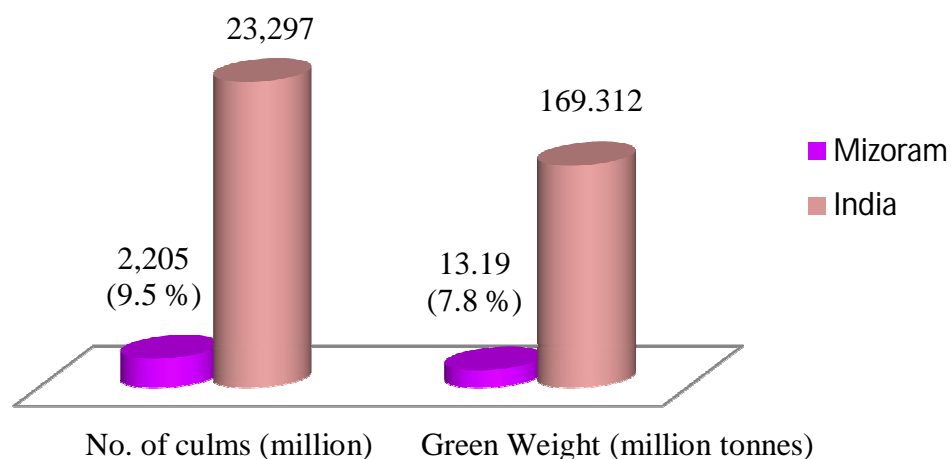
- **Pioneer Euphorbiaceous Scrub (2B/2S1):** It is generally found in degraded forests and exposed lands present on higher slopes and on top of the hills. It has quick growing species like *Macaranga* spp., *Mallotus* spp. etc. This type is found in all districts except Champhai.
- **East Himalayan Moist Mixed Deciduous Forest (3C/C3b) :** *Schimawallichii*, *Syzigiumcumini*, *Albizziaprocera*, *Dilleniapentagyna*, *Artocarpuslakoocha*, *Terminaliaballerica*, *T. chebula*, *Lagerstroemia parviflora*, *Anthocephalouskadamba* etc. are the characteristic species of this type. It is found in all districts of Mizoram.
- **East Himalayan Subtropical Wet Hill Forest (8B/C1):** Major characteristic species are *Quercusvercus*, *Q. serrata*, *Castanopsisspp*, *Litsea spp.* *Machilus spp* etc. This forest type is found in Champhai district.
- **Assam Subtropical Pine Forest (9/C2):** It is mostly dominated by the species *Pinus kesiya* with other associates like *Quercusspp*, *Schimawallichii*, *Rhododendronspp* etc. This forest type is found mainly in Champhai district of the State.

### 1.2.3 Bamboo Resources

Nature has endowed Mizoram with valuable Bamboo Forests. Bamboos - Green Gold for the State - are one of the most important natural resources which provide immense economic and environmental benefits for the local people. Bamboos are used for multiple purposes as the culms are straight and strong but light. These are used extensively in house construction particularly in the rural areas, as food, and for making various household items such as stools, benches, kitchen utensils, agricultural implements, and fishing devices. Further, bamboo acts as an effective soil binder protecting the slopes from erosion through its deep and extensive root system.

Bamboos are found abundantly in the State mainly along river banks and on abandoned jhumland. Both the clump forming and the non-clump forming species occur naturally in most parts of the State except on the higher altitudes of its eastern region. A large area of about 9,245 sq. kms., which is 44 percent of the State's geographical area, is covered under "Bamboo Forests" (Forest Survey of India, 2011, p.61). In spite of being small in size, Mizoram contributes significantly to the country's growing stock of bamboos.

Bamboo resources of the country have been assessed by the Forest Survey of India (FSI), Dehradun. As per the India State of Forest Report 2011 (Chapter 6) published by the FSI, total number of culms in recorded forests of Mizoram has been estimated to be 2,205 million as against 23,297 million estimated at the national level. Similarly, the total estimated green weight of bamboo culms has been estimated to be 13,187,000 tonnes for the recorded forests of Mizoram as against 1,69,312,000 tonnes for the whole country. The growing stock of bamboos in recorded forests of Mizoram as against the same for the whole country has been shown below graphically.



Area under “pure bamboo brakes” in Mizoram was found the highest among all the States/Union Territories of the country (226 sq.kms.). The dense bamboo forests also cover a large area in the State of Mizoram. The dense bamboo across all the States was found maximum in Arunachal Pradesh (8,681 sq. kms.) followed by Mizoram (6,116 sq.kms.).

The bamboo forests in Mizoram are also rich in bio-diversity. 35 species of bamboos under 9 genera have been reported to grow in the State (E & F Department, 2010). *Melocanna baccifera* (locally called “Mautak”), a non-clump forming species, is the prominent species found in the State. Other dominant species are *Dendrocalamus hamiltonii* (Phulrua), *D. longispathus* (Rawnal), *Bambusa tulda* (Rawthing), *B. longispiculata* (Rawthing chi), and *Arundinaria callosa* (Phar). These species do not occur in large proportions like Mautak but are commercially valuable.

#### **1.2.4 Areas under Notified Forests in the State**

The notified forests include (1) Riverine Reserve Forests (1832.50 sq.kms), (2) Innerline Reserved Forests (570 sq. kms.), (3) Roadside Reserve Forests (97.20 sq.kms.), (4) Other Reserve Forests (1963.63 sq. kms.) and (5) Protected Areas (1240.75 sq.kms) under the ownership of the State Government as well as 2562 sq. kms. under the ownership of District Councils. Thus, about 39 percent of the total geographical area (8266.08 sq.kms.) is covered under “notified forests” in the State of Mizoram.

#### **1.2.5 Protected Areas**

The Environment and Forest Department, Govt. of Mizoram has taken praiseworthy initiatives for preservation of wildlife by constituting one Tiger Reserve, two National Parks and seven Wildlife Sanctuaries. These are (1) Dampa Tiger Reserve, (2) Murlen National Park, (3) Phawngpui National Park, (4) Ngengpui Wildlife Sanctuary, (5) Lengteng Wildlife Sanctuary, (6) Khawnglung Wildlife Sanctuary, (7) Tawi Wildlife Sanctuary, (8) Thorangtlang Wildlife Sanctuary, (9) Pualreng Wildlife Sanctuary, and (10) Tokalo Wildlife Sanctuary. The area set aside for long-term wildlife conservation is 1728.75 sq. km. which is more than 8 % of the State’s geographical area.

The network of protected areas provides healthy habitats for many wild animals, birds, and reptiles. Some important species of mammals found in the State are Tiger, Elephant, Malayan Sun Bear, Wild dog, Brush Tailed Porcupine, Gour, Leopard Cat, Marbled Cat, Golden Cat, Clouded Leopard, Serow etc. The forests of Mizoram also provide habitats for primates such as Assamese Macaque, phyare Leaf Monkey, Slow Loris, Pig Tailed Macaque, Stump Tailed Macaque, Rhasus Macaque, and Capped Langur and also for Hoolock Gibbon, the only ape found in India.

Important bird species found in the State are Black Stork, Oriental Darter, Serpent Eagle, Black Eagle, Humes Bartailed Pheasant, Blyth’s Tragopan, Green Burmese Peafowl, Grey Peacock, Fufous Partridge, Brushed Partridge, Yellow-legged Button quill etc. The Hornbill species include Great Indian Hornbill, Wreathed Hornbill, Oriental Pied Hornbill, Brown Hornbill, and Rufous-necked Hornbill.

### **1.3 Bio-geographical importance**

The forests in Mizoram are ecologically significant as the region represents an important part of the Indo Myanmar bio-diversity hotspot which is one of the 25 global biodiversity hotspots recognized across the globe. Several hot-spots in the State carrying diverse flora and fauna have been identified for protection. Further, the region is part of biologically distinctive eco-system (Mizoram-Manipur-Kachin Rainforests Eco-region). As such, conservation of the forests in the State is a necessity for arresting the progress of climate change and mitigating the impact of changing climate on the people.

## **1.4 Expectations of people from the forests**

### **1.4.1 People's Participation in Conservation of the Forests**

The State of Mizoram moved from State regulation to people's participation for managing its rich forest wealth by adopting the "Joint Forest Management" (JFM) through a notification issued in 1998. The introduction of JFM established a new mutually-beneficial relationship between the forests, the people and the State. The basic objective for adopting the mechanism of JFM in the State was to encourage active involvement of the local people in enrichment, protection and sustainable management of the forests.

It was envisaged to impart sense of ownership over the forest areas covered under JFM to the villagers. Guidelines for managing the forests with people's participation were framed. As per these guidelines, the local people participating in managing the forests and the State would share the forest produce, which may be extracted from the areas covered under JFM by applying scientific principles of sustainable management.

The organizational structure for managing the forests with constructive participation of the local people, at present, consisted of three levels in the State i.e. (1) State Forest Development Agency (SFDA) at the State level, (2) Forest Development Agencies (FDAs) at the divisional level, and (3) Village Forest Development Committees (VFDCs) at the village level. Eco-Development Committees (EDCs) have been constituted for the villages located near the protected areas. The existing guidelines for JFM included (1) the procedures for constituting SFDA, FDAs and VFDCs/EDCs, (2) their duties and responsibilities, (3) methodology of preparing micro-plans, their effective implementation, and timely monitoring, (4) fund flow mechanism, and (5) disposal of forest produce and sharing of benefits.

For involving the local people in planning, implementation, and monitoring of schemes for forest management, one SFDA, 21 FDAs and 598 VFDCs/EDCs have been constituted in Mizoram. These committees i.e. VFDCs/EDCs have 2, 75,435 members belonging to 80,728 families. Memorandum of Understandings (MoUs) has been signed between SFDA and FDAs and also between various FDAs and VFDCs/EDCs.

Works under centrally sponsored scheme - "National Afforestation Programme" (NAP) - are mainly taken up by VFDCs/EDCs through FDAs. Revised operational guidelines for implementing NAP through JFM were issued in the year 2009 by the Ministry of Environment and Forests, Government of India. These guidelines were aimed at (1) strengthening institutional arrangements for project implementation (capacity building), (2) treatment of highly degraded lands (problem lands), (3) application of latest nursery and plantation techniques, (4) generation of additional sustainable income for members of VFDCs/EDCs through value addition to forest produce and linkage to better markets for forest-based products. The Government of Mizoram has adopted these revised guidelines by issuing notification in March, 2010.

The scheme - NAP - is being implemented effectively in Mizoram through the mechanism of JFM. Suitable tree species have been planted over an area of 57540 ha. under NAP during the period\_2003-04 to 2013-14. These plantations are being protected through joint efforts of the local people and the Government agencies. It is expected that enrichment, protection, and sustainable management of the forests through JFM will provide substantial benefits to the local people while contributing significantly to ecological equilibrium and environmental stability.

### **1.4.2 Stakeholder's expectations**

The local people particularly those living nearby forest areas expect sustainable livelihood support from the forests through extraction of permissible yield, value addition to forest produce and marketing of value-added products. They also expect to meet their needs for constructional timber at economical cost from the forests. However, they are also concerned for ecological stability in the region. Expectations of various stakeholders from the Environment and Forests department are given as under:-

Table 1

Sl. No.	Name of Stakeholder	Expectations from the Department
1	The Indian citizens living in Mizoram including the indigenous people.	<ul style="list-style-type: none"> <li>a. Ecological balance and environmental stability.</li> <li>b. Bonafide forest-based needs - constructional timber, fuel wood, and fodder – as per the Mizoram Forest Act, 1955.</li> <li>c. Constructive participation in afforestation, enrichment, and protection of forests.</li> <li>d. Easy access to information on uses and economic benefits of the forest products including Non-Timber Forest Products (NTFPs) and Medicinal Plants.</li> <li>e. Availability of technical know-how as well as other facilities for raising private plantations.</li> </ul>
2	The State Government	<ul style="list-style-type: none"> <li>a. Effective implementation of the planned schemes achieving the desired outcomes.</li> <li>b. Satisfaction of the local people.</li> </ul>
3	The Government of India	<ul style="list-style-type: none"> <li>a. Conservation of environment and forestry resources as envisaged in the National Forest Policy, 1988.</li> <li>b. Balance between conservation and development by implementing the provisions of the Forest (conservation) Act, 1980 as well as other National and State acts and rules related to management of the forests and the wildlife.</li> </ul>
4	The forest officials working in the State	<ul style="list-style-type: none"> <li>a. Healthy working conditions.</li> <li>b. Adequate facilities at par with our counterparts in other departments/services.</li> <li>c. Awards and recognition for good works.</li> </ul>
5	Non-Government Organizations (NGOs)	<ul style="list-style-type: none"> <li>a. Increase in forest cover.</li> <li>b. Enrichment and protection of the existing forests.</li> <li>c. Preservation of wildlife by creating and maintaining healthy habitats for them.</li> <li>d. Generating awareness towards the importance of forests and wildlife.</li> <li>e. Eliciting active participation of public in conservation and protection efforts.</li> </ul>
6.	Private tree/bamboo growers	<ul style="list-style-type: none"> <li>a. Technical knowhow.</li> <li>b. Logistic and financial support for raising and managing the plantations.</li> <li>c. Mechanism to facilitate harvesting and transportation of timber and bamboos.</li> </ul>

Accordingly, the Department of Environment & Forests, Government of Mizoram is committed to provide a variety of services, both tangible as well as intangible, to the citizens by scientifically managing the rich forest cover existing in the State. The tangible services include (1) arranging forest products of economic importance such as constructional timber, fodder, fuel-wood, sand, gravels etc. at reasonable costs, (2) offering gainful employment while implementing various schemes for enrichment and protection of the forests, (3) creating opportunities for additional income through the mechanism of “Joint Forest Management”, (4) disseminating information on importance and economic benefits of the forests including Non-Timber Forest Products and medicinal plants, (5) building and maintaining eco-friendly recreation sites and trails, (6) making technical know-how available for raising and managing



private forests/plantations, and (7) assisting private tree-growers in silvicultural harvesting and transporting of timber inside as well as outside the State. The intangible services include (1) stabilizing the climate, (2) enriching the soil fertility, (3) recharging ground water, (4) regulating the water flow, and (5) offsetting the air pollution.

### **1.5 Objectives for GIM implementation**

Although the identified landscape (L-1) - the entire state of Mizoram - has a large area under forest cover, the forests are not rich in quality. About 67.70 % of the forest cover is open, having very less canopy density. A large extent of open forest, particularly in the hilly terrain, can have devastating impacts on the normal structure and the delicate interdependencies of diverse flora and fauna in the forest ecosystem. The situation is likely to be further aggravated in Mizoram by the prevalence of shifting cultivation and other biotic interferences.

Efforts to enrich and protect the forests are being taken up by effectively implementing various schemes such as National Afforestation Programme, Integrated Forest Management, Thirteen Finance Commission Grants-in-Aid, National Bamboo Mission, New Land Use Policy etc. The local people are being encouraged to shift from shifting cultivation to settled agriculture by providing them technical and financial assistance.

The treatments being done to the landscape coupled with the proposed interventions under Green India Mission (GIM) will save the valuable hilly ecosystem of the State from deterioration. It is expected that implementation of proposed strategies will enhance the quality of existing forests, ecologically re-stock wastelands, improve eco-system services, increase forest-based livelihood income and augment annual CO<sub>2</sub> Sequestration.

### **1.6 Scope of implementing planned interventions under GIM**

The GIM, which aims at providing sustainable livelihood support to the people in a stable ecosystem would be implemented initially in 51 villages of eight identified L2 landscapes. These villages form compact blocks for treatment in five Forest divisions/4 districts of the State. It is further planned to extend the mission in other parts of the State. It is to mention here that, the entire State has been identified as vulnerable i.e L1 landscape

## Chapter 2 Details of Identified Landscapes

### 2.1 Criteria for selection of L1 Landscape

Criteria, which were adopted for identification of L1 landscape, are given below:-

Table 2			
Details of Criteria			
Item	Criteria	Details	Details of the source of data, maps etc. appended
1. Forest cover and degradation	a) Forest cover	19,277 sq. kms. (91.44% of the State's geographical area).	India State of Forest Report 2013, Forest Survey of India, Dehradun.
	b) Bio-diversity	The State is rich in Bio-diversity, having six major forest types, namely i) Cachar Tropical Semi-Evergreen Forest, ii) Secondary Moist Bamboo Brakes, iii) Pioneer Euphorbiaceous Scrub, iv) East Himalayan Moist Mixed Deciduous Forest, v) East Himalayan Subtropical Wet Hill Forest, vi) Assam Subtropical Pine Forest.	India Forest Atlas prepared by Forest Survey of India, Dehradun
	c) Wastelands	6021.14 sq km (28.56% of the State's total geographical area) is wasteland including jhumland.	Wastelands Atlas of India, 2010.
2. Projected Forest vulnerability to climate change	a) Vulnerability maps and attribute data	Although the State is having a large area under forest cover, the forests are not good in quality. The State has 13,016 sq km open forest which is 67.70% of the total forest cover and 61.74% of the total geographical area. It is expected that a large extent of open forests, particularly in the hilly terrain, may adversely affect not only the forest eco-system but adjoining areas as well. The situation is likely to be further aggravated in Mizoram by the prevalence of shifting cultivation and other biotic interferences.	As indicated above in column 1.
		Effect of climate change in the State is (1) irregular behavior of rainfall, (2) rise in mean maximum and mean minimum temperatures, (3) gradual and progressive increase in humidity, and (4) increased frequency of extreme climate events (heavy rainfall, flash floods, etc.). Forests are highly vulnerable to these changes in climatic conditions. Impact of climate change on the forests coupled with biotic interferences is characterized by (1) degradation (a large extent of open forests), (2) loss of biodiversity, (3) increased incidence of invasive species, and (4) loss of forest environmental functions (water conservation, soil conservation, flood control etc.).	(1) Programme Design Document for North East Climate Change Adaptation Programme presented to KfW Germany, DoNER, and State Govts. (2) Field observations by Forest Officers.
3. Vulnerable Population/communities	a) ST/SC Total population, ratio b) Scheduled areas	The majority of the population in the State - over 95% - belongs to STs.	2011 Census data, Govt. of India.

## 2.2 Importance of L1 Landscape

Based upon the criteria given in para 2.2, the entire State of Mizoram (Area: 21,081 sq. km.) has been taken as L1 Landscape. Proper treatment of the landscape in the State would bring ecological security in the region and would also contribute significantly to stabilize the changing climate. The bio-geographical importance of the L1 landscape has been given in para 1.3.

## 2.3 Criteria for selecting L2 Landscape

Operational units (L2 level) have been identified based mainly on five indicators which are (1) extent of open forest, (2) dependency of the local population on the forests i.e. biotic pressure, (3) drainage pattern, (4) prevalence of shifting cultivation and (5) compact block for treatment under GIM. The criteria for selection of L2 Landscapes are given below in detail:

	Criteria	Details	Details of the Source of data – Maps etc appended
Extent of open forests	Extent of degraded forests i.e. forests having very less canopy density	Aizawl, Champhai, Lawngtlai, Lunglei, and Mamit districts have larger area under open forests.	FSI, Dehradun
Forest Dependence	Forest areas (sq. kms.) per 1000 population	Aizawl, Champhai, Champhai, and Serchhip districts have less forest areas per 1000 population. Therefore, it is expected that these districts may witness more biotic pressure on the forests.	Data for forest areas: FSI data and for population: census data.
Drainage Pattern	Catchment areas of major and important rivers	After identifying the divisions on the basis of first two criteria, the operational units have been identified within these divisions on the basis of these two criteria.	Maps obtained from MIRSAC (Mizoram Remote Sensing Application Centre)
Prevalence of shifting cultivation	Areas including Abandoned Jhumland and Current Jhumland		Maps obtained from MIRSAC (Mizoram Remote Sensing Application Centre)
Formation of Compact Block	All identified L2 landscapes to form a compact block for better outcomes.	Aizawl, Champhai, Darlawn, Champhai and Thenzawl divisions form a compact block in the State.	Map of the State.

### 2.4.1 Reasons for selecting this L2 landscape among other possible L2 landscapes within L1:

A meeting (brainstorming session) of senior forest officers was held in March, 2012 to discuss various issues and formulate suitable strategies for the preparation of Bridge Plan/Perspective Plan under GIM. The views presented by the senior officers in the meeting are summarized below:

- The operational units should be from the districts which satisfy either of the two criteria i.e. extent of open forests or biotic pressure on the forests. Further, this unit should be strategically important for i) treatment and management of catchment areas and ii) engagement of the local people in settled agriculture or other sustainable livelihood options i.e weaning them away from jhum cultivation.
- The operational units, so selected, should form a compact block.

- The forest divisions, where activities similar to those proposed under GIM (KfW sponsored North East Climate Change Adaptation Programme) are being carried out, may not be taken up as operational units.
- Aizawl city, which carries maximum concentration of population (26% of the State's population), has the significant impact on the climate and the eco-system in the State. Therefore, forest-based interventions inside and outside the city of Aizawl may be taken up under GIM.

Considering the above views, it was decided in the meeting that 8 nos. of operational units in 5 forest divisions namely Darlawn, Champhai, Thenzawl, Champhai, and Aizawl (for Aizawl division limited to inside and outside Aizawl city) may be taken in the initial five years of GIM. Other areas/divisions may be taken up subsequently under GIM.

The proposed landscape, Kawlkulh Range is one of the two operational units of selected L2 under Champhai Division. The Landscape consist of open and degraded forests, both Government & privately owned. There are many current and abandoned jhumlands. There are 9 villages having separate Village Council as well as separate jurisdiction within this landscape. Further, it formed the catchment area of Tuichang and Tuivawl rivers, these two major rivers have many tributaries which are the major source of water for drinking as well as for irrigation to Agriculture/Horticulture field of the people living inside and outside of this landscape Kawlkulh Range. Treatment under Green India Mission would ensure continuous and interrupted supply of water for the villagers not only living in the 9 villages within the landscape but also some villages nearby the Landscape Kawlkulh Range. As such, Kawlkulh Range was selected as L2 Landscape for treatment under GIM.

## **2.5 Importance of L2 Landscape (Kawlkulh Range)**

The identified landscape lies in the catchment area of Tuichang and Tuivawl river which have many tributaries, the source of water for the villages. Further, one of the highest Mountain Mawmrang Tlang also lies within this landscape. The Mawmrang Tlang is one of the few patches which covered by very dense forest in the State of Mizoram. Mawmrang Tlang is famous for its virgin forest, the home of Hornbill with other Fauna with huge and extensive precipice, the home of Chinese Goral(Sathar) & Serow(State animal of Mizoram). But unfortunately, the virgin forest of this famous mountain also seriously suffered degradation of the forests. Hence, treatment under Green India Mission is the key to keep the regular water supply to the people and to check degradation of the forest within this landscape.

## **2.6 Criteria for selection of L3 landscape**

All villages under this Landscape namely Kawlkulh, Hliappui, Pawlrang Changzawl, Saichal, Dulte, Puilo, Chhawrtui and Vanchengpui having interests in GIM L2 have been taken as working unit i.e. L3.

## **2.7 Importance of L3 landscape (Puilo Ram)**

The area under Village Council of Puilo is one of the nine L3 landscapes (working units) identified for coverage in L2 landscape 'Puilo Ram'. The Puilo village was established around the year 1921. It has the population of 490 with 100 households (33 households under BPL category). The villagers are well educated, literacy rate being 93%.

The total geographical area of this L3 landscape is 30.04 sq. km. Several rivers/streams flowing through this L3 such as Sihdarh lui, Tawmkailo lui, Lawibual lui, R. Tuichang, R. Tuivawl etc. These are the natural sources of water for Puilo and nearby villages. In the past, most of the land was covered with well-stocked good-quality forests. However, the forests have suffered serious depletion and degradation due to traditional practice of shifting cultivation and uncontrolled felling of tress and prodigal used of forest resources due to inadequate knowledge of the importance of forests. As a result, presently, most of the areas are either deforested or forests having less/moderate canopy density i.e. approximately 9.56 %. It is expected that execution of well-planned strategies under GIM may result into ecological stability in the region.

## 2.8 Extent of L1 landscape

Name of the L1 landscape: The entire State of Mizoram (map enclosed as annexure 'E')

Location of the landscape: State: Mizoram

District: All Districts

Forest Division: All Forest Divisions

### Extent (area, boundaries, geo-references) :

- Geographical area of the State is 21,087 sq. kms.
- The State shares its boundary with Assam and Manipur on the North, Myanmar on the East and the South, Tripura and Bangladesh on the West.
- It is located between 21°56' and 24°31' N latitude and 92°16' and 93°26' E longitude.

## 2.9 Extent of L2 landscape

Name of L2 landscape : Kawlkulh Range

Location of the L2 Landscape : State: Mizoram, District: Champhai,

Division : Champhai

Geo references of the L2 Landscape: 23°51'30" N & 93°7'0" E and 23°24'0" N and 93°3'0" E

23°40'0" N & 93°1'30" E and 23°40'0" N and 93°9'30" E

Area of the landscape:	Open forests	:	233.84 sq. km.
	Moderately dense	:	148.47 sq. km.
	Very Dense forests	:	7.03 sq. km.
	Scrub lands	:	-
	WRC	:	4.44 sq. km
	Horticulture	:	6.97 sq. km
	Other areas	:	41.98 sq. km.
	<b>Total area</b>	:	<b>442.73 sq. km.</b>

## 2.10 Extent and other features of L3 landscape (Puilo Ram)

Table 4	
Location	Puilo is a Village in Khawzawl RD Block in Champhai District of Mizoram State, India. It is located 80 kms. towards west from District headquarters Champhai. 141 kms. from State capital Aizawl. Puilo is surrounded by Champhai Block towards East, East Lungdar Block towards South, Thingsulthliah Block towards west, Phullen Block towards North.
GPS coordinates:	N 23°36' 57.015'' & E 93°1'47.633'', N 23°36'31.16'' & E 93°3'20.174'' N 23°33'3.363'' & E 93°2'8.704'', N 23°33'31.867'' & E 93°6'7.808''
Area	30.04 sq. kms.
Forest cover	Moderately dense forests – 10.46 sq. kms. Open forests – 14.96 sq. kms. Non-forests - 4.62 sq. kms.
Forest type	Cachar Tropical Semi Evergreen Forest (2B/C2) mixed with bamboo breaks. Important species found in the locality are <i>Dipterocarpus turbinatus</i> , <i>D tuberculatus</i> , <i>Terminalia chebula</i> , <i>Emblica spp</i> , <i>Careya arorea etc</i> . Dominant bamboo species are <i>Melocanna baccifera</i> , <i>Dendrocalamus hamiltonii</i> , <i>Bambusa tulda</i> , <i>D longispathus etc</i>

Soil quality	Three soil orders i.e. ultisols, inceptisols and entisols are found in the project area. The surface soil textures are loam to clay loam with clay content increasing with depth in the hills whereas in the valleys it is mostly sandy loam to sandy clay loams. The soils are acidic in nature with pH values ranging from 4.3 to 6.8. The soils in the hills are strongly acidic in reaction, whereas, the soils in alluvial deposits are less acidic in nature. The percentage of organic carbon content is medium (0.64 %).
Topography	Most of the land is undulating with moderate slope i.e. 15° to 37°, whereas some parts of the land are comparatively flat with an altitude of 500-1050 mts. above MSL.

## 2.11 Profile of L3 Landscape (Puilo)

### 2.11.1 Population and Workers Population

The population data of Puilo village is given below in the following table:

No. of Households	Population		Children below 6yrs	Total
	Adult Male	Adult Female		
100	233(47.55%)	196(40%)	61(12.44%)	490

The average family size is 4 to 5 persons per household.

Workers Population is as under:-

Total Workers	Regular/Main Workers	Irregular/Marginal Workers	Non Workers
Workers: 294 (60%) Male: 150 (30.61%) Female: 144 (29.38%)	Regular Workers: 132 (26.93%) Male : 71(14.48%) Female: 61(12.44%)	Irregular Workers: 162 (33.06%) Male: 79(16.12%) Female: 83 (16.93%)	NonWorkers:196 (40%) Male: 94(19.18%) Female: 102(20.81%)

Source:Census data 2011

### 2.11.2 Social structure

The social structure of the population at Puilo village is as under:-

General	Scheduled Caste	Scheduled Tribe	OBC	Total
-	1(0.20%)	489(99.79%)	-	490

Source: Census data,2011

### 2.11.3 Wealth Ranking

Sl. No.	Classification	No. of families
1	Rich (Families having RCC building or motor car whose annual income exceeds Rs 5,00,000.00)	3(approx)
2	Middle class (Families whose annual income is less than Rs 5,00,000.00 but above BPL)	64(approx)
3	Poor (Families who are listed as BPL by the Govt.)	33 (approx)

Source : Actual field verification

#### 2.11.4 Energy Consumption

Table 8		
1	No. of Household	100
2	LPG users	12
3	LPG & Fuel wood users	55
4	Fuel wood only user	33
5	Solar devices user	Nil

#### 2.11.5 No of Educational institutions

Table 9						
Anganwadi	Primary school	Middle school	High school	HSS	Colleges	Others
1	1	1	-	-	-	-

Source : Field verification

#### 2.11.6 Enrolment (as on 15th Aug 2014)

Table 10						
Anganwadi	Primary school	Middle school	High school	HSS	Colleges	Others
61	51	33	23	8	3	-

Source : Field verification

#### 2.11.7 Literacy percentage

Male – 47%, Female – 46%, Overall – 93%

Source: Census data 2011

#### 2.11.8 Occupation

Table 11		
Sl. No.	Category of Occupation	No of families
1	Govt. service	9
2	Jhumming (Shifting cultivation)	63
3	Horticulture including WRC	5
4	Business/Petty trade	4
5	Daily labourers	19
6	Others	

Source : Field verification

#### 2.11.9 Livestock population

Table 12					
Cattle	Goat	Sheep	Pig	Poultry	Other
-	-	-	65	220	-

Source: Field verification

#### 2.11.10 Agriculture practices

Table 13			
Category	Current Jhumming	Abandoned Jhumming	WRC
Area (ha)	159	138	-

Source: Existing Land Use Map

### 2.11.11 Cropping pattern

Table 14				
Sl No	Crop	Time of sowing	Time of harvest	% of agri. area covered
1	Rice	April-May	Sept- Nov	102 Ha. (3.39%)
2	Orange	May-June	Oct-Dec	2 Ha. (0.06%)
3	Banana	April-March	Jan-Dec	1 Ha. (0.03%)
4	Arecanut	May-June	March-April	-
5	Maize	March	July	-
6	Ginger	April- June	Oct-March	48 Ha. (1059%)
7	Pumpkin	March	June	1 Ha. (0.03%)
8	Calocasia (Bal)	April	Nov-Dec	3 Ha. (0.09%)
9	Local pea (Behlawi)	March	Sept-Nov	2 Ha. (0.06%)
10	Soya bean	June-July	Nov-Dec	2 Ha. (0.06%)
11	Oil Palm	April-June	Aug-Dec	1 Ha. (0.03%)

### 2.11.12 Water Resource

There are three main sources of water for the people living in Pulo village i.e. water connection from Public Health Engineering (PHE) department, water collection points connected to perennial fountains and rain water harvesting. Water connection from PHE department has many outlets for all villagers but house-to- house connection has not been provided. Rain water harvesting is being done by limited well-to-do families only.

### 2.11.13 Energy Consumption Pattern

The village has already been electrified by Power & Electricity department of the State. In addition, energy requirement is met from LPG connections, kerosene oil and fuel-wood collected from the Village Supply Reserves, the Jhumlands and the surrounding forests.

### 2.11.14 Demand for fuel-wood

The demand for fuelwood has been worked out based upon inputs received from NGOs, VC members and other villagers. The annual demand is as under:-

Table 15		
Average annual demand/household	No of households	Total annual demand of the village
1.8 cum	100	180 cum

The supply as per the carrying capacity of existing forest in L3(Pulo) is expected as under:-

- A - Total forest area: 2542 Ha
- B - GS/Ha : 73.80cum
- C - Total GS: 187599.6 cum
- D - Annual Yield : 4168.88 cum
- E - Fuelwood availability assuming 30% of Annual Yield as fuel wood: 1250.66 cum

### 2.11.15 Existing infrastructure

Anganwadi Centre (1 nos.), Primary School (1 nos.), Middle School (2 nos.), Community Hall (1 no.), Mini-Market (1 nos.), Mini-Playground (1 nos)

Local Institutions/Organizations: - Village Council, YMA (1 Branches), MUP (1 units), MHIP (1 Branches) and Games & Sports Association



### 2.11.16 Problems and Priority

Through PRA exercise, problems being faced by the villagers could be ascertained. These are lack of proper medical facility, absence of link road to agricultural fields, incomplete net-work of approach roads within the village, in-sufficient supply of LPG cylinders and scarcity of water-supply.

### 2.12 Demographic statistics of L2 Landscape

Sl. No.	Village	Population			Poverty (BPL families)	Forest dependency	Drivers of degradation	JFMCs/ other institutions of Gram Sabha
		Total	SC	ST				
1	Puilo	490	1	489	33	Shifting cultivation, fuel-wood, timber for construction of houses, furniture etc.	Dealt in para 2.15	Village Forest Development Committee (VFDC) is active in the village.

Source: Census data 2011

### 2.13 Present interventions for addressing livelihood needs (forestry as well as non-forestry sector) and promoting sustainable forest development

Sl. No	Name of Scheme	Implementing Agency	Forestry and Wildlife activities	Other components like SMC	Details of livelihood component	Villages covered
1	NLUP (New Land Use Policy)	Different line departments such as-Soil Conservation, Horticulture, Agriculture, Forest, Sericulture, Fisheries, Industries, AH&Vety etc	Plantation of bamboos and other indigenous species	Construction of terracing, trenching, Rain water harvesting structures	Provision of technical and sustainable livelihood support so as to wean them away from the traditional practice of jhumming	Puilo
2	NAP (National Afforestation Programme)	FDA Champhai/ concerned VFDC	Sustainable management of forests with people's participation. Plantation is carried out on degraded lands	Construction of contour trenching, Checkdams, inspection path etc	Livelihood generation through direct employment, sustainable extraction of forest produce, value addition and marketing	

3	NBM(National Bamboo Mission)	FDA Champhai/ concerned VFDC	Plantation of bamboo spp, Training to farmers to increase crop productivity		Livelihood support is expected from extraction of bamboo & marketing of value added products
4	MGNREGS	DRDA, Champhai Dist	Roadside plantation	Terracing Checkdam, Retaining wall, contour trenching, Public water point, Rain water harvesting structures	Provision of 100 days employment for every willing household
5	IWMP(Integrated Watershed Management Programme)	D.O,S & WC Khawzawl	Afforestation including plantation, reservation of community forest area, and prevention of fire etc.	Terracing, contour trenches, Farm ponds, water harvesting structures, Check Dam and Horticulture Development etc.	Provision of Financial and Material Support to selected beneficiaries and Self Help Groups of activities like Piggery, Goat Rearing, Poultry, Farming, Handloom, Tailoring, Hair Cutting, Petty Trade etc.
6	IAY(Indira Gandhi Awas Yojana)	DRDA, Champhai	Nil	Nil	Construction of houses for the poor

## 2.14

## Gaps/Strategies identified under GIM

Table 17					
Sl. No.	Village	Forestry activities proposed	Other activities like SMC	Livelihood activities proposed	Any others
1	Puilo	1) Moderately dense forest cover, but showing degradation 2) Eco-restoration of degraded open forest (Type A) 3) Eco-restoration of degraded open forest (Type B) 4) Eco-restoration of degraded open forest (Type C) 5) Rehabilitation of shifting cultivation areas 6) Farmer's land including current fallows 7) Highways/Rural Roads/Canal/Tank bunds	Interventions in catchment areas of hydrological importance	(1) Support to SGHs (2) Construction of modern toilet (septic tank) (3) Provision of Household water storage tank	Promoting alternative fuel energy sources.

## 2.15 Drivers of degradation and deterioration in the forest eco-system

Table 19		
Sl. No.	Village	Drivers of degradation
1	Puilo	Traditional practice of shifting cultivation, Lack of strategic and participatory land-use planning, excessive population pressure on the forests for fuel-wood, fodder, timber etc., inadequate scientific management of watersheds including rainwater harvesting. Prodigal use of Forest resource due to inadequate knowledge of the importance of forest not only for themselves but also for future generation.

## **Chapter - 3**

### **Process undertaken for preparation of Micro-Plan/Sub-Landscape Plan**

#### **3.1 Constitution of Micro-Plan Working Group**

A meeting was held with members/representatives of Village Council for Puilo village, conservation-oriented NGOs (YMA, MHIP and MUP), forest officers and other prominent citizens of the village on Dt. 5.9.2014. As per recommendations made in the meeting, a Micro-Plan Working Group was constituted for facilitating preparation of micro-plan for Puilo Landscape (L3). The constitution of the group is as under:-

- Chairman : K. Lalthianghlina, Forest Range Officer, Kawlkulh Range  
Secretary : B. Lalmachhuana, Forester, Kawlkulh Range  
Members: 1) Lalpianthangi (VFDC Representative)  
2) Hnamtinkunga (VFDC Representative)  
3) K. Vanlalvena (VC Representative)  
4) K. Lalremruata (VC Representative)  
5) C. Zothantlinga (YMA Representative)  
6) Zothanmawii (MHIP Representative)

A questionnaire was designed by the committee for collection of data on (1) demographic status, (2) socio-economic conditions of the villagers, (3) resources available in the village etc. The questionnaire was designed to facilitate (1) assessment of current land use pattern and formulation of proposed land use pattern, (2) participatory resource-based land-use planning, (3) identification of livelihood needs, (4) planning of activities for sustainable livelihood support to the people and ecological stability in the region. The members of the Working Group also visited the area covered under L3 landscape.

#### **3.2 Participatory Rural Appraisal (PRA)**

PRA exercise including group discussion, experience sharing, one to one discussion with the villagers etc. was conducted to promote people's participation in project planning, implementation and monitoring. Information on various issues concerning GIM implementation was explained to the villagers through interpretation of maps and other documents. Resource mapping, Preparation of existing land use map, seasonal Calendar (Cropping season) and wealth ranking exercise were completed during PRA activities. The principle of participatory land use planning was adopted with available technical inputs and in consultation with all the stakeholders including the local public, proposed land used map was prepared. The proposed land used map reflects the area where interventions are to be planned and implemented.

#### **3.3 Households survey**

House-hold survey was carried out in the village covering almost all the families. A structured questionnaire was prepared for collecting information on dependency of every family on the forests as well as other required data.

#### **3.4 Transect Walk**

Transect walk was done by the Micro-plan Working Group along-with some local people and VFDC members. During transect walk, inputs were obtained from the field for deciding upon the suitability of the proposed land-use. GPS reading of the prominent sites/spots visited by the Working group were also recorded.

**3.5 Details of awareness programmes, meetings and work-shops along-with the resolutions and other outcomes:**

Table 20					
Sl. No	Workshop / meetings State Level/ Landscape / Villages covered	Category (stakeholders and no. of participants)	Major outcomes	Details of facilitators engaged	Whether resolutions/ photographs enclosed
1	State/L1 level(State Mission Directorate )	Representative of all line departments, reputed academic and technical institutions No. of attendants - 33	Suggestions were mainly given for strengthening institutions responsible for GIM implementation in the State	Principal Secretary, Environment and Forest Dept. Govt. of Mizoram	
2	District/L2 level at Champhai	Representatives of VFDCs, VCs, and NGOs such as YMAS, MHIPs & MUP. Total No. of participants - 65	More trainings are to be given at all levels.GIM guidelines in local dialect be distributed to locals/trainees	1) Pu CC Lalchuangkima, Project Director, District Rural Development Agency, Champhai District Phone/Fax: 03831 - 234940/234104 E-mail: <a href="mailto:chuangkima@yahoo.co.in">chuangkima@yahoo.co.in</a>  2)Pu Lalthanzuala, District Agriculture Officer, Champhai District	
3	Village/L3 level at Puilo	Representatives of VFDCs, VCs, and NGOs such as YMAS, MHIPs & MUP attended. Total no. of participants - 28	GIM guidelines in local dialect be distributed. Rural outreach activity for data collection be done at the earliest	1) Pu CC Lalchuangkima, Project Director, District Rural Development Agency, Champhai District Phone/Fax: 03831 - 234940/234104 E-mail: <a href="mailto:chuangkima@yahoo.co.in">chuangkima@yahoo.co.in</a>  2)Pu Lalthanzuala, District Agriculture Officer, Champhai District	

**3.6 Details of facilitators engaged in the process, institutions who prepared the micro-plans and approval of the Gram-Sabha**

Table 21					
Sl. No	Village	Institution who prepared Micro-Plan JFMC/Others	Details of participation of all stakeholders/ departments	Approval of Gram Sabha	Details of facilitators engaged
1	Puilo	Revamped FDA, Champhai & Micro-plan Working Group as in para 3.1	Representatives of Govt. departments, Conservation oriented NGOs, VFDCs, VCs, and local public.	Approved by Village Council, Puilo. Approval letter enclosed at Annexure - C	1) Pu CC Lalchuangkima, Project Director, District Rural Development Agency, Champhai District. Phone /Fax : 03831- 234940/234104 E-mail: <a href="mailto:chuangkima@yahoo.co.in">chuangkima@yahoo.co.in</a>  2)Pu Lalthanzuala, District Agriculture Officer, Champhai District

**1.7 Details of involvement of district level committee in preparation of perspective plan especially of convergence mechanism.**

-

**1.8 Details of the meetings/consultations with other departments in finalizing the convergence issues and perspective plan.**

-

## Chapter -4

### Activities proposed to be undertaken in the Sub-landscape (L3)

#### 4.1 Current Land Use pattern

Current land use pattern has been mapped with interpretation of satellite imageries and field verification of interpreted data. The details are as under:-

*Puilo village:*

Table 22A				
Sl. No.	Land Use category	Area (sq. km.)	% of total area	Remarks
1	Current Jhum Land	1.59	5.29 %	
2	Abandoned Jhum Land	1.26	4.19 %	
3	Horticulture Land	0.03	0.09 %	
4	Private Pond	0.02	0.06 %	
5	Supply Safety Reserved	0.81	2.69 %	
6	VC Land	17.02	56.66 %	
7	VC Land with moderately dense forest	5.96	19.84 %	
8	VC Land with open forest	8.46	28.16 %	
9	Private Land	1.86	6.19 %	
10	Private Land with moderately dense forest	0.67	2.23 %	
11	Private Land with open forest	0.73	2.43 %	
12	Moderately dense forest under RF	0.48	1.59 %	
13	Open forest under RF	0.47	1.56 %	
14	Moderately dense forest under RRF	2.40	7.98 %	
15	Open forest under RRF	3.34	11.12 %	
16	Settlement area	0.09	0.29 %	
<b>TOTAL</b>		<b>30.04</b>		

*Source: GIS cell, E&F Dept. Mizoram*

#### 4.2 Proposed Land Use Pattern

After careful scrutiny of current land use pattern, needs assessment and consultation with stakeholders, the following land use model is designed/proposed:

*Puilo village:*

Table 22B				
Sl. No.	Proposed land-use	Area (sq. km.)	% of total area	Remarks
1	Agriculture Land	1.59	5.29 %	
2	Horticulture Land	0.03	0.09 %	
3	WRC	0.45	1.49 %	
4	Fishery	0.02	0.07 %	
5	Shifting Cultivation Rehabilitation	1.26	4.19 %	
6	Agro Forestry	1.86	6.19 %	
7	Supply Safety Reserved	0.81	2.69 %	
8	Social Forestry	1.42	4.73 %	
9	Community Reserved	5.08	16.91 %	
10	RF (Dense Forest)	1.04	3.46 %	
11	RRF (Dense Forest)	6.29	20.94 %	
12	VC Area (Dense Forest)	10.10	33.62 %	
13	Settlement Area	0.09	0.29 %	
<b>TOTAL</b>		<b>30.04</b>		

### 4.3 Objectives

#### Short term objectives:-

- Identification and arrest of drivers responsible for eco-system degradation
- Water-shed management - ridge to valley approach
- Increase in fuel-wood and fodder availability
- Employment generation
- Awareness for sustainable management of natural resources

#### Long term objectives:-

- Sustainable livelihood support to the people
- Ecological stability in the region

### 4.4 Details of submissions proposed for treatment (Action plan):

Sl. No.	Village	Sub-mission	Categories	Proposed area (in Ha.)	Proposed cost (Rs. in lakh)	Livelihood activities proposed based on Micro-Plan
1	Puiloo	<b>Sub-Mission 1:</b> Enhancing quality of forest cover and improving ecosystem services (4.9 m ha.)	a) Moderately dense forest but showing degradation	50 Ha.	20.25	(1) Support to SGHs @Rs. 6 lakh/unit (5 SGHs)
			a) Eco-restoration of degraded open forest (Type A)	65 Ha.	28.08	
			b) Eco-restoration of degraded open forest (Type B)	30 Ha.	24.30	
			c) Eco-restoration of degraded open forest (Type C)	75 Ha.	101.25	
		<b>Sub-Mission 2:</b> Ecosystem restoration and increase in forest cover (1.8 mha)	a) Rehabilitation of shifting cultivation areas	95 Ha.	76.95	(2) Construction of Modern Toilet @ Rs. 40,000/unit to BPL families (33 families)
		<b>Sub-Mission 4:</b> Agro-Forestry and social forestry (increasing biomass & carbon sink) : 3 mha	a)Farmer's land including current fallows	50 Ha.	27.00	(3) Provision of HH water storage tank @ Rs. 27861.93/HH (26 HH)
			c) Highways/ Rural Roads/ Canal/ Tank Bunds	10 Ha.	18.90	
<b>TOTAL</b>				<b>375 Ha.</b>	<b>296.73</b>	



#### 4.5 Treatment area under the landscape unit:

Table 24						
Sl. No.	Sub-mission	Category	Proposed area	Proposed cost (Rs. in lakh)	Livelihood activities	Proposed cost (Rs. in lakh)
1	Sub-Mission 1: Enhancing quality of forest cover and improving ecosystem services (4.9 m ha.)	a) Moderately dense forest but showing degradation	50 Ha.	20.25 @Rs. 40,500/Ha		
		b) Eco-restoration of degraded open forest	a) Eco-restoration of degraded open forest (Type A)	65 Ha.	28.08 @Rs. 43,200/Ha.	
			b) Eco-restoration of degraded open forest (Type B)	30 Ha.	24.30 @Rs. 81,000/Ha.	
			c) Eco-restoration of degraded open forest (Type C)	75 Ha.	101.25 @Rs. 1,35,000/Ha	
<b>Sub Total</b>			<b>220 Ha.</b>	<b>173.88</b>		
2	Sub-Mission 2: Ecosystem restoration and increase in forest cover (1.8 mha)	a) Rehabilitation of shifting cultivation areas	95 Ha.	76.95 @Rs. 81,000/unit	Support to SGH	5 SHG @ Rs. 6 lakh/SGH
<b>Sub Total</b>			<b>95 Ha.</b>	<b>76.95</b>	<b>30 HH</b>	<b>30.00</b>
3	Sub-Mission 4: Agro-Forestry and social forestry (increasing biomass & carbon sink) : 3 mha	a) Farmer's land including current fallows	50 Ha.	27.00 @Rs. 54,000/unit	Construction of modern toilet to BPL families	33 families @Rs. 40,000 per family
		c) Highways/ Rural Roads/ Canal/ Tank Bunds	10 Ha.	18.90 @Rs. 1,89,000/unit	Provision of Household(HH) waterstorage tank	26 HH @Rs. 27861.93 /HH
<b>Sub Total</b>			<b>60 Ha.</b>	<b>45.90</b>	<b>59 HH</b>	<b>20.4441</b>
4	Promoting alternative fuel energy	Biogas, solar devices, LPG, Biomass-based systems, improved stoves	90	2.97 @Rs. 3,300/unit		
<b>Sub Total</b>			<b>90 families</b>	<b>2.97</b>		
<b>TOTAL</b>				<b>299.70</b>	<b>89 HH</b>	<b>50.4441</b>

**4.6 Whether Map showing details of the area proposed village-wise and submission-wise enclosed**

- Attached at Annexure -

**4.7 Whether the geo-references of the treatment locations enclosed in the prescribed format**

- N/A

**4.8 Details of support activities proposed in the landscape including proposed cost and village-wise details wherever applicable.**

(1) Financial support to 5 unit of SHGs for revolving fund which may be utilized as a loan by the members and the interest may be distributed in equal amount among the members from time to time. The proposed cost for this activity will be Rs. 30.00 lakh.

(2) Construction of modern toilet (septic tank) to 33 BPL families to improve their livelihood by having a hygienic toilet. The proposed cost for this activity will be Rs.13.20 lakh.

(3) Construction of household water storage tank for 26 families @ Rs. 27861.93/HH to solve scarcity of water and time consume to carry water from far distance so that working periods will increase. The proposed cost for this activity will be Rs. 7.2441 lakh.

**4.9 Details of each cross-cutting intervention proposed under the mission with area details, geo-references, activities etc.**

Sl. No.	Cross cutting interventions proposed	Activities	Unit	Total Cost (Rs. in lakh)	Geo-references
1	Promoting alternative fuel energy	Biogas, solar devices, LPG, Biomass-based systems, improved stoves	90 families	2.97	
2	Community livelihood enhancement	1) Support to SHGs	5 unit	30.00	
		2) Construction of Modern Toilet to BPL families	33 HH	13.20	
		3) Provision of household water tank	26 HH	7.2441	
<b>TOTAL</b>				<b>53.4141</b>	

**4.10 Promotion of alternative fuel energy:**

Sl. No.	Village	Schemes proposed (Biogas, Solar devices, LPG, improved stores, biomass based systems etc.	No. of beneficiaries in each scheme proposed		Total cost under each scheme (Rs. in lakh)
			No. of family	No. of beneficiary	
1	Puilo	Biogas, solar devices, LPG, Biomass-based systems, improved stoves	90 families	90 nos.	2.97 @ Rs. 3,300/unit
		<b>Total</b>	<b>90 families</b>	<b>90 nos.</b>	<b>2.97</b>

**Chapter - 5**  
**Activities Proposed Under Convergence**

**5.1 Activities Proposed Under Convergence:**

Table 27						
Village/L3 Landscape	Scheme	Implementing Agencies	Area (NRD Activities)		Other Activities	
			Works	Proposed Funding	Works	Propose funding
Puilo	MGNREGS	RD Department	Side Drain	GIM and MoA		
	NEDP	LAD			PCC Pavement	GIM and MoA
	IWMP	Ministry of Rural Development	Public Urinal	GIM and MoA		

## Chapter - 6

### Institutional Set-up for implementation in the landscape

#### 6.1 GIM Committee:

Various committees have been constituted by the State government vide Notification No. B. 11016/16/2011-FST; Dated 11<sup>th</sup> November, 2014 for effective implementation of GIM in the State of Mizoram. A copy of notification is attached at Annexure – D.

**The names of these committees are as under:-**

- 1) State Forest Development Agency for “Green India Mission”/State Mission Directorate
- 2) State Level Steering Committee for Green India Mission
- 3) GIM Cell under Environment & Forest Department/Nodal Agency
- 4) Revamped FDA for Green India Mission
- 5) District Level Steering Committee
- 6) Village Level GIM Committee

#### 6.2 Institutional Set-up for implementation in the landscape:

					Table 28	
Village	Institutions proposed for implementation	Submission of area			Details of other activities	
		Submission	Category	Area		
Puilo	Revamped VFDC	<b>Sub-Mission 1:</b> Enhancing quality of forest cover and improving ecosystem services	a) Moderately dense forest but showing degradation	50 Ha.	Provision of support to small scale cottage industries	
			b) Eco-restoration of degraded open forest	a) Eco-restoration of degraded open forest (Type A)		65 Ha.
				b) Eco-restoration of degraded open forest (Type B)		30 Ha.
				c) Eco-restoration of degraded open forest (Type C)		75 Ha.
		<b>Sub-Mission 2:</b> Ecosystem restoration and increase in forest cover (1.8 mha)	a) Rehabilitation of shifting cultivation areas	95 Ha.		
		<b>Sub-Mission 4:</b> Agro-Forestry and social forestry (increasing biomass & carbon sink) : 3 mha	a) Farmer’s land including current fallows	50 Ha.		
			c) Highways/Rural Roads/ Canal/Tank Bunds	10 Ha.		
<b>Total</b>			<b>375 Ha.</b>			

## Chapter - 7 Livelihood Issues

### 7.1 Brief note on the forest dependency and livelihood issues village-wise

#### 7.1.1 Availability and Requirement of Fuel wood.

Most of the households use fuel-wood as supply of LPG cylinders is much limited in the rural areas. The requirement and availability of fuel-wood is indicated below:-

Table 29						
Sl. No.	Village	No. of households	Average fuel wood requirement per household (cum.)	Annual Fuel wood requirement (cum.)	Fuel wood availability (Annual Yield) (cum.)	Remarks
1	Puilo	100	1.8	180	1121.35	

#### 7.1.2 Availability and Requirement of Fodder

No one practice cattle rearing for livelihood support. Therefore, there is no demand for fodder.

#### 7.1.3 Availability and requirement of Timber

Demand for timber used in house construction and furniture has been worked out and is indicated below:-

Table 30						
Sl. No.	Village	No. of households	Average timber requirement per household (cum.)	Annual timber requirement (cum.)	Timber availability (cum.)	Remarks
1	Puilo	100	0.19	19	1450.57	Source: PRA Exercise

#### 7.1.4 Availability and Requirement of NTFP(s).

Bamboo, cane, thatch, honey etc. are some of the important NTFP (s) which are extracted by the villagers from the forests. The demand as well as the availability for various NTFPS has been indicated below:-

##### Puilo Village:

Table 31							
Bamboo (nos.)		Fuelwood(cum)		Broom(Qtls)		Thatching grass (Bundles)	
<i>Demand</i>	<i>Supply availability</i>	<i>Demand</i>	<i>Supply Availability</i>	<i>Demand</i>	<i>Supply availability</i>	<i>Demand</i>	<i>Supply Availability</i>
15000	230000	180	1121.35	2.3	180	2247	85000

**3.2 Details of activities to be carried out to address livelihood issues through Green India Mission including details of activities, beneficiaries, cost, village-wise plan etc.:**

Table 32						
Village	Proposed livelihood activities	Role of facilitators, if any engaged	Beneficiaries		Proposed cost (Rs. in lakh)	Remarks
			Family	No.		
Puilo	(1) Support to SHGs	Provision of knowledge to form a healthy SHGs for livelihood improvement activities	30	5	30.00 @6 lakh per SHGs	The revolving fund may be utilized as a loan by the members and the interest may be distributed in equal amount among the members from time to time
	(2) Construction of Modern toilet (septic tank) to BPL families	Provision of technical knowledge for construction of septic tank	33	33	13.20 @ Rs. 40,000 per HH	BPL families may improve their livelihood by having a hygienic toilet
	(3) Provision of Household water storage tank		26	26	7.2441 @ Rs. 27861.93/ HH	Scarcity of water and time consume to carry out water from far distance will be solved, and working period will increase.
<b>TOTAL</b>			<b>89</b>	<b>64</b>	<b>50.4441</b>	

**3.3 Convergence of schemes of other departments/missions viz. NRLM to enhance the livelihood especially with the aim of addressing the drivers of degradation and the activities proposed along-with the beneficiaries, cost, and village-wise plan.**

Table 33							
Village	Scheme	Implementing Agency/ department	Proposed livelihood activities	Beneficiaries		Proposed cost (Rs. in lakh)	Remarks
				Family	No.		
Puilo	NRLM	DRDA, Champhai District	Poultry/ Muga Silkworm/ Piggery	30	5	30.00	SHG shall be formed and financial support to be given in the form of revolving fund @Rs. 6 lakh/SHG. The cost shall be borne from livelihood improvement activities as in Table 22

## Chapter - 8 Baseline Survey

### 8.1 Baseline survey

The baseline data for various parameters required for maintaining the outcomes of activities undertaken under GIM are given below:-

*Puilo village:*

Table 34		
Parameters	Indicator	Baseline Status
1. Forest/tree cover on forest/non-forest lands in the Mission Target Area (MTA)	a) % of area with forest cover	84.62 % (Total forest cover 25.42 sq. km. out of 30.04 sq. km.)
	b) % area in various forest density classes	1) Very Dense = 0.0% 2) Moderately Dense = 34.82% (10.46 sq. kms.) 3) Open Forest = 49.80% (14.96 sq. km.)  <i>Source: GIS cell E&amp;F Dept. Govt. of Mizoram</i>
2. Ecosystem services from targeted areas/ landscapes	a) Shannon-Weiner Index	3.547485178
	b) Biomass	Above Ground Biomass = 146939.5474tonnes <i>Source: Field Survey data</i>
3. Soil	a) Depth of top soil	The depth of top soil is very deep in valley flatlands whereas in the hills it is deep to very deep.
	b) Soil quality	Three soil orders such as ultisols, inceptisols and entisols are found in the project area. The surface soil textures are loam to clay loam with clay content increasing with depth in the hills whereas in the valleys it is mostly sandy loam to sandy clay loams. The soils are acidic in nature with pH values ranging from 4.5 to 6.3. The soils in the hills are strongly acidic in reaction, whereas, the soils in alluvial deposits are less acidic in nature. The percentage of organic carbon content is medium (0.70%). The available nitrogen is medium (0.6 kg/ha) while available phosphorus is found low (12 kg/ha). The available potash is found to be high (285 kg/ha).
4. Hydrology	a) Wetland area b) Stream beds/water discharge c) Ground water, Table- water level in wells/ springs	a) No wetlands in the Area b) No data on stream water discharge c) The area is hilly with variable elevation. Therefore, the ground water level varies. In the village settlement area, the depth of water in well is about 40 ft.
5. Annual sequestration of CO <sub>2</sub>	Carbon sequestered in the target area.	Baseline Carbon Stock = 237429.00248 tonnes



6. Forest/non-forest based livelihoods income	No. of targeted households (HH) reporting at least 25% increase in real income	<b>Income(Rs. Annual)</b>	<b>No. of Households</b>
		More than 5Lakh	3
		5 lakh> -- <50,000	64
		Less than 50,000	33
		<b>Total</b>	<b>100</b>
7. Quality of forest cover & ecosystem services of forest/non-forests	a) % of forest area naturally regenerating.	68%	<i>Source: GIS Cell, E&amp;F Dept. Mizoram</i>
a) Moderately dense forests	b) Biomass	60463.7162 tonnes (AGB)	
b) Open forests		86475.8312 tonnes (AGB)	
c) Degraded grasslands		No Degraded Grasslands	
d) Wetlands		No wetland area	
8. Ecosystems are restored and forest cover is increased in Scrub, shifting cultivation areas etc.	a) % of area that is adequately stocked /productivity		
9. Forest and Tree cover in urban/peri-urban land	a) % of forest and tree cover in the targeted urban/peri-urban areas	No urban area is there in the Mission Target Area	
10. Forest and tree cover on marginal agricultural lands/fallows and other non-forest land under agro forestry/ social forestry	a) % of tree cover on non-forest land.	96.05 % (0.73 sq. kms. out of 0.76 sq. kms.)	<i>Source: GIS Cell, E&amp;F Dept. Mizoram</i>
11. Public forest/non-forests areas (taken up under the Mission) are managed by the community institutions.	a) % of area under management of community institutions	17.04 % (5.12 Sq Km out of 30.04 Sq Km) Legally under the Village Council	<i>Source: GIS Cell E&amp;F Dept. Mizoram</i>
12. Improved fuel wood-use efficiency and alternative energy devices adopted by households in the MTA.	a) % of HH reporting use of alternative energy devices.	Total Households = 100 LPG users = 12 LPG & Fuel-wood users = 55 Fuel-wood only users = 33 Solar Devices users = Nil	
13. Forest/non-forest based livelihoods of the people living in and around the forests is diversified.	a) % of HH reporting diversification of income sources.	<b>Source of income</b>	<b>No. of Households</b>
		Govt. Service	9
		Jhumming	63
		Horticulture including WRC	5
		Business/Petty Trade	4
		Daily Labourers	19
		Others	-
		<b>Total</b>	<b>100</b>

## **Chapter - 9**

### **Status of reforms proposed**

#### **9.1 Role of Gram Sabha (Village Council) in project planning, implementation and monitoring.**

Village level GIM committee has been constituted by the State Government vide notification No. B.11016/16/2011-FST dated 11<sup>th</sup> Nov, 2014 for the following activities:-

1. To render support in the preparation of Perspective Plan.
2. To ensure implementation of planned and approved schemes (approved by the State Level Steering Committee and MoEFCC) with expected level of quality.
3. To promote active people's participation in the implementation of "Green India Mission" and
4. To provide feedbacks timely to concerned authorities for further improvement in programme implementation.

Further, VFDC would play key role in project planning, monitoring and implementation under GIM. Both the VFDC and the village level GIM Committee would work closely in co-ordination with Gram Sabha (Village Council).

#### **9.2 Revamping of FDAs and SFDA**

SFDAs and FDA's (General Body as well as Executive Committee have been revamped for formulating suitable plans and executing well-planned projects with people's participation under GIM in Mizoram. The SFDA (General body) will provide overall guidance for effective implementation of 'Green India Mission' in the State. It will also oversee implementation of the broad policy framework in achieving Mission goals and objectives. The Executive Committee of revamped SFDA has been entrusted with the following functions:-

1. Approval of Perspective Plan as well as Annual Plan of Operations;
2. Preparation of annual reports on GIM implementation in the State;
3. Programmatic convergence at the landscape level.

The revamped FDA (General body) will deal with policy issues pertaining to cohesion and convergence of different programmes at the Panchayat/Village Council level for better outcomes from the mission. The Executive Committee of revamped FDA will arrange for preparation of perspective plan/annual plan and convergence of various programmes.

#### **9.3 FRAs compliance in areas covered under L2 and L3s.**

Claims for rights in the forests would be settled strictly as per the relevant acts applicable in the State of Mizoram.

#### **9.4 Easing out regulatory framework in felling and transportation of forest produce.**

There is a need to simplify the procedure for issuing documents enabling felling and transportation of forest produce. The MoEFCC has recently taken initiative for simplifying rules and procedures for issue of permits and transit passes in respect of trees grown on non-forest private lands. The State of Mizoram would work in this direction in a proper way to motivate tree planters on non-forest private lands and also to protect the valuable forest wealth existing in the State.

#### **9.5 Strengthening frontline formation of E&F department.**

Necessary actions would be taken for 'Capacity Building' of frontline forest staff engaged in implementation of GIM in the State. Suitable training as well as required facilities would be provided to them for executing the planned works efficiently. It is expected that well-trained forest staff with people's participation would be able to deliver the desired outputs/outcomes under GIM.

## Chapter – 10 Mission Cost

### 10.1 Cost of the Mission

Year-wise cost of the mission for various work items has been given in the table place in Annexure – A

### 10.2 Mission sustainability

The mission will be executed with active participation of the local people. On completion of the project, crop productivity of the existing forest will increase substantially. Sustainable extraction of forest produce, value addition to forest produce as well as marketing of value added products will provide livelihood support to the people while maintaining ecological stability in the region. Thus the mission is economically viable and socially adoptable.

### Abstract

Table 35	
<b>1. Name of L1 landscape</b>	The State of Mizoram
<b>2. Name of L2 landscape</b>	Kawlkulh Range
<b>3. Forest and non-forest area in L2</b>	389.43 Sq. Km. & 53.30 Sq. Km.
<b>4. Drivers of degradation in the landscape</b>	Traditional practice of shifting cultivation, Lack of strategic and participatory land-use planning, excessive population pressure on the forests for fuel-wood, fodder, timber etc., inadequate scientific management of watersheds including rainwater harvesting.
<b>5. Results of problem analysis</b>	
<b>6. Existing scheme implemented in the landscape</b>	NAP, NBM, CAMPA, MNREGS, IWMP, IAY
<b>7. Implementing agencies under GIM</b>	Revamped FDA, Champhai
<b>8. GIM activities</b>	<b>Proposed funding</b>
<i>(a) Submission/Category</i>	<b>(Rs. in lakh)</b>
<b>Sub-Mission 1:</b>	
a) Moderately dense forest but showing degradation	20.25
b) Eco-restoration of degraded open forest (Type A)	28.08
b) Eco-restoration of degraded open forest (Type B)	24.30
b) Eco-restoration of degraded open forest (Type C)	101.25
<b>Sub-Mission 2:</b>	
a) Rehabilitation of shifting cultivation areas	76.95
<b>Sub-Mission 4:</b>	
a) Farmer's land including current fallows	27.00
b) Highways/Rural Roads/Canal/Tank bunds	18.90
<b>Sub-Total</b>	<b>296.73</b>

Biogas, solar devices, LPG, Biomass-based systems, improved stoves	2.97
<b>Sub-Total</b>	<b>2.97</b>
<b>(b) Livelihood improvement activities</b>	
1. Support to Self Help Groups (SHGs)	30.00
2. Construction of modern toilet(septic tank) to BPL	13.20
3. Provision of Household water storage tank	7.2441
<b>Sub-Total</b>	<b>50.4441</b>
<b>(c) Other support activities</b>	
1. Research	5.9346
2. Publicity/Media/Outreach activities	2.9673
3. Monitoring and Evaluation	2.9673
4. Strengthening local-level institutions	14.8365
5. Strengthen FDs	14.8365
6. Mission Organisation, operation and maintenance, contingencies and overheads	11.8692
<b>Sub-Total</b>	<b>53.4114</b>
<b>TOTAL</b>	<b>403.5555</b>

- **Details of Work Proposal given in Annexure - A**

**GREEN INDIA MISSION, CHAMPHAI FOREST DIVISION  
WORK PROGRAMME FROM 2017-2018 TO 2022-2023  
PUILO (L3) LANDSCAPE : KAWLKULH RANGE**

**ANNEXURE - A**

<b>A. WORK DETAILS</b>																					
Sub-Mission/ Intervention	Category	Type	Rate per Ha. (in Rs.)	2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		Total Financial Outlay (in lakh rupees)			
				Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19			
<b>Sub-Mission - 1:</b> Enhancing quality of forest cover and improving ecosystem services (4.9 m ha)	a) Moderately dense forest but showing degradation	<b>ANR (without Plantation)</b>																			
		1) Advance Work	9450			28	2.646												2.646		
		2) Creation	15660			22	3.4452	28	4.3848											7.83	
		3) Maintenance 1st year	9720					22	2.1384	28	2.7216									4.86	
		4) Maintenance 2nd year	3510							22	0.7722	28	0.9828							1.755	
		5) Maintenance 3rd year	2160									22	0.4752	28	0.6048					1.08	
		6) Advance Work (Fund Received)	5400	22	1.188															1.188	
		7) Advance Work (Bal. of 2016-2017)	4050			22	0.891														0.891
		<b>Sub-Total</b>	<b>49950</b>		<b>1.188</b>		<b>6.9822</b>		<b>6.5232</b>		<b>3.4938</b>		<b>1.458</b>		<b>0.6048</b>					<b>20.25</b>	
		b) Eco-restoration of degraded open forests	<b>200 plants/Ha. (Type A)</b>																		
	1) Advance Work		8100			17	1.377	35	2.835											4.212	
	2) Creation		15390			13	2.0007	17	2.6163	35	5.3865									10.0035	
	3) Maintenance 1st year		8100					13	1.053	17	1.377	35	2.835							5.265	
	4) Maintenance 2nd year		6480							13	0.8424	17	1.1016	35	2.268					4.212	
	5) Maintenance 3rd year		5130									13	0.6669	17	0.8721	35	1.7955			3.3345	
	6) Advance Work (Fund Received)		6750	13	0.8775															0.8775	
	7) Advance Work (Bal. of 2016-2017)		1350			13	0.1755														0.1755
	<b>Sub-Total</b>		<b>51300</b>		<b>0.8775</b>		<b>3.5532</b>		<b>6.5043</b>		<b>7.6059</b>		<b>4.6035</b>		<b>3.1401</b>		<b>1.7955</b>			<b>28.08</b>	
	<b>1100 plants/Ha. (Type B)</b>																				
	1) Advance Work		18360			15	2.754														2.754
	2) Creation		36450			15	5.4675	15	5.4675												10.935
	3) Maintenance 1st year		11340					15	1.701	15	1.701									3.402	
	4) Maintenance 2nd year		8100							15	1.215	15	1.215							2.43	
	5) Maintenance 3rd year		6750									15	1.0125	15	1.0125					2.025	
	6) Advance Work (Fund Received)		11070	15	1.6605																1.6605
	7) Advance Work (Bal. of 2016-2017)		7290			15	1.0935														1.0935
	<b>Sub-Total</b>		<b>99360</b>		<b>1.6605</b>		<b>9.315</b>		<b>7.1685</b>		<b>2.916</b>		<b>2.2275</b>		<b>1.0125</b>					<b>24.3</b>	

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
<b>Sub-Mission-1:</b> Enhancing quality of forest cover and improving ecosystem services (4.9 m ha)	b) Eco-restoration of degraded open forests	<b>2500 plants/Ha. (Type C)</b>																	
		1) Advance Work	25650			26.29	6.743385	35	8.9775										15.720885
		2) Creation	53460			13.71	7.329366	26.29	14.054634	35	18.711								40.095
		3) Maintenance 1st year	20250					13.71	2.776275	26.29	5.323725	35	7.0875						15.1875
		4) Maintenance 2nd year	18090							13.71	2.480139	26.29	4.755861	35	6.3315				13.5675
		5) Maintenance 3rd year	17550									13.71	2.406105	26.29	4.613895	35	6.1425		13.1625
		6) Advance Work (Fund Received)	17010	13.71	2.332071														2.332071
		7) Advance Work (Bal. of 2016-2017)	8640				13.71	1.184544											
<b>Sub-Total</b>		<b>160650</b>		<b>2.332071</b>		<b>15.257295</b>		<b>25.808409</b>		<b>26.514864</b>		<b>14.249466</b>		<b>10.945395</b>		<b>6.1425</b>		<b>101.25</b>	
<b>Sub-Mission - 2:</b> Ecosystem restoration and increase in forest cover (1.8 mha)	a) Rehabilitation of Shifting Cultivation Areas	<b>1100 plants/Ha.</b>																	
		1) Advance Work	18360			28.125	5.16375	45	8.262										13.42575
		2) Creation	36450			21.875	7.9734375	28.125	10.251563	45	16.4025								34.6275
		3) Maintenance 1st year	11340					21.875	2.480625	28.125	3.189375	45	5.103						10.773
		4) Maintenance 2nd year	8100							21.875	1.771875	28.125	2.278125	45	3.645				7.695
		5) Maintenance 3rd year	6750									21.875	1.4765625	28.13	1.8984375	45	3.0375		6.4125
		6) Advance Work (Fund Received)	11070	21.875	2.421563														2.4215625
		7) Advance Work (Bal. of 2016-2017)	7290				21.875	1.5946875											
<b>Sub-Total</b>		<b>99360</b>		<b>2.421563</b>		<b>14.731875</b>		<b>20.994188</b>		<b>21.36375</b>		<b>8.8576875</b>		<b>5.5434375</b>		<b>3.0375</b>		<b>76.95</b>	
<b>Sub-Mission-4:</b> Agro-Forestry and Social Forestry (increasing biomass & creating carbon sink) : 3 mha	a) Farmer's land including current fallows	1) Advance Work	13500			28.5	3.8475											3.8475	
		2) Creation	20250			21.5	4.35375	28.5	5.77125										10.125
		3) Maintenance 1st year	7020					21.5	1.5093	28.5	2.0007								3.51
		4) Maintenance 2nd year	6750							21.5	1.45125	28.5	1.92375						3.375
		5) Maintenance 3rd year	6480									21.5	1.3932	28.5	1.8468				3.24
		6) Advance Work (Fund Received)	8370	21.5	1.79955														1.79955
		7) Advance Work (Bal. of 2016-2017)	5130				21.5	1.10295											1.10295
		<b>Sub-Total</b>		<b>67500</b>		<b>1.79955</b>		<b>9.3042</b>		<b>7.28055</b>		<b>3.45195</b>		<b>3.31695</b>		<b>1.8468</b>			
	c) Highways/ Rural Roads/ Canals/ Tank Bunds	<b>Roads/Canals/Tank Bunds</b>																	
		1) Advance Work	29700			6.5	1.9305												1.9305
		2) Creation	83700			3.5	2.9295	6.5	5.4405										8.37
		3) Maintenance 1st year	32400					3.5	1.134	6.5	2.106								3.24
		4) Maintenance 2nd year	21600							3.5	0.756	6.5	1.404						2.16
		5) Maintenance 3rd year	21600									3.5	0.756	6.5	1.404				2.16
		6) Advance Work (Fund Received)	25110	3.5	0.87885														0.87885
7) Advance Work (Bal. of 2016-2017)		4590				3.5	0.16065											0.16065	
<b>Sub-Total</b>		<b>218700</b>		<b>0.87885</b>		<b>5.02065</b>		<b>6.5745</b>		<b>2.862</b>		<b>2.16</b>		<b>1.404</b>				<b>18.9</b>	
<b>TOTAL</b>				<b>11.15803</b>		<b>64.16442</b>		<b>80.853647</b>		<b>68.208264</b>		<b>36.8731035</b>		<b>24.4970325</b>		<b>10.9755</b>		<b>296.73</b>	

B.																			
Sub-Mission/ Intervention	Category	Type	Rate per Ha. (in Rs.)	2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		Total Physical Target	Total Financial Outlay (in lakh rupees)
				Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)	Physical Target (in Ha.)	Financial Outlay (in lakh)		
<b>Sub-Mission 5:</b> Promoting alternative fuel energy	Biogas, solar devices, LPG, Biomass-based systems, improved stoves	Per House Hold	3300			38	1.254	52	1.716									90	2.97
		<b>TOTAL</b>	<b>3300</b>				<b>1.254</b>		<b>1.716</b>										<b>90</b>

C. SUPPORT ACTIVITIES			
Sl. No.	Support Activities	Cost	Amount (in lakh)
1	Research	2 % of A	5.9346
2	Publicity / Media / Outreach activities	1 % of A	2.9673
3	Monitoring & Evaluation	1 % of A	2.9673
4	Livelihood improvement activities	17 % of A	50.4441
5	Strengthening local – level institutions	5 % of A	14.8365
6	Strengthening FDs	5 % of A	14.8365
7	Mission Organization, operation and maintenance, contingencies & overhead	4 % of A	11.8692
<b>TOTAL</b>		<b>35 % of A</b>	<b>103.8555</b>

D. G. TOTAL (A+B+C) = 403.5555 lakh. Rupees (Four hundred and three lakh, fifty five thousand, five hundred and fifty) only.

GREEN INDIA MISSION - CHAMPHAI FOREST DIVISION, MIZORAM  
ANNUAL PLAN OF OPERATION (APO)  
PUILO (L3) LANDSCAPE (2017-18)

A.

Sl. No.	Sub-Mission/ Interventions	Category		Items of work	Target (in Ha.)	2017-2018		
						Rate per unit (in Rs.)	Total cost per unit (in lakh)	
1	2	3		4	5	6	7	
1	Sub-Mission- 1: Enhancing quality of forest cover and improving ecosystem services (4.9 mha)	a) Moderately dense forest but showing degradation		Advance Work	28	9450	2.646	
				Creation	22	15660	3.4452	
				Advance Work (Balance of 2016-2017)	22	4050	0.891	
				Sub-Total	50		6.9822	
		b) Eco-restoration of degraded open forests		200 plants/Ha. (Type A)	Advance Work	17	8100	1.377
					Creation	13	15390	2.0007
					Advance Work (Balance of 2016-2017)	13	1350	0.1755
					Sub-Total	30		3.5532
		b) Eco-restoration of degraded open forests		1100 plants/Ha. (Type B)	Advance Work	15	18360	2.754
					Creation	15	36450	5.4675
					Advance Work (Balance of 2016-2017)	15	7290	1.0935
					Sub-Total	30		9.315
		b) Eco-restoration of degraded open forests		1100 plants/Ha. (Type C)	Advance Work	26.29	25650	6.743385
					Creation	13.71	53460	7.329366
					Advance Work (Balance of 2016-2017)	13.71	8640	1.184544
					Sub-Total	40		15.257295
2	Sub-Mission 2: Ecosystem restoration and increase in forest cover (1.8 mha)	a) Rehabilitation of shifting cultivation areas		Advance Work	28.125	18360	5.16375	
				Creation	21.875	36450	7.9734375	
				Advance Work (Balance of 2016-2017)	21.875	7290	1.5946875	
				Sub-Total	50		14.731875	
3	Sub-Mission 4: Agro-Forestry and social forestry (increasing biomass & creating carbon sink) : 3 mha	a) Farmer's Land including current fallows		Advance Work	28.5	13500	3.8475	
				Creation	21.5	20250	4.35375	
				Advance Work (Balance of 2016-2017)	21.5	5130	1.10295	
				Sub-Total	50		9.3042	
		c) Highways/Rural Roads/Canals/Tank Bunds			Advance Work	6.5	29700	1.9305
					Creation	3.5	83700	2.9295
					Advance Work (Balance of 2016-2017)	3.5	4590	0.16065
					Sub-Total	10		5.02065
TOTAL (A)					260		64.16442	
Advance Work Funding already received							11.15803	
TOTAL							75.32245	



B.						
Sl. No.	Sub-Mission/ Interventions	Category	Items of Work	Target (in Nos.)	Rate per unit (in Rs.)	Total cost per unit (in lakh)
1	2	3	4	5	6	7
1	Promoting alternative fuel energy	Biogas, Solar device, LPG, Biomass based systems, improved stoves	Per Household	38	3300	1.254
TOTAL of B				38		1.254

C.			
Sl. No.	Support Activities	Cost	Amount (in lakh)
1	Research	2 % of A	1.506449
2	Publicity / Media / Outreach activities	1 % of A	0.7532245
3	Monitoring & Evaluation	1 % of A	0.7532245
4	Livelihood improvement activities	17 % of A	12.8048165
5	Strengthening local – level institutions	5 % of A	3.7661225
6	Strengthening FDs	5 % of A	3.7661225
7	Mission Organization, operation and maintenance, contingencies & overhead	4 % of A	3.012898
TOTAL of C		35 % of A	26.3628575

D. G. TOTAL (A+B+C) = 91.78128 lakh.

*Rupees (Ninety one lakh, seventy eight thousand, one hundred and twenty eight) only.*


ANNEXURE - C

APPROVAL LETTER. Dt 17.7.2017  
Puiho

Green India Mission (G.I.M) nom xia, Kalphung  
 leh thiltum de (mission aims and objective) mipui  
 Chanvo leh naphshurhna (Stake holder's  
 expectation) te, forest official ten Chiang taka  
 min hithfiah hnuah, Keini Puiho khaw  
 mipui de chuan he mission hna hi tho kan  
 tin kan paroma, G.I.M hnuai kan khaw  
 samchhunga hnatthach the suahnan (Plan)  
 de hi parmpria kan remti hanga, concerned  
 department hrang hrang pawh he mission hna  
 a hlawhtin ngai theih nan kan thawhpui ang.

Green India Mission Committee din kan  
 kenti ngal bawte e.

Khawhtlang aish in.

Name : K. VANLALVENA  
 Signature :   
 Designation : V.C.P Puiho

President  
 Village Council/Court  
 Puiho

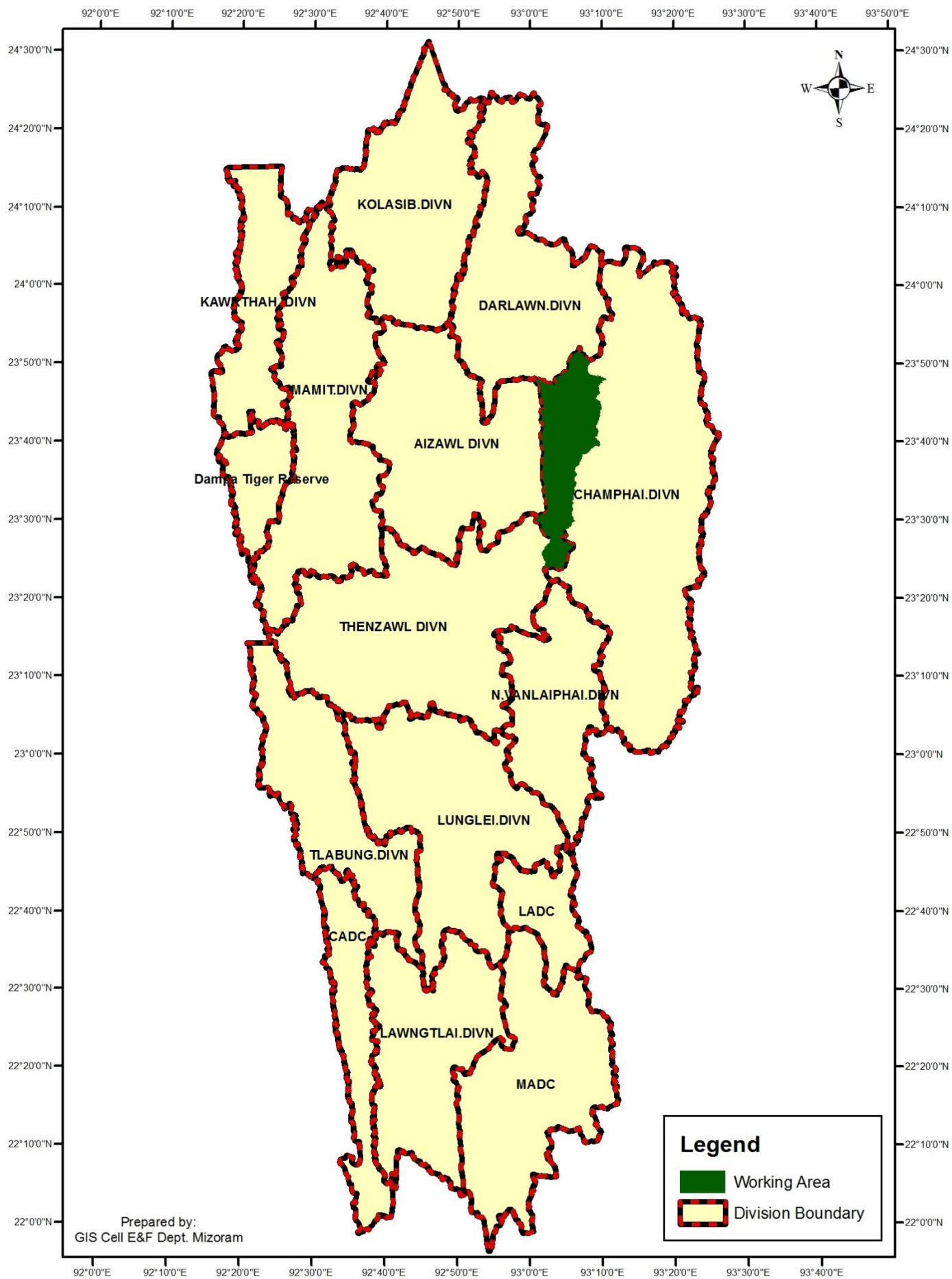
**Constitution of Village Level GIM Committee**

As per Govt. Notification No. B. 11016/16/2011-FST, Dated 11<sup>th</sup> November, 2014 a Village Level GIM Committee was set up with the following composition:

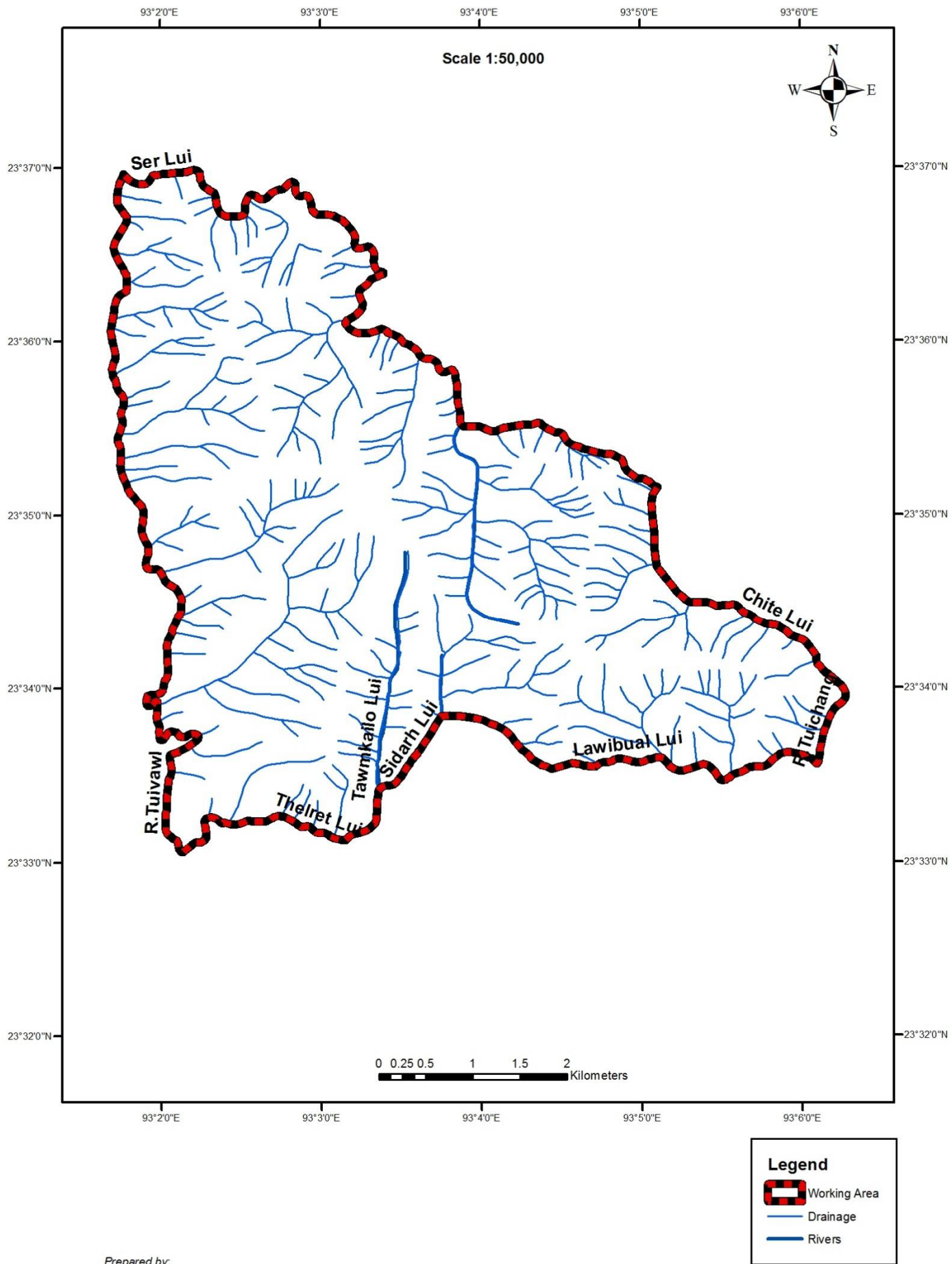
**Puilo Village:-**

- Chairman : K. Lalthianghlina, Forest Range Officer, Kawlkuh Range  
Secretary : B. Lalmachhuana, Forester, Kawlkuh Range  
Members: 1) Lalpianthangi (VFDC Representative)  
2) Hnamtinkunga (VFDC Representative)  
3) K. Vanlalvena (VC Representative)  
4) K. Lalremruata (VC Representative)  
5) C. Zothantlinga (YMA Representative)  
6) Zothanmawii (MHIP Representative)

### MAP OF L1 LANDSCAPE MIZORAM

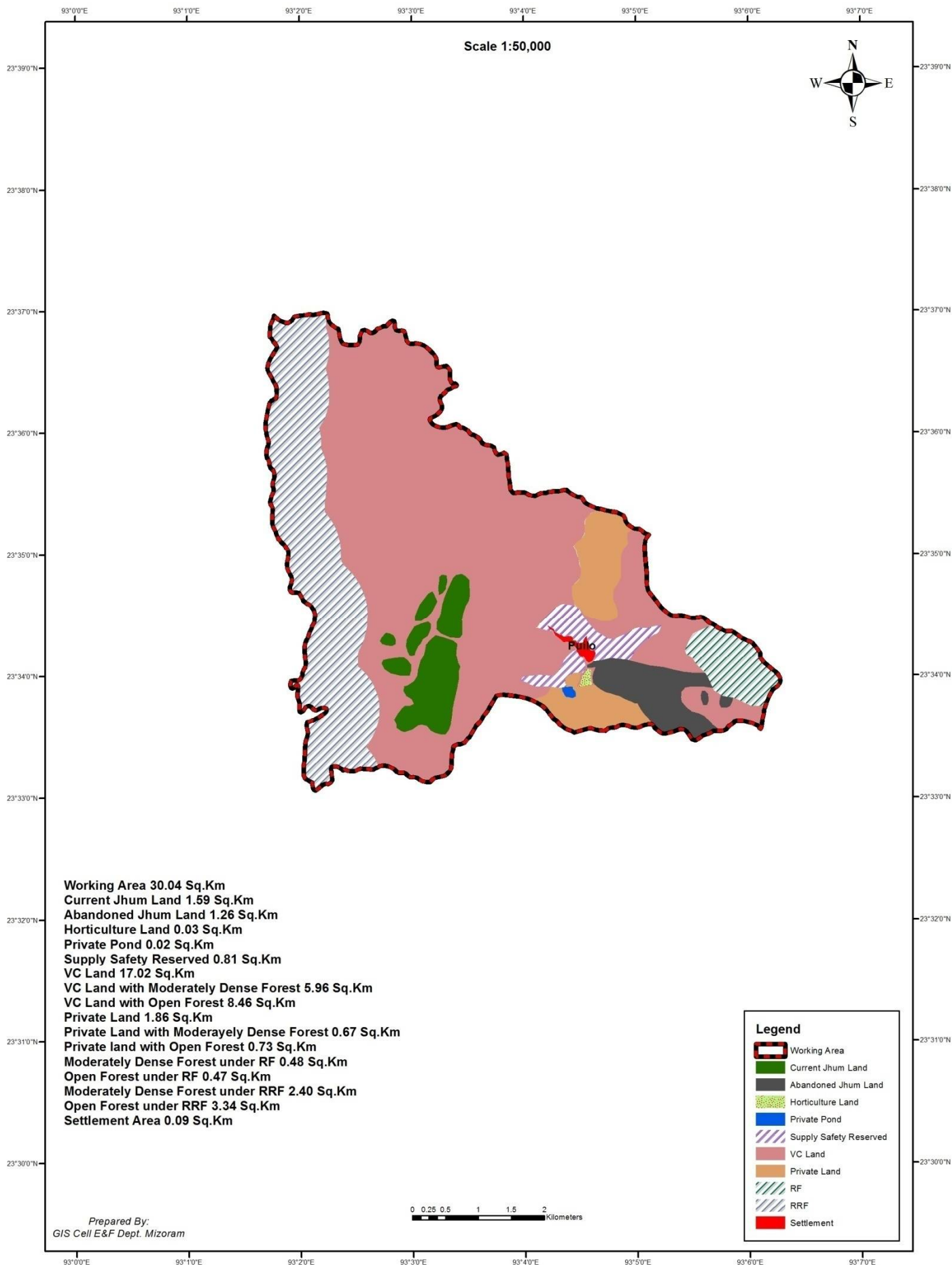


### DRAINAGE MAP OF L3 LANDSCAPE PUILO VC AREA

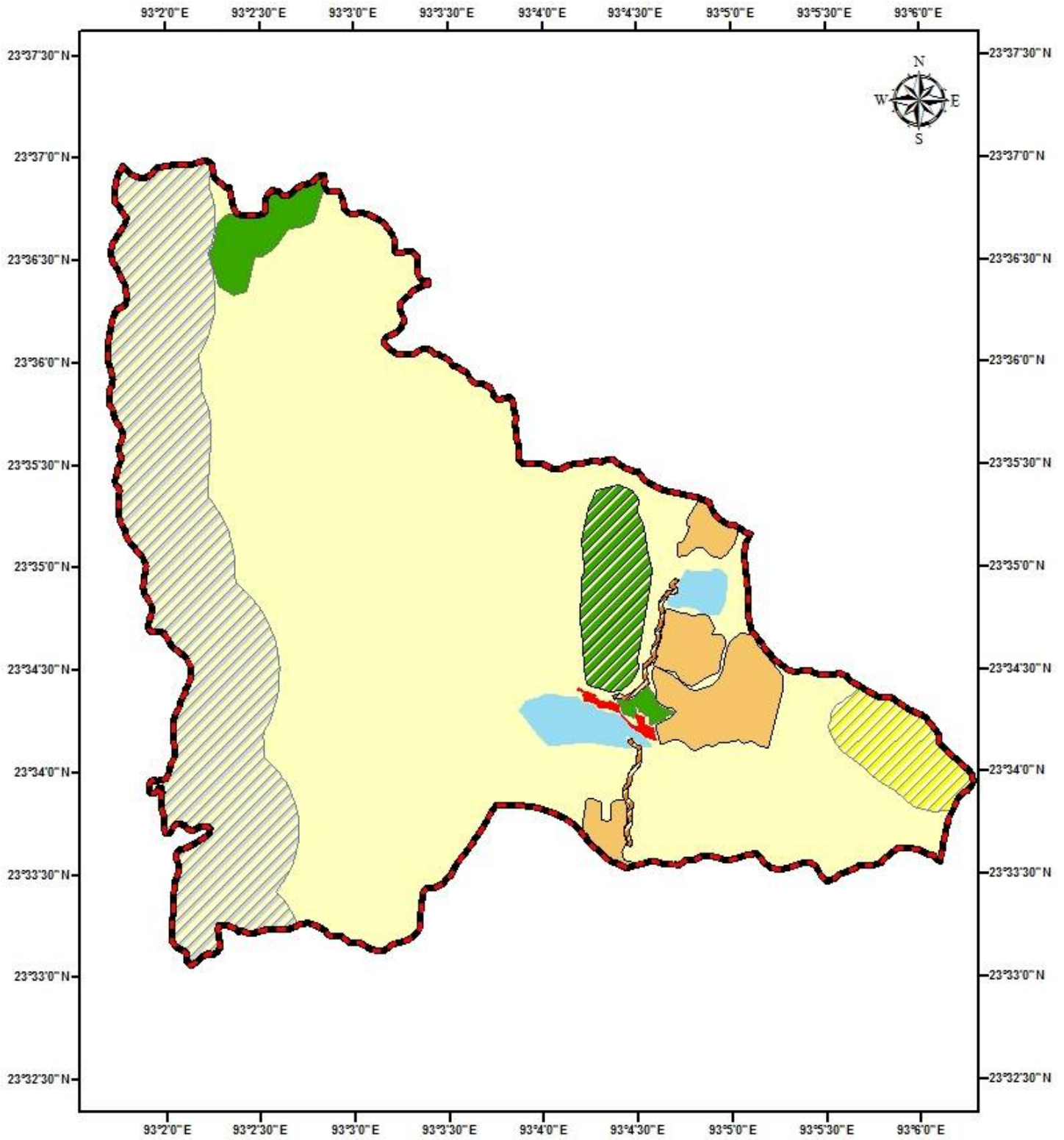




LANDUSE MAP OF L3 LANDSCAPE PUULO VC AREA



**PROPOSED LANDUSE MAP OF L3 LANDSCAPE PUILO**



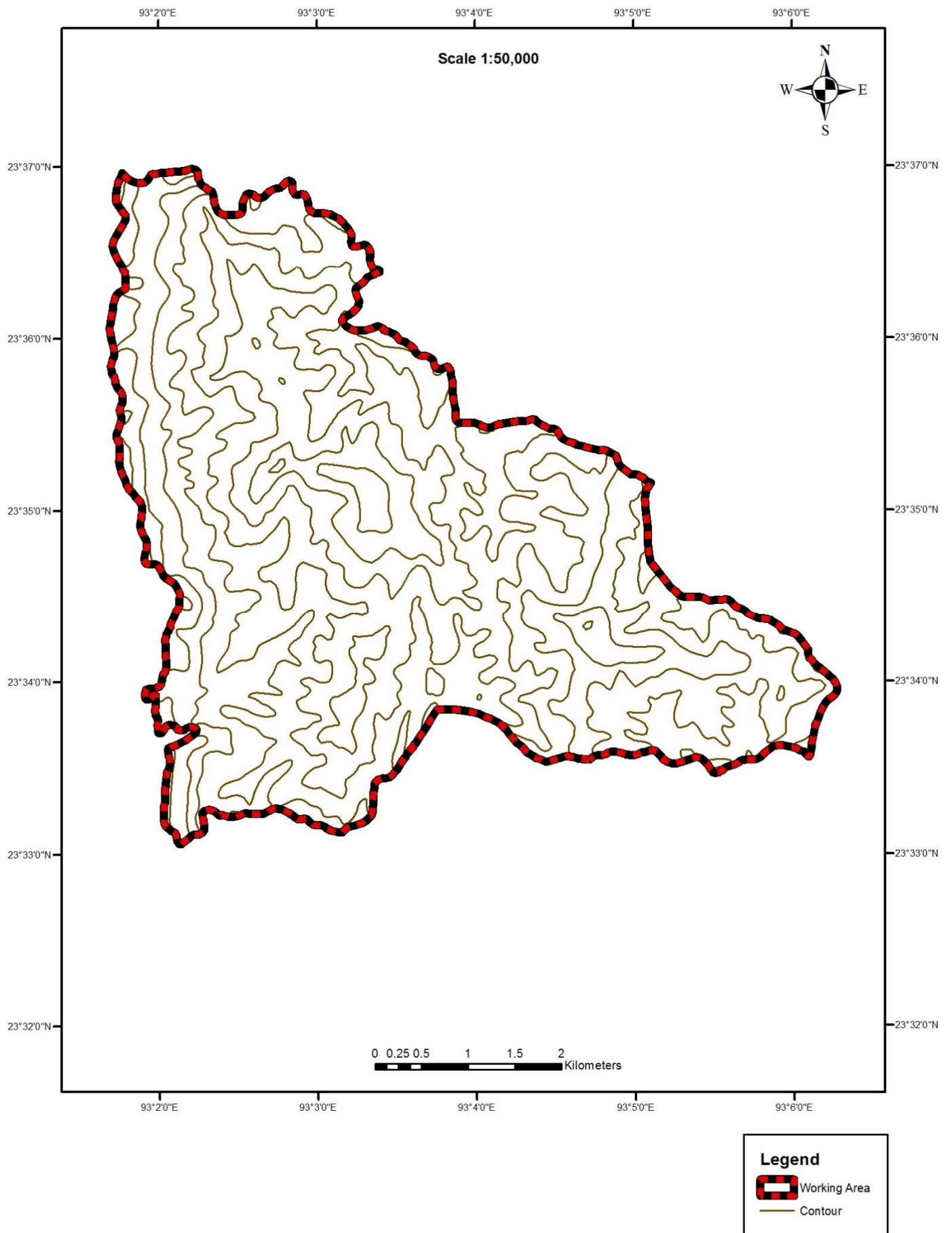
0 0.125 0.25 0.5 1 Kilometers  
Map not to scale

**Working Area - 30.04 Sq.km**  
**Rehabilitation of Shifting Cultivation - 0.95 Sq.km**  
**Agro Forestry & Social Forestry:**  
 1. Farmers Land - 0.51 Sq.km  
 2. Highway / Roadside Plantation - 0.10 Sq.km  
**Community Land :**  
 1. Moderately Dense Forest cover showing degradation - 0.52 Sq.km  
 2. Eco-restoration of degraded open forest - 1.38 Sq.km  
**Private Land & Community Land - 19.43 Sq.Km**  
**Settlement Area - 0.05 Sq.Km**

**Legend**

- Working Area
- RF
- RR.F
- Settlement
- Community Land II moderately Dense Forest
- Community Land Degraded Open Forest
- Rehabilitation of Shifting Cultivation
- Highway/Roadside Plantation
- Farmers Land
- Private Land & Community Land

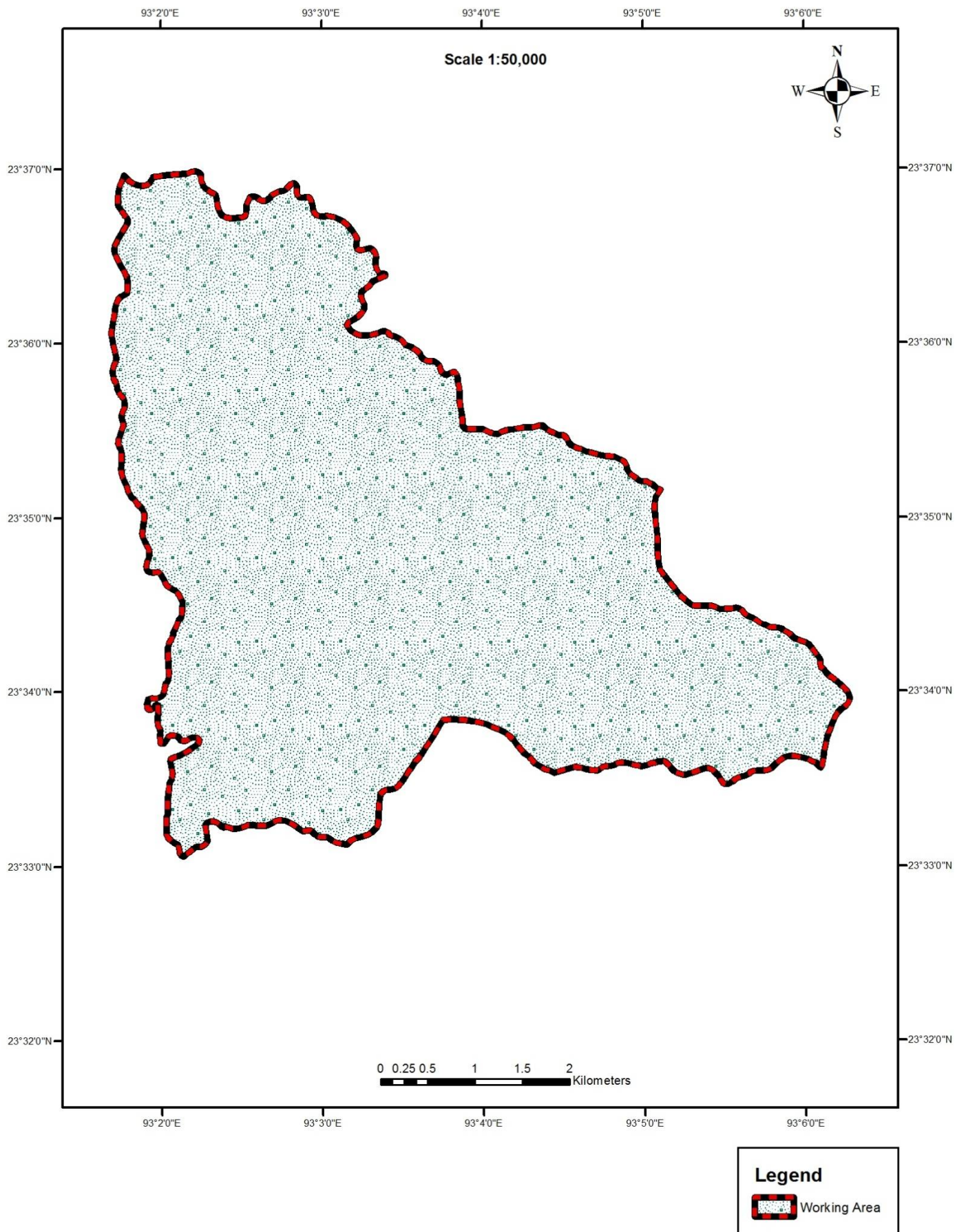
### CONTOUR MAP OF L3 LANDSCAPE PUULO VC AREA



Prepared by:  
GIS Cell E&F Dept. Mizoram

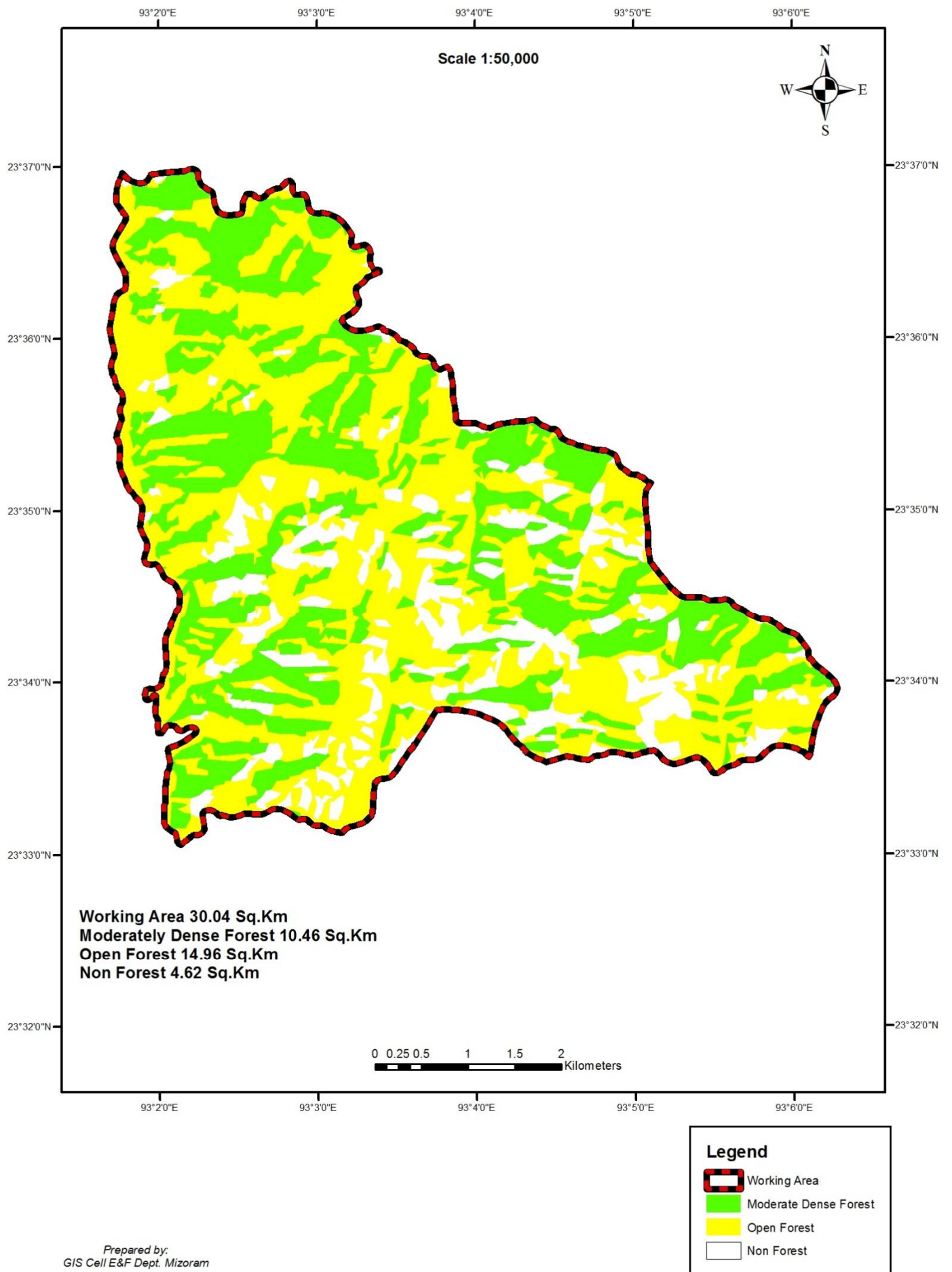


### GEOGRAPHICAL MAP OF L3 LANDSCAPE PUILO VC AREA



Prepared by:  
GIS Cell E&F Dept. Mizoram

### VEGETATION MAP OF L3 LANDSCAPE PUILO VC AREA



**ESTIMATION OF TOTAL CARBON STOCK  
PUILO L3 LANDSCAPE : KAWLKULH RANGE**

ANNEXURE - L

<b>Sl. No.</b>	<b>Plot No.</b>	<b>Total Volume</b>	<b>Vol./t/.1Ha.</b>	<b>Vol./t/Ha.</b>	<b>AGB</b>	<b>AGC</b>	<b>BGB</b>	<b>BGC</b>	<b>DWB</b>	<b>CLB</b>	<b>SOC</b>	<b>Total</b>
1	86	2.918979	7.03474	70.3474	61.20224	28.76505	5.75301	2.703915	3.461586	3.271	57.14	95.34155
2	71	1.520303	3.66393	36.6393	31.87619	14.98181	2.996362	1.40829	1.802911	3.271	57.14	78.60401
3	54	2.589002	6.239495	62.39495	54.28361	25.5133	5.102659	2.39825	3.07027	3.271	57.14	91.39282
4	85	3.149576	7.590479	75.90479	66.03716	31.03747	6.207493	2.917522	3.735049	3.271	57.14	98.10104
5	204	3.482954	8.39392	83.9392	73.0271	34.32274	6.864548	3.226337	4.130398	3.271	57.14	102.0905
6	55	2.880808	6.942748	69.42748	60.40191	28.3889	5.677779	2.668556	3.41632	3.271	57.14	94.88477
<b>TOTAL AGB</b>					<b>346.8282</b>	<b>TOTAL</b>						<b>560.4147</b>
<b>AGB/Ha.</b>					<b>57.8047</b>	<b>Carbon Stock per 1 Ha.</b>						<b>93.40244</b>

**SHANNON DIVERSITY INDEX**  
**PUILO (L3) LANDSCAPE : KAWLKULH RANGE**

ANNEXURE - M

Sl. No.	Tree Species	Local Name	Ni (No. of trees)	Pi	ln(Pi)	-(Pi *lnPi)
1	2	3	4	5	6	7
2	<i>Albizzia chinensis</i>	Vang	2	0.01369863	-4.290459441	0.058773417
3	<i>Litsea monopetala</i>	Nauthak	5	0.034246575	-3.374168709	0.115553723
4	<i>Quarcus polystachya</i>	Thil	8	0.054794521	-2.90416508	0.159132333
5	<i>Macaranga indica</i>	Hnahkhar	2	0.01369863	-4.290459441	0.058773417
6	<i>Collicarpa orborea</i>	Hnahkiah	7	0.047945205	-3.037696473	0.145642982
8	<i>Phus semialata</i>	Khawmhma	2	0.01369863	-4.290459441	0.058773417
9	<i>Quercus helferiana</i>	Hlai	8	0.054794521	-2.90416508	0.159132333
10	<i>Artocarpus chama</i>	Tatkawng	1	0.006849315	-4.983606622	0.034134292
11	<i>Syzygium grandis</i>	Theichhawl	7	0.047945205	-3.037696473	0.145642982
12	<i>Ficus semicordata</i>	Theipui	1	0.006849315	-4.983606622	0.034134292
13	<i>Sterculia villosa</i>	Khaupui	1	0.006849315	-4.983606622	0.034134292
14	<i>Engelhardtia spicata</i>	Hnum	2	0.01369863	-4.290459441	0.058773417
15	<i>Lithocarpus elegans</i>	Thingpuithing	1	0.006849315	-4.983606622	0.034134292
16	<i>Diospyros glandulosa</i>	Theivawkmit	1	0.006849315	-4.983606622	0.034134292
17	<i>Aporeisa octandra</i>	Chhawntual	3	0.020547945	-3.884994333	0.079828651
18	<i>Alstonia scholaris</i>	Thuamriat	1	0.006849315	-4.983606622	0.034134292
19	<i>Albizzia odoratissima</i>	Thingri	6	0.04109589	-3.191847152	0.131171801
20	<i>Kydea colycina</i>	Thalteh	4	0.02739726	-3.597312261	0.0985565
21	<i>Litsea salicifolia</i>	Parsen	1	0.006849315	-4.983606622	0.034134292
22	<i>Anogeissus acuminata</i>	Zairum	1	0.006849315	-4.983606622	0.034134292
23	<i>Diospyros glandulosa</i>	Theivawkpui	1	0.006849315	-4.983606622	0.034134292
24	<i>Castanopsis tribuloides</i>	Thingsia	2	0.01369863	-4.290459441	0.058773417
25	<i>Vernisia montana</i>	Tung	4	0.02739726	-3.597312261	0.0985565

## ANNEXURE - M

1	2	3	4	5	6	7
26	<i>Lithocarpus dealbata</i>	Fah	9	0.061643836	-2.786382044	0.171763277
27	<i>Wendlandia grandis</i>	Batling	3	0.020547945	-3.884994333	0.079828651
28	<i>Garuga pinnata</i>	Bungbutuairam	1	0.006849315	-4.983606622	0.034134292
29	<i>Vitex penduncularis</i>	Thingkhawilu	3	0.020547945	-3.884994333	0.079828651
30	<i>Oroxylum indicum</i>	Archangkawm	2	0.01369863	-4.290459441	0.058773417
31	<i>Ficus religiosa</i>	Hmawng	1	0.006849315	-4.983606622	0.034134292
32	<i>Phoebe hainesiana</i>	Buleng	1	0.006849315	-4.983606622	0.034134292
33	<i>Ficus virens</i>	Zaihri	1	0.006849315	-4.983606622	0.034134292
34	<i>Glochidion kharicum</i>	Thingpawncchia	1	0.006849315	-4.983606622	0.034134292
35	<i>Terminalia bellerica</i>	Phulthing	2	0.01369863	-4.290459441	0.058773417
36	<i>Lannea coromandelica</i>	Tawitawsuak	1	0.006849315	-4.983606622	0.034134292
37	<i>Protium serratum</i>	Bil	5	0.034246575	-3.374168709	0.115553723
38	<i>Garuga floribunda</i>	Tuairam	2	0.01369863	-4.290459441	0.058773417
39	<i>Toona ciliata</i>	Tei	2	0.01369863	-4.290459441	0.058773417
40	<i>Helicia excelsa</i>	Sialhma	1	0.006849315	-4.983606622	0.034134292
41	<i>Colona floribunda</i>	Hnahthap	3	0.020547945	-3.884994333	0.079828651
42	<i>Ficus retusa</i>	Rihnim	1	0.006849315	-4.983606622	0.034134292
43	<i>Celtis australis</i>	Anku	2	0.01369863	-4.290459441	0.058773417
44	<i>Hamalium ceylanicum</i>	Thinglung	1	0.006849315	-4.983606622	0.034134292
45	<i>Cordia fraggastisimo</i>	Muk	1	0.006849315	-4.983606622	0.034134292
46	<i>Gmelina orborea</i>	Thlanvawng	11	0.075342466	-2.585711349	0.194813869
47	<i>Parkia timoriana</i>	Zawngtah	13	0.089041096	-2.418657264	0.215359893
48	<i>Erythrina stricta</i>	Fartuah	2	0.01369863	-4.290459441	0.058773417
49	<i>Duabanga indica</i>	Zuang	1	0.006849315	-4.983606622	0.034134292
50	<i>Artocarpus lakoocha</i>	Theitat	3	0.020547945	-3.884994333	0.079828651
51	<i>Melia dubia</i>	Sakhithe	1	0.006849315	-4.983606622	0.034134292
52		Tawitaw	1	0.006849315	-4.983606622	0.034134292
<b>TOTAL</b>			<b>146</b>			<b>3.547485178</b>