सत्यमेव जयते
Government of Mizoram

MIZORAM STATE REDD+ ACTION PLAN

2018

ICIMOD

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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

NORWEGIAN MINISTRY OF FOREIGN AFFAIRS

MIZORAM ENVIRONMENT FOREST & CLIMATE CHANGE

सत्यमेव जयते

Government of Mizoram

Mizoram State REDD+ Action Plan

2018

Prepared by:

International Centre for Integrated Mountain Development (ICIMOD), Kathmandu

Indian Council of Forestry Research and Education (ICFRE), Dehradun

Environment, Forests & Climate Change Department, Agriculture and Allied Departments

and REDD+ Core Team of Mizoram, Government of Mizoram

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MIZORAM

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सत्यमेव जयते

Government of Mizoram

MESSAGE

Climate change is a global challenge and it affects all of us. Scientific findings indicate that risks associated with climate change are real and the impacts are being witnessed in many systems and sectors which has a bearing on our wellbeing. Developing countries are more vulnerable to climate change, since their resources are limited to cope up with the adverse impacts of climate change.

Mizoram, traditionally an agrarian State which follows practices that are sustainable and eco-friendly, however, owing to population pressure and rapid urbanization, people's dependence on natural resources are increasing, rendering the age old practices, such as shifting cultivation, etc. increasingly unsustainable. Mizoram has high forest and tree cover providing large sink for absorbing carbon, though, some amount of carbon dioxide are also emitted in to the atmosphere through burning of shifting cultivation areas, uncontrolled forest fire, etc. to some extent. A global UN Climate Change programme that addresses drivers of deforestation and forest degradation and promotes conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks collectively known as REDD+ will always be beneficial for the wellbeing of the local community of the State.

I have been informed that State of Mizoram in collaboration with Indian Council of Forestry Research and Education, Dehradun and International Centre for Integrated Mountain Development, Kathmandu (Nepal) has prepared State REDD+ Action Plan (SRAP) for the State through multi stakeholder's consultation processes and active involvement of the local community of the state.

I am hopeful that Mizoram SRAP will be a good guiding document for effective implementation of REDD+ activities in the State and the local communities will be benefited through implementing this SRAP.

Dated: 21st December, 2018

(Zoramthanga)

TJ Lalnuntluanga

सत्यमेव जयते

Government of Mizoram

Minister of State
Environment, Forests &
Climate Change
Government of Mizoram

MESSAGE

Reducing Emission from Deforestation and Forest Degradation (REDD+) is a global climate change mitigation programme under United Nations Framework Convention on Climate Change that addresses deforestation, forest degradation and promotes sustainable management and conservation of forests, and enhancement of forest carbon stocks. Complying with global agreements on REDD+, India in 2018 developed its National REDD+ Strategy and National Forest Reference Level. Both of these high level documents reiterate Government of India's commitment to climate change mitigation to embrace a low carbon pathway in accordance with the Paris Agreement on climate change. The National REDD+ Strategy focuses on mitigating options in the forestry sector across the country. Forest management leads to biological sequestration of carbon which makes it the most effective and sustainable way to mitigate ambient concentration of carbon dioxide.

The Mizoram State REDD+ Action Plan is designed for the implementation of the National REDD+ Strategy at sub-national level so that the State Department of Environment, Forests & Climate Change can integrate REDD+ objectives at State level and contribute to the overall emission reducing target of India. This is important for Mizoram for many reasons, firstly it is the State with the highest extent of forest cover in the country and secondly, it is the State with the most severely degraded forest. And thirdly, the customary lifestyle of Mizoram is such that there is an intricate linkage and dependency between households and forest resources and hence there is a need for improved sustainable management of forest. Therefore, there is an ample scope to implement REDD+ by addressing the drivers of deforestation and forest degradation in the state.

I would like to thank the Department of Environment, Forests & Climate Change (Government of Mizoram), ICFRE, FRCBR and ICIMOD in guiding the process for developing the State REDD+ Action Plan for the State of Mizoram. Implementing this action plan in the State will further contribute to the implementation of the National REDD+ Strategy.

Dated: 20th December, 2018

(TJ Lalnuntluanga)

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MESSAGE

In accordance with the requirements of UNFCCC, to be eligible to get result based financial incentives for REDD+, Government of India has prepared and released its National REDD+ Strategy. The Strategy recognises the role of local and tribal communities in getting fair share of REDD+ benefits. The National REDD+ Strategy of India outlines the facilitative and enabling environment for implementing REDD+.

Forests hold immense potential to mitigate and adapt to the challenges posed by climate change. Mizoram, a hill state with its wide expanse of lush and evergreen forests and abundant natural resources, presents immense opportunities for implementation of REDD-plus activities, which seeks to incentivize communities not only for reducing deforestation but also for conservation, sustainable management of forests, and enhancement of forest carbon stocks.

ICFRE in collaboration with ICIMOD and Department of Environment, Forest and Climate Change, Government of Mizoram has prepared State REDD+ Action Plan (SRAP) for Mizoram through multi-stakeholder's consultation processes under trans-boundary REDD+ Himalaya Project. Mizoram SRAP prioritized the drivers of deforestation and forest degradation, and barriers for enhancement activities. It devised necessary intervention packages for addressing the drivers and enhancement activities. SRAP will be helpful in implementation of the National REDD+ Strategy and getting the carbon and non-carbon incentives under REDD+ mechanism.

I am hopeful that the State REDD+ Action Plan for Mizoram will serve as a guiding document for implementation of REDD+ activities and mobilizing the result based financial incentives. It will also be a guiding document for the other states to develop their SRAPs.

I compliment the team of experts from the ICFRE, ICIMOD, GIZ, Mizoram State Department of Environment, Forests and Climate Change and other organizations for bringing out the State REDD+ Action Plan for Mizoram.

I also compliment the hard work done by Dr. R.S. Rawat, Scientist Incharge and all team members of the Biodiversity and Climate Change Division, Directorate of Research, ICFRE for finalization and publication of this document.

Dated: 24th December 2018

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सत्यमेव जयते
Government of Mizoram

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FOREWORD

In the recent years, climate change is one of the global issues that has received tremendous attention of common man, scientists and policy planners. Global climate change is a threat having perceptible and tangible impacts upon human kind and nature. The forestry sector occupies a unique position in so far as climate change is concerned. It contributes significantly to global carbon dioxide emissions, and at the same time also provides significant climate change mitigation and adaptation opportunities. Further, forestry sector is closely linked to socio-economic systems, particularly those of the forest dwellers, forest dependent people and rural communities in the developing countries. Reducing emissions from deforestation and forest degradation in developing countries and role of conservation, sustainable management of forests and enhancement of forest carbon stocks (collectively known as REDD+) is one such programme agreed under UN Climate Convention (UNFCCC) to reward financial incentives for forestry activities. The Government of India has approved the National REDD+ Strategy in a manner that it dovetails with the National Forest Policy with the aim of constituting a common thread running through all programme, projects and schemes implemented in the forestry sector.

The National REDD+ Strategy envisions the establishment of State REDD+ Cells in collaboration with a National Designated Entity for REDD+ (NDE-REDD+) and in developing their State REDD+ Action Plans; this document responds directly to this call. This is the beginning of a process for planning the interventions for the implementation of the National REDD+ Strategy.

This State REDD+ Action Plan is developed in collaboration with key State and local level stakeholders with the aim of implementing the National REDD+ Strategy at the sub-national level. The multi-stakeholders approach taken in developing this State REDD+ Action Plan enhances the ownership and sustainability aspects when mitigating actions are taken in the forestry sector.

I would like to commend on the roles of Department of Environment, Forests & Climate Change, Mizoram, ICFRE, FRCBR and ICIMOD in assisting with this process that supplements the aims and objectives of the National REDD+ Strategy which eventually contributes to climate change mitigation.

I compliment the hard work done by Dr. K. Kire, Addl. PCCF & NO (CC) and all members of the Climate Change Cell in bringing about this document.

Dated: 21st December, 2018

(Lalram Thanga)

ACRONYMS AND ABBREVIATIONS

AF	Agroforestry
BCC	Biodiversity and Climate Change
BMUB	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety
CO_2	Carbon dioxide
D&FD	Deforestation and Forest Degradation
EF&CC	Environment, Forests and Climate Change Department
FAO	Food and Agriculture Organization of the United Nations
FRCBR	Forest Research Centre for Bamboo and Rattan
JFMC	Joint Forest Management Committee
MRV	Measurement, Reporting and Verification
FREL/FRL	Forest Reference Emission Level/ Forest Reference Level
FSI	Forest Survey of India
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaftfür Internationale Zusammenarbeit
ICFRE	Indian Council of Forestry Research and Education
ICIMOD	International Centre for Integrated Mountain Development
ICS	Improved Cook Stove
IGA	Income Generation Activity
IPCC	Intergovernmental Panel on Climate Change
IPs	Intervention Packages
LPG	Liquefied Petroleum Gas
MDF	Moderately Dense Forest
Mha	Million hectare
MoEF&CC	Ministry of Environment, Forest and Climate Change
NFMS	National Forest Monitoring System
NGO	Non-Governmental Organization
NRS	National REDD+ Strategy
NTFPs	Non-Timber Forest Products
OF	Open Forest
PAMs	Policies and Measures
PRA	Participatory Rural Appraisal
REDD+	Reducing emissions from deforestation and forest degradation, and role of conservation, sustainable management of forests and enhancement of forest carbon stocks
SFDs	State Forest Departments
SIS	Safeguard Information System
SRAP	State REDD+ Action Plan
TOF	Trees Outside Forests
UNFCCC	United Nations Framework Convention on Climate Change
UT	Union Territory
VDF	Very Dense Forest
WG	Working Group
WRC	Wet Rice Cultivation

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All the participants of multi stakeholders consultation workshop for formulation of SRAP for the State of Mizoram

EXECUTIVE SUMMARY

REDD+ is an important climate change mitigation option by incentivizing the developing countries for reducing emission from deforestation, forest degradation, conservation of forest carbon stocks, sustainable management of forests and enhancement of forest carbon stocks through various forest conservation activities and policy measures. The aims of REDD+ initiative is to lower the rate of deforestation and forest degradation as well as to sequester more carbon through sustainable management of forests for mitigating climate change.

Recently, Ministry of Environment, Forest and Climate Change, Government of India has released National REDD+ Strategy with the broad objectives to create REDD+ architecture at National and Sub-National levels. The National REDD+ Strategy lays emphasis on development of State REDD+ Action Plan for implementation of National REDD+ Strategy at state level.

Indian Council of Forestry Research and Education (ICFRE) in collaboration with International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal is implementing trans-boundary REDD+ Himalaya Project in North Eastern states of India. The project is mainly focusing on capacity building, technology sharing and knowledge dissemination in context of REDD+. Mizoram has been chosen as a pilot state for implementation of this project.

Forest and tree cover of the Mizoram constitute about 88.48% of the total geographical area of the state. Forests are a crucial resource to the people of Mizoram as their livelihood and food security are derived from the forests. However, forests in the state are under tremendous pressure and have suffered serious depletion from shifting cultivation, uncontrolled fires, unregulated felling, over-exploitation of forests resources, changes in land use pattern etc. India State of Forest Report 2017 reported the net decrease of forest covers of 531 sq km in the state of Mizoram from the previous assessment of 2015.

ICFRE in collaboration with ICIMOD and Department of Environment, Forests & Climate Change, Government of Mizoram has prepared State REDD+ Action Plan (SRAP) through multi-stakeholders consultation processes under REDD+ Himalaya Project. Through this consultation process direct drivers of deforestation, forest degradation and barriers to enhancement have been identified and prioritized. A set of REDD+ intervention packages and their constituent activities, identified:

Sustainable land management and cropping pattern;

- Adoption of horticulture crops;
- Sustainable energy supply;
- Creating habitat mosaic for biodiversity conservation;
- Livelihood improvement;
- Forest fire control and management;
- Market linkages for agriculture produce and
- Demonstrations of private plantation and agroforestry

For each of these intervention packages feasibility and safeguard analysis were undertaken. The feasibility analysis involved analysing the risks and obstacles for implementation, and identifying risk mitigation measures to make them more cost-effective. The safeguard analysis involved checking each intervention package for governance, social and environmental risks, and how to mitigate them, and was also necessary to meet the UNFCCC 'Cancun Safeguards'. It is also a first step towards being able to contribute to the national Safeguards Information System (SIS) which is a requirement of the UNFCCC for a national REDD+ programme.

Another key step in developing the SRAP was developing the monitoring protocol; this involved setting quantitative targets for the outputs of each intervention package, and identifying indicators for their measurement. Finally a five year budget was developed for the intervention packages, which involved costing out all the implementation activities, including the monitoring activities.

Therefore, SRAP will enable implementation of India's National REDD+ Strategy in the state of Mizoram, and help obtaining results-based payment, social and environmental co-benefits under the international REDD+ mechanism.

CHAPTER 1

INTRODUCTION

1.1 REDD+ and India

In 2014 the Intergovernmental Panel on Climate Change (IPCC) estimated that the forestry sector contributed about 9-11% of total greenhouse gas emissions or approximately 5.8 Gt. CO_2 equivalent per year, mainly in developing or tropical countries (IPCC, 2014). However, the recent special report of IPCC on 'Global Warming of 1.5^{0}C' suggests that afforestation is the only carbon dioxide removal option which has to be considered for climate change mitigation (IPCC, 2018). Thus, under the United Nations Framework Convention on Climate Change (UNFCCC), reducing emissions from deforestation and forest degradation through conservation of forest carbon, sustainable management of forests and enhancement of forest carbon stocks, collectively known as REDD+, was developed as an international mechanism to mitigate climate change. For REDD+ implementation with results-based finance, UNFCCC set out four main requirements: development of a National REDD+ Strategy or REDD+ Action Plan, a National Forest Monitoring System, a baseline Forest Reference Level/ Forest Reference Emission Level which provides the basis for a system of measurement, reporting and verification of carbon emissions and a Safeguards Information System.

India, with a geographical area of 329 Mha is the seventh largest country, and ranks tenth amongst the most forested nations of the world. India has 29 states and 7 Union Territories. Each state

has its own plan and programme for development that contribute to the implementation of the national plans. Similarly for implementation of its National REDD+ Strategy (NRS), a set of 'sub-national' or State REDD+ Action Plans (SRAPs) are essential since ecology and drivers of deforestation and forest degradation vary from state to state. SRAP addresses the drivers of deforestation and forest degradation as well as the barriers to forest carbon enhancement (mainly through reforestation, afforestation and forest restoration) in the State.

The SRAP is based mainly on a multi-stakeholders and multi-sectorial consultative processes, complemented by spatial analysis using geographical information systems, that leads to identification of a set of REDD+ 'intervention packages' and activities that respond to the drivers and barriers. There is also a careful analysis of the potential social and biodiversity side-effects or risks associated with the proposed REDD+ interventions, leading to a set of risk mitigation measures. This allows the SRAPs and the NRS to respond to the REDD+ safeguards and meet wider social and development objectives such as gender equity, and informs the national Safeguards Information System (SIS). This makes the SRAP different from other previous forestry plans.

In the context of REDD+, the 'sub-national level' refers to any administrative or jurisdictional unit subordinate to the national level, and can also refer to larger ecosystems or biomes where REDD+ policies are implemented. This report is based mainly on a consultative workshop undertaken at Forest Research Centre for Bamboo and Rattan, Aizawl (Mizoram) with the participation of the relevant forestry sector stakeholders.

1.2 REDD+ Readiness in the National Context

A key part of most REDD+ programmes involves further reinforcement of measures aimed at forest conservation, increasing terrestrial carbon pools by promoting afforestation and reforestation, improved forest management, and forest conservation, etc. There are also possible synergies between carbon sequestration and adaptation measures, e.g., through afforestation of vulnerable areas, watersheds, and rehabilitation of degraded lands. Singh *et al.* (2015) discussed in detail how various REDD+ actions can be implemented in India, and listed some key interventions required for sustainable forest management.

To facilitate REDD+ at the National level among all stakeholders, the government prepared a 'REDD+ Reference Document' (MoEF&CC, 2014). This Reference Document discusses the required policy framework to support REDD+ implementation as part of the forest management of the country. The document describes in detail the issues and concepts related to definitions as an approach to construct the national forest reference level. It also assigns institutional roles and responsibilities to government and non-government organizations, including MoEF&CC, FSI, ICFRE, SFDs, JFMCs, Village/ *Gram*

Panchayats and *Gram Sabhas*, etc. Good governance and adherence to safeguards are necessary to ensure that REDD+ implementation supports the rights of the local communities and ethnic groups/ tribes as they have a key role in the conservation of biodiversity and forests. The Reference Document also comprehensively addresses capacity building needs across all levels of government, expert organizations, civil society, other organizations and local communities. It also deals lucidly with the other key components of a National REDD+ Programme: the National Forest Monitoring System (NFMS), needed for the measurement, reporting and verification (MRV) of emissions, and the Safeguards Information System (SIS).

Indian Council of Forestry Research and Education on behalf of Ministry of Environment, Forest and Climate Change, Government of India has prepared National REDD+ Strategy (NRS) which has been approved and released by Ministry for submission to United Nations Framework Convention on Climate Change (UNFCCC). Objectives of the NRS is to facilitate implementation of REDD+ programme in India in conformity with relevant decisions of UNFCCC, in particular the Cancun Agreements, Warsaw Framework for REDD+, Paris Agreement, and the national legislative and policy framework for conservation and improvement of forests and the environment. The National REDD+ Strategy emphasizes developing a robust REDD+ Framework through establishing a National Governing Council for REDD+. The NRS also underscores the importance of the REDD+ safeguards, stakeholders participation in REDD+ activities, and the role of the private sector (MoEF&CC, 2018).

1.3 Evolution of State REDD+ Action Plan (SRAP) Approach in India

According to FAO (2010) , India is tenth largest forested country in the world, however, India also faces problems of forest degradation. India has 16 major forest types and 221 sub-grouptypes (Champion and Seth, 1968). It is one of 17 'megadiverse' countries (identified by Conservation International, 1998) with four global biodiversity hotspots. The Protected Area network includes 104 National Parks, 544 Wildlife Sanctuaries, 77 Conservation Reserves, and 46 Community Reserves extending over 16.2 Mha and covering almost 5% of the national geographical area.

India joined the UN-REDD Programme in 2015 and in August 2018 the National REDD+ Strategy (NRS) was approved by the Ministry of Environment, Forest and Climate Change, Government of India. In the NRS, it is stated that one of the main objectives is to create REDD+ architecture at the National and Sub-national/ state levels to support REDD+ actions, and that states should prepare REDD+ action plans.

In December 2015, the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) agreed to fund the regional programme "REDD+ Himalayas: Developing and using experiences in implementing REDD+ in the

Himalayas". The programme is jointly implemented by ICIMOD and GIZ in partnership with REDD+ focal points in four Himalayan countries: Bhutan, India, Myanmar and Nepal with the basic aim to improve the framework conditions for socially and ecologically appropriate REDD+ measures to mitigate climate change. In this context the measures primarily focus on capacity building and providing technical assistance for partners and stakeholders, as well as setting up a regional learning platform to enhance South-South cooperation in the implementation of REDD+.

Under the UN-REDD technical assistance, ICIMOD developed first sub-national REDD+ Action Plan (termed as the District REDD+ Action Plan) for Chitwan District in Nepal. The methodology used for the preparation of this plan was adapted from Vietnam's experience in developing five sub-national REDD+ action plans which were supported by UN-REDD.

The ICIMOD managed REDD+ Himalaya Project activities for 2018 have included formulation of State REDD+ Action Plans for the states of Mizoram and Uttarakhand. For Mizoram State, Indian Council of Forestry Research and Education (ICFRE) and Environment, Forest & Climate Change Department, Government of Mizoram initiated the process in coordination with ICIMOD to develop India's first State REDD+ Action Plan (SRAP).

The methodological process for developing the Mizoram SRAP is based on a multi-stakeholder consultation process involving the State Forest Department, local organizations, research institutions and universities. This process, involving a series of workshops, which were jointly organized by ICFRE, ICIMOD and Environment, Forest & Climate Change Department of Mizoram and resulted a set of Intervention Packages (IPs), including state-level policies and measures, risk mitigation measures, monitoring plans and a budget for the implementation of REDD+ in the state of Mizoram.

1.4 Linking India's Nationally Determined Contributions (NDCs) and the SRAPs

Article 4, paragraph 2 of the Paris Agreement states that each country should prepare, communicate and maintain successive Nationally Determined Contributions (NDCs) that it intends to achieve. Parties are mandated to implement a set of domestic mitigation measures with the aim of achieving the objectives of the NDCs.

One of the main mitigation actions in India's NDC is "to create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030". In order to achieve this target, the Government of India has prepared a National REDD+ Strategy (NRS) in accordance with the requirements of UNFCCC, to be eligible to get the result based financial incentives for REDD+. To meet the NDC target, increased cover of natural forests needs to be supplemented by a concerted focus on trees outside forests (TOF), which contribute significantly to the national carbon sink. Action with respect to TOF thus forms a significant part of the NRS aimed at a major increase in the national forest carbon sink. Forest and tree cover, as well as being essential for the NDC, provides additional non-carbon benefits.

A SRAP is developed in consultation with provincial (sub-national) stakeholders to implement NRS at the sub-national/ state level. Since the drivers of deforestation and forest degradation are cross-sectoral (e.g., agriculture, mining, infrastructure), the intervention packages (IPs) in the SRAP need to cover not only the forestry sector but also other sectors like energy, agriculture, biodiversity conservation, livelihoods, TOF, agroforestry and others. All the IPs needs to be supported by an operational plan with a detailed budget which can support NDC target directly or indirectly. Most activities in a SRAP are formulated at the local level, which helps ensure feasibility and implementation effectiveness.

2 CHAPTER

MIZORAM STATE: CONTEXTUAL BACKGROUND

Mizoram is a mountainous state in north-east India. It is bordered by the Indian states of Assam and Manipur in the north, on the east and south by Myanmar and on the west by Bangladesh and the state of Tripura. The Mizos (the 'hill people') are a Mongoloid race that originally came from the Chin Hills of neighboring Myanmar. Mizoram was created as a separate state of the Indian Union on 20th February 1987.

The state has 8 districts viz. Aizawl, Champhai, Kolasib, Lunglei, Mamit, Lawngtlai, Saiha, and Serchhip. As per Census of India 2011, the total population of Mizoram is 10,97,206 with overall density of 52 persons per sq. km. Population of Mizoram has increased by 23.48% in the decade of 2001-2011 compared to past decade of 1991-2001. The literacy rate of the state is 91.33% which is the 3rd highest in the country. Total geographical area of the state is 21,081 sq km which constitutes 0.64% of the total geographical area of the country.

The hills in Mizoram run from north to south with a tendency to be higher in the east to the territory and tapering off in the north and south. The average altitude of the hills is about 900 meters; the Blue Mountain is the highest peak of the state. Mizoram has an abundance of trees, bushes, plants, shrubs and grasses, and many rivers including the Tlawng, Tuirial, Tuivawl, and Koladyne. The climate of the state exhibits a strong seasonal rhythm: there are normally four seasons - winter, pre-monsoon, monsoon and retreating monsoon.

Mizoram's Forests: About 88.48% (18,186 sq km) of the geographical area of Mizoram is under forest and tree cover making it the state with the highest percentage of forested area in India (FSI, 2017). About 131 sq km, of the total forest area is classified as Very Dense Forest (VDF), 5,861 sq km is Moderately Dense Forest (MDF) and 12,194 sq km is Open Forest (OF). Tree cover outside the forests is 467 sq km. In spite of having only 0.64% of the geographical area of the country, Mizoram contributes about 2.33% of the total forest and tree cover. This means that there is little area available for afforestation and reforestation, and therefore enrichment plantations and addressing forest degradation are higher priority.

The per capita availability of forest and tree cover in Mizoram is 1.71 ha, which is quite high compared to other states. Forests are a crucial resource to the people of Mizoram as their entire culture, subsistence livelihood and food security is derived from the forests. However, these forests are under tremendous pressure and have suffered serious depletion from shifting cultivation, uncontrolled fires, unregulated felling, over-exploitation of forests resources and changes in land use pattern, etc.

Change in Forest Cover: Recent change in the forest cover of Mizoram, based on satellite data, is shown in Table 1. This shows that from 2005 to 2017, the Very Dense Forest (VDF) category shrunk by 5%, and Moderately Dense Forest (MDF) shrunk by 9.4%. Figure 1 also indicates the rate of forest degradation in the state. India State of Forest Report 2017 reported the net decrease of forest covers of 531 sq km in the state of Mizoram (FSI, 2017). Mizoram state has six forest types belong to four forest types groups (Table 2). Rawat *et al.* (2017) reported the drivers of deforestation and forest degradation (shifting cultivation, fuelwood collection, unemployment, excessive extraction of NTFPs, lack of industries, lack of knowledge and awareness etc.) in the state of Mizoram.

Mizoram is one of the states with the most severe forest degradation. Nevertheless, the state is still richly endowed with forest cover, and through development of the SRAP the state has acknowledged the need to take urgent actions to conserve the forest resources.

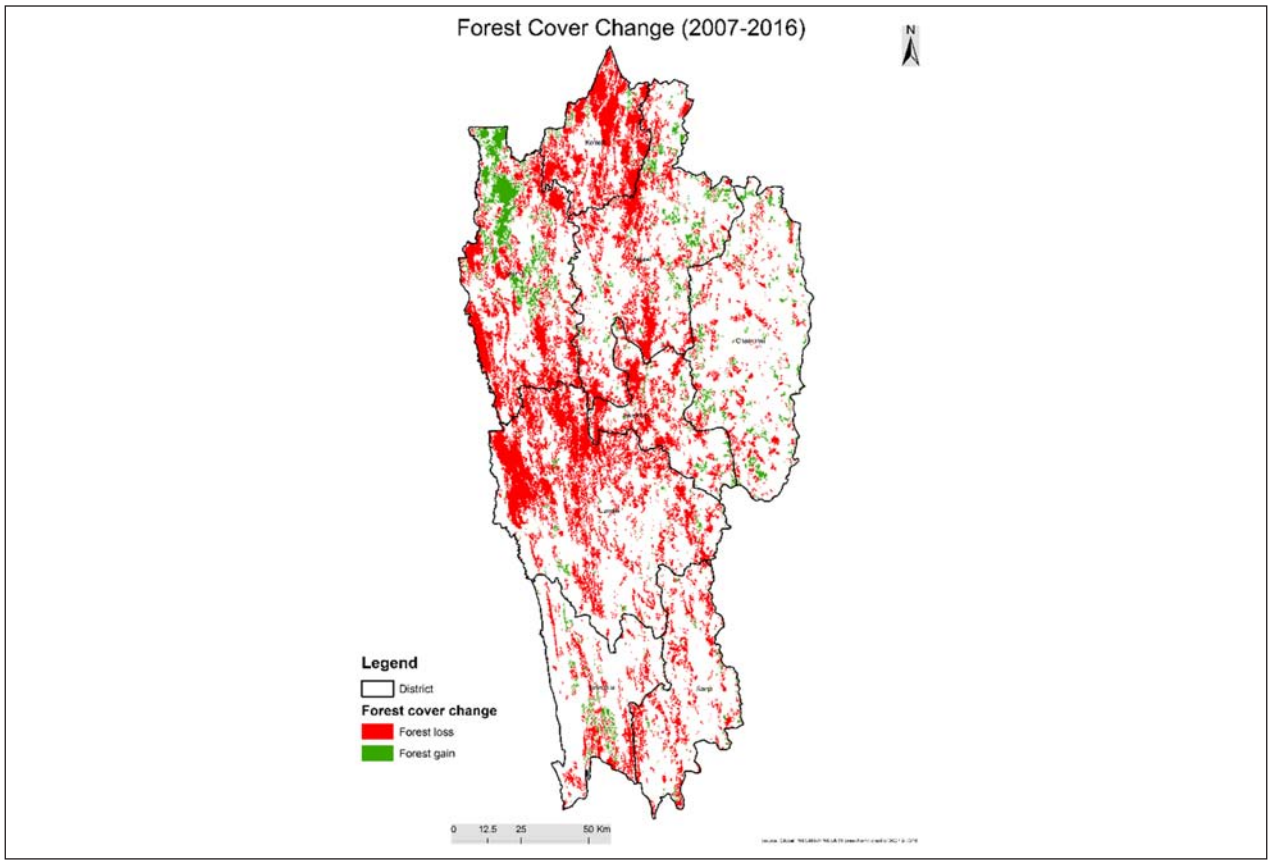


Figure 1: Forest Cover Change Map of Mizoram

Table-1: Forest Cover in Mizoram State 2005-2017 (sq km)

Year	Very Dense Forest (VDF) sq km	Moderately Dense Forest (MDF) sq km	Open Forest (OF) sq km	Total area sq km
2005	133	6,173	12,378	18,684
2009	134	6,251	12,855	19,240
2011	134	6,086	12,897	19,117
2013	138	5,900	13,016	19,054
2015	138	5,858	12,752	18,748
2017	131	5,861	12,194	18,186

Source: http://fsi.nic.in/ (accessed on 12.2.2018)

Table-2: Forest Types of Mizoram State (according to Champion and Seth, 1968)

S. No.	Forest Type Group	Forest Type	Area (sq.km)	Percent
1	Group 2 Tropical Semi-Evergreen Forest	2B/2S1 Pioneer Euphorbiaceous Scrub	280.75	1.50
2	Group 2 Tropical Semi-Evergreen Forest	2B/C2 Cachar Tropical Semi-Evergreen Forest	4675.93	25.03
3	Group 3 Tropical Moist Deciduous Forest	2/2S1 Secondary Moist Bamboo Brakes	8484.05	45.41
4	Group 3 Tropical Moist Deciduous Forest	3C/C3b East Himalayan Moist Mixed Deciduous Forest	5120.17	27.40
5	Group 8 Sub Tropical Broadleaved Hill Forest	8B/C1 East Himalayan Subtropical Wet Hill Forest	6.82	0.04
6	Group 9 Sub Tropical Pine Forest	9/C2 Assam Subtropical Pine Forest	116.28	0.62

(Source: FSI, 2011)

3 CHAPTER

METHODOLOGY AND PROCESS

3.1 Summary of the SRAP Approach

The methodology and process for preparing the Mizoram SRAP were based on the manual "Developing Sub-national REDD+ Action Plans: A Manual for Facilitators" (Richards *et al.*, 2017 a). This manual is based on the experiences of developing five SRAPs in Vietnam and two SRAPs in Nepal under the umbrella of the UN-REDD Programme of these countries, and with full participation of the national REDD+ planning authorities. A summary of the SRAP approach is also available in the briefing paper of ICIMOD (Richards *et al.* 2017 b).There are five main steps in the development of SRAPs as indicated in Table 3.

3.2 Workshop for Formulation of Mizoram State REDD+ Action Plan

Forest Research Centre for Bamboo and Rattan (FRCBR), Indian Council for Forest Research and Education (ICFRE), ICIMOD and Environment, Forests and Climate Change Department (Government of Mizoram) jointly organized a two days multi-stakeholder consultation workshop and expert consultation meeting at FRCBR, Aizawl for formulation of State REDD+ Action Plan (SRAP) for the State of Mizoram. The workshop was attended by officials from FRCBR, Environment, Forests and Climate Change Department, Mizoram University, Autonomous District Council Forest Officers, Mizoram Science Technology

and Innovation Council, local NGOs, media persons, ICFRE, ICIMOD and GIZ. Altogether 44 participants contributed (Annex 1) in developing SRAP for the state of Mizoram through technical support facilitated by ICIMOD. The workshop was held on 25-26th April 2018, and expert consultation meeting was held on 28th April 2018 and attended by 20 participants.

Table-3: The main steps and activities in the SRAP process

Main Steps	Process/activities
Step A: Prepare Initial consultation and inception workshop	Train facilitators, select workshop participants and commission preparatory studies
Step B: Analyse Expert analysis reviewed and endorsed by stakeholders	Analyse satellite imagery maps, discuss and prioritize drivers of deforestation and forest degradation (D&FD) and constraints to forest (biomass) enhancement. Undertake and analyse stakeholder and institutional analysis Identify and prioritize D&FD hotspots
Step C: Plan Develop REDD+ activity package; identify risk and mitigation measures	Identify SRAP intervention packages, analyze implementation, social and environmental risks (complying with REDD+ safeguards), and risk mitigation measures
Step D: Monitor Develop monitoring protocol and indicators	Develop monitoring plans for the SRAP activities or IPs for the risk reduction and benefit enhancement measures
Step E:Budget and approval SRAP approval from REDD+ working group	Detailed activity plan and budget for each and every IPs for 5 years operational plan Formulate SRAP document for approval Endorsement of Mizoram SRAP

CHAPTER 4

DIAGNOSTIC ANALYSIS AND PLANNING

4.1 Prioritization of Drivers of Deforestation and Forest Degradation, and Enhancement Activities

Following the introductory and contextual presentations, the participants were divided into Working Groups (WGs) in order to analyze and prioritize the main drivers of deforestation and forest degradation (D&FD), as well as the main barriers to scaling up forest carbon enhancement activities (reforestation, afforestation, landscape restoration, agro-forestry, etc.) in the state. This prioritization of the drivers and barriers provides the basis for the SRAP in the sense that it defines the 'key challenges' which the REDD+ programme needs to overcome in order to generate positive carbon, social and biodiversity outcomes. It should be noted that the validity of this identification and prioritization process depends partly on how well the workshop participants are informed through the spatial analysis undertaken in preparation for the diagnostic analysis.

A key distinction in this stage is the difference between 'direct drivers' and 'underlying causes'. By definition 'direct drivers' are the specific land use activities (e.g., commercial logging, rubber, oil palm plantations etc.) that replace or degrade the natural forest, whereas the 'underlying causes' are the indirect or underlying factors (e.g., weak forest governance etc.) that lead to the direct drivers. The workshop participants were then

divided into following three working groups (WGs) based on their expertise and interest, as well as maintaining a reasonable institutional distribution among the three groups:

WG A: Deforestation drivers and underlying causes
WG B: Forest degradation drivers and underlying causes
WG C: Barriers to forest carbon enhancement

The process involved firstly a prioritization (e.g., of deforestation drivers) within each WG, secondly a plenary presentation of the higher priorities by each WG, and thirdly an overall scoring by all workshop participants of all the prioritized (by the three WGs) D&FD drivers and barriers to enhancement. Table 4 presents the results of the priority drivers and barriers (to enhancement) identified for Mizoram State.

Table 4: Priority D&FD drivers and barriers to enhancement in Mizoram (identified in consultation workshop)

Direct Drivers or Barriers	Deforestation	Forest Degradation	Barriers to Forest Carbon Enhancement
	Topographic factors	Shifting cultivation	Socio-cultural aspect and tradition
	Traditional farming methods	Forest fire	Lack of economic resources
	Limited livelihood options	Firewood and NTFP collection	Topography
Underlying or indirect causes	Limited flat land	Low socio-economic status	Traditional agricultural practices
	Unavailability of irrigation	Abiotic factors (soil, rainfall, temperature, topography, slope and terrain)	Poor technology or lack of technical inputs
	No alternative for shifting cultivation	Remoteness	Low return from agriculture
	Income generation	Lack of awareness	Remote or inaccessible markets
	Food security	High livelihood dependency on forest resources	Low impact of government initiative son conservation
	Lifestyle of Mizo people	Weak government policies and poor law enforcement	Lack of finance/credit for farmers
	Lack of awareness	Land and revenue policies	Insufficient research on improved tree planting technology
	To meet the domestic demand	Traditional practices	Low capacity/awareness of extension
		Lack of viable income opportunities	Traditional agriculture practice
			Loss of soil on hill slopes
			Water scarcity

The workshop participants identified the following prioritized direct D&FD drivers and barriers (to enhancement) :

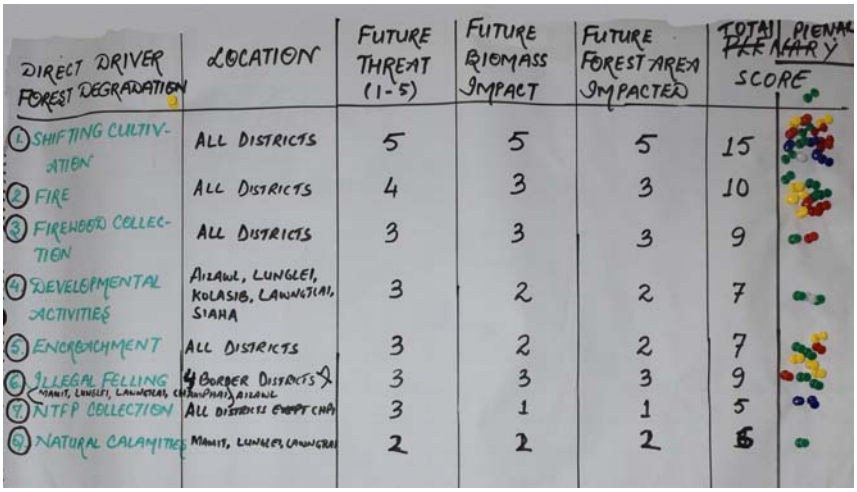
- **Direct drivers of deforestation :** Topographic factors, traditional farming methods, and limited livelihood options.
- **Direct drivers or causes for forest degradation:** Shifting cultivation, forest fire, and fuelwood and NTFP collection.
- **Barriers to enhancement :** Socio-cultural aspects and tradition, lack of economic resources, and topography.

Then through a participant scoring system, the following three priority key challenges were selected:

1. Shifting cultivation (as a direct driver of deforestation and forest degradation)
2. Forest fire (as a direct driver of forest degradation)
3. Lack of adoption of settled agriculture (as a barrier to enhancement activities)

On the basis of multi-stakeholders consultation workshop, several areas of having deforestation and forest degradation were identified. In addition, areas having possibility of carbon enhancement were also identified. All the identified places were ranked on the basis of importance to address the problem.

These prioritized deforestation and forest degradation (D&FD) drivers and barriers to enhancement constitute the 'key challenges' that provide the basis for the rest of the analysis, which involves the development of a problem tree each key challenge, and a solution tree from which the REDD+ Intervention Packages (IPs) can be identified, and which will form the basis of the Mizoram State REDD+ Action Plan (SRAP).



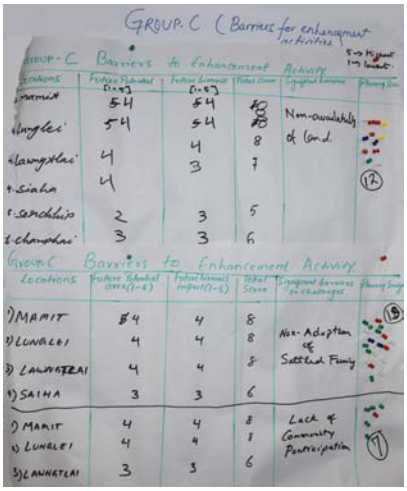
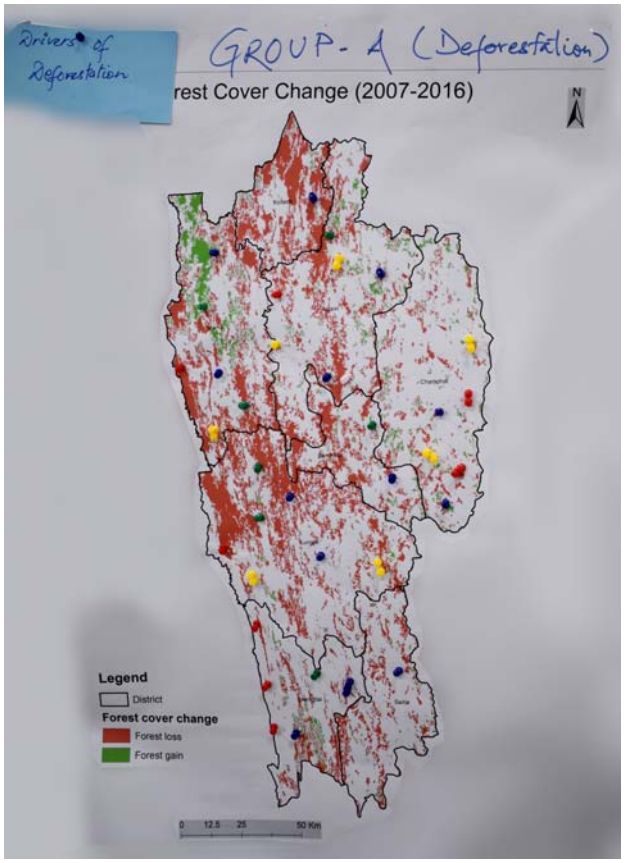
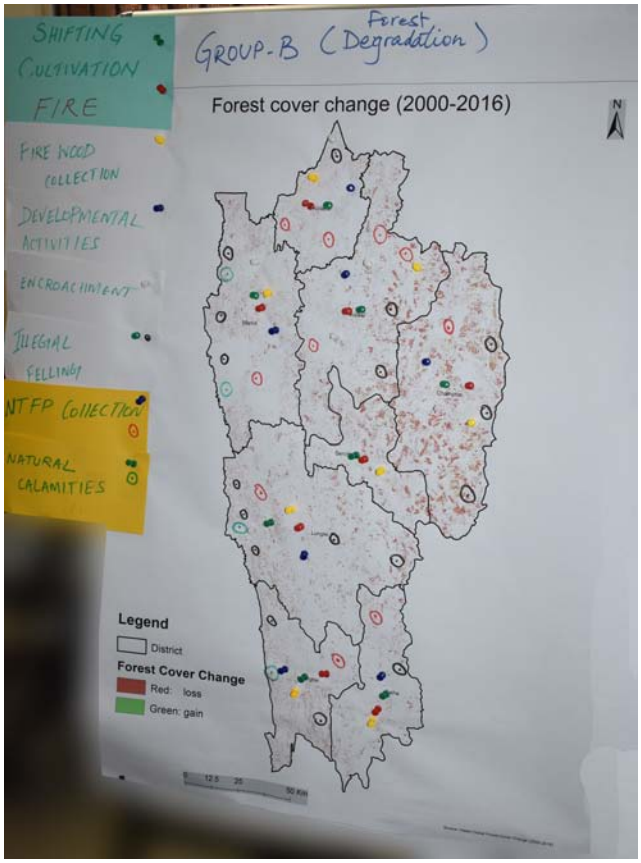


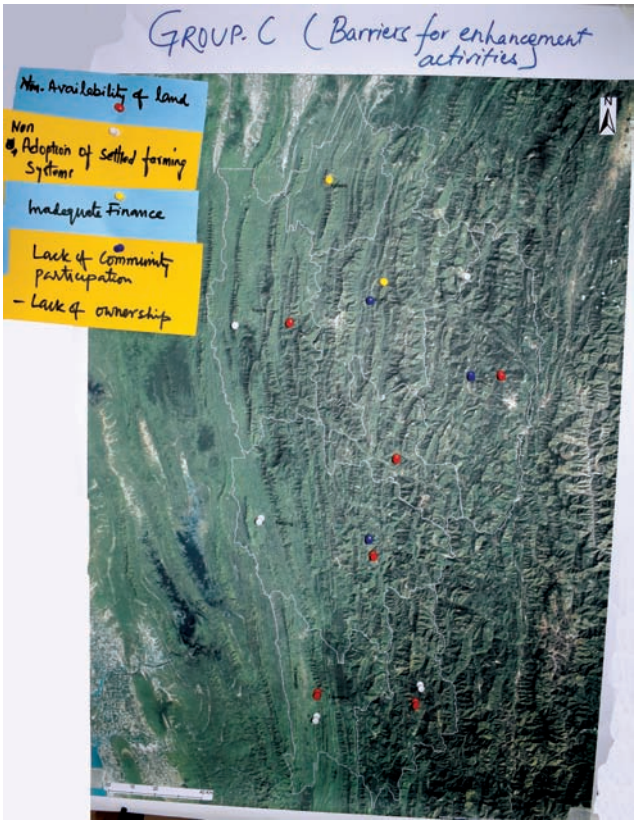
Figure 2: Mizoram workshop sheets of prioritization of deforestation and forest degradation drivers and barriers to enhancement



Areas with deforestation



Areas with forest degradation



Areas having possibility of carbon enhancement

Figure 3: Areas with deforestation, forest degradation and areas for carbon enhancement in Mizoram

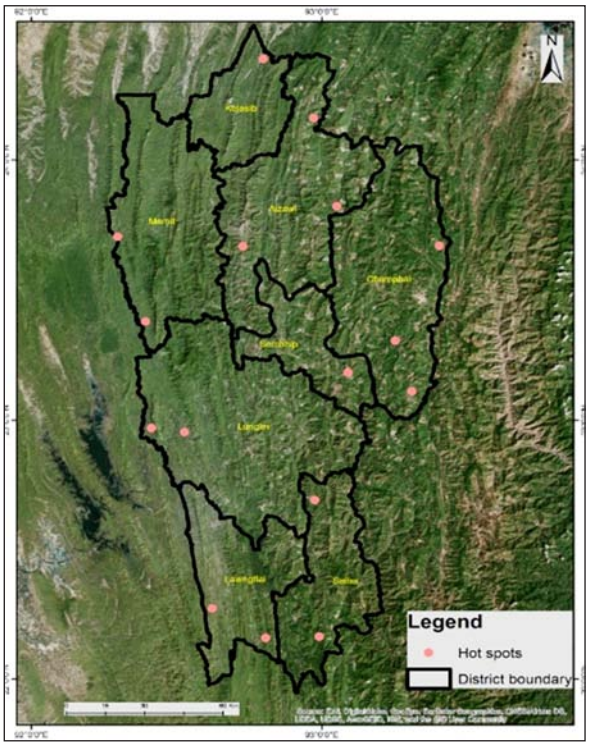


Figure 4: Map of hotspots in Mizoram

4.2 Development of Problem and Solution Trees

Problem and solution tree analysis (also called "participatory theory of change" analysis) is a participatory tool for mapping out the main problems, along with their causes and effects, to come up with a set of clear and manageable goals and a strategy of how to achieve them. More detailed explanation is given in the manual for facilitators for developing SRAP (Richards *et al.*, 2017 a). There are two main stages to this process:

1) identification of the direct and underlying causes of each key challenge in the form of a problem tree; and,
2) the inversion of the problems into objectives and solutions leading to a solution tree or "results chain" showing potential solutions or strategies that respond to the drivers or barriers, and which can then lead to identification of the IPs.

From the three sets of problem trees (Annex 5) and solution trees (Figure 5 to 8), the following four desired outcomes were identified for addressing the main D&FD drivers and barriers to forest carbon enhancement in Mizoram State:

1. Minimized Shifting Cultivation (to address Deforestation)

   To address shifting cultivation as a driver of deforestation, the desired outcome in the solution tree (Figure 5) was formulated as 'Minimized shifting cultivation'. From the solution tree, four key results were identified for achieving this desired outcome: development of hill terracing and contour farming; promotion of horticultural crops; promotion of permanent farming systems; and development of a habitat mosaic for biodiversity.

2. Minimized Shifting Cultivation (to address Forest Degradation)

   Another key driver of forest degradation was shifting cultivation, and the desired outcome formulated in the solution tree (Figure 6) was 'Shifting cultivation minimized'. From the solution tree, three key results for achieving this desired outcome were identified: 'Reduced dependency on firewood', 'Improved farming practices' and 'Viable income opportunities provided'.

3. Forest Fire Controlled (to address Forest Degradation)

   Forest fire was identified as a major driver of forest degradation, and the desired outcome

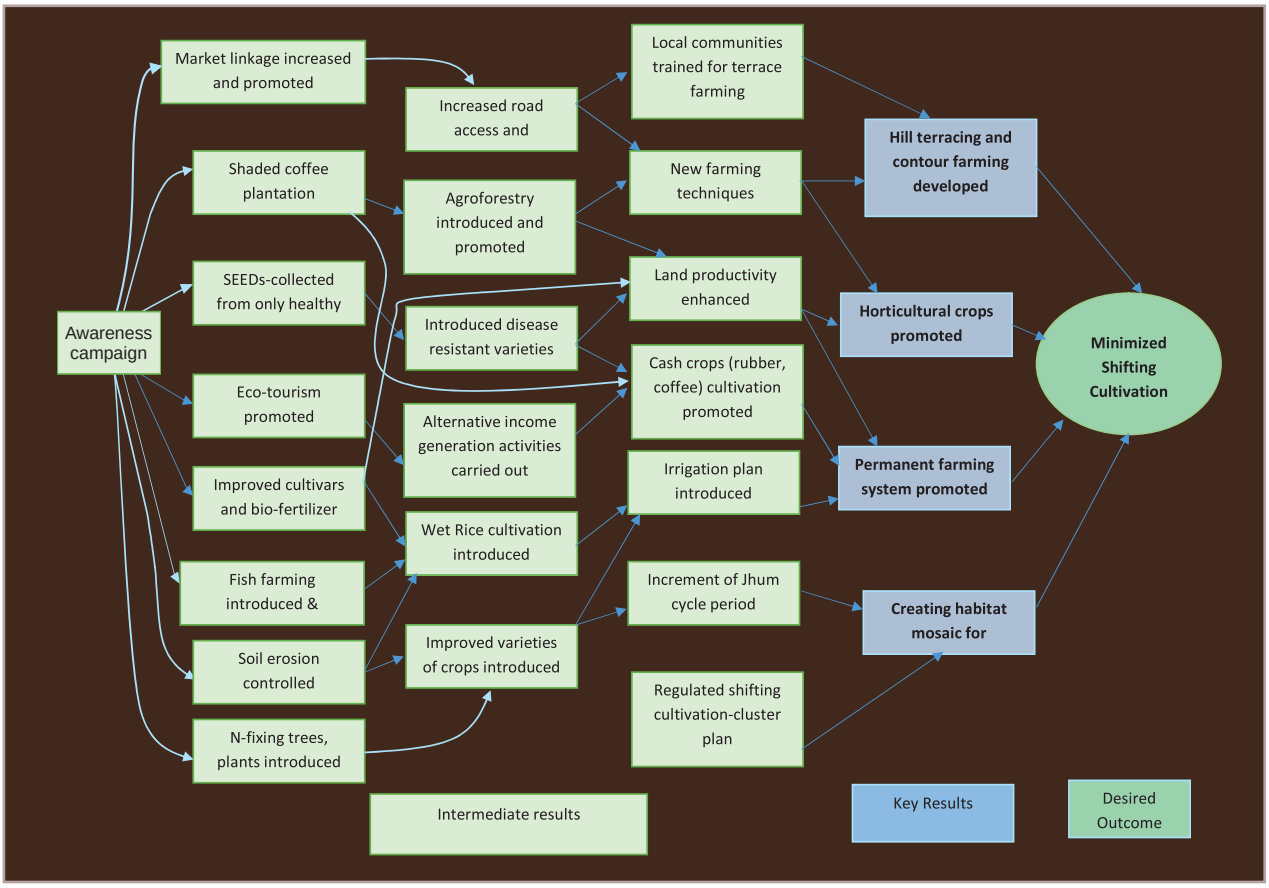


Figure 5: Solution tree for deforestation: Minimized shifting cultivation

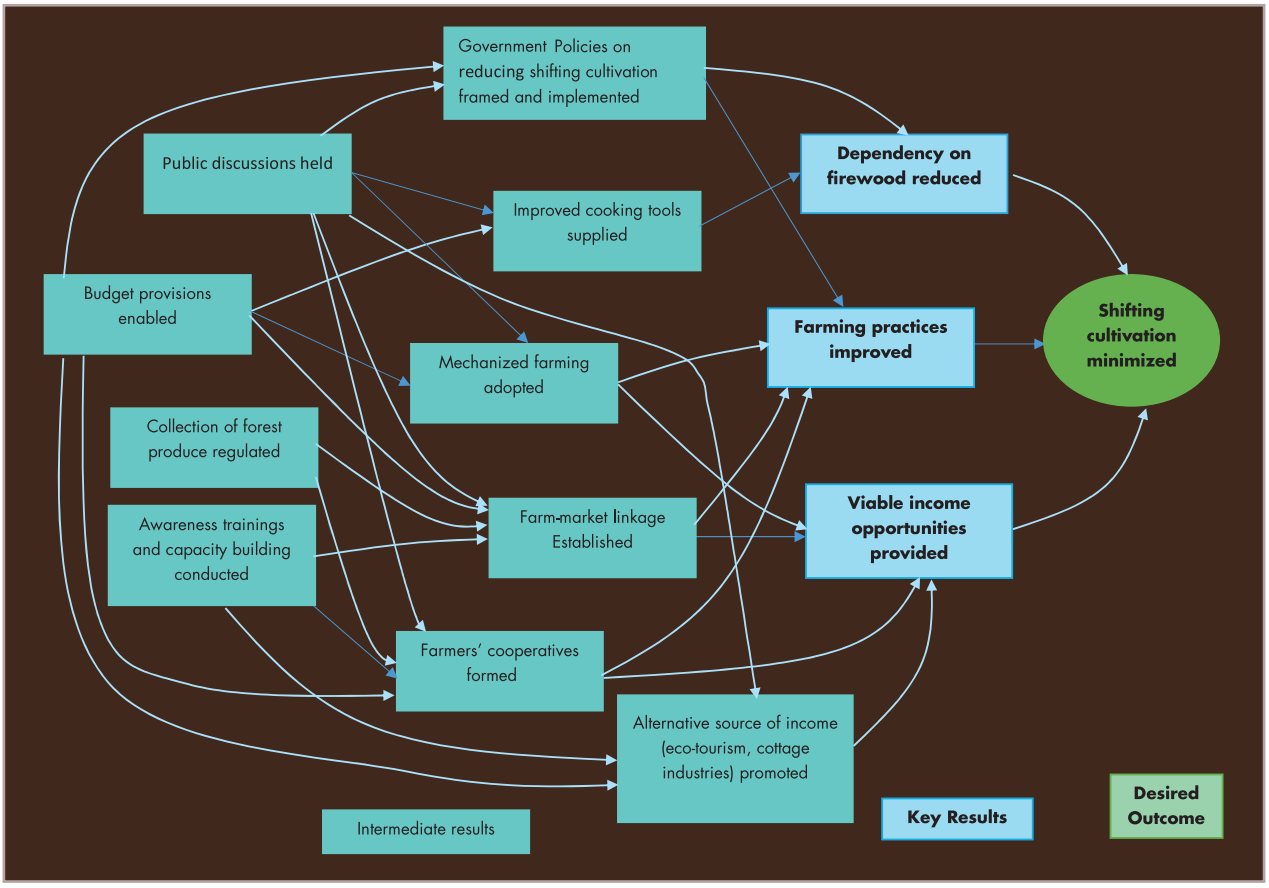


Figure 6: Solution tree for forest degradation: Minimized shifting cultivation

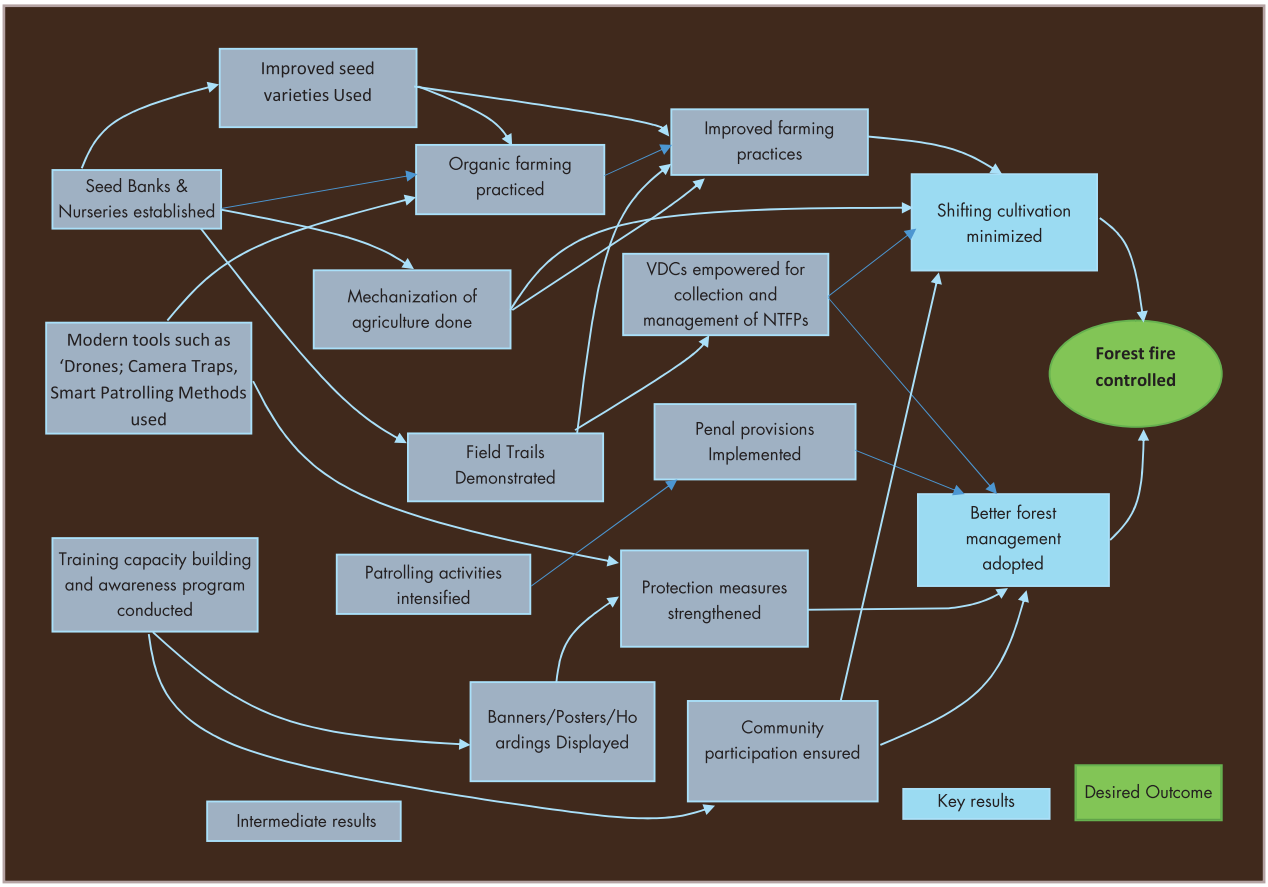


Figure 7: Solution tree for forest degradation: Forest fire controlled

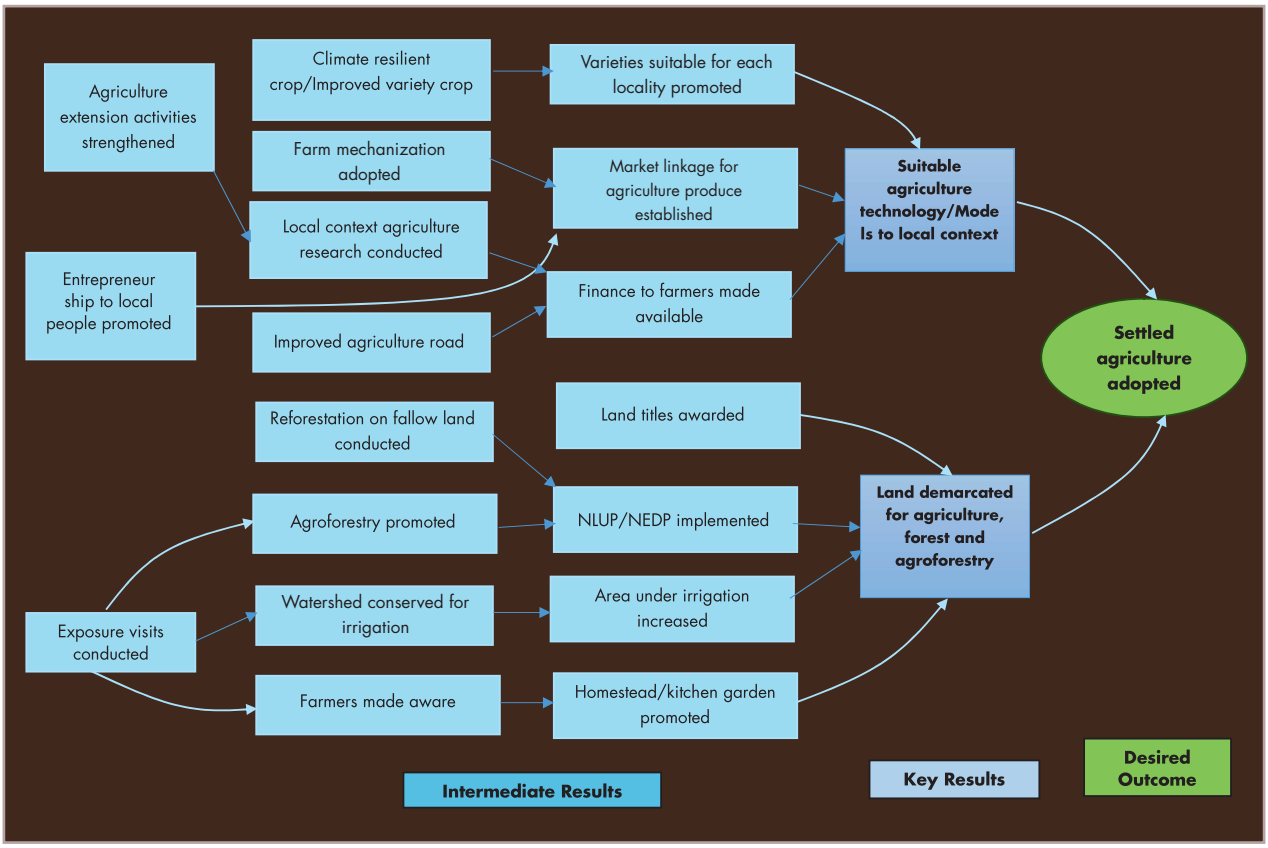


Figure 8: Solution tree for barriers for forest enhancement: settled agriculture adopted

formulated in the solution tree (Figure 7) was 'Forest fire controlled.' From the solution tree two key results for achieving this desired outcome were identified: 'Shifting cultivation minimized' and 'Better forest management adopted'.

4. Settled Agriculture Adopted (to address barriers to enhancement activities)

Lack of adoption of settled agriculture was identified as a key barrier to forest enhancement activities and settled agriculture adopted' was formulated in the solution tree (Figure 8) as the desired outcome. From the solution tree two key results were identified for achieving this desired outcome: 'Suitable agriculture technology/ models to local context' and 'Demarcation of land for agriculture, forests and agroforestry'.

4.3 Development of Intervention Packages

The most important key results in the solution trees were used as the basis for the strategies in the intervention packages (IPs).Each IP requires a set of activities and a strategy as shown in Table

5. Its important to note that each intervention package should be implemented and monitored independently, especially if different sources of funds are available from different ministries or agencies.

Table-5: Intervention packages, strategies and outputs

Drivers or barriers addressed	Name of Intervention Package	Strategies	Outputs
Deforestation and forest degradation	Sustainable cropping pattern and land management	Adoption and expansion of settled hillside farming systems	**1. Terracing/contour and permanent farming system adopted** **2. Vermi-compost/organic manure produced** **3. Agroforestry and enrichment plantation promoted** **4. Wet rice cultivation (WRC) with fish farming expanded**
Deforestation	Adoption of horticultural crops	Promotion of horticultural crops for improved livelihood options	**1. High value cash crops promoted** **2. Value addition of horticultural crops**
Deforestation	Creating mosaic habitat for biodiversity conservation	Establishment and connecting in-situ parks in the landscape for ecotourism opportunities	**1. Jhuming cycle regulated** **2. In-situ conservation of flora and fauna improved** **3. Nature based tourism promoted**
Forest degradation	Livelihood improvement	Providing income opportunities to shifting cultivation farmers	**1. Skill development programmes and trainings imparted** **2. Improved land entitlement to forest dependent local communities (direct dependent users that depend on forest for bona fide livelihood needs)** **3. Supported cooperatives/self-help groups/micro-finances for livelihood improvement**
Forest degradation	Forest fire control and management	Community capacity building and involvement in forest fire management	**1. Management mechanism for forest fire mitigation established** **2. Boundary demarcation of government notified forest area and community land carried out**

Drivers or barriers addressed	Name of Intervention Package	Strategies	Outputs
Forest degradation	Sustainable energy supply	Alternative and sustainable energy made accessible to local communities	**1. Improved supply of LPG and ICS promoted** **2. Firewood supply for local communities better managed** **3. Agroforestry and enrichment plantation promoted**
Forest enhancement	Market linkages for agriculture produce	Sustainable agriculture technology and models adopted	**1. Financial and technical assistance provided** **2. Improved market access to cooperatives** **3. Market identified and linkage established**
Forest enhancement	Demonstration of private plantation and agroforestry	Appropriate use of unproductive lands and reducing soil erosion	**1. Agroforestry and private plantation including multi-tier agroforestry developed and demonstrated.** **2. Commercial horticulture farming demonstrated**

4.4 Strategies and Activities

Each IP requires a set of activities for achieving the strategies and outputs. These are shown in Table 6.

Table-6: Strategies and activities

Name of Intervention Package (IP)	Strategies	Activities
Sustainable cropping pattern and land management	Adoption and expansion of settled hill farming system	• Site survey, selection and preparation of land. • Capacity building/ training on terracing/contour and permanent farming system • Development of irrigation channels • Construction of vermi-compost/manure collection tank (pit-holes etc.) • Awareness campaigns on agroforestry systems • Development of nurseries to promote agroforestry and enrichment plantation • Selection of appropriate paddy varieties • Financial and technical support for the establishment of wet rice cultivation cum fish farming
Adoption of horticulture crops	Promotion of horticulture crops for improved livelihood options	• Selection of appropriate cash crop varieties • Capacity building on plantation and management • Plantation of horticulture/cash crops • Financial and technical support • Development of cottage industries and establishment of market linkages
Creating mosaic habitat for biodiversity conservation	Establishment and connecting in-situ parks in the landscape for ecotourism opportunities	• Awareness campaigns on management of jhum cycle • Jhumming in cluster • Identification and selection of sites • Financial and technical assistance • Establishment of eco-parks, nature trails and homestays • Initiation of adventure tourism such as zip-liners, paragliding

Name of Intervention Package (IP)	Strategies	Activities
Livelihood improvement	Providing income opportunities to shifting cultivation farmers	• Training/capacity building activities for Income Generation Activities (IGAs) • Vocational and value-added trainings for youth including 'Green Skill Development' programmes • Poverty Reduction Programmes through skills development trainings • Issuance of temporary land use passes • Establishment of market linkages • Establishment of storage facilities/common facilities centers for NTFPs
Forest fire control and management	Community capacity building and involvement in forest fire management	• Effective enforcement of forest rules and regulations (targeting checking of illegal felling) • Plantation of fire-resistant tree species • Deployment of modern tools such as drones, GPS etc. • Capacity building programmes for front line staff and communities • Advanced research and management of forest fire • Land zoning and implementation relating to forest sector • Effective coordination between government, line agencies, and local communities
Sustainable energy supply	Alternative and sustainable energy made accessible to local communities	• Frequent coordination between supply agencies and transport agencies • Awareness programmes to encourage the local communities to adopt improved cook stoves(ICS) • Trainings on management and maintenance of ICS • Enrichment plantation activities in supply reserve areas • Creation of firewood lot and monitoring visits • Awareness programmes on agroforestry and biomass energy • Selection of agroforestry species (firewood species such as *Derris robusta*, *Anogeissus acuminata, Schima wallichi, Pinus* species, *Quercus* species etc) • Development of nurseries to promote agroforestry
Market linkages for agriculture produce	Sustainable agriculture technology and models adopted	• Awareness and capacity building programmes/ trainings in sustainable agriculture practices • Demonstration plots of suitable agricultural practices • Procurement of tools and machinery suitable to hillside agriculture • Soft loans and financial assistance to farmers • Strengthening cooperation and coordination between cooperatives and farmers • Financial assistance for development of cooperative infrastructures (office, storage facilities etc.) • Value addition for agricultural produce • Developing communication amongst farmers, agriculture experts and, institutes, and markets • Development of mobile apps • Development of toll-free/helpline numbers (*krishi/lo-hnathawkmi* helpline number)
Demonstration of private plantation and agroforestry	Appropriate use of unproductive lands and reducing soil erosion	• Demonstration plots on appropriate agroforestry models • Promotion of homestead/kitchen garden • Selection of suitable horticulture crops • Watershed conservation for irrigation facilities • Exposure visits to farmers

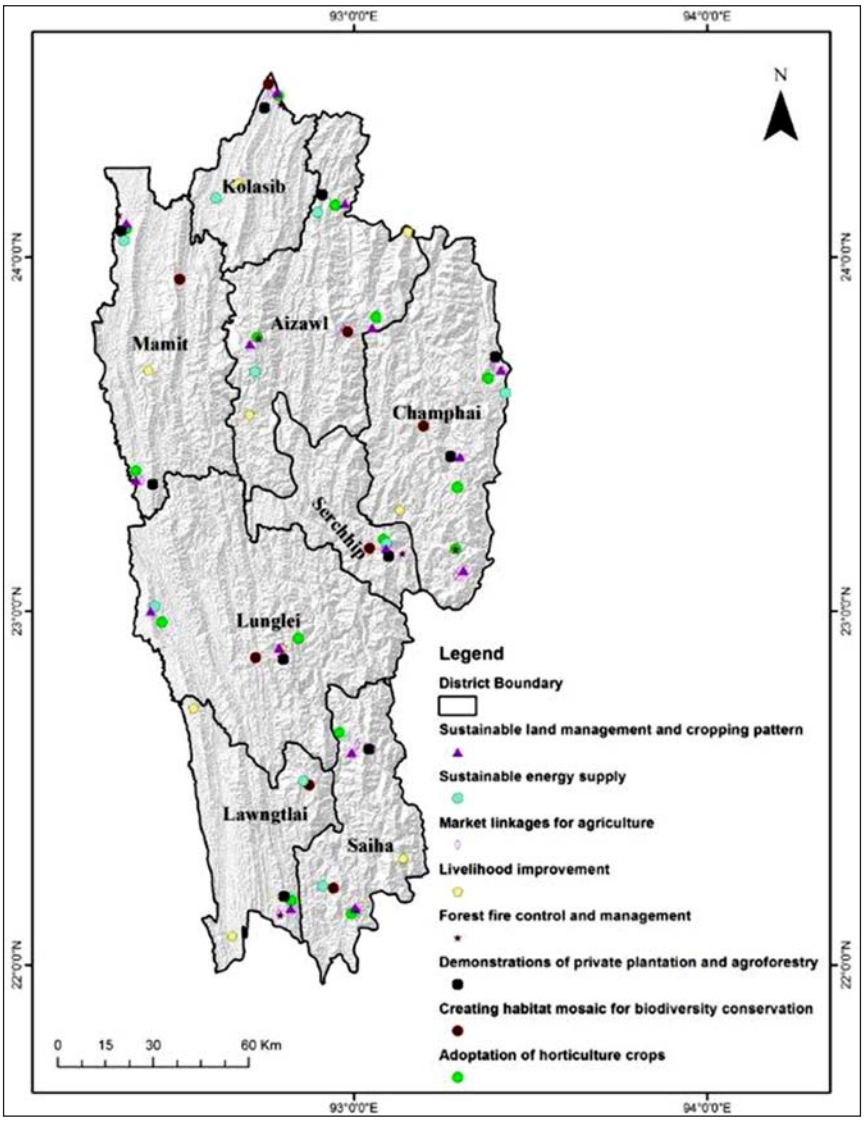


Figure 9: Intervention activities in the hotspots

4.5 Feasibility Analysis of Intervention Packages

An analysis and evaluation of intervention packages were carried out to determine their feasibility: (i) will be technically feasible, (ii) will be feasible within the estimated cost, and (iii) will be profitable. Feasibility analysis provides a basis for deciding which IPs are more practical and cost-effective, and which ones it may be better to leave out of the SRAP since they are less feasible and cost-effective .

In the SRAP planning process feasibility analysis can be conducted in small expert groups who assess the strengths and weakness of each IP. During this meeting, experts analyzed the risks and obstacles of implementing the IPs, which ultimately provides the overall feasibility of IPs. It was noted that the risks or obstacles should not include lack of finance or resources since it is assumed that the costs and resources required for implementation will be covered by REDD+ finance. At the same time cost-effectiveness is considered to be a vital criterion for feasibility analysis.

Table 7 shows the overall feasibility of the IPs. The scores indicate that all the IPs were reasonably feasible. The most feasible IP was Sustainable energy supply followed by Sustainable cropping pattern and land management, and Livelihood improvement. Moderately feasible IPs were:

Adoption of horticulture crops, creating habitat mosaics for biodiversity conservation, Market linkages for agriculture, Demonstrations of private plantation and agroforestry.

Table-7: Overall feasibility analysis of intervention packages

Intervention Packages	Implementation risks/obstacles (L=3, M=2, H=1)	Cost-effectiveness of risk reduction measures (L=1, M=2, H3)	Implementation cost (L=3, M=2, H=1)	Opportunity cost (L=3, M=2, H=1)	Incentive measures (L=1, M=2, H=3)	Total score
Sustainable cropping pattern and land management	1	3	2	3	3	12
Adoption of horticulture crops	2	2	1	3	3	11
Creating habitat mosaic for biodiversity conservation	3	3	3	1	1	11
Livelihood improvement	1	3	1	3	3	11
Forest fire control and management	2	3	2	1	1	9
Sustainable energy supply	3	3	1	3	3	13
Market linkages for agriculture produce	1	3	1	3	3	11
Demonstration of private plantation and agroforestry	1	1	2	3	3	10

4.6 Safeguard Analysis

Safeguards analysis mainly refers to the identification of risks or threats as regards the “Cancun Safeguards” and other social and environmental or biodiversity-related risks. The analysis also refers to the contribution made by the intervention packages (IPs) to the enhancement of social and environmental benefits. One of the crucial criteria for social risk is whether the IPs negatively impact a targeted vulnerable group, and for an environmental risk whether it negatively impacts biodiversity and ecosystem services.

For the Mizoram SRAP, safeguard analysis was conducted through an exchange of working groups in order to refine and improve the analysis made by the first working group of stakeholders (in other words, a second working group identified social and environmental risks and threats associated with the activities/strategies of each IP).

Table 8 presents the risks or threats identified for each IP, including the risk reduction measures, and Table 8 provides for the benefits of the IPs, including the benefit enhancement measures. In this way both the risks and benefits of the IPs were assessed and addressed.

Table-8: Implementation risks and obstacles analysis of Intervention Packages

Intervention Packages	Implementation Risk or Obstacles	Likelihood of Risk (H/M/L)	Impact of Risk (H/M/L)	Risk Reduction Measures
Sustainable land management and cropping pattern	Current unsustainable management practices	H	H	Awareness, exposure to best practices, motivation, incentives
Adoption of horticulture crops	Lack of technologies and market assurance	M	M	Research and extension, technological inputs, Improve market linkage
Creating habitat mosaic for biodiversity conservation	Lack of awareness and motivation Lack of sense of ownership	L	M	Public awareness and participation, reduce human wildlife conflict
Livelihood improvement	Lack of skills, limited opportunities	H	H	Trainings and skills development, creating new employment opportunities
Forest fire control and management	Carelessness, Lack of awareness,	M	H	Awareness campaigns
Sustainable energy supply	Inadequate supply Transportation and infrastructure, poverty	L	M	More programs on sustainable energies targeted to rural areas
Market linkages for agriculture produce	Transportation, distance to remote areas, Lack of support prices	H	H	Improve connectivity, improve infrastructure and communication, Assured prices
Demonstration of private plantation and agroforestry	Lack of skills, good seedlings and willingness	H	H	Awareness campaigns

Table-9: Analysis of social and environmental benefits of Intervention Packages

Intervention Packages	Social/environmental benefits	Likelihood of benefit (H/M/L)	Impact of benefit (H/M/L)	Benefit Enhancement Measures
Sustainable land management and cropping pattern	Higher economic returns from	M	H	Target farmers with arable land
Adoption of horticultural crops	High value agriculture	M	M	Establish market linkage for horticulture produce
Creating habitat mosaic for biodiversity conservation	Increase in floral and faunal biodiversity	L	L	Reduce possibility of human wildlife conflicts
Livelihood improvement	Livelihood opportunities created	H	H	Develop programmes for targeted groups
Forest fire control and management	Wild and uncontrolled fires managed	M	H	Demarcations required supported by adequate awareness campaigns
Sustainable energy supply	Improved access to energy	H	H	Adequate finance available for promoting and adoption of sustainable energy supplies
Market linkages for agriculture produce	Value addition of farm products	M	M	Selection of appropriate farmers that adopt improved technology
Demonstration of private plantation and agroforestry	Appropriate use of unproductive lands, Economic benefits	H	H	Adequate finance for the establishment of demonstration sites and training program to manage the demonstration sites

4.7 Gaps Analysis

The Environment, Forests and Climate Change Department, local authorities, other state departments/ organizations and NGOs currently implement a range of activities or measures that address D&FD drivers, however, following major gaps/challenges have been observed (between current practice and what is needed for success of the SRAP) for implementing SRAP activities in Mizoram:

- Difficulty in estimating the emission reduction and removals at state level as a result of implementing the SRAP.
- Land entitlement is an issue in Mizoram, there is weak enforcement of land use policies, and demarcation between different land uses is not clear.
- Shifting cultivation as an extensive agriculture practice is deeply rooted in the traditions and lifestyle of the Mizo people.
- There is a dearth of capacity at different levels to comprehend and articulate the compliance process of REDD+.

4.8 Monitoring

The UNFCCC does not require measurement, reporting and verification (MRV) of emission reductions and removals at the sub-national level, but it is essential to monitor the SRAP implementation, both for adaptive management of the SRAP and to be able to compensate or incentivize local stakeholders for their contribution to positive outcomes. Therefore, a monitoring plan forms a vital part of the SRAP, including the description of an institutional framework to carry out monitoring activities. The SRAP review workshop revealed that the development of the monitoring plan for the SRAP is a challenging task, both technically and institutionally. It is important to build, to the extent possible, on pre-existing monitoring frameworks to assess the implementation of IPs and the impact of the SRAP as a whole on forest-related indicators. Training the State Department of Environment, Forests and Climate Change together with local stakeholders in basic data collection can also improve cost-effectiveness of monitoring approaches and provide a means for validation of data generated at the state or local level.

BUDGET AND OPERATIONAL PLAN

Detailed and transparent budgeting of the SRAP resulted in the development of a five-year operational plan (Table 10) to be presented to the national Government and potential donors. The quantitative implementation targets defined in the planning stage (and that are also required for the monitoring plan) are the starting point for the budgeting process, followed by a detailed analysis of the activities, tasks (within each activity) and resources needed. The budgeting stage also involved a "gaps analysis" to identify activities in the IPs that are already planned and budgeted since the SRAP budget and operational plan is only for additional resource requirements.

Table-10: Estimated Budget for 5 Year Operational Plan

Intervention Packages	Year 1	Year 2	Year 3	Year 4	Year 5	Total (INR)
Sustainable land management and cropping pattern	19,950,000	19,950,000	9,975,000	9,975,000	6,650,000	**66,500,000**
Adoption of horticulture crops	4,650,000	4,650,000	2,325,000	2,325,000	1,550,000	**15,500,000**
Creating habitat mosaic for biodiversity conservation	30,900,000	30,900,000	15,450,000	15,450,000	10,300,000	**103,000,000**
Livelihood Improvement	8,430,000	8,430,000	4,215,000	4,215,000	2,810,000	**28,100,000**
Forest fire control and management	5,889,300	5,889,300	2,944,650	2,944,650	1,963,100	**19,631,000**
Sustainable energy supply	2,355,000	2,355,000	1,177,500	1,177,500	785,000	**7,850,000**
Market linkages for agriculture	6,885,000	6,885,000	3,442,500	3,442,500	2,295,000	**22,950,000**
Demonstrations of private plantation and agroforestry	2,070,000	2,070,000	1,035,000	1,035,000	690,000	**6,900,000**
Total in INR	**81,129,300**	**81,129,300**	**40,564,650**	**40,564,650**	**27,043,100**	**270,431,000**
Total in USD (exchange rate, 1 USD=71.86)	**1,128,991**	**1,128,991**	**564,496**	**564,496**	**376,330**	**3,763,304**

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ANNEX 1

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ANNEX 2

List of participants of expert consultation meeting for formulation of Mizoram State REDD+ Action Plan

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ANNEX 3

Relevant state level stakeholders of Mizoram

Government Institutions

1. Department of Environment, Forests and Climate Change
2. Agriculture Department
3. Animal Husbandry Department
4. Horticulture Department
5. Land Resource, Soil and Water Conservation Department
6. Local Administration Department
7. Rural Development
8. Sericulture Department
9. Commerce and Industries department
10. Public Works Department
11. Revenue Department
12. Power and Electricity
13. State Biodiversity Board

Science and Technology Institutions

1. Forest Research Centre for Bamboo and Rattan
2. Mizoram University
3. ICAR –Krishi Vigyan kendra
4. Central Agriculture University – Veterinary and Horticulture College
5. Zoram Energy Development Agency
6. MIRSAC-Mizoram Remote Sensing Application Centre
7. RIPANS-Regional Institute of Paramedical and Nursing Sciences

Non-Government Organizations

1. Young Mizo Association
2. Environment and Biodiversity NGOs
3. Mizo Hmeichhe Insuihkhawm Pawl

Private Sectors

1. Bamboo and Cane industries
2. Teak Planters Association
3. Commercial plantation
   a) Tea
   b) Coffee planters
   c) Oil palm
   d) Rubber
   e) Arecanut
   f) Broomstick
   g) Horticultural crops
4. Wood based industries
5. Charcoal and vinegar producers

ANNEX 4

Ranking of Deforestation & Forest Degradation Drivers and Enhancement Activities

Prioritization of deforestation drivers

Direct Drivers	Location in the state	Future threat	Future Biomass impact	Future Forest Area impacted	Total	Plenary Score
Forest fire	North East and South West part	3	3	2	8	14
Shifting cultivation	All districts	4	4	4	12	12
Development works	All districts	1	1	1	3	8
Timber logging	Mamit, Lunglai, Lawngtlai, Serchhip districts	3	2	3	8	6
Natural Calamities	Lawngtlai and Lunglei	1	1	1	3	
Collection of NTFPs	All districts	2	1	2	5	
Grazing	Aizawl and Champhai district	1	1	1	3	
Charcoal burning	Champai and Serchhip district	1	1	1	3	

Prioritization of forest degradation drivers

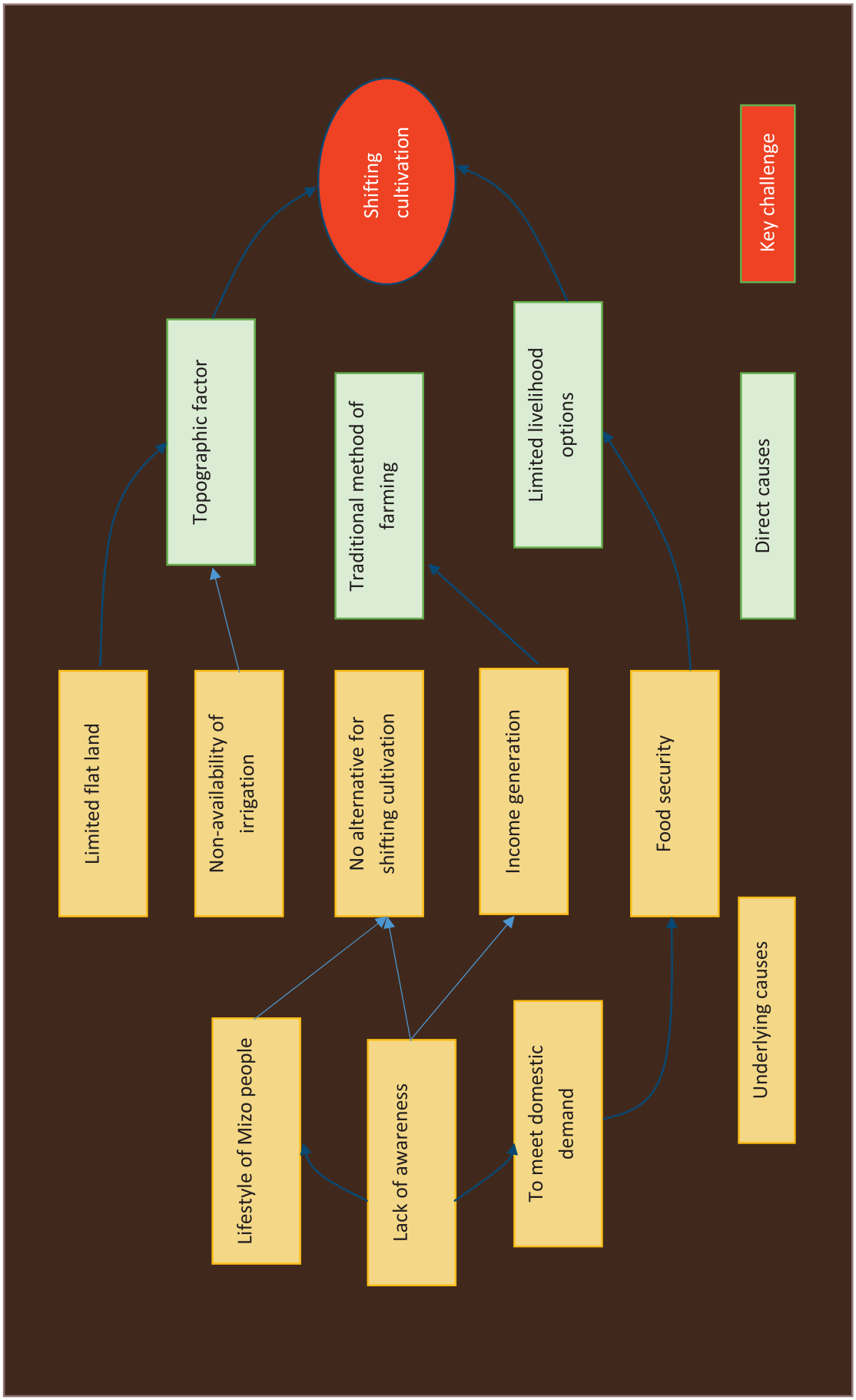
Direct Drivers	Location	Future Threats (1-5)	Future Biomass Impact (1-5)	Future Forest Area Impacted (1-5)	Total Score	Plenary Score
Shifting Cultivation	All districts	5	5	5	15	15
Forest Fire	All districts	4	3	3	10	11
Firewood Collection	All districts	3	3	3	9	2
Developmental Activities	Aizawl, Lunglei, Kolasib, Lawngtlai, Siaha	3	2	2	7	3
Encroachment	All districts	3	2	2	7	5
Illegal Felling	4 Border districts (Mamit, Lunglei, Lawngtlai, Champhai)	3	3	3	9	5
NTFP Collection	All districts except Champai	3	1	1	5	2
Natural Calamities	Mamit, Lunglei, Lawngtlai	2	2	2	6	1

Barriers to improve forest management, Mizoram

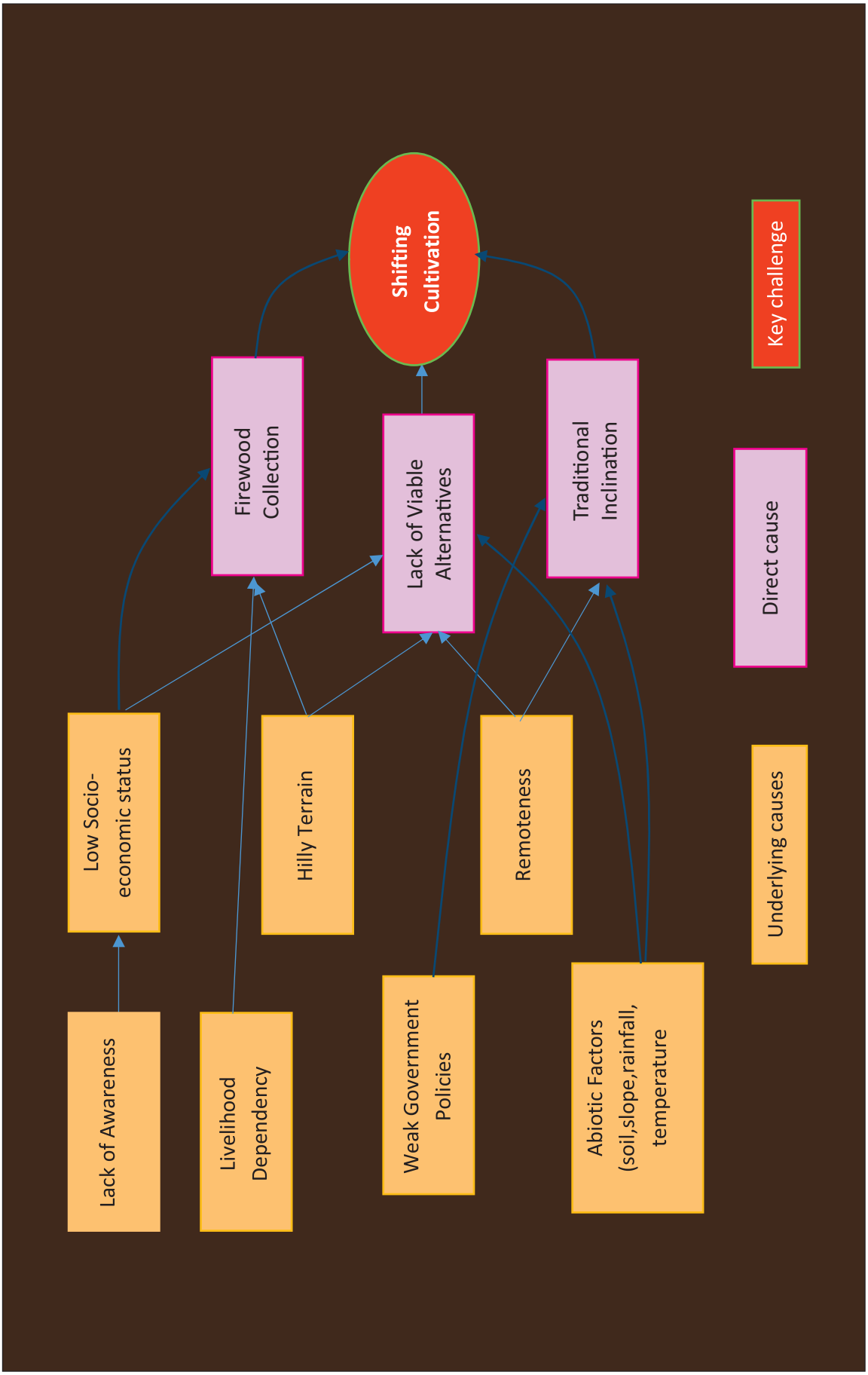
S. No.	Locations	Future potential area [1-5]	Future biomass impact [1-5]	Total Score	Significant barriers or challenges	Plenary scoring
1	Mamit	4	4	8	Non-availability of land	12
2	Lunglei	4	4	8		
3	Lawngtlai	4	4	8		
4	Siaha	4	3	7		
5	Serchhip	2	3	5		
6	Champhai	3	3	6		
1	Mamit	4	4	8	Non-adoption of settled farming	19
2	Lunglei	4	4	8		
3	Lawngtlai	4	4	8		
4	Siaha	3	3	6		
1	Mamit	4	4	8	Lack of community participation	7

ANNEX 5

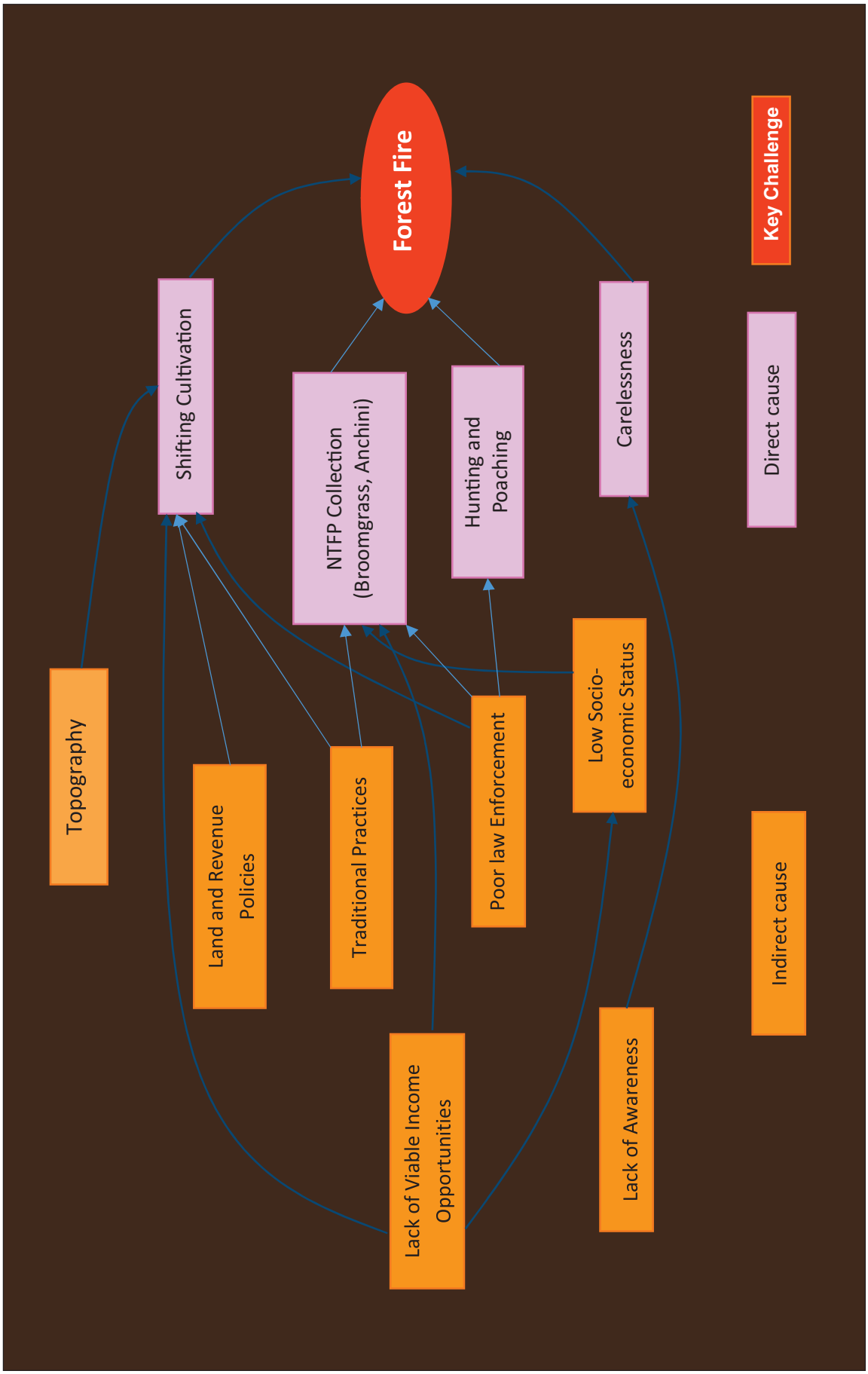
Problem tree for deforestation : Shifting cultivation



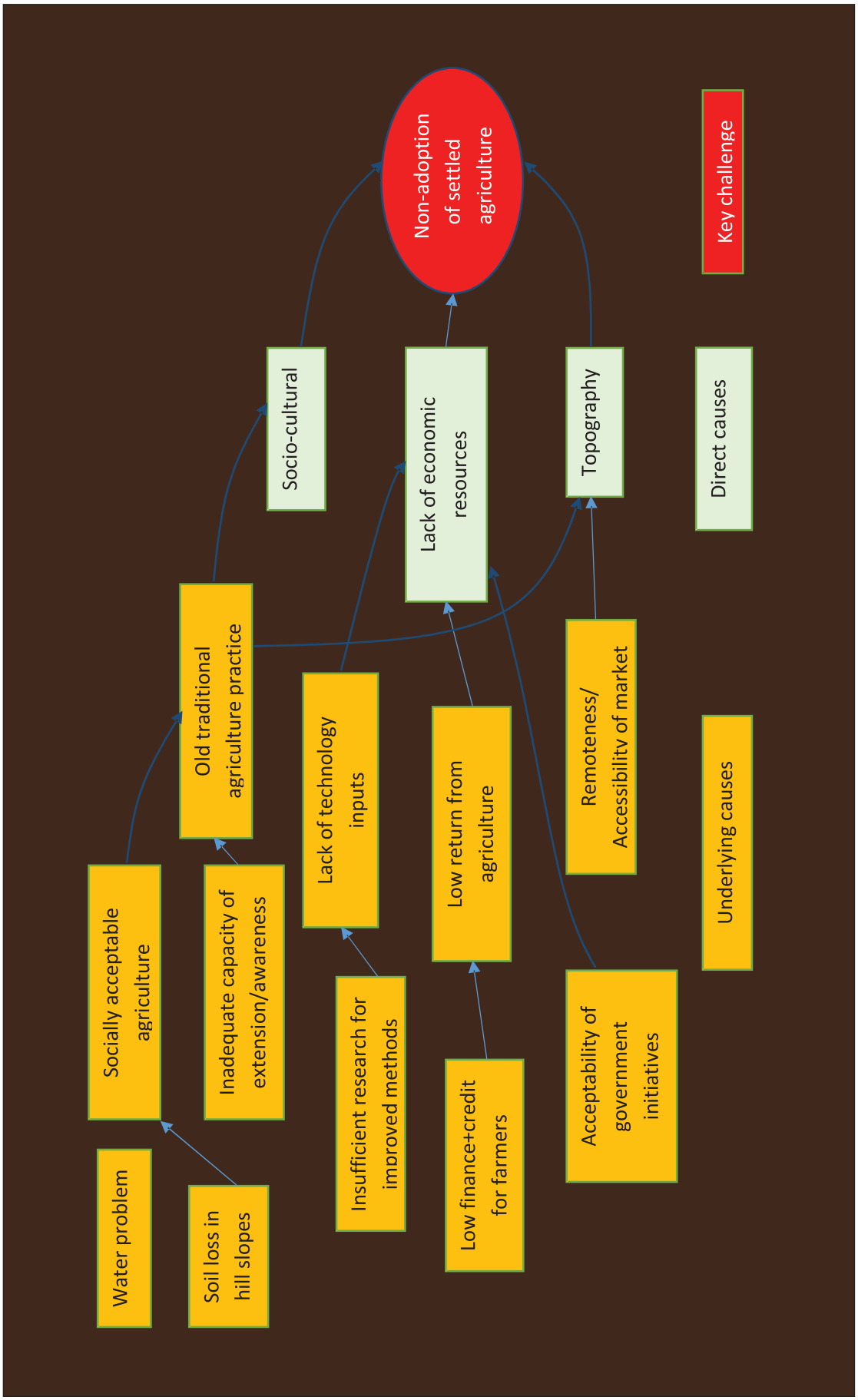
Problem tree for forest degradation : Shifting cultivation



Problem tree for forest degradation : Forest fire



Problem tree for barriers for forest enhancement



ANNEX 6

Detailed Intervention Packages with Monitoring Plan and Budget

Intervention Package 1: Sustainable land management and cropping pattern

A. General Information	
IP Name	**Sustainable land management and cropping pattern**
Drivers or barriers addressed	Deforestation and forest degradation: Land management and suitable cropping pattern will support in settled farming, which further supports in decreasing the rate of deforestation. In addition, minimizing shifting cultivation ultimately reduces the rate of forest degradation as well.
IP description	Shifting cultivation has become one of the most important drivers for forest deforestation in Mizoram. Assisting and guiding local communities to adopt sustainable land management techniques and cropping pattern with suitable income generating activities helps in reducing deforestation.
Objectives	Sustainable land management in shifting cultivation areas for livelihood and to reduce forest deforestation.
Strategies	Promotion and adoption of settled hill farming system.
Incentives for participation & changing stakeholder practices	Improving capacities of local communities to diversify income generating activities by providing appropriate crop varieties and promotion of agroforestry. Financial and technical support will be provided. Ensuring participation of poor and marginalized people in training activities and exposure visits.
Outputs and activities/tasks	**Output 1- Terracing /contour and permanent farming system adopted** • **Site survey, selection and preparation of land** • **Capacity building training on terracing/contour and permanent farming system** • **Development of irrigation channels** o **Construction of water tanks** o **Deployment of pipe channels for collection and irrigation** • **Selection of appropriate crop varieties** • **Plantation of crops, pulses, cereals, spices and others** **Output 2 – Vermi-compost/Organic Manure Generated** • **Construction of vermi-compost/manure collection tank (pit-holes etc)** • **Training programmes for local communities** **Output 3 – Agroforestry and enrichment of plantation promoted** • **Awareness campaigns of Agroforestry systems.** • **Development of nurseries to promote agroforestry and enrichment plantation** o **Financial and technical support for nursery establishment.** o **Selection of appropriate plants/tree species** o **Training programme on management of nurseries** o **Investigate and explore waste land** o **Plantation activities in the waste land** **Output 4 - Wet Rice cultivation (WRC) with fish farming promoted** • **Area survey and preparation of land** • **Selection of appropriate paddy varieties** • **Paddy cultivation** • **Financial and technical support for the establishment of WRC cum fish farming** • **Exposure visits**

B. Feasibility Analysis				
Outputs/activities	**Risks or obstacles**	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Terracing /contour and permanent farming system adopted	Existence culture and lack of finance	Awareness, exposure to best practices, motivation, incentives	30% of people took part in awareness campaign At least 10% of households received exposure to better farming system. At least 40% of the households motivated to shift to settled farming	Number of awareness campaign conducted Number of households received the better farming system exposure visit Number of Households motivated towards settled farming
Vermi-compost/ Organic Manure Generated	Time consuming	Incentivize the households	40% households generated vermi-compost/organic manure	Number of households generated vermi-compost/ organic manure
Wet Rice cultivation (WRC) with fish farming promoted	Terrain conditions	Practicing terracing for WRC in gentle slope lands	10% adopted WRC with fish farming	Number of households adopting WRC with fish farming
Overall feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
1	3	2	3	3

C. Safeguards Analysis			
Serious risks	**Risk reduction measures**	**Risk Reduction targets**	**Indicators**
Reduction in indigenous crops that are staple food of poor	Implement multi-level agroforestry practices with a focus on indigenous crops	250 households consuming indigenous crop products from agroforestry systems	% of total agroforestry area under hybrid/exotic spp. cultivation
Elite capture of exposure visits	Establish transparent grant approval, monitoring & reporting mechanism	50% of poor/marginal households receiving exposure visit	Number of poor/ marginal households receiving exposure visit
Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
Improved soil fertility and crops productivity	Training on generating organic manures and minimizing soil erosion	50% of Households received training on organic manure generation and soil management	Number of Households receiving training on organic manure generation and soil management

D. Monitoring Protocol			
How does the IP ensure effective provision for monitoring	Regular monitoring by State Government, Agriculture Department and Environment, Forests and Climate Change Department Allocation of adequate budget for monitoring		
Implementing partners	State Government, Agriculture Department, Environment, Forests and Climate Change Department and local communities		
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target	
	Number of households practicing shifting cultivation.	80% reduction of shifting cultivation area in all hotspots	
IP implementation targets	50% households capacitated for settled farming system 500 households received financial and technical support for agroforestry 200 households initiated wet rice cultivation 5% households generated vermi-compost/organic manure 50 households received training on System of Rice Intensification (SRI) and fish farming 25 community water tank installed		
Monitoring Protocol		Indicators	Source of data or data collection methods
	Proxy indicators	Number of households practicing shifting cultivation	Baseline and monitoring from HH records of farming practice
	Intervention indicators	Number of households capacitated for settled farming	Field observation and report completion
		Number of households receiving financial and technical support for agroforestry	Training report, field observation and report completion
		Number of WRC initiated Households	Field observation and report completion
		Number of households generated vermi-compost/ organic manure	Training report, field observation and report completion
		Number of households received trainings on SRI and fish farming	Field observation and report completion
		Number of community tank installed	
	Risk reduction indicators	Implement multi-level agroforestry practices with a focus on indigenous crops	Focus group and key informant discussions; field report and report completion
		Establish transparent grant approval, monitoring & reporting mechanism	Grant records, survey and report completion
E. Budget Plan (5 years)			
Introduction	Standard government price norms are used Annual increase in costs by 10% to allow for inflation factored in		

Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	Terracing /contour and permanent farming system adopted	23,000,000	
	Vermi-compost/Organic Manure Generated	1,000,000	
	Wet Rice cultivation (WRC) with fish farming promoted	25,000,000	
	Community water tanks	17,500,000	
Total Budget:		**66,500,000**	

Intervention Package 2: Adoption of horticulture crops

A. General Information	
IP Name	**Adoption of horticulture crops**
Drivers or barriers addressed	Deforestation: Horticulture crops provides better income generation as compared to shifting cultivation.
IP description	Plantation of horticulture crops with tree species contributes in enhancement of forest biomass. Adoption and plantation of horticulture crops can cater the market demands and support local communities for better income generation.
Objectives	To minimize the shifting cultivation practices through adoption of horticulture crops.
Strategies	Promotion and adoption of horticulture crops for better livelihood opportunities.
Incentives for participation & changing stakeholder practices	Increase in income generating activities and access to suitable market demand. Financial and technical assistance will be provided.
Outputs and activities/tasks	**Output 1: Horticulture/Cash crops planted and promoted** • **Selection of appropriate cash crop varieties** • **Capacity building on plantation and management** • **Plantation of horticulture/cash crops** **Output 2: Value addition for Horticulture crops promoted** • **Capacity building trainings** • **Financial and technical support** • **Development of cottage industries and establishment of market linkages** o **Identification of suitable areas for cottage industries** o **Facilitation in registration process**

B. Feasibility Analysis				
Outputs/activities	**Risks or obstacles**	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Horticulture/Cash crops planted and promoted	Lack of technologies and market assurance	Research and extension, technological inputs, Improve market linkage	Two research studies per year on Jhum	Number of research studies on Jhum
Overall feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
2	2	1	3	3

C. Safeguards Analysis			
Serious risks	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Introduction of new pest and disease	Application of proper agriculture techniques	70% of households having pest and disease free crops	Numberof Households having pest and disease free crops
Excessive use of pesticides and chemical fertilizers	Awareness on hazards and usage of fertilizers	Four awareness programme carried out on usage and hazards of fetilizers	Numberof awareness programmes on usage and hazards of fertilizers

Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
High value agriculture	Establish market linkage for horticulture produce	70% of Households getting good market linkage on horticulture produce	Number of households getting good market linkage on horticulture produce

D. Monitoring Protocol			
How does the IP ensure effective provision for monitoring	Regular monitoring by State Government, Agriculture Department, Horticulture Department and Forest Department. Allocation of adequate budget for monitoring		
Implementing partners	State Government, Agriculture Department, Horticulture Department, Forest Department and local communities		
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target	
	Number of households adopting horticulture crops	150 households adopted horticulture farming	
IP implementation targets	200 households adopted horticulture/cash crop farming 70% of Households linked with suitable markets on horticulture produce 25 trainings programmes conducted on value-addition of horticulture products		
Monitoring Protocol		Indicators	Source of data or data collection methods
	Proxy indicators	Number of households adopting horticulture crops	Baseline and monitoring from HH records of farming practice
	Intervention indicators	Number of households adopted horticulture/cash crop farming	Field observation and completion report Market Survey Report
		Number of households linked with suitable markets on horticulture produce	Training report, field observation and completion report
		Number of trainings programmes conducted on value-addition of horticulture products	
	Risk reduction indicators	Numberof households having pest and disease free crops	Field survey/household survey and completion report
		Numberof awareness programmes on usage and hazards of fertilizers	Focus group discussions, key information interviews, field report, programme report

E. Budget Plan (5 years)			
Introduction	Standard government price norms are used Annual increase in costs by 10% to allow for inflation factored in		
Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	Horticulture/cash crop farming adopted	14,000,000	
	Suitable market linkage with famers adopting horticulture/cash crop farming	500,000	
	Awareness and trainings programmes	1,000,000	
Total Budget:		**15,500,000**	

Intervention Package 3: Creating habitat mosaic for biodiversity conservation

A. General Information	
IP Name	**Creating habitat mosaic for biodiversity conservation**
Drivers or barriers addressed	Deforestation: Habitat mosaic created for biodiversity conservation.
IP description	Regulating and managing the Jhum areas not only helps in reducing the rate of deforestation but also helps to create the mosaic for wildlife habitat.
Objectives	Management of *Jhum* areas
Strategies	Development of *in-situ* parks and creating eco-tourism opportunities.
Incentives for participation & changing stakeholder practices	Adoption of ecotourism helps in creating employment opportunities resulting in increased income. Conservation of forest and environment.
Outputs and activities/tasks	**Output 1: *Jhumming* cycle regulated** • **Awareness campaigns on management of jhum cycle** • **Jhumming in Cluster** **Output 2: *In-situ* conservation of flora and fauna promoted** • **Identification and selection of sites** • **Awareness campaigns** • **Financial and technical assistance** **Output 3: Nature-based tourism developed and promoted** • **Establishment of eco-parks, nature trails and homestays** o **Exposure visits for local communities** o **Sensitization trainings and exchange programmes** o **Financial and technical support** • **Initiation of adventure tourism such as zip-liners, paragliding**

B. Feasibility Analysis				
Outputs/activities	Risks or obstacles	Risk reduction measures	Risk reduction targets	Indicators
Jhumming cycle regulated	Existing traditional practice, Unwillingness	Awareness campaign	25 awareness campaigns per year on jhumming cycle	Number of awareness campaigns on jhumming cycle
Habit mosaic created for biodiversity conservation	Lack of technologies and research	Research and extension, technological inputs	Two research studies per year on jhum	Number of research studies on jhum
Overall feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
3	3	3	1	1

C. Safeguards Analysis			
Serious risks	Risk reduction measures	Risk reduction targets	Indicators

Lack of awareness and motivation, Lack of sense of ownership	Public awareness and participation, reduce human wildlife conflict	Four awareness campaigns per year on wildlife conservation and ecotourism 20% of human wildlife conflict reduced	Numberof awareness campaigns conducted Numberof human wildlife conflicted cases
Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
Increase in floral and faunal biodiversity	Reduce possibility of human wildlife conflicts	20% reduced cases of human wildlife cases	Number of human wildlife conflicted cases

D. Monitoring Protocol

How does the IP ensure effective provision for monitoring	Regular monitoring by State Government, Agriculture Department and Forest Department Allocation of adequate budget for monitoring		
Implementing partners	State Government, Agriculture Department, Wildlife wing of Forest Department and local communities		
Proxy indicators for impact on forest area or condition	Proxy impact indicators		Target
	Number of eco-park created Number of clusters formed for jhumming		Eight mosaic habitat created 16 clusters of villages formed for jhumming (Note: 1 cluster should consist at least 3 villages)
IP implementation targets	20 homestays established in two hotspots 8 eco-park established in hotspots 20 awareness campaign on conservation and nature-based tourism		
Monitoring Protocol		Indicators	Source of data or data collection methods
	Proxy indicators	Number of eco-park created Number of clusters formed for jhumming	Field survey report, and field report
	Intervention indicators	Number of awareness campaigns on management of jhum cycles conducted	Programme report and report completion
		Number of homestays established	Household survey and report and report completion
		Number of eco-park established	Field observation and report completion
		Number of awareness programme on conservation and nature-based tourism conducted	Programme report and report completion
	Risk reduction indicators	Numberof awareness campaigns conducted	Programme report and report completion
		Numberof human wildlife conflicted cases	Field Survey and research, household survey: final report completion

E. Budget Plan (5 years)			
Introduction	Standard government price norms are used Annual increase in costs by 10% to allow for inflation factored in		
Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	Establishment of homestays	20,000,000	
	Establishment of eco-park	80,000,000	
	Awareness campaigns and trainings on nature-based tourism and conservation	3,000,000	
Total Budget:		**103,000,000**	

Intervention Package 4: Livelihood Improvement

A. General Information	
IP Name	**Livelihood improvement**
Drivers or barriers addressed	Forest Degradation: Shifting cultivation minimized.
IP description	Providing job opportunities and alternate sources of income will improve the livelihood of the community, and furthermore will reduce adoption of practice of shifting cultivation.
Objectives	Minimize shifting cultivation by providing viable income opportunities and improving the livelihood of the communities. To help the community build their capacity through trainings and skill development programmes.
Strategies	Providing alternate and viable income opportunities to minimize shifting cultivation practices.
Incentives for participation & changing stakeholder practices	Alternate and viable income opportunities through skill development trainings, capacity building/ trainings will empower the communities and improve their socio-economic status. Awareness programmes will help the communities to understand and adopt new opportunities to earn their living in a sustainable manner. Promotion of eco-tourism including adventure tourism will provide ample job opportunities for the people by which they can improve their livelihood.
Outputs and activities/tasks	**Output 1: Skill development trainings and programmes conducted** • **Training/capacity building activities for IGA (Income Generation Activities)** • **Vocational and value-added trainings for youth including Green Skill Development programmes** • **Trainings on eco-tourism activities** • **Poverty Reduction Programmes through trainings** **Output 2: Land titles issued to forest dependent local communities (direct dependent users, who depends on forest for bonafide livelihood needs)** • **Temporary land passes issued** **Output 3: Improved cooperatives/self-help groups/micro-finances** • **Linkage with market** • **Establishment of storage facilities/common facilities centers for NTFPs** **Output 4: Integrated Farming system** • **Introduction of kitchen garden and small dugout fish pond** • **Promotion of poultry, piggery, apiculture based farming system**

B. Feasibility Analysis				
Outputs/activities	**Risks or obstacles**	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Skill development trainings and programmes conducted	Limited resources and opportunities	Creating new employment opportunities	At least 20% of Households having employment opportunities	Number of Households receiving employment opportunities
Overall feasibility of IP				
Implementation Risks/ obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
1	3	1	3	3

C. Safeguards Analysis			
Serious risks	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Lack of skills and low socio-economic status	Create and initiate skill development programmes and poverty reduction programmes in the sate	At least one skill development programme conducted in each hotspot	Number of skill development programme conducted
Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
Improved livelihood and increased job and income generating opportunities Ecotourism promoted	Train community people to develop skills and enhance and build the capacity.	50% of Households received training on skill development and capacity building	Number of skill development and capacity building programmes conducted

D. Monitoring Protocol			
How does the IP ensure effective provision for monitoring	Regular monitoring by State Government, Land Revenue and Settlement Department, Cooperative Department and local communities Allocation of adequate budget for monitoring		
Implementing partners	State Government, Land Revenue and Settlement Department, Cooperative Department and local communities		
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target	
	Number of trainee receiving training under skill development programmes Number of cooperatives/self-help groups supported and strengthened Number of kitchen garden and dugout fish pond introduced Number of households practicing poultry, piggery and apiculture farming system	At least 200 trainees trained under skill development programmes 8 cooperatives/self-help groups supported and strengthened Kitchen garden introduced in at least 500 households At least 5 households in each hotspots practicing poultry, piggery and apiculture.	
IP implementation targets	Forty capacity building and skill development trainings on income generation activity conducted 10% of land issued to forest dependent communities 8 cooperatives supported and strengthened 2 storage facilities established for forestry products and locally made products At least 100 households practicing kitchen garden At least 5 households in each hotspots practicing poultry, piggery and apiculture (*Direct dependent users who depend on forest for bonafide livelihood needs)		
Monitoring Protocol		Indicators	Source of data or data collection methods
	Proxy indicators	Number of trainee receiving training under skill development programmes	Training registration sheet and training report
		Number of cooperatives/ self-help groups supported and strengthened	Invoice and receipts, field observation and report completion
		Number of kitchen garden and dugout fish pond introduced	Field observation and report completion
		Number of Households practicing poultry, piggery and apiculture farming system	Field observation and report completion

	Intervention indicators	Number of capacity building and skill development trainings on income generation activity conducted	Training and programme report, Field observation and report completion
		Percentage of land issued to forest dependent communities*	Leasehold contract paper/document, field survey and report completion
		Number of cooperatives supported and strengthened	Invoice and receipts, field observation and report completion
		Number of storage facilities established for forestry products and locally made products	Invoice and receipts, field observation and report completion
		Number of households practicing kitchen garden, poultry, piggery and apiculture	Field observation and report completion.
	Risk reduction indicators	Number of skill development programme conducted	Training and programme report, Field observation and report completion

E. Budget Plan (5 years)			
Introduction	Standard government price norms are used Annual increase in costs by 10% to allow for inflation factored in		
Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	Capacity building trainings and skill development programmes on income generation activities	1,600,000	
	Establishment of storage facilities	10,000,000	
	Exposure visits for farmers/members of cooperatives	4,000,000	
	Integrated farming system adopted	12,500,000	
Total Budget:		**28,100,000**	

Intervention Package 5: Forest fire control and management

A. General Information	
IP Name	**Forest fire control and management**
Drivers or barriers addressed	Forest Degradation: By adoption of better forest management, forest fire will also be controlled resulting in reduced forest degradation.
IP description	With strong and strict enforcement of forest rules and regulations, adoption of modern technologies to monitor forest activities, effective and strengthened manpower and human resources for forest management will help in reducing forest degradation by addressing and managing forest fire which is crucial driver of forest degradation.
Objectives	To control and manage forest fire by adopting appropriate management and monitoring activities. To build capacity and provide income generation opportunities to the communities in management of forest fire. To strengthen capacity of the existing manpower in forest fire control and management.
Strategies	Adoption of better forest management by creating awareness, building and strengthening capacity of communities and strengthening the protection measures to control and manage forest fire.
Incentives for participation & changing stakeholder practices	Providing and creating ample job opportunities for local communities by strengthening their capacity and involving them in fire management activities. By preventing and controlling damages controlled caused by forest fire by developing good coordination and awareness between local authorities and communities in managing and controlling forest fire. Better forest management will also help the communities as well as other stakeholders to achieve forest benefits along with sustaining native biodiversity and environment benefits.
Outputs and activities/tasks	**Output 1: Mechanism for forest fire mitigation and management established** • **Maintenance of firelines** • **Effective enforcement of forest rules and regulations (targeting checking of illegal felling.)** **1. Plantation of fire-resistant tree species** **2. Formation of Voluntary fire protection squad** **3. Deployment of modern tools such as Drones, GPS etc** **4. Awareness/extension activities for forest protection** **5. Capacity building programmes for front line staff and communities** **6. Advanced research and management of forest fire.** **Output 2: Boundary demarcation of government notified forest areas and community land conducted.** **1. Simplified procedures for management of private plantations.** **2. Land zoning and implementation relating to forest sector** **3. Effective coordination between government, line agencies, and local communities**

B. Feasibility Analysis				
Outputs/activities	Risks or obstacles	Risk reduction measures	Risk reduction targets	Indicators
Mechanism for forest fire mitigation and management established	Labor days and limited finance resources	Good incentives for the labor, budgetary support	At least 70% of labor from community receiving incentives for their work.	Number of people from community receiving incentives

Boundary demarcation of government notified forest areas and community land conducted.	Political pressure and unwillingness of community people to participate in demarcation process	Good governance, Good coordination and commitment	One coordination committee in each hotspot. 1 meeting per month	Number of coordination committees formed Number of meeting conducted
Overall feasibility of IP				
Implementation Risks/obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
2	3	2	1	1
C. Safeguards Analysis				
Serious risks	Risk reduction measures	Risk reduction targets		Indicators
Biodiversity loss	Deployment of modern tools for firefighting and training programmes to strengthen capacity of the staff	At least two trainings in each hotspot on forest fire control and management At least one full set of fire-fighting tools procured and handed over to forest office		Number of fire control and management training programmes conducted Sets of fire-fighting tools procured and handed over to forest office.
Benefits	Benefit enhancement measures	Benefit enhancement targets		Indicators
Biodiversity conservation, Wild and uncontrolled fires managed	Existing forest staff trained on fire management and new tools used and adopted for fire control, Demarcations required supported by adequate awareness campaigns	At least 80% of forest staff trained and sensitized on fire management At least five awareness program in each hotspot. At least 60% of land demarcated		Number of training programmes conducted Number of awareness programs in each hotspot % of land demarcated
D. Monitoring Protocol				
How does the IP ensure effective provision for monitoring	Regular monitoring by State Government, Forest Department and local communities Allocation of adequate budget for monitoring			
Implementing partners	State Government, Forest Department and local communities			
Proxy indicators for impact on forest area or condition	Proxy impact indicators		Target	
	Forest quality enhanced after forest fire control and management		Quality of at least 5% of the total forest area will be increased	
IP implementation targets	12 fire management training conducted for territorial forest offices and wildlife division At least 1 ha of land is planted with fire resistant plants 8 voluntary fire squad formed At least 50 km of boundary demarcation of government notified forest areas and community land 19 sets of forest fire fighting tools procured and distributed			

Monitoring Protocol		Indicators	Source of data or data collection methods
	Proxy indicators	Forest quality enhanced after forest fire control and management	Remote sensing, field observation and report completion
	Intervention indicators	Number of fire management training conducted	Training report
		Area (ha) of land planted with fire resistant plants	Field observation and report completion
		Number of voluntary fire squad formed	Registered volunteers and list
		Area (km) of government notified forest areas and community land demarcated	Field observation and report completion
		Number of forest fire fighting tools distributed	Field report and report completion
	Risk reduction indicators	Number of people from community receiving incentives	Receipts, Records and report completion
		Number of coordination committees formed	Record book and minutes of meeting
		Number of meeting conducted	Minutes of meeting

E. Budget Plan (5 years)			
Introduction	Standard government price norms are used Annual increase in costs by 10% to allow for inflation factored in		
Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	Fire management trainings	1,800,000	
	Plantation of fire resistant plants	81,000	
	Formation of voluntary firefighting squad	4,000,000	
	Boundary demarcation of government notified forest areas and community land	12,500,000	
	Forest fire fighting tools procured and distributed	1,250,000	
Total Budget:		**19,631,000**	

Intervention Package 6: Sustainable energy supply

A. General Information	
IP Name	**Sustainable energy supply**
Drivers or barriers addressed	Forest Degradation: Reduced dependency on firewood.
IP description	Sustainable energy supply can reduce the dependency on firewood. Promotion of improved cook stoves along with promotion of agroforestry models and systems will help the community in reducing use of firewood and their dependency on forest.
Objectives	Supporting, promoting and supplying alternative energy for forest dependent communities to reduce dependency and ultimately forest degradation. To make people aware of sustainable energy to reduce their dependency on firewood and reduce forest pressure through awareness programmes.
Strategies	Provision and adoption of alternate and sustainable energy for the communities to reduce pressure on forest by reducing their dependency.
Incentives for participation & changing stakeholder practices	By improving supply of LPG and Improved cook stoves, communities can avoid health issues caused by air pollution due to firewood burning, and will also save their time wasted in commuting to forest. Native biodiversity will be protected as pressure on forest will be reduced. Awareness programme will help in sensitization of the communities and other stakeholders about new technologies and renewable energy options.
Outputs and activities/tasks	**Output 1: Supply of LPG improved and Improved Cook Stoves (ICS) promoted** • **Frequent coordination between supply agencies and transport agencies** • **Awareness programmes to encourage the local communities to adopt IS** • **Distribution and demonstration of ICS** • **Trainings on management and maintenance of ICS** • **Follow up visits and regular monitoring** **Output 2: Firewood supply for the local community managed** • **Baseline survey on consumption of firewood per household** • **Enrichment plantation activities in supply reserve areas** • **Monitoring activities** o **Formation of local monitoring teams** o **Trainings on patrolling activities for capacity building** **Output 3: Agroforestry promoted** • **Awareness programmes on agroforestry and biomass energies** • **Selection of agroforestry species (firewood species such as *Derris robusta, Anogeissus acuminata, Schima wallichi, Pinus species, Quercus species* etc)** • **Development of nurseries to promote agroforestry** • **Plantation of the selected agroforestry species**

B. Feasibility Analysis				
Outputs/activities	Risks or obstacles	Risk reduction measures	Risk reduction targets	Indicators
Supply of LPG improved and IS promoted	Lack of adequate supply, Remoteness and toporgraphy	More programs on sustainable energies targeted to rural areas	60% of Households used sustainable energy sources programmes	Number of households using sustainable energy.

Overall feasibility of IP				
Implementation Risks/ obstacles L=3/M=2/H=1	Cost-effectiveness of risk reduction measures H=3/M=2/L=1	Implementation cost L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive measures S=3/M=2/W=1
1	3	1	3	3
C. Safeguards Analysis				
Serious risks	Risk reduction measures	Risk reduction targets		Indicators
Lack of skills and low socio-economic status	Create and initiate skill development programmes and poverty reduction programmes in the state	At least one/two skill development programme conducted in each districts		Number of skill development programme conducted Number of households participation
Benefits	Benefit enhancement measures	Benefit enhancement targets		Indicators
Improved access to energy	Adequate finance available for promoting and adoption of sustainable energy supplies	50% of households accessed finance for energy supply 200 households adopted sustainable energy sources		Number of households adopting sustainable energy sources
D. Monitoring Protocol				
How does the IP ensure effective provision for monitoring	Regular monitoring by State Government and local communities Allocation of adequate budget for monitoring			
Implementing partners	Local Government, forest office, private sector and local communities			
Proxy indicators for impact on forest area or condition	Proxy impact indicators		Target	
	Average amount of fuelwood consumed per households after receiving sustainable energy sources		60% reduction in per households fuelwood consumption in hotspots	
IP implementation targets	200 Households installed ICS Two awareness and training programme conducted to encourage local communities to adopt IS in each hotspot One nursery established in each hotspot All seedlings planted			
Monitoring Protocol		Indicators	Source of data or data collection methods	
	Proxy indicators	Average amount of fuelwood consumed per Households after receiving sustainable energy sources	Household survey and report	

	Intervention indicators	Number of households installed ICS	Household survey, field observation, completion report
		Number of awareness and training programme conducted to encourage local communities to adopt ICS in each hotspot	Programme and training report
		Number of local monitoring team formed for patrolling activities in each hotspot	Village council record, Forest beat/range office record,
		Number of nursery established in each hotspot	
		Number of firewood lot established in each hotspot	Field survey, observation and report completion
		Number of firewood plant species planted	Field survey, observation and report completion
			Field survey, observation and report completion
	Risk reduction indicators	Number of Households using sustainable energy	Household survey and report completion

E. Budget Plan (5 years)

Introduction	Standard government price norms are used Annual increase in costs by 10% to allow for inflation factored in		
Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	ICS installed	2,000,000	
	Awareness and training programmes on ICS	3,600,000	
	Establishment of nurseries	1,250,000	
	Transportation and plantation of firewood species	1,000,000	
Total Budget:		**7,850,000**	

Intervention Package 7: Market linkages for agriculture produce

A. General Information	
IP Name	**Market linkages for agriculture produce**
Drivers or barriers addressed	Barriers for forest enhancement activities.
IP description	Mizoram can serve as the best example of traditional agricultural produce if linked to market. If introduced to modern agricultural tools, practices, technologies and different heat tolerant/ water stressed crop varieties, the state of Mizoram can become a future market for sustainable agriculture and supply of value added products thus, bringing economic and environmental benefits.
Objectives	Promote agricultural market linkage for the state of Mizoram through improved transportation and communication for agricultural produce. To support in carbon enhancement.
Strategies	Sustainable Agriculture Technology and Models to Local Context Adopted.
Incentives for participation & changing stakeholder practices	The beneficiaries will not only be economically benefitted but will also receive carbon benefits as well as income generation opportunities.
Outputs and activities/ tasks	**Output 1: Financial and technical assistance for sustainable agriculture provided** • **Research in agriculture** • **Type of soil and its properties** • **Identification of suitable crop varieties** • **Awareness and Capacity building trainings in sustainable agriculture practices** • **Demonstration plots of suitable agricultural practices** • **Procurement of tools and machinery suitable to hilly agriculture** • **Soft loans and financial assistance to farmers** **Output 2: Agriculture produce promoted through cooperatives** • **Baseline survey on cooperatives** • **Strengthening cooperation and coordination between cooperatives and farmers** • **Regular meetings and minutes** • **Financial assistance for development of cooperative infrastructures (office, storage facilities etc.)** • **Value addition for agricultural produce** • **Awareness campaigns and trainings (on drying, processing, packaging) to the farmers** **Output 3: Mechanisms for market identification and linkages developed** • **Market survey and identification** • **Developing communication amongst farmers, agriculture experts and, institutes, and markets** • **Development of mobile apps** • **Development of toll-free/helpline numbers (*krishi/lo-hnathawk* mi helpline number)** • **Improvement in transportation facilities for agriculture produce**

B. Feasibility analysis				
Outputs/Activities	**Risks or obstacles**	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Agriculture produce promoted through cooperatives	Unavailability of full time staff	Payment for full time staff should be allocated	At least one staff in each of the cooperatives fully employed	Number of staffs fully employed in the cooperatives

Mechanisms for market identification and linkages developed	Transportation, remoteness, Lack of support price	Improve connectivity, improve infrastructure and communication, Assured price	At least 1 transportation network developed At least 20 species of vegetables/cash crops price assured	Number of developed transportation networks Number of vegetables/ cash crops with assured prices
Overall feasibility of IP				
Implementation Risk/ obstacles L=3/M=2/L=1	**Cost effectiveness of risk reduction measures**	**Implementation cost L=3/M=2/H=1**	**Opportunity cost L=3/M=2/H=1**	**Incentive measures** **S=3/M=2/W=1**
1	3	1	3	3

C. Safeguard Analysis

Serious risks	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Poor/marginal Households excluded (or elite capture)	Reserve shares in Cooperatives for poor/ marginal Households	2000 shares (10/households = 15 households/hotspot) distributed to poor/marg. Households	% of poor/marg. households who is members of agroforestry cooperatives
Benefits	**Benefit enhancement measures**	**Benefit enhancement targets**	**Indicators**
Value addition of the farm products	Selection of appropriate farmers that adopt improved technology	At least 50 farmers adopting improved technology	Number of farmers adopting improved technology

D. Monitoring Protocol

How does the IP ensure effective provision for monitoring	Regular monitoring by State government, Agriculture department, Forest Department and local communities Allocation of adequate budget for monitoring		
Implementing partners	State Government, Forest Department, concerned authorities and local community		
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target	
	Increased production of agriculture produce due to good market linkage	At least 30% increment in the agriculture produce	
IP implementation targets	1 research per year in agriculture 1 mobile application developed At least 1 helpline number developed 1000 households receiving financial and technical assistance for sustainable agriculture At least 1 cooperative strengthened in each hotspot. At least 2 events of market survey per year carried out. 12 awareness and training programs carried out on sustainable agriculture 1 demonstration plot in each of hotspots		
Monitoring Protocol		Indicators	Source of data or data collection methods
	Proxy indicators	Increased production of agriculture produce due to good market linkage	Field observation, monitoring and report

	Intervention on indicators	Number of research per year in agriculture	Research report
		Number of mobile application developed	Backup drive, contract with the developer, report completion
		Number of helpline number developed	Telecom office, report
		Number of Households receiving financial and technical assistance for sustainable agriculture	Households survey, field observation and report
		Number of cooperative strengthened in each hotspot.	Cooperative office, site observation, and report
		Number of events of market survey per year carried out.	Field observation, Verification and report completion
		Number of awareness and training programs carried out on sustainable agriculture	List of participants, training & awareness report
		Number of demonstration plot in each of hotspots	Field visits and report completion
	Risk reduction indicators	Number of staffs fully employed in the cooperatives	Cooperative profile and audit report, field visit and report
		Number of developed transportation networks	Field visits and report completion
		Number of vegetables/cash crops with assured prices	Field observation and report

E. Monitoring Protocol

Introduction	Standard Government price norms are used Annual increase in costs by 10% to allow for inflation factored in		
Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	Research in agriculture	1,000,000	
	Demonstration plot for suitable agriculture practice developed	2,500,000	
	Mobile apps and helpline number	3,450,000	
	Communication networks developed	5,000,000	
	Cooperatives strengthened	1,000,000	
	Awareness and training campaigns conducted	5,000,000	
	Drying, processing and packaging units	5,000,000	
Total Budget :		**22,950,000**	

Intervention Package 8: Demonstrations of private plantation and agroforestry

A. General Information	
IP Name	**Demonstrations of private plantation and agroforestry**
Drivers or barriers addressed	Drivers for Forest Enhancement Activities.
IP description	Adoption of commercial horticultural farms and promotion of Agroforestry can provide economic benefits to the local farmers as well as environmental benefits to the community.
Objectives	Promote the concept of agroforestry in the state of Mizoram. Supports in carbon enhancement.
Strategies	Appropriate use of unproductive lands and reducing soil erosion to maintain the soil fertility. To help in income generation of local communities.
Incentives for participation & changing stakeholder practices	The stakeholders will acquire knowledge on income generating opportunities by applying the agroforestry and horticulture farming on their private lands.
Outputs and activities/ tasks	**Output 1: Agroforestry & Private plantation including multi-tier agroforestry developed and demonstrated** • **Demonstration plots on appropriate agroforestry models** • **Awareness and training programmes on agroforestry** • **Promoting homestead/ Kitchen garden** • **Exposure visits for farmers** **Output 2: Commercial horticulture farming demonstrated** • **Selection of suitable horticulture crops** • **Watershed conservation for irrigation facilities** o **Rain water harvesting and soil moisture conservations (SMCs)** • **Exposure visits for farmers**

B. Feasibility analysis				
Outputs/Activities	**Risks or obstacles**	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Commercial horticulture farming demonstrated	Unwillingness of local communities	Provision of incentives to establish the horticulture farming	At least 1 meeting with the local communities in 3 months' time to know the status of horiticulture	Meeting minutes
Overall feasibility of IP				
Implementation Risk/ obstacles L=3/M=2/L=1	**Cost effectiveness of risk reduction measures**	**Implementation cost L=3/M=2/H=1**	**Opportunity cost L=3/M=2/H=1**	**Incentive measures S=3/M=2/W=1**
1	1	2	3	3

C. Safeguard Analysis			
Serious risks	**Risk reduction measures**	**Risk reduction targets**	**Indicators**
Economic implication for poor and marginalized groups	Follow PRA process, priority will be given to poor and marginalized groups while implementing the activities	PRA process followed resulting consent of affected households At least 10% poor and marginalized Households receiving training on horticulture farming	Report of PRA process % of marginalized Households receiving training in horticulture farming

Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
Labor opportunity for unemployed poor/ marginalized households	Priority section of unemployed poor/ marginalized households to work on demonstration sites	At least 2% of unemployed people engaged in demonstration sites	Number of employed poor/ marginalized households working on demonstration sites
Income generating opportunities due to horticulture farming and agroforestry	Provide trainings to the interested households on horticulture and agroforestry	At least 2 trainings per year in each hotspots	Number of training conducted each year

D. Monitoring Protocol			
How does the IP ensure effective provision for monitoring	Regular monitoring by State Government, Revenue and Land Department, Forest Department, cooperative office and local communities Allocation of adequate budget for monitoring		
Implementing partners	State Government, Revenue and land department, Forest department, cooperative office and local communities		
Proxy indicators for impact on forest area or condition	Proxy impact indicators	Target	
	Increase in economy after commercialization of horticulture farming	50% increase in economy after commercialization of horticulture farming	
IP implementation targets	2 awareness campaign in each hotspots for homestead/kitchen garden 2 exposure visit to the farmers per year 10 soil moisture conservation site constructed		
Monitoring Protocol		Indicators	Source of data or data collection methods
	Proxy indicators	Increase in economy after commercialization of horticulture farming	Field survey, households survey, completion report
	Intervention on indicators	Number of agroforestry demonstration sites established.	Field observation and completion report.
		Number of awareness campaign in each hotspots for homestead/kitchen garden	Forest office and completion report Participants list and completion report
		Number of exposure visit to the farmers	Travel report
		Number of rain water harvesting tanks constructed	Field observation, households survey and completion report
	Risk reduction indicators	Meeting minutes	Meeting and meeting minutes

E. Budget Plan (5 years)	
Introduction	Standard government price norms are used Annual increase in costs by 10% to allow for inflation factored in

Implementation cost including monitoring	Activity	Budget (INR)	Remarks
	SMC constructed	2,000,000	
	Exposure visits carried out	2,400,000	
	Demonstration plot for agroforestry developed	1,500,000	
	Management and monitoring	1,000,000	
Total Budget:		**6,900,000**	

Multi stakeholder Consultation Workshop for formulation of Mizoram State REDD+ Action Plan

Stakeholder Consultation, Workshop and Expert Consultation for
Preparation of State REDD+ Action Plan for Mizoram
& 28 April, 2018

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REDD+ Himalaya

Expert Consultation Meeting for formulation of Mizoram State REDD+ Action Plan