MEGHALAYA COMMUNITY LED LANDSCAPE MANAGEMENT PROJECT

ENVIRONMENTAL MANAGEMENT FRAMEWORK

FINAL

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Team of Researchers

ProfessorB. K. Tiwari
Beautiqueen Shylla
Carielyne Kharsyntiew
Wanrapbok Syiemlieh
Queenie Syngkrem

Meghalaya Institute of Governance (MIG),

Meghalaya Basin Development Authority (MBDA),

Government of Meghalaya,

Shillong.

List of Acronyms

ADC	Autonomous District Council
CDD	Community Driven Development
C.E.M	Chief Executive Member
CLLMP	Community Led Ecosystem Management Project
DBDU	District Basin Development Units
EMF	Environmental Management Framework
EHS	Environment Health and Safety
GHADC	Garo Hills Autonomous District Council
GoI	Government of India
GoM	Government of Meghalaya
GSDP	Gross State Domestic Product
IBDLP	Integrated Basin Development and Livelihood Programme
ICARE	Informed Conscious and Responsible Existence
IFAD	International Fund for Agricultural Development
IWMP	Integrated Watershed Management Programme
JHADC	Jaintia Hills Autonomous District Council
KHADC	Khasi Hills Autonomous District Council
MBDA	Meghalaya Basin Development Authority
MBMA	Meghalaya Basin Management Agency
MDC	Members of District Councils
MINR	Meghalaya Institute of Natural Resources
MoDoNER	Ministry of Development of North Eastern Region
MSAM	Meghalaya State Aquaculture Mission
MSRLS	Meghalaya State Rural Livelihood Society
MT	Million Tonnes
NEN	North East Network
NEEDS	North East Educational & Development Society
NERCORMP	The North Eastern Region Community Resource Management Project
NGO	Non-Governmental Organization
NRLM	National Rural Livelihood Mission

PDO	Project Development Objective
PIA	Project Implementing Agency
PIU	Project Implementing Unit
PMU	Project Management Unit
SMRs	Small Multipurpose Reservoirs
SWCD	Soil and Water Conservation Department
TI	Traditional Institutions
VEC	Village Executive Committee

Preamble:

The government of Meghalaya with financial help from the World Bank is preparing the Meghalaya Community Led Landscape Management Project (MCLLMP) to be implemented by the Meghalaya Basin Development Authority (also Meghalaya Basin Management Agency) during the period of five years from 2018 till 2023. The project will cover the entire state of Meghalaya and implementation of community led plans will be rolled out in phase manner throughout the state. The Meghalaya Basin Management Agency (MBMA) will facilitate community-led planning by providing support, technical inputs and funding. The community will be engaged at the very early stage of the project planning.

The Meghalaya Community Led Landscape Management Project (MCLLMP) will work with the communities broadly in the area of forest and water and will help in identifying activities for degraded forest, soil and water conservation, restoration of springs and water bodies, nature based tourism, agro-forestry and homestead forestry. The project will enhance skill and technical capacity of communities along with strengthening support to social system. The Project supports an integrated approach for sustainably managing forest and water resources for multiple purposes and functions -- a landscape approach. Managing natural resources in an integrated way across different land uses and connecting them at the landscape level provides the basis for enhancing people's livelihoods, security, and resilience to climate variability and change. For policy-makers, it is a chance to plan across sectors by focusing on development challenges at the right scale by minimizing trade-offs and reaping more value from existing resources.

Landscape restoration techniques that improve productivity, reduce erosion and enhance the provision of water are within reach. They include proven methods integrate trees on farms and ranches; cross slope barriers and farmer-managed natural regeneration to fight soil erosion; conservation area management to protect water sources; and climate smart strategies that uses less water and builds up soil for more resilient crops. Many of these interventions deliver a "triple win" by increasing livelihoods, enhancing resilience to climate change, and storing carbon to mitigate climate change.

This document aims to provide insight to the Environment Assessment and Environment Management Framework of the Meghalaya Community Led Landscape Management Project (MCLLMP), in the state of Meghalaya. The purpose of the Environment Assessment is to ensure that environmental risks are identified and an appropriate Environment Management Framework is prepared in anticipation of the environmental risks, issues and benefits likely to come up from the implementation of CLLMP project. The framework will provide mitigation measures to address the perceived impact from project design and implementation.

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Executive Summary

The Government of Meghalaya is preparing the Meghalaya Community Led Landscape Management Project (CLLMP) to be implemented by the Meghalaya Basin Management Agency (MBMA). The project is intended to strengthen community- led natural resources management in selected landscapes within the 11 districts of the state. This would be achieved through a variety of planning, capacity building, and on-the-ground interventions to promote the conservation, sustainable use of natural resources, social inclusion and community mobilisation; building traditional knowledge and learning, mapping of natural resources management; strengthening the community institutions and creating linkage with financial institutions and community organisations. The project interventions will include preparation of community led natural resource management plans, which will broadly include (i) Soil and water conservation measures; (ii) land reclamation measures such as land levelling, field contour terracing, de-siltation of village ponds, bunding etc.; (iii) water management, development and implementation spring shed management plans to reduce losses through run-off; (iv) afforestation and regeneration of natural forests; and, (v) rehabilitation of lands affected by shifting cultivation and mining.

Although the project would be implemented within sensitive areas, rich in endemic species of flowering plants and valuable medicinal plants, project interventions are designed to be environmentally positive overall. None of the planned project investments or activities are expected to generate significant adverse, irreversible environmental impacts, in fact the project will work towards reversing and reducing the level of degradation current land management activities are causing, so that the impacts are not permanent, and productivity can be restored. Consistent with the Project Development Objectives, this project seeks to reduce forest degradation and water resource depletion within Meghalaya. This would be achieved through improved planning of forests landscapes, long-term management of sensitive environmental habitats such as sacred groves, sustainable management of community forests, springs, and water bodies. Through convergence with other schemes, the project will promote environmentally friendly cultivation techniques, land productivity restoration mechanisms that are intended to help restore soil fertility, provide better management of the fallow periods, and optimise the productivity in jhum cycles to reduce the ongoing pressures for forest degradation. The project through the EMF instruments will also promote community managed forest fire control protocols, and explore systems for payment for ecosystem services for maintaining the quality of forests, natural heritage sites and water resources of the landscape. No large scale civil works such as feeder roads, bridges would be supported under the project. The project would not support any activity in government designated reserve forests and protected areas.

The project is assigned environmental Category B - Partial Assessment. This means significant and/or irreversible adverse environmental impacts are not anticipated from the investments to be financed under the project. The environmental safeguards policies triggered are Environmental Assessment - OP/BP 4.01, Natural Habitats - OP/BP 4.04, Forests - OP/BP 4.36, and Physical Cultural Resources - OP/BP 4.11. The project has three components (1) Strengthening knowledge and capacity of communities for improved natural resource management (NRM) (2) Planning and investments (2A) Landscape Planning for Sustainable Natural Resource Management (2B) Investment in NRM activities (3) Project management and Governance. Since this will be a state- wide project, component 1 will in implemented in the entire State to support CLLM-Programme of the Government of Meghalaya. Component 2 will be implemented in only limited number of villages to develop models of landscape management. Component 3 of the CLLM-Project will support CLLM-Programme only

critical areas of financial management, monitoring and evaluation, establishment of social and environmental safeguards.

A detailed environmental baseline study has been conducted to investigate the geographical area of the state and to understand the current environmental situation of the state. An overview on the environmental baseline shows the key environmental issues such as (i) degradation of forests due to logging, uncontrolled extraction of fuel wood and charcoal, significant reduction in the fallow period of shifting cultivation activities. Uncontrolled forest fires also further compromise the survival of young plantations aimed at restoring the level of degradation. Water resources in the state have been threatened with contamination, siltation and pollution primarily contributed from the coal mining activity and domestic effluents from urban centres. Meghalaya begin an agrarian state has about 2/3rd of the population depending on the existing water resource in the state, but in most cases integrated farming practices are not followed, however the state has many traditional farming practices which is primarily organic in nature and these will be supported. Springs acts as a main source for irrigation and domestic's usage. According to a survey by Meghalaya Institute of Natural Resources (2015) from the 714 springs surveyed about half of the total springs have either dried up or reduced drastically. The main cause in the drop of springs has been contributed to change in land use pattern, deforestation, quarrying and mining activities, as well as climate change. Though 77% of the state's geographical area is under forest cover, a major chunk of it is under open and moderately dense forest cover. Another major concern is the fragmentation of habitats, particularly area under sacred groves which is shrinking as they have come under deterioration, alien species invasion, grazing, unsustainable resource extraction and, changes in tradition of environmental conservation based on indigenous knowledge. The mining activities has adversely affected the land and water resources leading to air, water and soil pollution.

An environment assessment study was undertaken by the Meghalaya Institute of Governance for the proposed project. The objective of the study was to understand the environmental condition, laws and regulation related to the environment in totality. The methodology adopted for the study included secondary data collection; review of legal and regulatory system; stakeholder consultation through focus group discussion (FGDs) with government departments, associations, community members. Further, a regional north east region level workshop was conducted on the national forest policy in July 2016, to seek inputs for forest area management, NTFP extraction and jhum cultivation for which the suggestions on forest management have been taken into consideration.

Three villages have been identified for field visits, consultations and surveys; Nongkhlaw (Khasi Hills), Sohkymphor (Jaintia Hills) and Rombagre (Garo Hills) which represent the different environmental problems of the state; such as; forest and water degradation, rat hole mining and its impact on agricultural land; depletion of drinking water sources, river/ stream; loss of aquatic life; and the practice of jhum cultivation and its impact on the soil, water and land. Prior to finalising the EMF, regional level workshops on the EMF was carried out in Garo Hills, Jaintia Hills and Khasi & Ri-Bhoi region. Three Regional Level Community Consultation Workshop on Community Led Landscape Management Project (CLLMP) were conducted by Meghalaya Basin Development Authority on the 28th, 29th and 30th March, 2017 in SMELC building (Garo hills), DC Conference hall (Jaintia Hills) and Meghalaya Agriculture Management and Extension Training Institute (MAMETI) (Khasi Hills & Ri-Bhoi) respectively. The workshop saw participation from various line departments like Agriculture, Horticulture, Forestry, Veterinary, Animal husbandry, Soil and Water Conservation, Industry, Fishery and Water resources, Block Development Officers, Non-Governmental Organisation, Water User Groups, and Headmen from various villages and staff from the IBDLP.

The issues identified from the Consultation are (i) ***Forests:*** Afforestation is taken up by the community and line departments but the survival rate of these saplings is poor due to poor monitoring and forest fires. (ii) ***Water:*** Meghalaya has a huge supply of rain water but taping and storage of this resources is lacking in the state thus the problem of water scarcity arises. (iii) ***Land:*** Need for improving the practices on shifting cultivation to improve soil quality and productivity. (iv) ***Biodiversity:*** Need for awareness on the protection of flora and fauna. Avoidance of use of exotic plants and seeds which does not survive in the state and encourage use of local species.

The site-specific investments, villages, and scale of interventions that will be selected within the targeted landscapes is not known, this will take place during project implementation. Accordingly, an environmental management framework has been prepared to guide the preparation of the CNRM plan, to ensure all interventions are environmentally sound and sustainable. The EMF has been publically disclosed on MBDA webpage (http://www.mbda.gov.in/publication/index.html). There is also a community operations manual under preparation, which outlines the technical specifications for implementation of afforestation, plantation, soil and water conservation works and spring shed management. This detailed information that will facilitate land use planning and other project-supported activities. Capacity building through training of national level and decentralized level staff will be conducted, to ensure proper implementation and compliance with Bank safeguards policies.

The EMF contains a process of (i) project data collection on the main environmental features in the landscape, and the threats/challenges facing the landscape (ii) screening of environmental activities against a negative list (project interventions which will not be financed under the project); and (iii) regulatory compliances required, (if any). The EMF describes the environmental risks (as well as the benefits) associated with the project, along with

recommended mitigation measures for anticipated impacts in Chapter 5. Further to this, depending on the list of activities/interventions selected, the community, using the screening format will with identify environmental impacts and indicate whether the impact is positive or negative against each activity.

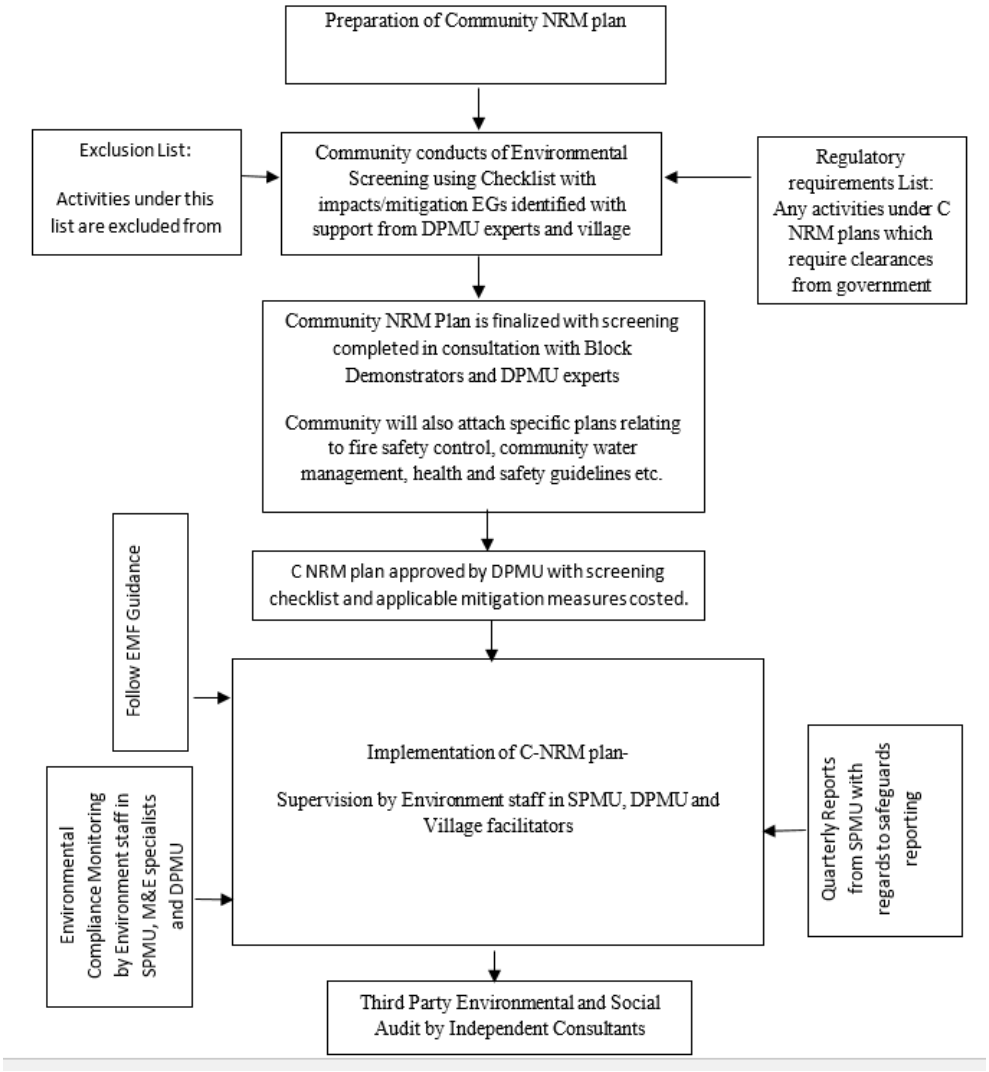
Although the project is expected overall to be environmentally positive, there is the potential for project works or activities to cause limited small-scale negative impacts, if they are not implemented correctly, screening has not been conducted appropriately and if environmental guidelines have not been mainstreamed. The environmental safeguard issues associated with the project activities could include (i) the need to ensure survival of plantations as the current scenario indicates that survival rate is low (ii) careful selection of tree species to ensure there is no replacement of the natural forests with incompatible exotic or invasive species (iii) ensure that community forestry activities and any extraction from forest areas are sustainable from an environmental standpoint (iv) adequate protection around the spring shed areas to ensure that the pristine water quality of the landscapes is maintained and no untreated wastewater, improper sanitation or changing land use leads to degradation of water bodies (vi) Improper land reclamation activities may also cause drainage and erosion problems resulting soil particles may be transported into surface drainage networks thus, affecting the quality of natural water systems. Mitigation measures for each of these anticipated impacts have been listed for the design and implementation phase, and these will be applied as needed by the community.

There could also be negative impacts on habitats through increased noise and disturbance, improper waste disposal or accidental fires. Following restoration of landscapes, induced impacts could be (i) increase in unplanned ecotourism activities in cultural and natural heritage sites, (ii) demand for rural

feeder roads to connect harvest of NTFPs, agriculture and horticulture produce to the markets, increasing livelihoods options; and (iii) minor impacts on downstream communities if there is a propagation in small scale irrigation schemes from the restored water source.

TheEMF outlines environmental guidelines (EGs) based on the typology of interventions, such as (i) spring shed catchment treatment, and community water management (ii) soil and water conservation (iii) afforestation and vegetative cover improvements (iv) land productivity management and (v) community forestry/agroforestry activities. There are cross cutting issues, for which irrespective of the typology of investment, if not managed appropriately could lead to environmental impacts, for this purpose, EGs have been developed for (i) forest fire control (ii) Management of pollution sources (iii) management of archaeological 'chance finds' (iv) environment health and safety management measures (v) management of natural, cultural heritage sites, and undertaking eco- tourism activities. The environmental guidelines will be included as an integral part of the community operations manual, so these can be applied during the design and implementation phase of these interventions.

The main purpose of the EMF was to provide a transparent framework with clear accountability for managing environment effects and risks associated with the operation phase of the project, outlining the criteria and procedures that the project should follow to help ensure compliance with the World Bank's, as well as national and state environmental policies and standards. It also identifies the institutional roles and responsibilities, capacity building, and budget requirements to effectively implement environmental mitigation measures. A schematic diagram of the EMF implementation process is outlined below:



The Project will be executed by the MBMA in collaboration with other partners particularly, SIRD (for training and capacity building), Department of Soil and Water Conservation, Water Resource Department, Forest Department, specifically with respect to technical inputs, safeguards management and CNRM plan preparation.

Dedicated staff for environment safeguards management will be deputed at the State PMU, which will have a dedicated Environmental project manager, supported by a project associate. The district level a committee will be constituted to approve C-NRM plans, and ensure convergence, administrative support and accompanying measures, where a dedicated environmental specialist will be present.At the block level, there is no dedicated environment specialist, however, Block units can allocate technical experts which will assist the village executing agencies in CNRM plan preparation, supervision and implementation. A team of eight village facilitators will be hired to work in the field, these will have specialisation in forest, water, soil, accounts, knowledge management, GIS, environmental safeguards and social safeguards to work as project frontline functionaries in awareness generation on project objectives, principles of participation, fund flow, social and environmental safeguards management.

The project will mainstream an MIS system which will track the progress of implementation of the safeguard provisions, and overall outcome of implementing the environmental guidelines/good practices. The project is monitoring a variety of indicators linked to area brought under improved management practices, soil and water conservation and land management practices, and improvement in natural resource management. However, specifically for EMF, indicators have been formed which can be monitored on a yearly basis. A semi-annual progress report will be prepared on progress and effective implementation of the safeguards provisions and furnished to the Bank. It is proposed that during mid- term the project will conduct an external third party audit on environment safeguards, to review C- NRM plan preparation and implementation, specifically (i) effectiveness of screening of activities (ii) application of environmental guidelines, and mitigation measures (iii) the deviations in implementing environmental measures, if any, (iv) application of tradition knowledge conservation practices, and where it can be scaled up (vi) suggestions for further improvement of environmental management practices at the community level.

A detailed capacity building and training plan has been proposed for all staff managing environmental safeguards, and village facilitators. The cost of implementing some of the provisions of the EMF over 5 years of the project, is up to 1% of the total project cost.

Chapter 1ProposedMeghalaya Community led Landscape Management Project

1.1 Background to the Project

Meghalaya, previously part of Assam, emerged as a full-fledged State on 21st January 1972, comprising of the districts of Khasi, Garo and Jaintia hills. The name means "the abode of clouds" in Sanskrit. Meghalaya covers an area of approximately 22,430 square kilometres, located between 24°57' and 26°10' North latitudes and 89°46' and 92°53' East longitudes. The state is bounded by Assam in the north and Northwest and Cachar area of Assam in the East, with Bangladesh in the South and Southwest sharing a 443 kms international border with Bangladesh.

The state is divided into three divisions, namely, Jaintia Hills (with two districts), Khasi Hills (with four districts) and Garo Hills (with five districts). About 70% of the state is forested, ninety percent of which is under community or private management. There are two national parks and three wildlife sanctuaries, 22 community reserves, one biosphere reserve and two elephant reserves to protect and conserve biodiversity of the state. It has predominantly hilly terrain with foothills as plains and flood prone areas.

Meghalaya has a population of 292.9 million of which 1,491,832 are male and 1,475,057 are female. Meghalaya is predominantly a tribal state. 85.9 percent of the state's total population constitute of Scheduled tribes. Khasi, Garo, Synteng, Hajong, Rabha, Koch, Mikir and Lushai etc. are the tribes that inhabit the state. Meghalaya is predominantly rural with 79.93 percent of the population residing in the rural area and 20.07 percent in the urban area. Largely an agrarian economy, important crops are potatoes, rice, maize, pineapples, bananas, papayas, spices, etc. The service sector is made up of real estate and insurance companies. Meghalaya's gross state domestic product for 2012 was estimated at ₹16,173 crores (US$2.4 billion) in current prices. The state is geologically rich in minerals, but it has no significant industries. 1The state has about 1,170 km (730 mi) of national highways. It is also a major logistical centre for trade with Bangladesh.2

Meghalaya is one of the fastest growing states in the country, yet economic opportunities continue to be limited for its rural inhabitants. The per capita income of the state in 2011was 48,383 INR which is below the national figure of 54, 835 INR. In 2013-14 the state grew at a high 9.7 percent, led by the industrial and service sectors. However, the state's HDI has seen a decline since the eighties and poverty is at 11 percent.

The state is the wettest region of India, recording an average of 12,000 mm (470 in) of rain in a year. 3however, it is challenged by degradation of water bodies, soil erosion and water scarcity in the dry season. While forest cover is high (76% of geographic area), unmanaged coal mining and limestone

[1]Arnold P. Kaminsky and Roger D. Long (2011), India Today: An Encyclopaedia of Life in the Republic

[2]http://www.ibef.org/download/Meghalaya-110313.pdf

[3]http://www.megforest.gov.in/megfor_extent_forest.htm

quarrying and unplanned logging are contributing to degradation of the resource base. Though there is abundant rainfall, there is very little management for storage and there is excessive soil runoff in the upper catchments. Rural communities in Meghalaya depend heavily on forests and community lands for livelihoods, food and medicine. A significant proportion of the population depends on jhum or shifting cultivation which is a direct cause of forest loss and degradation in the short term. The Khasi, Garo and Jaintia tribes who call this region home have a long history of sophisticated management of natural ecosystems and a spiritual connection with the land and its diversity manifest in their traditions and customs. This legacy of community management of natural resources is recognized in the Sixth Schedule4 of the Constitution which vests the rights over forests, Jhum and water resources with the Autonomous District Councils (ADCs).

With increase in population over time and the decrease in per capita availability of agricultural land, poverty has remained a serious concern. Poverty in the mining area and villages close to the towns has declined but it may have worsened in the interior villages due to stagnant agricultural production, soil erosion, and lack of new economic opportunities. The rural people market their agricultural forest and other farm produce in primary form with little or no value addition, thus reducing the employment, income generation and revenue base within the primary sector. Lack of infrastructure and industries within the state has also hampered the growth of the primary sector. Another challenge for the slow growth of the economy is the dependence of the people on the government for employment and income generation.

Around 52,000 families of rural Meghalaya practice shifting cultivation commonly called as jhum cultivation. This practice has an in-built mechanism of sustenance, conservation and renewable system of resources management. Traditionally, the farming communities were self-sufficient since they have their own granaries and seed bank. However, with the rise in population and shortening of the cycle of Jhum the quality and productivity of jhum land has declined. During the few months before harvesting season when food from previous years has run-off the jhum farmers experience scarcity of food where they may supplement their food requirement from forest products. Another challenge from this age-old practice is the conversion of forest into jhum land which causes depletion of natural forest and drying up of springs and water sources especially during the winter season.

Cultural and spiritual belief of the tribal communities of the state has also help in protection of small and large stretch of forest called as sacred grooves which has remained undisturbed from human activities from time immemorial. The tradition of sacred groves has helped a great deal in conservation of biodiversity of the state.

The climatic condition of the state has good potential for horticulture and plantation like tea, rubber and spices. It also has high growth potential for animal husbandry and fishery. To tap these potentials, the state needs to ensure that there is proper accessibility and availability to market facilities otherwise the produces will not fetch remunerative prices to the growers. Therefore, to strengthen the traditional conservation practices and enhance the sustainability of the natural resources of the state of

[4]The Sixth Schedule of the Constitution of India deals with establishing ADCs in the North Eastern Region of India.

Meghalaya, it is important to adopt approaches that will help build on the traditional knowledge and local technology. There is a need to judiciously integrate the modern scientific knowledge of natural resources management with the traditional NRM practices based on value system so that the people identify and participate effectively in the development process that is sustainable.

The Government of Meghalaya has begun efforts in this direction with a multi-pronged flagship "Integrated Basin Development & Livelihood Promotion Programme (IBDLP)" which focuses on poverty alleviation, employment generation and livelihood promotion. The program considers the need for meaningful participation by communities at the grassroots level and ensures convergence between State institutions and traditional village headmen. The existing systems of community ownership of natural resources provide the appropriate framework for this collaboration. The new approach seeks to expose the stakeholders to new knowledge and skills which would enable them to make the best use of natural resources, through the value chain and would result in a more equitable and inclusive growth.

The proposed MCLLM project will be nested under this framework and will strengthen community-led landscape management in selected areas of the state. It will build on existing traditional systems at village level and find synergies and complementarities between those and the formal government systems of management. The proposed project will be based on the principles of community leadership in decision-making, transparent information flows, respect for local culture and traditions, enhancing gender equity and sustainable management of resources. It proposes preparation of landscape level investment plans under community leadership which will be implemented, linking activities to value chains and economic benefits whilst maintaining and enhancing the ecosystem functions and services.

1.2 Project development objective:

The objective of the CLLMP is to strengthen community-led natural resources management in selected landscapes in the state of Meghalaya.

Key Results

- Direct project beneficiaries (#) of which female (%)
- Beneficiaries that feel project investments reflected their needs (%) disaggregated by gender
- Area in selected landscapes managed by communities per defined criteria (ha)
- Land area brought under a catchment system because of the project (ha)
- People in targeted forest and adjacent communities with increased monetary or non-monetarybenefits from forests, disaggregated by gender (#)

1.3 Project Components

The project will finance landscape management planning and implementation by community institutions covering the entire state of Meghalaya. Capacity building and landscape level planning will be carried out state-wide, while implementation of these plans will be in prioritized landscapes and rolled out in a phased manner. During implementation, activities under the plans will be linked to ongoing state supported livelihood programs under the IBDLP and LAMP, which provide support to entrepreneurs for value addition and marketing of agricultural and forest products.

The Meghalaya Basin Management Agency (MBMA), is the implementing agency for IBDLP and LAMP is the proposed implementing agency for the CLLM project and will facilitate the planning with technical inputs. The community will be engaged at the very early stage of project planning, including during resource mapping, social data collection, project design and monitoring. The project will support inclusion and capacity building of women for their effective participation and equal opportunities for leadership in collective decision-making at village level. The project will foster collaboration between ADCs, traditional village leaders, women and youth in program planning and implementation and, build on MBMA' s experience on community led design of investments.

Component 1: Strengthening Knowledge and Capacity for management of Natural Resources: This component will help to strengthen Natural Resource Management (NRM) knowledge of communities, traditional institutions and other stakeholders for improved NRM with landscape approach. This component will comprise of the following sub-components:

Sub-Component 1A: Promotion of traditional knowledge, grass-root innovations and communication will support (i) state and regional level workshops on sharing of unique and traditional NRM practices, learnings from other NRM projects (ii) development of a knowledge management strategy and web platform for sharing of NRM related knowledge with the community under CLLMP and development of knowledge networks (iii) development of website for CLLM-Programme (iv) innovation grants to promote and pilot new approaches to sustainable NRM products and services;

Sub-Component 1B: Training and Capacity Building will finance (i) training and capacity building activities for all stakeholders and beneficiaries on community leadership and management of natural resources and the approaches promoted by the project; (ii) development of C-NRM plans (iii) development of training infrastructure at block level Bharat Nirman Rajiv Gandhi Seva Kendra (BNRGSK)/ Enterprise Facilitation Centres; and (iv) national and international exposure visits for project stakeholders. These training activities will be implemented in coordination with the Meghalaya Institute of Natural Resource Management, Institute of Governance, Department of Science and Technology, State Institute of Rural Development (SIRD), Forest Training Institute (FTI – Tura) and Conservation Training Institute of the Soil and Water Conservation Department (CTI). It was agreed during the mission that procurement of these agencies will be completed prior to negotiations.

Sub-Component 1C: Catalytic NRM Fund for adoption CLLMP approach will support villages not covered under Component 2 B to support village communities with small scale NRM activities to encourage community interest and leadership.

Sub-Component 1D: Preparation of Strategies, Research and Development will support consultancy services to develop plans and strategies on the following areas: (i) Preparation of strategy and action plan for development of a centre of excellence in knowledge management, innovation and communications; (ii) Institutional development study for Integrated Basin Development and Livelihood Promotion Program (IBDLP); (iii) Preparation of Training Plan for the project; (iv) Baseline Study for the project; (v) Study on drivers of deforestation and natural resource degradation; and (vi) Study on Rehabilitation of population displaced due to mines.

Sub-Component 1E: Monitoring learning and reporting will support an MIS system to cover the entire state for tracking performance and implementation progress of the CLLM-Project. MBMA will design and establish MIS infrastructure for CLLMP that can be scaled up to cater to other requirements of the IBDLP.

Component 2: Community-led landscape planning and implementation. This component will support both planning and implementation of the landscape plans by communities in the selected very high/high priority areas.

Sub-component 2A: Preparation of Community landscape plans. Communities, with the help of project facilitating teams (subject matter specialists) at block level and village level service providers, will prepare plans which will allow communities to (i) optimize synergies between programs and funding streams; (ii) plan holistically rather than be program/ scheme-driven to meet targets; and, (iii) take a leadership role for the management of natural resources under their stewardship. A Community Operations Manual (COM) will outline processes of community consultation and development of Community-led Natural Resource Management (CNRM) Plans. The COM will specifically define "bottom-up" participatory planning and implementation processes.

Sub-component 2B: Implementation of community landscape plans: Communities will implement CNRM plans in a phased manner, agreed through an MoU between the Village NRM Committee and respective District Project Management Units (DPMU). Communities will first implement agreed first phase activities in their plan and graduate to the next phase of financing if implementation meets agreed criteria. This approach is meant to incentivize performance based access to funds by the communities. Actual interventions needed will be decided by the community in their respective CNRM Plans but will relate to soil and water conservation measures; soil health improvement and productivity enhancement measures; spring-shed development and water management plans; nursery, agro forestry and community forestry; optimisation of shifting cultivation; rehabilitation of areas affected by mining etc. Criteria for assessing successful implementation will be agreed in the MoU.

Component 3: Project Management and Governance: This component will support the strengthening of the institutional capacity and knowledge management of the Project Implementing Entity MBMA for the implementation and management of the Project including, inter alia, (i) establishment of the state project management unit (SPMU) within MBMA, support to seven district project management units, including technical staff and consultants (ii) the incremental costs associated with implementation; (iii) administrative support to 20 block development offices (iv) technical fiduciary and safeguards oversight and supervision of project activities in the field.

1.4 Project Implementation Area

- **Component 1** of the CLLM-Project will in implemented in all villages in the State to support the CLLM-Programme of the Government of Meghalaya.
- **Component 2** will be implemented select villages as defined by North East Space Application Centre (NESAC) classification as critical landscapes which is based on a vulnerability analysis of all 35 watersheds and 179 sub watersheds of Meghalaya and classified these landscapes as: (i) very

critical (very high priority) areas; (ii) critical (high priority) areas; and, (iii) low priority areas. This classification is based on vegetation index, slope and soil brightness index. The Government of Meghalaya will utilize Component 2 of the project it to establish and demonstrate best practices for planning and implementation of landscape management approach through actual investments in land, water, soil and forests development activities in few villages so that those practices can be replicated in the entire State as part of CLLM-Programme. Keeping in view the principle of providing equal opportunity to all villages that are finally identified as falling under critical and very critical landscapes, all villages will have equal opportunity to submit their Expression of Interest for participating under CLLM-Project. First 400 villages that demonstrate their preparedness to implement CLLM-Project through achieving set milestones will receive investment funds for CNRM plan preparation and implementation under the project. All remaining villages in the State will receive financial assistance from GoM from State and Centrally sponsored schemes under CLLM-Programme for implementing CNRM plans as and when they are able to achieve set milestones for receiving that assistance.

1.5 Project Beneficiaries

The project will provide targeted support to landscape restoration activities in *an estimated 400 villages* in the prioritized degraded and highly degraded landscapes under Component 2 B. Village community members from across the state will benefit from the training and capacity building and knowledge sharing activities of the project.

1.6 Methodology for Preparation of EMF

The EMF was prepared following methodology as depicted in the figure below. As per the Terms of Reference agreed, the scope of work is to ensure the potential environmental issues and risks are identified and appropriate Environmental Management Framework (EMF) are prepared at the earliest stage of CLMM project for the avoidance and mitigation of adverse impacts while implementing the project.

Desk Review:A desk review conducted included similar comparable projects that have been carried out in the State of Meghalaya, and within the north-east region to enable the identification of environmental issues pertaining to such type of projects. Compliance of the project with the relevant legislations of GoI, State level and local level and policies of World Bank was ascertained. Applicable legislations during implementation of the project and necessary provisions for compliance has also examined.

Environmental baseline conditions has been compiled based on secondary information, relevant to understanding the baseline, as well as the design of mitigation and enhancement measures, as pertaining to physical (topography, geology, soil characteristics, climate, water resources (surface and groundwater), and forest cover. Primary baseline data was gathered from field visits to villages in experiencing different environmental challenges (degradation due to mining, shifting cultivation and community forestry activities) accordingly a primary baseline profile for selected villages was also presented and analysed. A detailed environment baseline was also conducted for three villages based

on sites visits and stakeholder questionnaires, these villages were in areas challenged by forest degradation, jhum cultivation and mining activities.

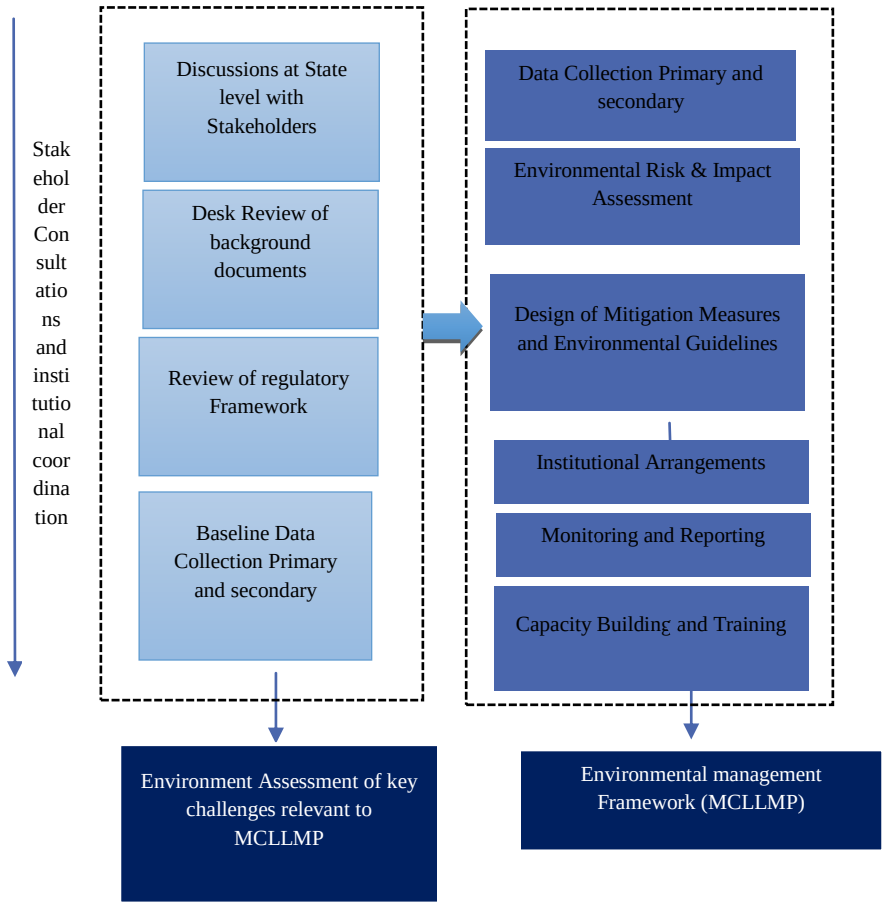
Stakeholder consultations have been carried out withlocal authorities and communities and all relevant stakeholders those who have been identified through stakeholder analysis with the objective to improve the project's intervention about environmental management. Two rounds of consultations have been carried out, the first would help to seek views from the stakeholders on the environmental issues and the ways these could be resolved, and the second at the district level to provide feedback to the stakeholders that their views have been taken care in the EMF and the project. The procedure for conducting stakeholder and public consultations with relevant consultation formats/ questionnaires/ checklists has been prepared and enclosed with the EMF, which acts as a guide for conducting consultations at any stage of the subproject implementation.

Environmental Assessment As the proposed project is expected to have environmental impacts that are positive overall, consistent with the PDO and the approach, this project seeks to reduce forest and spring shed degradation within Meghalaya, by promoting sustainable management of landscapes, which include spring-sheds, community forests, and demonstrate environmentally compatible agricultural activities, that are intended to reduce the ongoing pressures on forests. The potential environmental risks/issues analysed through the baseline assessments, and impacts (both positive and negative) due tothe potential interventions has been determined through the identification, analysis and evaluation of these impacts on environmental parameters (air, water, soil); and sensitive areas (forests, natural habitats; sites of historic, cultural and conservation importance).

Environmental management framework was developed establish clear procedures for the environmental and social planning, review, monitoring of activities under the landscape management plans. Activities within the landscape plans will be required to screen for eligibility and potential negative impacts for which mitigation measures and application of Environmental Code of Practices (ECOP) would be applicable. The ESMF describes policies, procedures, and processes to be considered and followed during the implementation of the proposed Project.

Institutional and implementation arrangementsfor the EMF with appropriate roles and responsibilities, and necessary reporting procedures, for managing and monitoring environmental and social concerns has been established. An analysis of training, capacity building and technical assistance needs to successfully implement the provisions of the EMF has also been presented to establish the project funding required for implementing the EMF.

Figure 1 Methodology for EMF preparation



1.7 Organisation of report:

Chapter 1: Includes the project background, objectives and components of the project.

Chapter 2: Environmental Baseline

Chapter3: Relevant laws, policies from the World Bank, GoI and GoM (Environment)

Chapter 4: The identification of key stakeholders and consultation process

Chapter 5: Anticipated environmental concerns, risks and impacts based findings of Chapter 1-4

Annexures:

Chapter 2EnvironmentalBaseline

2.1 Overview of Meghalaya

Meghalaya, which was previously part of Assam became a full- fledged state on January 21, 1972. The state of Meghalaya comprises Khasi, Garo and Jaintia hills. The state has a 496 km long international boundary with Bangladesh in the south and west. It is bordered by Assam in the north and east. The eastern part is bound by the Karbi Hills which is a continuation of the Meghalaya plateau. In the north and west sides of the state lies an extensive plain drained by the river Brahmaputra and in the south, lies the river Surma and its tributaries.Meghalaya has 11 districts namely, West Jaintia Hills, East Jaintia Hills, East Khasi Hills, West Khasi Hills, South West Khasi Hills, Ri-Bhoi, North Garo Hills, East Garo Hills, South Garo Hills, West Garo Hills and South West Garo Hills.

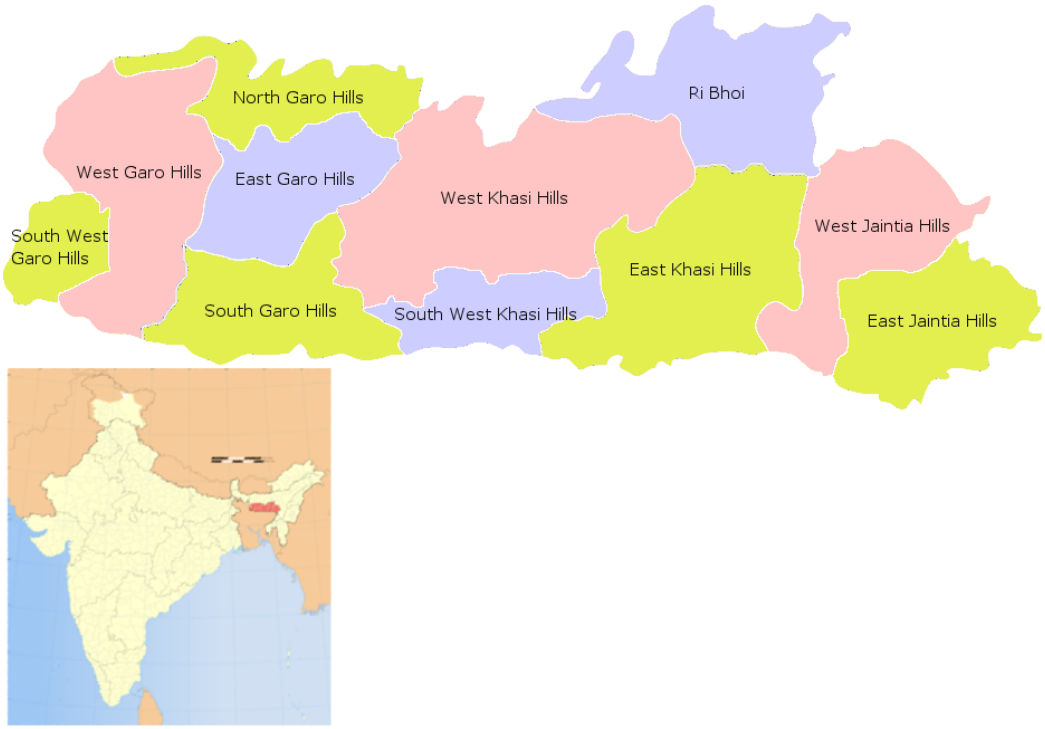


Figure 2 Physical Map of Meghalaya

2.1.1Landscape and Topography

The state can, broadly, be divided into three physiographic zones

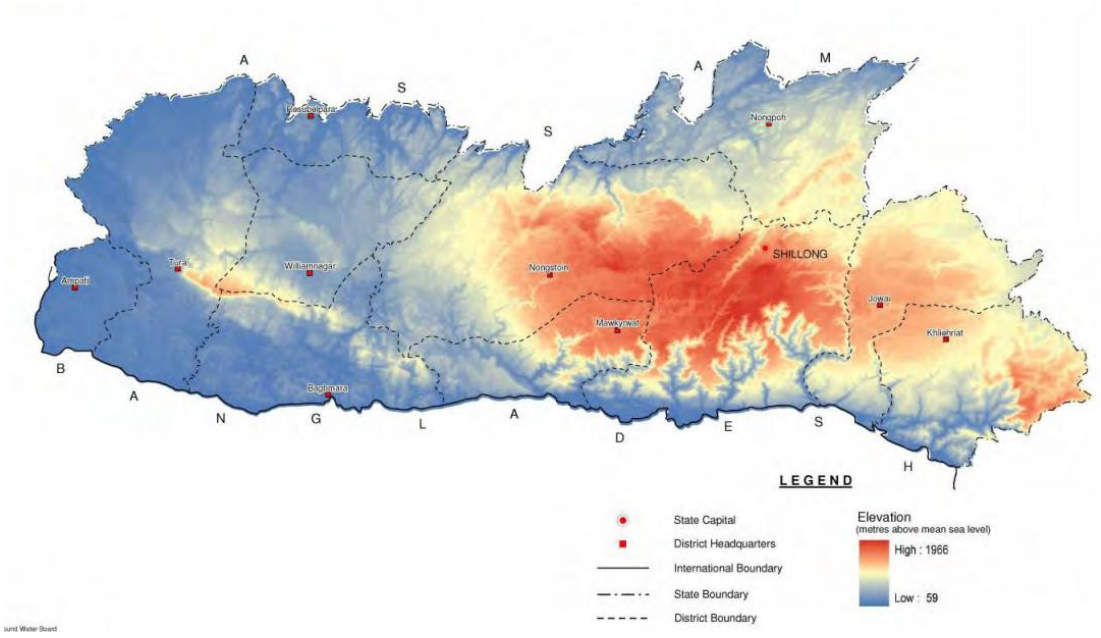
(i) Central Plateau Region between 900-2000m elevations

(ii) Sub-montane region in continuation with the Central Plateau below 900m which gradually merges with the plains in the West and North and

(iii) Border region which stretches south-wards abruptly from the Central Plateau to the plains in Bangladesh.

Meghalaya state is also known as Meghalaya plateau. The elevation of the plateau ranges from 150 m to 1961 m. The central part of the plateau has the Khasi hills and the eastern section is bounded by Jaintia hills. The highest point in the state is the Shillong Peak with an altitude of 1961 meters. The Garo Hills bound the western section of the plateau.

Figure 3 Topographical Map of Meghalaya



2.1.2 Climate and Rainfall

Climate of Meghalaya plateau is influenced by elevation and distribution of physical relief. Based on the weather condition, the Meghalaya plateau has 4 distinct seasons; (a) The rainy season from May to early October, (b) The cool season from early October to November, (c) The cold season from December to February and (d) The warm season or hot season from March to April.The western part of the Garo hills is relatively lower in elevation as compared to Khasi and Jaintia hills. Garo hills experienced higher temperature conditions and humidity from February to October. April and May are the warmest months and January is the coldest month. The nature of elevation and slope has also influenced the distribution of rainfall.

The Khasi and Jaintia hills experiences a moderate climate because of higher elevation. Warm and humid conditions are prevalent in the foothills region in the south and sub-montane region in the north and central uplands. The plateau experiences a temperature of 24^{o} c throughout the year.

The southern parts of the plateau have the Cherrapunji -Mawsynram region which receives the heaviest rainfall, an annual average of 12670 mm. The Khasi and Jaintia hills receive an average of

7700 mm of rainfall and lies in the rain shadow area. Cherrapunji and Mawsynram lying about 55 Km south of Shillong receives an annual rainfall of about 14,000 mm which is the highest amount of rainfall in the world.

Table 1 Rainfall in Districts [5] in (mm)

District/Centres	2004	2005	2006	2007	20085	2009	2010	2011	2012
East Khasi Hills (a)Mawsynram	14026	10072	8082	13302	10722	8952	11069	8927	12327
(b)Sohra	NA	NA	NA	12647	11415	9000	13472	8732	13350
West Khasi Hills (a)Nongstoin	4036	3097	2366	4778	NA	*3507	3316	2982	NA
Jaintia Hills (a)Jowai	5374	3042	2898	5379	3094	3025	3404	2964	4254
East Garo Hills (a)Willliamnagar	3837	3612	2098	3899	3317	3252	3183	NA	3109
West Garo Hills (a)Tura	4107	4652	2528	4265	3632	3355	3278	4003	3580
Ribhoi (a)Nongpoh	1147	1792	1274	3086	3853	3354	1156	6278	NA
South Garo Hills (a)Baghmara	1811	2347	1405	2589	2392	1532	1161	2147	1841

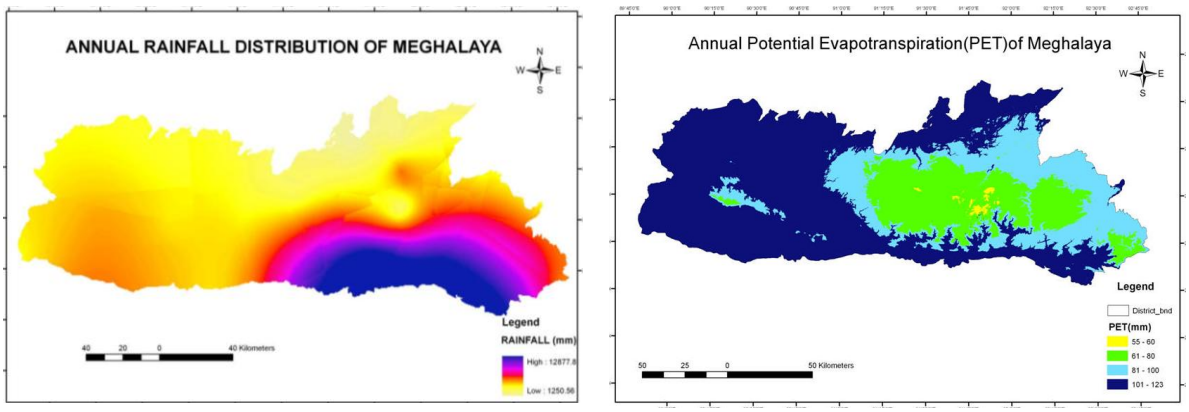


Figure 4 Rainfall Distribution and Annual Potential Evapotranspiration

[5] *District Agriculture office, Meghalaya, District and local Research Station and laboratories, West Garo Hills, Tura, S.D.O, PWD, Mawsynram, Sub-Divisional Agriculture Officer – Sohra (*February to December)*

2.1.3 Geology and Soils[6]

Geologically the Meghalaya plateau comprises of rocks from the oldest Precambrian gneissic complex to the Recent alluvium formations. The stratigraphic sequence is as follows (i) Cretaceous –Tertiary sediments, (ii) The Sylhet trap, (iii) Lower Gondwana rocks, (iv) Shillong Group of rocks, (v) Precambrian gneissic complex (Basement gneiss)

The soils of the hills are derived from gneissic complex parent materials; they are dark brown to dark reddish-brown in colour, varying in depth from 50-200 cm. The texture of soils varies from loamy to fine loamy. The soils of the alluvial plains adjacent to the northwest and southern plateau are very deep, dark brown to reddish-brown in colour and sandy-loam to silty-clay in texture.

Being a hilly region Meghalaya has a wide range of soils in terms of depth, texture, structure, fertility and drainage properties, broadly derived from genesis complex parent material. Soils are largely lateritic and deep to moderately deep with the depth of soil varying from 50 to 200 cm in different parts of the State.

Broadly, the central part of Garo hills and central upland of Khasi and Jaintia hills have read loamy soils formed as a result of weathering of granite, gneisses, diorites, etc. Red and yellow fine textured soils raining from loam to silty loam are found along the southern fringes of read loamy soils. Lateritic soils are present in the southern part of the State. Alluvial soils are found all along the southern, western and northern fringes of the State, with sandy to clay loam texture.

Soils are by and large highly leached, rich in organic carbon with high nitrogen supplying potential, but deficient in phosphorus and potassium. Soil reaction varies from acidic (pH 5.0 to 6.0) to strongly acidic (pH 4.5 to 5.0). There is not much difference in fertility classes of soils across the State. Soils occurring on higher altitudes under high rainfall belt are strongly acidic due to intense leaching. These tend to be excessively drained and erosion-prone. Soils on very steeply sloping hill escarpment are moderately deep, excessively drained, with coarse-loamy texture, sandy surface with very severe erosion hazard and strong stoniness. Soils on steeply sloping side-slopes of hills are generally moderately deep, excessively drained, with fine-loamy surface. These have severe erosion hazard.

Soils on moderately steep side-slopes of hills are deep to moderately deep, excessively drained, with fine loamy surface, moderate erosion hazard and strong stoniness. Soils on moderately sloping side-slopes of hills are deep to moderately deep, excessively drained, with fine loamy surface and moderate erosion hazard. Soils on gently sloping side-slopes of hills are deep to moderately deep, excessively drained, with fine loamy surface and some erosion hazard. Soils on level valley bottoms tend to be deep, very poorly drained, fine in texture with clayey surface and prone to water logging. Soils on gently sloping valleys tend to be deep, well drained, having fine-loamy surface. These are suitable for all kinds of crops with proper management of water. Soils on very gently sloping plains tend to be deep, inadequately drained with loamy surface and mild erosion hazard.

[6] http://megdmg.gov.in/features.html

2.1.4 Land Use

The Forest area in the State (42.01%) dominates the major portion of the land use, however, is still below the national norm of 60% recommended for hilly areas. This is because ofsignificant proportion of the population depends on jhum or shifting cultivation which is a direct cause of forest loss and degradation in the short term. Most of the land is under rural areas, with Shillong being predominately the main urban settlement. Only 12.74% is net sown area, which has potential to be increased if and when the fallow lands are utilised for cultivation purposes. About 17.4% of the land is under wasteland category, (comprising of scrubland, jhum, abandoned jhum lands and degraded scrub forest, with the highest proportion in the west Khasi hills and Jaintia hills

Table 2 Land Use Pattern of Meghalaya

Land Use Pattern		
Land Use	Area in '000 ha	Percentage
Total Geographical Area	2,243	
Reporting area for land utilization	2,241	100
Forests	946	42.22
Not available for cultivation	239	10.68
Permanent pastures and other grazing lands	0	0
Land under Misc. Tree crops and groves	164	7.33
Culturable wasteland	391	17.43
Fallow lands other than current fallows	155	6.92
Current fallows	60	2.68
Net area sown	285	12.74

Source: Landuse Statistics, Ministry of Agriculure, GOI, 2012-13.

2.2 Forests

The total forest area in Meghalaya is 9496 sq. km, of total land area of 22,429 sq. km which comprises of 42%. Within the forest area, 10.6 % is classified as reserve forest, 0.13% as protected forest and 88% as unclassified forest. State Forest Department is responsible for the reserved forests and protected areas, and the remaining forests are under the control of Administrative District Councils. Community forests are categorized as ‘unclassified’ forests, while forests under State Forest Department stewardship are ‘reserved forests’ and protected areas.

Table 3 Notified Forests under the Control of State Forest Department

Serial Number	Class of Forests	Area (in Sq. Km.)
1	Reserved Forests	713.12
2	Protected Forests	12.39
3	National Parks (including proposed)	267.48
4	Wild life Sanctuaries	34.20
Total		1,027.19

As stated above, having 1,027.20 sq. Km is under the control of State Forest Department, constitutes only 4.58 % of the total geographical area of the State and 6.56 % of the total forest area of the State. The remaining forest area is either private or clan/ community owned and is under the indirect control and management of the Autonomous District Councils set up under the provisions of the Sixth Schedule to the Constitution of India. The Khasi Hills Autonomous District Council, Garo Hills Autonomous District Council and the Jaintia Hills Autonomous District Council. Under the Sixth Schedule of the Constitution, these District Councils have been vested with legislative, executive and judicial functions in many subjects. Important functions which have implications for CLLMP are as follows:

- Lands other than Reserved Forests
- Forests other than Reserved Forests
- Regulation of the practice of jhum cultivation or any other form of shifting cultivation
- Use of any land or water courses for agricultural purposes

The forest cover of the State is estimated to be 17275 Sq. km which is 77.02% of the State's geographical area. In terms of canopy density classes, area under Very dense forests (VDF) is estimated to be around 433 sq. km., moderately dense forests (MDF) is around 9775 sq. km and are 7067 sq. km. area under open forests (OF). Around 485 Sq. km. area falls under scrub lands category. Estimated area under Trees Outside Forests (TOF) area is 578 sq. km which is 2.58% of the State's geographical area. In addition to providing an economic and cultural backdrop for the lives of people, forests in Meghalaya deliver an array of essential local and global environmental services, including water storage and filtration, soil stabilisation and carbon sequestration, prevention and reduction of floods, provide food, fodder, fuel, medicines, and materials for construction.

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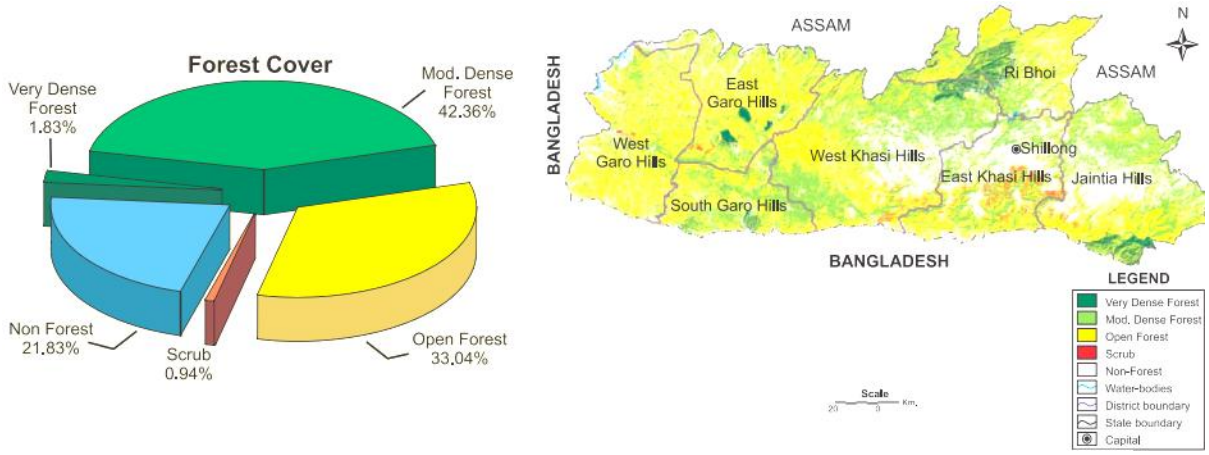

Figure 5 Forest cover type in Meghalaya

Evergreen, semi-evergreen, and moist deciduous tropical forests occur up to an elevation of 1200m where average rainfall is between 100-125cm mostly on the north eastern and northern and southern slopes of the states. The sub-tropical forests occur at 1500 m elevation on the southern slopes of Khasi and Jaintia Hills with annual rainfall of 200-250 cm and sever winters during November to March. Degraded grasslands are found in Khasi and Jaintia hills and West Garo Hills.According to the Forest

Survey of India, total area under forests seems to have marginally increased in Meghalaya.This could be due to the increasing number of afforestation activities undertaken in the state. It should be noted that there has been an increase in the area under scrub forest over the 2003-2011 assessments.Of the total of forest cover, a major chunk of it is open and moderately dense forest. For complete inventory on type of trees and species refer to Annex 6.

Table 4 Trends in area under different types of forest in Meghalaya (sq. km)

Forest Type	2001 Assessment	2003 Assessment	2005 Assessment	2009 Assessment	2011 Assessment
Dense Forest	5,681	6,491	7,146	VDF – 410, MDF- 9501	VDF– 433, MDF - 9775
Open Forest	9,903	10,348	9,842	7,410	7,067
Scrub Forest	259	169	181	211	485
Total	15,843	17,008	17,169	17,532	17,760

Table 5 District –wise forest cover (2015 FSI assessment) with changes compared to 2009 assessment

District	Geographical Area (ha)	VDF	MDF	Open Forest	Total	% of Geographical area	Change*	Scrub
East Khasi Hills	2820	0	1084	716	1800	63.83	-279	110
West Khasi Hills	5247	91	2551	1366	4008	76.39	-40	64
Jaintia Hills	3819	99	1578	839	2516	65.88	-65	53
RiBhoi	2376	131	1092	898	2121	89.27	433	10
South Garo Hills	1849	44	1005	590	1639	88.64	-50	27
West Garo Hills	3715	0	1361	1613	2974	80.05	257	129
West Khasi Hills	5247	91	2551	1366	4008	76.39	-40	64
Total	**22429**	**433**	**9775**	**7067**	**17275**	**77.02**	**-46**	**485**

2.2.1Protected Areas

The protected area network in Meghalaya occupies 1133.9 Sq.km area which constitute about 5.06% of the State's Geographical Area. The Protected Area Network includes 2 national Parks, 4 wildlife Sanctuaries and 1 Biosphere Reserve playing an important role in in-situ conservation of Biodiversity. The Protected Area Network still support viable population of the Endangered Western Hoolock Gibbon, the Bengal Slow Loris on the other is patchily distributed. Primates including Stumped Tail Macaque, Assamese Macaque, Northern Pig Tail Macaque, Rhesus Macaque, capped Langur, and the blond bellied langur. Among the carnivores, the Bengal Tiger and the Clouded Leopard have become extremely rare while the adaptable leopards are still widely distributed. Bears including Sun bears, Asiatic Black Bear and the Sloth Bear. Smaller cats like the jungle cat, marbledcat, leopard cat is still found in these protected areas. Smaller carnivores are also abounding, among them mongoose, badger, binturong, dhole, jackal, weasel, otter, fox and marten.

Table 6 Protected Areas in Meghalaya[7]

Protected Area	Area in Sq. Km	District	Est.
Siju Wildlife Sanctuary	5.81	South Garo Hills	1979
Nongkhyllem Wildlife Sanctuary	29	Ri-Bhoi District	1981
Baghmara Pitcher Plant Sanctuary	0.02	South Garo Hills	1984
Balpakram National Park	220	South Garo Hills	1986
Nokrek Ridge National Park	47.78	East Garo Hills	1986
Nokrek Biosphere Reserve	820	East, West and South Garo Hills	1988
Narpuh Wildlife Sanctuary	59.90	East Jaintia Hills	2014

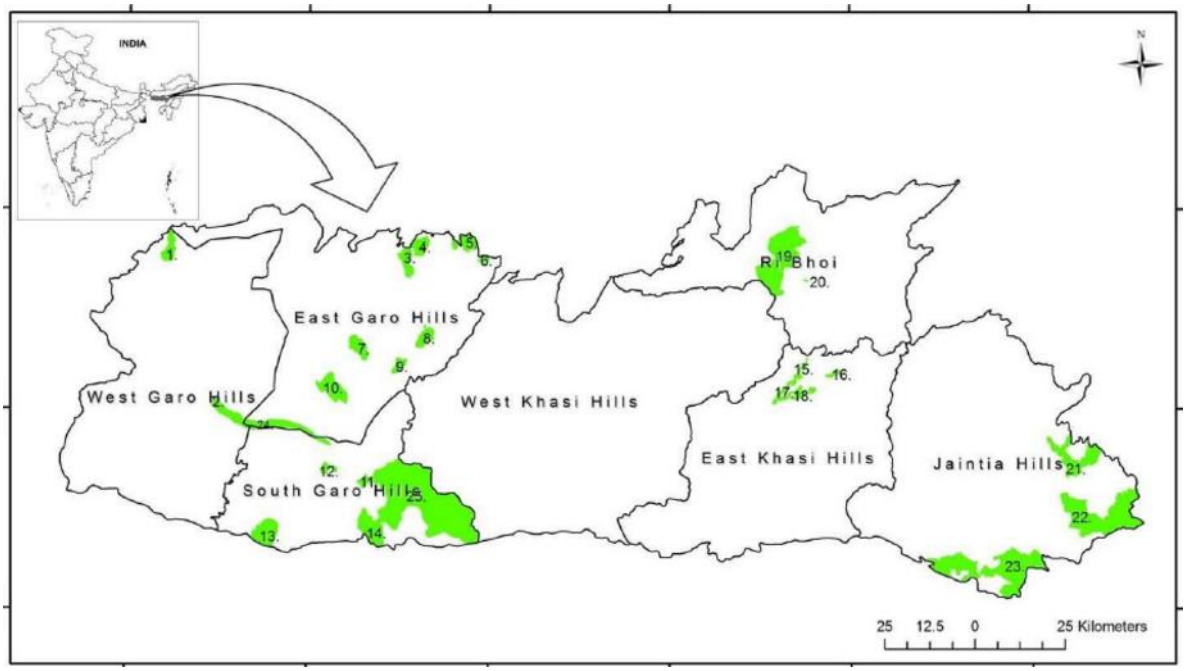

Figure 6 Map showing the distribution of National parks (NP), Wildlife sanctuaries (WLS) and Reserved forests (RF) in Meghalaya (1. Dribruhills RF, 2. Tura peak RF, 3. Chima Bangshi RF, 4.Dhima RF, 5. Rajasimla RF, 6. Iidek RF, 7. Songsak RF, 8. Darugiri RF, 9. DambuRF, 10. Rongrengiri RF, 11. Siju WLS/RF, 12. Emanggiri RF, 13. Angratoli RF, 14. Baghmara WLS/RF, 15. Rait Khawn RF, 16.Shyrwat RF, 17. Upper Shillong RF, 18. Rait Laban RF, 19. Nongkhyllem WLS/ RF, 20. Umsaw RF, 21. Saipung RF, 22. Saipung RF,23. Narphu RF, 24. Nokrek NP, and 25. Balphakram NP).

2.2.2 Biodiversity

Meghalaya is part of Indo-Myanmar biogeographic region one of the mega bio-diversity regions of the world. Bio-diversity rich areas of Meghalaya are:

- Balphakram National Park 2200 ha. (South Garo Hills)
- Nokrek Biosphere Reserve 82000 ha. (Garo Hills)

[7] http://megbiodiversity.nic.in

- Nongkhyllem Wildlife Sanctuary 2900 ha. (Ribhoi)
- Siju Wild Life Sanctuary 518 ha. (South Garo Hills)
- Sacred Groves 10000 ha. (all over the state)

There are 3,128 species of flowering plants including 1,237 endemic species and several valuable medicinal plant species. Some highly exploited and endangered species include *Panax pseudoginseng* and *Rouvlfia serpetania*. Most of the endemic and threatened species are confined to protected forests and sacred groves. Species endemic to Meghalaya includes*Aeschynanthes parasiticus, A. superba, Callicarpa psilocalyx, Citrus latipes, Ilex embeloides, Impatiens khasiana, Nepenthes khasiana, Paramignya micrantha* and many others. Species that were common about 20 to 30 years ago have become rare (e.g., *Dipteris wallichii, Cyathea gigantea, Ilex embeloides, Styrax hookerii and Fissistigma verrucosum*) due to overexploitation, deforestation and habitat destruction. Beside a large number of amphibian, reptile, fish and bird species, more than 110 mammal species including elephants, wild buffalo, sambar and barking deer, red jungle fowl, hornbills, civets, etc. These include elephants, wild buffalo, amphibians, reptiles, barking deer, civets etc. are found in the forests of Meghalaya. Many of the species which were common 20-30 years before, and have become rare due to overexploitation, deforestation and destruction. Many factors are responsible for loss of bio-diversity such as unsustainable land tenure system, poor supervision of community owned forests, conversion of mixed forests in to mono-culture, urbanisation etc.

2.2.3 Sacred Groves

Sacred groves are forest patches, which are protected by communities based on religious beliefs, and have a significant religious connotation for the protecting community. The Khasi, Garo and Jaintia tribes, which comprise over 80 percent of Meghalaya's population, have been managing the forests and communal lands and water bodies for centuries under tribal customary law. Each tribe has an elaborate system of use-based classification of their lands and stringent protection of forests designated as sacred groves. These groves are considered as one of the most species-rich areas for plants, birds and mammals. Most of the groves are in the catchment areas of major rivers. The information on floristic richness of the sacred groves of Meghalaya revealed that at least 514 species representing 340 genera and 131 families are present in these sacred forests. Many endemic, rare, endangered and threatened species of the state are found in the sacred groves. The sacred grove biodiversity compares favourably with that of the core area of some of the biosphere reserves in this region, which are being managed by the state forest department. This bears testimony to the efficacy of the traditional forest management systems practiced by the locals. [8] Ryngkew, Basa, Labasa are some of the deities to whom these groves are dedicated. Bamboo, Needle wood, Indian birch, White Pear, RoyalRobe, Balsum of Peru, Phurse Champ, Lac tree and Plot's Elm are among the most commonly found plant species in the sacred groves. [9]

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[8] http://dspace.nehu.ac.in/bitstream/1/6287/1/Sacred%20groves%20of%20Meghalaya%20(BK%20Tiwari).pdf

[9] Tiwari B.K., S.K. Barik and R.S. Tripathi, 1999, "Sacred Forests of Meghalaya- Biological and Cultural Diversity", and Barik, S.K., H.N.Pandey, B.K. Tiwari and B. Singh, 2006, " Sacred Groves of Meghalaya: A sceintific and conservation perspective", Regional Centre, National Afforestation and Eco- Development Board, North- Eastern Hill University, Shillong.

A large and intact grove represents a healthy forest ecosystem that renders valuable ecological services like, soil, water and biodiversity conservation, nutrient cycling and temperature regulation. Carbon sequestration per unit area of the grove is expected to be greater than adjoining secondary forests, understandably due to higher biomass. Tiwari et at (1998) report 79 SGs from the State. Rodgers (1994) mentions categorization of protected groves in Meghalaya, which was formulated by Durbar of Khasis in 1925 as follows:

- Ki Law Lyngdoh: forests under the control of the traditional religious leader (or now village councils): no public use permitted.
- Ki Law Kyntang: forests of great sacred value for sacrificial and religious ceremonies.
- Ki Law Niam: religious forest (may not be distinct from above).
- Ki Law Adong: forest protected for non-commercial use, e.g. water.
- Ki Law Shnong: forest resources for village use.

Groves are often treated as independent distinct entity for biodiversity conservation and ecosystem functioning. Water conservation is perhaps the most well documented ecological service provided by the sacred groves, which provides soil and water conservation which are beneficial for the local inhabitants in terms of less soil erosion, preventing flash flood, supply of water in lean season etc.

Present day groves are typical representation of islands of native vegetation amidst heterogeneous landscapes. They play a vital role in preserving landscape biodiversity and maintaining ecological services. Groves act as shelter place for forest birds and small mammals during their foraging activities. Sacred Groves of Meghalaya are falling under severe anthropogenic pressure causing fragmentation, area shrinkage and degradation, alien species invasion, grazing, resource extraction. Changing social structure plays an important role in gradual declination of sacred grove system. These nature centric worship places in many areas have already been replaced by temples/solid structures in the name of modernization. Once the god/goddess has been shifted to the temple, the surrounding places become irrelevant to the people, thus immediately converted for other usage. Fragmentation of the groves often affects seed dispersal and regeneration of rare plants which ultimately causes decline of plant population. The availability of pollinators and seed dispersers is adversely affected causing decline in mutualistic relationship between trees and animals.Most studies associate sacred groves with perennial water sources. Comparatively rich vegetation cover and thick litter cover help to regulate the runoff water thus reducing the chances of flash floods (downstream) and release it slowly during lean season. Studies in Meghalaya indicate that well preserved groves efficiently reduce the erosive power of runoff water thus preventing soil erosion and nutrient wash out (Khiewtam and Ramakrishnan 1993). For detailed overview on traditional institutions and their management of forests refer to Annex 3.

2.2.4 Endangered and Threatened Species

The current protected area system in Meghalaya is inadequate for biodiversity conservation. National Parks and Wildlife Sanctuaries of the State are distributed only in low and medium altitudes. Similarly, reserve forests are also restricted to low –medium altitudes whereas, protected forest /green blocks are represented by medium and high altitude. Absence of National Parks and Wildlife Sanctuaries at high altitudes and lack of adequate protection for subtropical andtemperate forests of Meghalaya are

criticalissues for conservation; and found as one of the major gaps in the protected area coverage in Meghalaya. Current threats facing biodiversity are logging, mining and shifting cultivation activities.

The state's undisputed botanical wonder is the endemic carnivorous pitcher plant Nepenthes khasiana, The pitcher plant is found on the moist, south-facing slopes of the West and South Garo Hills, West and East Khasi Hills and the Jaintia Hills. Despite being a source of pride for the state, the plant's habitat has suffered due to coal mining in the Rymbai and Khliehriat areas of the Jaintia Hills. Only two small sanctuaries for the plant exist, at Baghmara, under the forest department and at Jarain, under the Jaintia Hills District Council.

The Clouded leopard *(Neofelis nebulosi)*is a Schedule – I animal, according to wildlife (Protection) act, 1972 and classified as Vulnerable (VU) by the IUCN which is found within Meghalaya. The globally endangered Indian Wild Water Buffalo (*Bubalus arnee*) is still found in small groups of 10 to 20 in the Balpakram-Siju-Baghmara belt and adjacent areas including parts of the West Khasi Hills.Shalyni barb (*Pethia shalynius*), is a species of cyprinid fish found in hill streams of Meghalaya, and spawns in rice paddies is currently on IUCN list of vulnerable species as with the increase in coal mining there are reports of heavy metals affecting to this species affecting the quality of habitat, which is declining. The Khasi Hill Rock Toad, Mawblang Toad *Bufoides meghalayanus* (IUCN Engaged species) is found in Cherrapunjee area, East Khasi Hills, usually occurs in forest areas dominated by screw pine trees, however the habitat has been affected due to extensive rock-blasting and stone quarrying near Cherrapunjee and the Mawblang plateau area. Other schedule -1 species found in Meghalaya include Black Spotted Turtle, Assam Roofed Turtle, Bengal Slow Loris, Guar, four horned Antelope, Capped Langur, Western Hoolock Gibbon, Chinese Pangolin, Sun Bear, Sloth Bear, Red Panda, Hedged badger,Oriental Small-clawed Otter, Large Indian Civet, Marbled Cat, Asiatic Golden Cat Leopard, Tiger and Asiatic Elephant.

2.2.5 Protected Archaeological and Historic Sites

This is a list of Monuments of National Importance as officially recognized by Archaeological Survey of India is listed below, there are also state protected monuments, archaeological sites that have been recognized by the ASI in Meghalaya, in the West Garo Hills, these include excavated temples, Buddhist Stupa and a Fortress.

Table 7 Protected Archaeological and Historic Sites

Sl. no	Name of monuments/ sites	Location	District
1.	Megalithic Bridge on the Um-Nyakaneth, between Jaraem and Syndai	Um-Nyakaneth	Jaintia Hills
2.	Megalithic Bridge known as Thulum-wi between Jowai and Jarain, Maput,	Maput	Jaintia Hills
3.	Megalithic Bridge on the Um-Kumbeh	Um-Kumbeh	Jaintia Hills
4.	Stone memorial of U.Mawthaw - dur-briew, Nartiang	Nartiang	Jaintia Hills
5.	Tank, Syndai	Syndai	Jaintia Hills
6.	Stone memorial of U-Mawthoh-dur, Bhoi Country	Bhoi Country	East Khasi Hills
7.	Scott's Memorials, Cherrapunji	Cherrapunji	East Khasi Hills
8.	Manipur Memorial, Shillong	Shillong	East Khasi Hills

2.2.6 Forest Base Enterprises in Meghalaya

As the state is rich in forest resources, forest based enterprise activities that will generate more income and employment for its poor population is important. However, there is underdevelopment of forest-based enterprises, including the volume and value of supply and demand for certain products, Eleven forest products were selected to analyze marketing and trade of forest products, and constraints in the development of the sector.[10]

Table 8 Status and Constrains facing major forest products in Meghalaya

Forest products	Status highlights[11]	Constrains (opportunities for intervention and investments)
Bamboo	State has 12 genera &43 species of bamboo, used for handicrafts, plying and paper manufacturing, construction purposes, food (bamboo shoots) and fodder. Estimate volume of production marketed is 38,568MT/yr; value around INR 49.2 million.	Limited value-addition: tonnes are exported outside the state for processing Bamboo shoot processing remains mostly micro-scale
Charcoal	Fuel for domestic and industrial use. Volume of production marketed annually 9,673 MT; value around INR 66.5 million.	Inefficient processing technology. Strict but lax implementation of rules leads to uncertainty and unsustainable practices
Dalchini (Cinnamomum zeynalicum)	Bark is extensively used as a spice in food, incense, perfume, pharmaceuticals and soaps. Annual production around 89 MT; valuing around INR 84.5 thousand.	Very low price for producers (market information distorted by traders) Regulation and royalty collection as it is considered a forest product
Fuel wood	For cooking and other heating needs. Estimate annual production marketed is 491,635 MT; value around INR 614.5 million	High transport costs limit buyers who requires large volume Unsustainable harvesting
Timber	Forest product that generates highest income for ADCs, especially before the Supreme Court order in 1996. Still generated around INR 135 million in gov't revenue in 2003-2004. Estimate production before 1996=456,991 m^3/yr with value around INR 1.7 billion; after 1996 average production went down to 7,068/yr with value around INR 26.2 million.	Strict regulation (e.g, harvesting, transport) Royalties, taxes, and illegal collections in check gates
Bay leaf (C. Tamala)	Use for making spices and condiments (Masala) Estimate volume of production marketed	Lack of storage and drying facilities, rice information, and credit facilities Lack of proper storage and drying

[10]Forest Livelihood Briefs, August 2008, Number 11, Centre for International Forestry Research

[11]Data were sourced from ADCs, State Forest Department, market surveys and interviews. Prices of most of these forest products fluctuate. The estimated value aims more for appreciation of value generated and comparability among forest products, and not exact value generated

	annually 44,370MT with value around INR 576.8 million.	facilities result in leaves turning brown and thus lower prices.
Broom grass (Thysanolaena maxima)	Estimate volume of production marketed annually 135,803 MT in value around INR 1.8 billion.	Lack of credit and storage facilities Local traders distort prices Royalties, taxes and illegal collection in check gates.
Medicinal plants	There are more than 100 medicinal plants in Meghalaya but mostly for household purposes only with very few being sold.	Lack of data on existing market (e.g. volume and value of production , sources) Limited selling or processing.
Packing leaf (Phyrnium puvinerve)	Grows abundantly and a popular wrapping and packing material in the State and is source of cash for many poor. Estimate volume of production marketed annually 2,123 MT with value around INR 8.6 million.	Bulky and low price Presence of substitute in the form of plastics and polythene bags
Wild pepper (Piper peepuloides)	Used in a variety of Ayurvedic medicines. Estimate volume of production marketed annually 123 MT with value around INR 11 million.	Price fixing by traders Royalties, taxes and illegal collection in check gates
Wood lichen (Usnea sp.)	Used mainly in making spices. Estimate volume of production marketed annually 127 MT with value around INR 7.3 million.	Sold as raw product: limited vale-addition, low price.

2.2.7 Issues Impacting Forest Cover

Deforestation: It is often quoted that the state with about 77 per cent of its total geographical area under forest cover, the quality of the forest has deteriorated, and dense forests with canopy closure of 40 per cent or more have been degraded into open forests or scrublands. Forests and grasslands are the single largest land use in the State. While some of the forests (especially the sacred groves and various reserves, including Government forests) have a degree of regulation, most forests and grasslands are not systematically managed. This attributable to relentless pressures arising from ever- increasing demand for fuel- wood, fodder and timber; inadequacy of protection measures; diversion of forest lands to non- forest uses.Significant portion of the rural population depends on forests for fuel wood and biomass for cooking and heating – which is often consumed by poor people that cannot access energy such as gas and electricity due to economic and/or accessibility constraints.Loss of forest in the catchment area of the springs have resulted into drying of springs, streams and reduction in the quality of water in the water bodies. A large area of forest as well as grasslands of the state experiences fire every year which create a heavy smog that is harmful to human and animal life.

Shifting Cultivation:

Shifting cultivation involves clearing a patch of forest land, but retaining useful trees and plant varieties, cultivating it for two to three years and then abandoning it for 10-20 years to allow the natural forest to grow back and the soil to regain its fertility. The cycle of cultivation, leaving it fallow

and coming back to it for cultivation, is called the Jhum cycle. Traditionally, a village community owns/controls the forest land and decides on such rotational cultivation pattern. Thus, the community cultivates land for its livelihood while practicing conservation and taking care of the ecological balance.Jhum Cultivation is still practiced in the State, especially in the Garo Hills, Ri-Bhoi and parts of Jaintia Hills, typically in and around forests on steep to moderately steep slopes in village where communities are largely dependent on it for year-roundfood security as well as income. The activities practiced under jhum show considerable variation between communities in time of timing of slash and burn, and sowing of seeds, and has evolved through many years of traditional knowledge, shared wisdom and technology. Te average land per family under jhum in Meghalaya is about 1.01 ha. The annual area under shifting cultivation is 53,000 ha with minimum area under jhum at a given time is 52,000 ha.

A wide variety of cereal crops, vegetables, spices (ginger and turmeric) pulses and tubers are cultivated in jhum land. With increase in population and increasing need for land for cultivation, the Jhum cycle has reduced to 2-3 years from 10-15 years in early 90s and the output-input ratio has also become smaller. Frequent shifting from one land to the other for cultivation has adversely affected basic life support systems like vegetation, soil, springs. The decline in soil fertility and loss of natural forests, the fragmentation of habitat, local disappearance of native species and invasion by exotic weeds are some of the ecological consequences of shifting agriculture. Due to shifting cultivation on steep slopes, down-stream siltation of water bodies is apparent in many districts. Most of the jhum lands arehighly infested with weeds and decline in the area under natural forests, fragmentation of habitat, local disappearance of native species, and invasion by exotic weeds are some of the ecological consequences of shifting agriculture. Due to shifting cultivation on steep slopes, downstream siltation of water bodies is apparent in many districts.

On further investigation, it appears that the problem of shifting cultivation is more because of the shortening of the fallow cycle and the associated unsustainable practices in the management of shifting cultivation lands, rather than the shifting cultivation practice *per se*. This problem deepens as it is not possible, as in the past, to extend the area of shifting cultivation to keep the cycles long because on the one hand claims of dependent population on land is increasing while there is no solid evidence of increase in the productivity of shifting cultivation, and on the other hand more and more areas are taken up formineral exploitation, plantation of cash crops viz., rubber, tea, cashew, pineapple, broomgrass, and are no longer available. Further, local institutions that once efficiently regulated land allocation and other shifting cultivation practice have mostly considerably weakened, and are not able to promote and sustain innovations or to support adoption of new technologies without causing further asymmetries in the local social structure. The immediately pertinent issue of rehabilitation of shifting cultivation areas is, thus, two-fold (i) scientific management of fallow cycle to maintain sustainability of the land, and (ii) introducing effective community interventions that could support such scientific interventions for sustainable development.

This land is unable to retain water in surface and sub-surface streams. However, there are some good conservation measures still practiced under jhum, such as retention of fruit and fuel wood trees that inhibits further soil erosion and helps biodiversity sustain, use of poles for soil conservation and fallow land management, practice of zero tillage, use of weeds as cover crop for maintenance of soil cover

during rainy season. Traditional knowledge and good practices will be documented as part of the knowledge management activities of the project.

Table 9 (Year 2001) District-Wise Jhuming in Meghalaya, Soil & Water Conservation Department Government of Meghalaya

Name of District	Total Population (Rural)	Jhumia Families dependent on jhum	Jhumia Population dependent on jhum	Percentage of the jhumia population from the total rural population	Annual Area under Jhum in Sq. Km.	Percentage of Annual Jhum Area from the total geographical area
East Khasi Hills	383027	721	3605	0.94	6.20	0.23
Ri-Bhoi	179630	4351	21755	12.11	27.40	1.53
West Khasi Hills	260595	5374	26870	10.31	46.19	0.88
Jaintia Hills	270669	1366	6830	2.52	11.74	0.31
East Garo Hills	211652	13630	68150	32.20	117.15	4.50
West Garo Hills	457422	18086	90430	19.77	155.45	4.19
South Garo Hills	90462	7900	39500	43.66	67.87	3.67
Total	**1853457**	**51428**	**257140**	**13.87**	**442.00**	**1.97**

Mining Activities

Meghalaya has rich mineral deposits. Important mineral resources found in the state are coal, limestone, feldspar, quartz, glass sand, sillimanite, clay, and kaolin. Coal mining and stone and sand quarrying have grown over the past three decades, especially in Garo Hills, Jaintia Hills and West Khasi Hills. Since land is owned privately by individuals, clans or community these mining operations are carried out haphazardly in an unscientific manner and are largely unregulated. Coal and limestone are the most important minerals of the state. Meghalaya has estimated coal reserves of 559 million tonnes (MT), spread over an area of 213.9 sq. km. The Garo Hills district has the maximum coal reserves of 390 MT, followed by West Khasi Hills (98 MT), Jaintia Hills (39 MT), and East Khasi Hills (31 MT). Unregulated and haphazard coal mining in some parts of the State have resulted in the overburden from mines and quarries flows into streams and fields, leading to pollution of water sources and loss of productive land.The mines are often within existing village boundaries rather than in exclusive mining areas. The overburden gouged out in the course of mining and construction of storage sites leads to heavy silting and pollution of water bodies downstream and often destroys village areas.

- **Coal Mining**: In Meghalaya, coal is extracted through unscientific rat hole mining using manual labour and generally on a small scale. Such coal mining adversely affects the land and water resources leading to water, soil and air pollution. Coal mining is affecting agricultural

fields, forests and water bodies of the mining affected area. At present, most active coal mines are located in Jaintia Hills, Garo Hills and West Khasi Hills. Mining of coal has caused enormous damage to hydrological cycles besides flora, fauna and soil biology of the area.

- **Limestone Mining**: Meghalaya has huge reserve of limestone deposits, most of which are of high grade. Limestone caves, apart from their significant tourism potential, could be a precious economic resource for the people. Limestone mining too has had adverse outcomes for land, forest, and water resources. Unregulated mining carried out on private and/or community land, without the necessary measures to control and mitigate the adverse environmental impacts, has had a deleterious effect on natural resources of the state.

Forest fragmentation: Heavy biotic pressure, shifting cultivation, mining and other anthropogenic activities have led to fragmentation, destruction and degradation of forests and irreversible changes in landscapes. There forest lands are deficient in nutrients and have poor regeneration carrying capacity. Many species have become extinct due to fragmentation and degradation of habitats. Deforestation also resulted into loss of soil cover and siltation of fish habitats, decrease in primary productivity of natural and agro-ecosystems, loss of habitats and disappearance of native species, invasion of exotic weeds etc.

Loss of bio-diversity: Forests of Meghalaya have faced extreme loss of biodiversity in last decade. Many of the endemic species have become extinct or are endangered. Major causes of loss of bio-diversity are deforestation, habitat destruction, fragmentation of natural forests into isolated patches due to mining, shifting cultivation, encroachment, forest fires, illegal extraction of forest production and other anthropogenic pressures and land use changes. The depletion rate of forest cover accelerated since 1985. This has reduced species richness, reduced population size of endemic species and increased number of threatened species. The deep pools that are the favoured habitats of many species are rapidly becoming shallow and choked with silt, leading to a decline in habitat. At the same time, swamps, marshes, and other wetlands are increasingly being reclaimed for urban and agricultural expansion.

Vulnerability to Climate Change: With the change in climatic conditions native species may get eliminated and various exotic invasive species may encroach on the patches so created. People recall that pine forests of West Khasi Hills are succession species and do not support much of the biodiversity. Forest fires have become more frequent due to climate change. Forest fires most certainly destroy the understory vegetation and in many cases also standing full-size trees. Trees damaged from forest fires are more susceptible to bark beetle attacks, especially in adverse weather conditions. The destruction of vegetative cover leads to surface runoff and soil erosion especially in the steeper topography. Run off also carries suspended soil particles, dissolved inorganic nutrients, and other materials into adjacent streams and lakes adversely affecting water quality and destroying fish habitats.

2.3 Water Resources

The annual availability of surface water in Meghalaya is roughly estimated at 63.204 billion cubic metres and the estimated replenishable ground water resources are 1.15 billion cubic metres (Department of Water Resources, GoM website). According to the Central Ground Water Board, 1.04 billion cubic metres of ground water are potentially available for utilisation. The state has 8400 ha of

reservoirs and 3734 ha of ponds and tanks.Due to the high rainfall, the State is endowed with a large number of perennial rivers, streams, lakes, springs and ground water.The average annual rainfall in Meghalaya is 2818mmwhereas, Sohra, Cherrapunjee and Mawsynram in Meghalaya receive the highest rainfall in the world i.e. about 11000 mm annually, but this huge rainfall is concentrated only in monsoon months. 11, 667 sq. km of the State drains into the Brahmaputra basin and the rest 10,650 sq. km into the Barak Basin.[12]In contrast during non-monsoon months, most of the rain-fed surface sources and spring sources get dried, leading to water scarcity, which is a major problem as the people living in these areas with highly variable rainfall, experience droughts and floods and often do not have regular access to water for drinking purposes.Meghalaya being a Sixth Scheduled state and the autonomous district councils have some power to legislate on water for agricultural purposes. They can also make laws with respect to the use of any canal or watercourse for agriculture . There is no defined custodian of water resources in the state. It does not have any specific law defining ownership and rights over water resources. Rights are derived from customary beliefs and practices which in turn are supported by several legislations.

Meghalaya being a Sixth Scheduled state, autonomous district councils have some power to legislate on water for agricultural purposes. They can also make laws with respect to the use of any canal or watercourse for agriculture. See Annex 3 for complete overview of Traditional Institutions in Management of Water Resources.

2.3.1 Surface Water Resources

The river system of Meghalaya[13] comprises mainly of rivers draining to the Brahmaputra Basin in the north and the Meghna Basin in the South. The State has two basins with three catchments, eight sub catchments, 35 watersheds and 179 sub-watersheds. The Brahmaputra river and the Barak river shares the catchment area of Meghalaya equally, with the north flowing rivers such as Simsang sharing the Brahmaputra catchment area, while the south flowing rivers such as Kynchiang sharing the Barak basin. The area of Meghalaya is 22,489 sq. km, with the catchment area of Brahmaputra in the state being 53% (11,800 sq. km) and the catchment area of Barak River being 10650 (47%) sq. km. The main rivers in Meghalaya in the Garo Hills are Simsang, Daring, Sanda, Bandra, Bhogai, Dareng, Nitai and the Bhupai. In the central and eastern section of the plateau, the important rivers are Umkhri, Digaru, Umiam, Kynchiang (Jadukata), Mawpa, Umiew or Barapani, Myngot and Myntdu (Jain et al., 2007).In the absence of soil and water conservation techniques, springs dry up a couple of months after the monsoon rains stop and many villages face shortage of drinking water.

[12] Central Water Commission

[13] **http://megwaterresources.gov.in/pdf/Meghalaya_Water_Resources_Scenario.pdf**

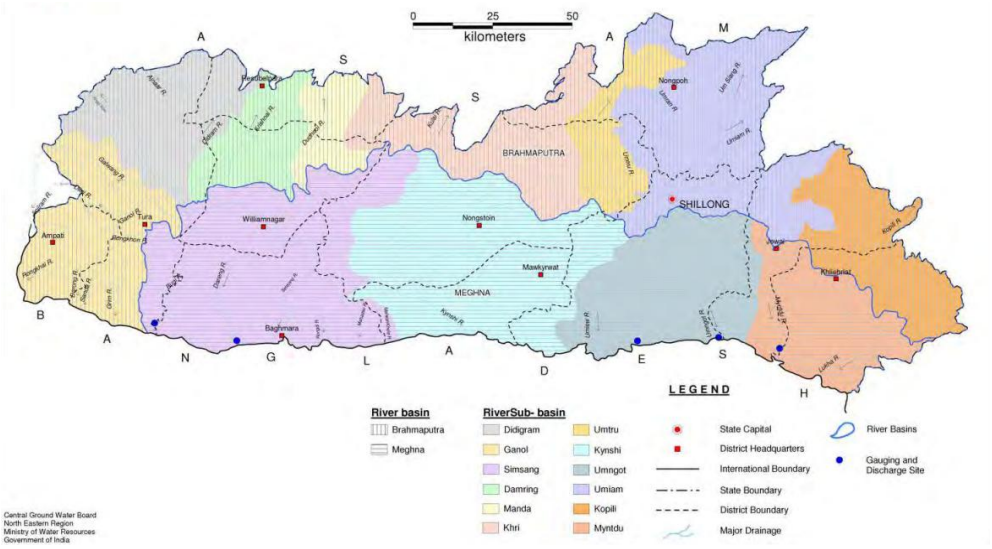


Figure 7 Basin wise data of the main rivers/streams of the state

Springs

Most villages of the state depend on springs as main source of water for household and irrigation purposes. According to an estimate, the State has over 60,000 springs. A sample survey of 714 springs (MINR, 2015) has revealed that more than half of the total springs have either dried or water discharge from them has significantly reduced. All springs in the State are currently being surveyed by the Soil and Water Conservation Department of the Government of Meghalaya. Water flow in a spring gradually declines after the monsoon ends and may stop altogether during December to March, causing drinking water shortages. Under customary law in the state no specific water related institutions exist. Traditionally, the user of land had the use of water on that land. Streams, rivers, etc. under customary law are considered common property. The drinking water in localities outside the Shillong municipal area is managed by the village dorbars.

These springs get recharged from the sub-surface flow or from the rain-water that percolates down. But recently climatic variations have affected health of the springs; due to high variability of monsoon and rise in temperature many of these springs are drying up or becoming seasonal and the discharge during the lean season is declining. Impaired springs have caused widespread water stress in the rural landscape, adversely affecting agriculture, livestock and other allied livelihood activities of the people and causing hardship and drudgery. Despite heavy rainfall, many areas are water-stressed due to increase in demand-supply gap leading to a surge in the use of ground water. Further, ground water data shows that the depletion rate between pre-andpost-monsoon period is about 40 to 80% depending on the landscape. Theinstitutionalresponsehasbeenfocusedonspringdevelopmentfromthesupply-side(e.g. tanksandpipes). However, littlehasbeendoneintermsof identificationof source or recharge areasand targetedaquifer protection.So,thereisawidespreadinteresttomainstreamhydrogeologyandother scientificapproaches.

The government of Meghalaya has embarked on a Spring shed revival programme to construct staggered contour trenches, digging staggered pits, other techniques of impounding rainwater (e.g. ponds and water harvesting structures) and changing the vegetative cover through plantations. he attempt essentially is to increase rainwater percolation and reduce runoff.

2.3.2 Groundwater

The annual gross dynamic ground water recharge of Meghalaya has been estimated as 1.234 billion cubic meter (BCM). The level of ground water development in the state is 0.15%. Meghalaya is mostly dependent on rain and surface water resources for irrigation purposes. Surface water is abundant but limited during non-rainy season. The importance and contribution of ground water is felt in the recent years to cope with development and water scarcity in the dry season, particularly to meet the drinking water needs. Though the physiography of the rugged terrain restricts development of groundwater, but areas with low gradients and valley areas are favourable areas for groundwater development. Ground water development in Khasi districts is mainly through dug /open well tapping the water in the weathered zone and bore wells are constructed to tap ground water from the fractures/joints in the hard rocks. In the shallow aquifers, the depth to water level ranges from less than 2 m bgl to 6 m bgl.[14]Springs play a major role to cater water requirement of the people throughout the year.Also, conjunctive use of surface and ground water, as well as rain water harvesting should be encouraged in the State as this entails the planned and coordinated harnessing of ground and surface water resources to achieve optimal utilization of total resources of the State.

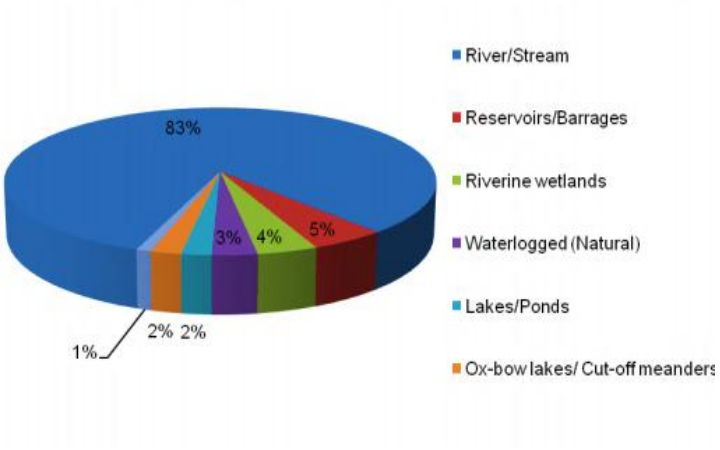
2.3.3 Wetlands[15]

In the state of Meghalaya, 259 wetlands have been delineated. Total wetland area estimated is 29987 ha. West Garo Hills district of Meghalaya covers the maximum wetland area (24 %). A major portion of wetland areas are also observed in West Khasi Hills, East Khasi Hills and in Jaintia Hills. East Garo Hills and Ribhoi district covers small portion of wetland area.

[14]Central Ground Water Board, Ground Water Information Booklet, East Khasi Hills District, 2013

[15]**Source:** http://www.moef.nic.in/downloads/public information/NWIA_Meghalaya_Atlas.pdf

Table 10 Wetland Distribution in Meghalaya



2.3.4 Key Issues affecting Water Availability and Quality

The water resource in the state are currently threatened with contamination, siltation and pollution primarily contributed from coal mining and domestic effluents. The water in coal mining areas is highly acidic with silt and suspended solids deposited at the bottom of these water bodies. The agricultural fields in the coal mining affected areas have turned into unusable infertile land from use and infiltration of the highly-polluted water. The irrigation potential of the State is approximately 2.18 Lakhs ha. However, very small percentage of the total potential has been realised. Currently only 27,300.32 ha is under surface water and 1913.45 ha is under the ground water irrigation. Most villages of the state depend on springs as main source of water for household and irrigation purposes. According to an estimate, the State has over 60,000 springs. A sample survey of 714 springs (MINR, 2015) has revealed that more than half of the total springs have either dried or water discharge from them has significantly reduced. Impaired springs have caused widespread water stress in the rural landscape, adversely affecting agriculture, livestock and other allied livelihood activities of the people and causing hardship and drudgery. Despite heavy rainfall, many areas are water-stressed due to increase in demand-supply gap leading to a surge in the use of ground water. Further, ground water data shows that the depletion rate between pre-andpost-monsoon period is about 40 to 80% depending on the landscape. Changing land use, deforestation, quarrying, mining and climate change are perceived to be the main causes for deterioration of springs and ground water.

2.4Agriculture and rural Livelihoods

The economy of Meghalaya is basically agrarian as it is rural based with agriculture laying a predominant role in the state's economy. Though, 81% of the population depends on agriculture, the net cropped area is only about 9.87 % of the total geographical area of the State. This is due to a lot of constraints, such as the undulating topography, transport and communication problem, population dispersal pattern, inadequate credit support, poor post-harvest infrastructure and weak marketing system.

2.4.1 Agro Climatic Zones

Meghalaya has a monsoon type of climate but with wide variation depending upon altitude and physiographic difference of landmass. While the Shillong plateau (600-2000m) has a bracing climate verging towards the temperate type, the lower regions adjoining the Surma and Brahmaputra Valley (100-300m) have a tropical climate. The potential net sown area could be increased if and when the fallow lands are utilised for cultivation purposes. The cultivable waste land of the state is 20.11% of the geographical area a part of which might be progressively utilised for cultivation purpose in the long run. The cropping intensity of the state is 121%. A summary of the major agriculture commodities from Meghalaya

- Meghalaya is amongst the leading states in the production of ginger and quality turmeric
- For fruit crops, pineapples occupy the most land, followed by oranges and banana
- For vegetable crops, potatoes occupy the most land but there are sizeable areas seasonally under tomatoes and cabbage, with radish, cauliflower and chow- chow also grown these are off seasonal crops marketed outside the state
- Areca nut and cashew nut are the major plantation crops, followed by rubber and tea
- High value, and low volume crops such as strawberry and commercial floriculture are increasing.

The agro-climatic conditions of Meghalaya offer an excellent scope for growing of different types of horticultural crops including fruits, vegetables, spices, plantation crops, medicinal and aromatic plants of high economic values. A wide range of tropical, sub- tropical and temperate fruits such as Mandarin Orange, Pineapple, Banana, Lemon, Guava, Pear, Plum etc. are grown all over the state. The high altitudinal places of the state provide good opportunity to grow vegetables including Potato and Cole crops during the rainy season. Tuber and root crops such as Sweet Potato and Tapioca, Spice crops such as Turmeric, Ginger, Chillies, etc. grow abundantly in the state. Plantation crops such as Tea, Cashew nut, Coconut, Areca nut, Betel leaf and Spice crops like Black pepper have been performing well and are coming up with promise.

Table 11 Agro-Climatic Zones and Sub-Zones in Meghalaya[16]

Sub-Region	Agro-climatic features	Soils	Dominant geographic units.
I.	Humid and warm with an average rainfall between 1270-2032 mm	Light to medium texture, depth varying between deep to very deep	Hills and rolling and undulating pediment
II.	Humid and hypothermic moderately cold in winter and warm in summer rainfall varying between 2800-4000mm	Light to medium texture depth varying from deep to very deep.	Upper and middle plateau.

[16] *Source: Meghalaya Agriculture Profile 2006, Third Edition, Department of Agriculture, Meghalaya.* *http://megagriculture.gov.in/PUBLIC/download/MegAgriProfile2006.pdf*

III.	Humid and moderately warm summer and severe winter rainfall between 2800-6000mm	Light to medium texture, depth varying from deep to very deep	Upper and middle plateau.
IV.	Humid and warm high rainfall ranging from 4000-10,000mm	Light to medium texture, depth varying from deep to very deep.	Severely dissected and undulating low hills gentle to steep slope and rolling pediment
V.	Humid and hot, rainfall varying from 2800-4000mm	Light to heavy texture, depth varying from moderately deep to very deep.	Rolling and undulating pediment and valley land having depression.

2.4.2 Agriculture and Horticulture

In general, there is much potential for many crops in Meghalaya, which is a veritable agro-forest, especially regarding productivity increase, as outlined in previous sections, and in terms of optimising land use. The State government has set forth many strategies for increasing significantly the net area sown, particularly under food grains, because of the given situation of topography and agro-climate, the state is now giving more emphasis on improving the productivity of crops by adopting good environmental and climate smart agriculture practices such as the following.

- Multiple cropping, to increase cropping intensity with all packages of practices of crop production.
- Judicious application of agricultural inputs like seeds, fertilizers, plant protection chemicals, etc. for increased crop production and productivity.
- Matching the type of seeds for right type of soils and climatic condition to reduce chemical inputs.
- Growing fodder and forage plants for building resilience within the local agro-ecosystem
- Integrated Plant Nutrient Systems
- Inclusion of legumes in the cropping system
- Composting, Farm Yard Manure and crop residue management
- Use of Bio Pesticides
- Seed Certification (establishment of the Meghalaya Seed Certifying Agency, MeSCA)

The State's has also ventured into high value low volume crops namely, strawberry and commercial floriculture like Rose, Liliums, Anthuriums, and Carnations. High value vegetables like Broccoli and Capsicum are also being expanded through the Technology Mission Scheme.

Organic Cultivation: the cultivation techniques in Meghalaya remain largely environmentally sound and sustainable. Organic cultivation is encouraged by the State of Meghalaya, and under the Mission Organic, the government Meghalaya aims to convert at least two lakh hectares into organic farm land by 2020.The agricultural land, in which some crops have been organically cultivated, includes 150 hectares for tea plantation, 380 hectares for cashew nut and 80 hectares for turmeric.

Homestead development: Homesteads and bari-bagans could be better utilised to grow vegetables, fruit trees, etc. by provisioning low cost micro-drip system. These comprise of elevated water drums with a network of drip irrigation pipes. The homesteads could thus serve as nutrition gardens besides being sources of cash income.

Agroforestry Tribal populations living in southern Meghalaya, where the climate and topography are not conducive to agriculture, due to extreme rainfall (> 6000 mm) and steep slopes (40–60°), have developed a unique production system in which economically useful trees are managed within natural forests. These complex agroforests provide high level of productive benefits and the biodiversity values are similar to those in village restricted forests or sacred forests of the area.

Table 12 Area under principal crops

Crop Category	Crop areas – hectares				Percentage of total area			
	2000-1	2004-5	2008-9	2012-13	2000-1	2004-5	2008-9	2012-13
Field crops	148,668	161,548	157,542	173,292	62%	63%	59%	60%
Tubers	27,571	26,236	26,772	28,180	11%	10%	10%	10%
Spices	12,667	12,748	14,001	14,929	5%	5%	5%	5%
Vegetables	10,000	11,947	15,076	15,412	4%	5%	6%	5%
Plantation	18,012	19,196	26,868	26,773	8%	7%	10%	9%
Fruit	23,232	26,231	27,026	28,161	10%	10%	10%	10%
Total	240,150	257,906	267,285	286,747	100%	100%	100%	100%

Source: Directorate of Agriculture

Some of the issues and constraints in horticulture are: low to very low productivity of crops; lack of assured irrigation facility; poor agro-mechanisation process; unscientific land use; poor economic condition of the farmers, remoteness of the area and backwardness; non-viability of proven quality planting materials suitable to the State; inadequate extension service in dissemination of improved production technology to the growers due to lack of adequate manpower at the field level; absence of appropriate post-harvest technology; lack of storage and processing facilities and lack of organized market infrastructure.

Table 13 Horticulture area and production in Meghalaya (2012)[17]

Particulars	Area in '000 ha	Production in '000 MT
Fruits	33.2	316.6
Vegetables	40.5	403.4
Flowers	N. A	N. A
Aromatic	N. A	N. A
Species	16.9	74.8
Plantation crops	23.1	29.2
Total in Meghalaya	**113.6**	**823.9**

2.4.3 Pesticide and Fertilizer usage

Chemical fertilizers are not greatly used in the State of Meghalaya, they are used only for potatoes and tomatoes, in a few valley bottom rice paddy areas, and in very few vegetable plots; where paddy follows a potato crop, rice benefits from fertilizer provided to potato crop. Overall the fertilizer consumption in Meghalaya is far below the national average; mean urea application in Meghalaya is

[17] Source: Handbook on Horticulture Statistic, 2014, Ministry of Agriculture, Govt of Meghalaya

18kg/ha whereas the national mean is currently around 100kg/ha, and fertilizer consumption in the state had not appreciably increased in the 14 years prior to 2006 (Meghalaya Agriculture Profile 2006, DoA). 80% of the fertilizer is said to be used on potatoes. Pesticide consumption in Meghalaya is extremely low, in 2006-07 6 MT was consumed in the entire state, a marginal increase was seen by 2011-12 where the annual pesticide consumption was 9.42 MT[18]due to a push from the government to increase productivity, but is negligible compared to other states. Part of the reason for the low fertilizer consumption is that due to the climate and low cropping intensity, the soils are naturally high in organic matter and contain moderate nitrogen levels, even in the cropped lands. There are still villages in the state where chemical fertilizers are still unknown and that crops are being grown organically with organic manure as the only source of plant nutrient. Keeping this in mind there is a very good scope of encouraging farmers to continue with this farming system to take advantage of the increasing demand and higher prices of crops free of chemical inputs.

Table 14 Total Consumption of Fertilizers

Year	*Kharif Season*			*Rabi Season*		
	N	**P**	**K**	**N**	**P**	**K**
2003-2004	1660	1100	91	1490	902	142
2004-2005	1554	1146	52	1294	755	129
2005-2006	2128	1298	77	1674	1134	180
2006-2007	1814	1168	99	1135	772	140
2007-2008	1433	701	118	1375	895	286
2008-2009	1155	182	275	1443	511	117
2010-2011	1313	492	144	3031	1520	487

2.5 Environmental Profile of Samples Villages

A typical village in Meghalaya is situated in a hilly and rolling landscape, with (sometimes steep) hilly outcrops and narrow valleys. Villages are often skirted by a perennial river or a seasonal stream. Most villages have some paddy land in the valley, though only a few households may own paddy land. Though there are variations, a typical village would also have forests. Since government forests and other government land comprise only a small fraction of the State's geographical area, most land is part of one or the other village. Field level assessments and consultation at the State has been carried out in three villages, Nongkhlaw Village (Khasi Hills), Sohkymphor village (Jaintia Hills) and Rombagre Village (Garo Hills) representing different landscape issue like deforestation, coal mining and shifting cultivation of the state. The approach for data collection used included a village level group discussion, and focus group discussions on the key environmental challenges and issues faced by the communities. Participants at the consultation were from the village council, elders, farmers, government employee, and Block Development Unit. Stakeholder consultation questionnaire is attached in the Annex.

[18]http://164.100.47.134/lsscommittee/Chemicals%20&%20Fertilizers/15_Chemicals_And_Fertilizers_36.pdf

Table 15 Field Survey Data on Environmental Issues

Sl.no	Name of village	Participants	Key concerns about community on environment	Environmental Issues/Impacts	Implications for EMF
1.	Nongkhlaw Village, WKHD	Traditional Institution members, elders, farmers, government employee.	Community dependency on forest and the trend leading to deforestation in the area.	Low forest productivity, Biodiversity loss, Reduced vegetation cover, Profuse growth of native and exotic weeds	- Re-vegetation of barren lands, checking of deforestation, - Management of soil to check erosion - Use of bamboo, agroforestry other plant resources for income generation - Environmental education for communities
2.	Sohkymphor Village, EJHD	Traditional Institution members, elders, farmers, agro-labourer, government employee, mine labourer.	Change in livelihood activity of the community from farming to mining and its impact on environment.	Destruction of natural Forest and development of degraded landscapes Land degradation and habitat destruction Loss in soil fertility	- Restoration of degraded land through forestry and other methods - Develop better drainage system for the disposal of mine discharge
3.	Rombagre Village, WGHD	Nokma, Farmers, BDU	Agricultural practice through jhum cultivation and its impact on the environment.	Land degradation, Depletion of soil fertility, Decrease in productivity of natural ecosystems, Loss in crop productivity, Profuse weed growth including exotic species	- Barren lands should be used for cultivation - Tree plantation to be done on degraded lands. - Scientific land management practices - Increasing water availability in jhum areas - Use of medicinal plants, agroforestry systems for income generation - Environmental awareness

2.6 Analysisof Baseline and identification of environmental issues

The State has an abundance of two key natural resources- water and forests which are connected to each other in a variety of ways. The most critical environmental issues are soil erosion, forest degradation, water pollution, and loss of biodiversity.All environmental components of the landscape (soil, water and forests) are connected, e.g. loss of tree cover from jhum/bun cultivation upstream would lead to soil erosion, silting of streams, flooding of valley lands and affecting quality of water resources downstream. The project design itself by virtue of its design is a mitigation of the environmental challenges faced in the state.

Table 16 Summary of Environmental Challenges to be addressed by the project

Environmental Issue	Causes	Project Intervention
Forest Degradation	***Deforestation:*** communities in Meghalaya are highly dependent on forests for food, fodder, energy, house-building materials and medicine. Bamboo and timber are used for construction and tools from community forests. Most community forests and grasslands are not systematically managed, commercial logging is also taking place due to demand for fuel- wood, fodder and timber; with inadequate of protection measures. Fuelwood harvesting is also driven by commercial demand, but also for domestic cooking and heating by the poor that cannot access energy such as gas and electricity due to economic and/or accessibility constraints. ***Forest Fires*** due to anthropogenic sources for clearing of land for agriculture, charcoal or spread of fires from jhum fields. ***Shifting Cultivation:*** shortening of the fallow cycle and the associated unsustainable practices in the management of shifting cultivation lands is an environmental issue rather than the shifting cultivation practice itself. Shortening of the fallow period from 10-20 years to 2-3 years, has caused (i) decline in soil fertility and loss of natural forests (ii) disappearance of native species and invasion by exotic	• Under Component 2B of the project, scientific management of jhum areas will be taken up along with optimisation of the jhum cycle. Documenting/implementing traditional knowledge in jhum cultivation which has conservation benefits (through component 1 activities) which will be implemented. • Through Component 2B the project will support optimisation of jhum cultivation in (i) increasing productivity of shifting cultivation by introducing terracing, fruit and vegetable crops (ii) promote and sustain innovations to support adoption of new technologies; and scientific management of fallow cycle to maintain sustainability of the land, and (ii) introducing effective community interventions that could promote sustainable land management practices. • This will also include re- forestation of abandoned jhum lands using native species, creation of recharge pits,and soil stabilisation techniques in unutilized lands under community ownership. • As the project is community led, a key focus will be to provide employment opportunities to the community, and support agro forestry activities to improve the quality of forest in community lands. This will be done through community forestry, comprising raising of grass and leaf fodder fruit trees and fuelwood trees on suitable wastelands. • The project will also support increasingthe forest/tree cover

	weeds (iii) down-stream siltation of water bodies and (iv) loss in soil productivity leading to poverty and food insecurity among the shifting cultivators.	involving local people by providingeconomic benefits and gainful employment opportunities meeting therequirements of fuel, wood, fodder, timber of the rural population with due cognizance of the carryingcapacity of the forest. This should address the current rate of deforestation to meet the needs of fuelwood and timber.
Land Degradation	***Soil erosion***: is one of most serious environmental problem faced by Meghalaya.The practice of indiscriminate land clearing, deforestation and shifting cultivation practices as well as poor site drainage has led to heavy erosion issues. This is especially on steep slopes. According GIS data, provided by North East Space Application Centre (NESAC)8891.86 sq.km area is highly vulnerable to soil erosion. The state has 10993 sq.km area which is moderately vulnerable to soil erosion. tois also considered very highly or highly degraded. The state is characterised by abandoned jhum areas, steep slopes and deforestation activities further exacerbating the issue. Soil erosion has compromised ecosystem integrity, eroded riverbanks, and led to silt loading in water bodies. ***Soil Fertility:*** Agriculture is practiced on the slopes of hills across the state. the value of traditional farming, agriculture has diminished, couples with reduced productivity of arable land through the constant loss of topsoil and nutrients is evident everywhere. There is also very little uptake of compost and farmyard manure on agriculture land, the supply of farm yard manure has limited, with what little is available only being used for homestead gardens. ***Unscientific Mining***, especially in the Jaintia Hills District is an area mostly impacted by mining activities such as lime stone and coal mining. Large swathes of land have	• As part of component 2, community led natural resource management plans can be designed by the communities to addressstabilisation of steep slopes. This is critical in addressing the issues of erosion, and harnessing rainfall for productive use. tree planting with protection measures through social fencing could be initiated. Simultaneously, soil and water conservation measures such as drainage treatment and contour trenching, along with vegetative measures such as strip planting Convergence with other schemes could also support horticulture and plantation crops on steep slopes. • Abandoned jhum lands could be converted into permanent cultivation areas as one of the land and water resource development activity. The specific treatment to such conversion would depend on the slope of the land. Jhum lands with low to moderate slopes could be terraced for tree horticulture of species suited to the agro- climatic conditions, intercropped with vegetables and tubers. Higher slopes could be used for raising plantation crops, with intercropping of spices. Such interventions will be promoted through convergence with MGNREGS • In the valley areas (land not available for jhum or any other form of cultivation)– about 12 percent of the geographical area is classified as ‘uncultivated land other than fallow land’. These may be taken up for forestry, suitable soil and water conservation measures, contour trenches and application of farm yard manure to cultivate paddy. Support for paddy production (inputs, cultivation techniques) can be channelled in

	been cleared off, and the landscape is dominated by open, active mines close to the main roads.Coal mining has been the main source of livelihood in the entire District, driving out other forms of income and livelihood. The overburden gouged out during mining leads to heavy silting, and contamination of water sources leading to depletion of groundcover in these areas.	LAMP villages by convergence MGNREGS, National Food Security Mission and with Meghalaya State Rice Mission. • Capacity building programmes, professional training and technical/financial support by various institutions under MBMA and CLLMP to improve their livelihoods augmentation of incomes from land based productive activities. • Project will demonstrate production of farm yard manure, crop rotation practices support and soil health testing to help restore soil deficiencies.
Water Quality	***Run off from mining areas***- In areas characterised by mining operations (Jaintia hills) the water quality of streams has deteriorated because of excessive and non-scientific mining processesleading to run off and discharge which flows into streams and fields, pollutingwater bodies, causing loss of productive land. Most rivers/streams in mining areas do not sustain aquatic biodiversity. ***No sanitary wastewater disposal systems for rural population:*** Pollution ofsurface water from discharges of domestic wastewater, due to the absence of proper sewerage and treatment systems. Surface water bodies are unprotected from domestic wastewater contamination. ***Increased sediment/silt run off***Due to deforestation for shifting cultivation, commercial logging and fuel wood harvesting, increased runoff has led to increased silt in streams and rivers, and destruction of water sources. Most rainfall received is not adequately tapped and stored, resulting in high rate of run off, especially in the upper catchments	• With a ban on mining activities in the state by the NGT, most communities are looking for alternative livelihoods and skills to restore their lands to fertile areas, and once again go back to cultivation as main source of income. The project will support investments in restoring land productivity, water quality and soil fertility. • The project will support revival of traditional water management system including improvement and modification of the existingirrigations systems like *Jalkunds*and other forms of harvesting and conservation of run-off rain water. • Promotion of community managed spring catchment area treatment could be a key component of the landscape plan, which indicates the treatment of the catchment as optimising the use of water of each spring. • Soil and water conservation mechanisms will be implemented to prevent erosion, stabilise fragile areas, facilitate intensive production systems on ecologically stable and less vulnerable areas. This would encompass drainage treatment and tree planting on fragile slopes, jhum, and abandoned jhum areas. where there are no perennial streams, the project will support rainwater harvesting in small dug out ponds

Water Scarcity	• ***Scarcity of surface water resources especially in the dry season is a serious concern in Meghalaya.*** Increasing water availability throughout the year in the State by providing storage facilities has been given importance by GoM and various projects have already been taken up by the State government. The availability of surface water sources is 63.204 BCM. Ground water remains underutilized, the estimated replenishable ground water resources are 1.15 BCM (According to CGWB, 1.04BCM of ground water is available for utilization.)[19] • ***Drinking Water Coverage is only 54%:*** Under the Rural Drinking Water Supply programme, as of 2011, only 5041 habitations have been covered under drinking water supply schemes, out of 9326 habitations. Large scale deforestation, flooding, sedimentation, soil erosion has had a significant effect on water availability, especially where drinking water is drawn from water bodies. • ***Depleting springs:***Significantly large population in Meghalaya is heavily dependent on springs and groundwater for their household and irrigation use and livestock. Loss of forest area in catchments of the springs has resulted in drying of springs, streams and reduction in the quality of water in the water bodiesDue to a lack of understanding on springs and groundwater resources, there are growing concerns over water security and water use rights.There is no	• Spring-shed rejuvenation supported under Component 2B, will be implemented systematically as part of landscape management activities, in conjunction with restoration of forest areas to secure drinking water availability in the dry season. This would require treatment of the recharge area of the aquifer or the 'spring-shed'. • Training local village community in basic hydrogeology to be able to identify the recharge area of the spring and to monitor spring revival would be necessary, including continuous spring discharge measurements for which spring have been treated, to understand if the correct treatment methods have been selected for the slope, soil depth and the nature and of vegetation to increase rainwater percolation. • The project will support knowledge sharing from various spring shed development initiatives in Meghalaya and other north eastern states through Component 1B.

[19] http://megwaterresources.gov.in/pdf/Meghalaya_Water_Resources_Scenario.pdf

	accurate data available for the number of springs, however, it is estimated that there are 5-15 no. s of springs. Meghalaya launched the Spring Shed Development Initiative to map all the springs in the state in about 5 to 7 years' time starting from 2016-17. The state is also receiving funding from MOEFCC for 'Rejuvenation and Climate Proofing of Spring-sheds for Livelihood, Water and Food Security in Meghalaya' under the National Adaptation Fund for Climate Change for highly water stressed areas targeting about 306 spring-sheds. • ***Deforestation*** The loss of forests has also impacted average rainfall, due to the decrease in rainfall, water availability has reduced considerably. The discharge of many streams has decreased, where in some cases the streams or the springs have dried up. (research done by University of Leeds and the NERC Centre for Ecology and Hydrology, published in Nature Magazine, Published online 05 September 2012).	
Loss of Biodiversity, and fragmentation of Sacred Groves	• Forest areas are experiencing severe habitat loss and fragmentation due to mining, shifting cultivation, encroachment, forest fires, illegal extraction of forest production and other anthropogenic pressures and land use changes. This has reduced species richness,reduced population size of endemic species and increased number of threatened species. • Natural forests are unable to regenerate due to continued anthropogenic pressures such as unsustainable harvesting of medicinal, endemic plants and timber, and controlled extraction of fuel wood. • The area under sacred groves is shrinking and has been turned into degraded forests as they have come under area shrinkage, alien species invasion, grazing,	• Component B will support the implementation of afforestation and reforestation activities to improve the quality of forest and enhance ecosystem services, whilst providing productive land for farming and agroforestry activities to provide alternate source of income to the communities. • The project will support interventions within sacred groves to restore degraded, fragmented patches. A landscape approach would be followed by the project as sacred groves provide ecosystem services like pollination, seed dispersal, nutrient cycling, and soil and water conservation. In addition, several perennial streams and springs originate from these groves, (provide people with drinking water and protect their health) and hence will require an integrated approach to planning at a landscape level.

	unsustainable resource extraction and, changes in social structure. • The long tradition of environmental conservation based on indigenous knowledge has eroded, leading to deterioration of sacred groves. • Sacred groves are now being introduced into the protected area category of community and conservation reserves under the Wild Life (Protection) Amendment Act, 2002 for providing government protection to community held lands, and controlling extraction.	• Under Component 2A- the community will prepare a landscape management/NRM plan for which all critical natural resources will be mapped, rare, endangered and threatened species would be identified and the process will be further support communities in the use of latest geo-spatial tools for planning and monitoring. • Under Component 2B- interventions under the landscape management plan will support regeneration of within these areas using soil and water conservation measures, planting of native species and ensuring nursery establishment for rare, endemic plants. This will also control habitat fragmentation and prevent further establishment of the invasive species in the grove area.

Chapter 3: Relevant Laws, Regulations and Development Programmes

3.1 Policy and regulation of GoI and GoM

Various GoI policies, plans and programs are applicable to the MCLLMP are listed below. GoI has over the past four decades developed several policies, plans and legislation to guide private and public institutions to pursue environmentally and socially sustainable development in various sectors of the economy. Environmental and social issues are crosscutting and this is reflected in the various legislative frameworks, policies and legal structures that are in place as depicted below:

Table 17 Environmental Policies of Govt. of India

Sl No	Relevant Act	Scope of the Act	Applicability to the project
1.	The Forest (Conservation) Act, 1980	To check indiscriminate deforestation and diversion of forest land for industrial or construction work the Forest Conservation Act was enacted in 1980. The Act was amended in 1988 to further facilitate prevention of forest destruction.The basic objective of the Act is to put a check on the indiscriminate diversion of forest lands. Under the provisions of this Act, prior approval of the Central government is required for diversion of forest land to non-forest purposes. Since the enactment of the Act, the rate of diversion of forest land has come down.	The project will not be working within government owned protected and reserve forests and will support interventions in community owned forests.Reserve and protected forests have very little direct influence on livelihoods, as they are managed almost entirely by the State Forest Department and local people cannot legally extract anything from them −especially not from reserved forests. The project will primarily work in Unclassified forests community and village forests that provide the backbone for livelihood generation, as these are the areas where most shifting cultivation takes place.
2.	Ancient Monuments & Archaeological Sites and Remains Act, 1958	Ancient Monuments & Archaeological Sites and Remains Act, 1958 The act has been enacted to prevent damage to archaeological sites identified by Archaeological Survey of India	As the state contains several National and State protected heritage sites, while selecting CNRM landscape areas, care will be taken and all possible efforts are made to avoid these areas. Wherever it becomes unavoidable community will take necessary permission under

			this act
3.	The Wildlife Protection Act, 1972	The Wild Life (Protection) Act, 1972. An Act to provide for the protection of Wild animals, birds and plants and for matters connected therewith or ancillary or incidental thereto.	The forests of Meghalaya support a vast variety of floral and faunal biodiversity. A portion of the forest area is under "sacred groves". These sacred groves harbour many rare, endangered and threatened plant and animal species a good number of which are endemic to the state. Poaching of Species prescribed under Wild Life Protection act Schedule is prohibited. Activities that involve destruction of wildlife or of wildlife habitat will not be supported.
4.	National Green Tribunal Act, 2010 (NGT)	The NGT Act enables creation of a special tribunal to handle the expeditious disposal of the cases pertaining to environmental issues. It draws inspiration from the India's constitutional provision of Article 21, which assures the citizens of India the right to a healthy environment	The key environmental concerns in Meghalaya constitute deforestation, fragmentation of forests, land degradation, biodiversity loss and contamination and silting of water bodies, unregulated, unscientific, illegal mining and logging, and the practice of short cycle distorted jhum. This Act is applicable to areas where development activities may cause any damage to environment and property.
5	Indian Constitutional Provision for NRM	Article 48A of the Constitution is one of the Directive Principle of State Policy and states that The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country. Furthermore, Article 51A deals with the fundamental duties of citizens, which includes a citizen's duty to value and preserve the rich heritage of our composite culture and to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creatures. Both these	This policy is applicable to the project, as a guiding principle of the MCLLMP design is to ensure sound management of the environment and the avoidance of exploitation of resources in ways that may result in irreparable damage to the environment. The Project will be guided by these policy considerations to ensure that the interventions do not adversely

		Articles have direct bearing on Natural Resource Management.	impact on the environment.
6	Joint Forest Management (JFM) 1990 and Forest Development Agency (FDA)	The Ministry of Environment & Forests, Government of India, in June 1990, issued a circular to all the Forest Departments of States and Union Territories for the revival, restoration and development of degraded forests along with the participation of the people, called the Joint Forest Management (JFM). JFM is now the sole strategy adopted under National Afforestation Programme being implemented through Forest Development Agencies(FDAs).	Relevant to project activities, and if employment generation for resettlement and rehabilitation are taken up in villages near government managed forests
7	Biological Diversity Act (2002) Biological Diversity Rules (2004)	Having objectives of (i) conservation, (ii) sustainable use of biodiversity and (iii) equitable sharing of benefits derived out of its use. The policy regulates access to biodiversity and traditional knowledge and provision for benefit sharing. It provides for establishment of a National Biodiversity Authority at national level, State Biodiversity Boards at state level and Biodiversity Management Committees at the level of Panchayats and Municipalities	Relevant to project activities as activities are taken up in ecologically sensitive areas. This is applicable where collection of minor forest produce and processing may be involved.
8	North - East Forest Policy, 2002 (Draft)	In pursuance of the recommendations of Shukla Commission which was set up by the Planning Commission to examine the backlog in basic minimum services and gaps in infrastructure sectors for the development in NER, the North-East Forest Policy Committee was constituted by the Government of India in the Ministry of Environment & Forests in 1998 to suggest a suitable Forest Policy for the NER within the framework of the National Forest Policy, 1988.	Relevant to Planning and implementation of all MCLLMP activities
9	Water (Prevention and Control of Pollution) Act 1974, amendments Water (Prevention and Control of Pollution) Cess Act, 1977 National Water Policy	This Act is applicable for maintaining or restoring wholesomeness of water. Central Board and state board are empowered to enforce this.	MCLLMP will be supporting spring shed management which will protect the water quality and quality in the catchment. The act is applicable for any discharge standards of effluent and dumping of solid waste within natural water bodies, and digging of tube well without

	1987, 2002		taking required permission from the relevant authority.
10	Medicinal Plants Guidelines	The existing programmes include activities for conservation of medicinal plants found in the wild, particularly in the reserved forests and protected areas and cultivation of medicinal plants in the degraded forests areas. The National Medicinal Plant Board has been established to ensure availability of medicinal plants in the country and to coordinate all matters relating to their development and sustainable use.	Applicable to the project as cultivation of medicinal plants in community lands and other non-forest areas for the benefit of the communities may be supported.
11	Forest Right Act -2006, The Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Right) Act, 2006	To recognize and vest certain forest rights in the forest dwelling Scheduled Tribes and other traditional forest dwellers such as collection of Minor forest produce, access to grazing grounds and water bodies, traditional areas of use by nomadic or pastoral communities etc.	Applicable in government managed forest areas where traditional forest dwellers have access as per the Scheduled Tribes and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006.
13	The Seeds Act, 1966 National seed Policy 2002	Regulating the quality of certain seeds for sale, and for related matter	The project does not envisage seed production, but will work in convergence with Government programmes to promote integrated farming, land productivity seed varieties will be promoted.
14	National Environment Policy, 2006	To protect and conserve critical ecological system and resources and to ensure equitable access to these resources for communities which are dependent on these resources for their livelihood.	The project promotes conservation and sustainable use of land, forests and biomass. The project addresses the issue of awareness generation and mitigation measures
15	Wetland (Conservation and Management) Rule 2010	To ensure better conservation and management and to prevent degradation of existing wetlands in India.	This is not directly applicable to the project, however once the project investments are implemented, there is likely to be convergence investment with fishery activities,aquaculture cultivation etc.

16	National Forest Policy 1894	The policy was revised in 1952 and again in 1988. The main plank of the revised forest policy of 1988 is protection, conservation and development of forests. The policy sets the framework for Maintenance of environmental stability" through preservation and restoration of ecological balance; Conservation of natural heritage; Checking soil erosion and denudation in catchment areas of rivers, lakes and reservoirs; Substantially increasing forest/tree cover through massive afforestation and social forestry programmes; Taking steps to meet requirements of fuel, wood, fodder, minor forest produce, soil and timber of rural and tribal populations.	The Act is applicable to the project, as the project will beencouraging efficient utilisation of forest produce and optimum substitution of wood; conservation and restoration of unique vegetation and eco-systems; protection and conservation of sacred groves.

3.2State Level Policies of Government of Meghalaya

The applicable GoM legislation is listed below. The most relevant laws are also highlighted in this section. The state has a series of general legal provisions aimed at preventing and controlling pollution and erosion; integration of environmental concerns into sectorial policies; promotion of the integration of environmental values in educational policies and programs. The State is also concerned with the promotion of land use planning with a view to ensure an adequate location of infrastructure activities pertaining to the sensitive environmental habitats. Those Acts addressing land and tribal issues are detailed and discussed more fully in the SMF.

Table 18 GoM Environment Policies Applicable to the Project

	Policy	**Description**	**Applicability to Project**
1	Meghalaya Forest Regulation (Application and Amendment) Act, 1973	The provisions of Assam Forest Regulation, 1891 was extended to the state of Meghalaya with certain modifications and renamed as Meghalaya Forest Regulation (Application and Amendment) Act, 1973. Most of the forests in Meghalaya is owned by the private individuals and controlled by the three District Councils, viz., Garo/Khasi/Jaintia Hills District Councils. The act is silent on livelihood issues of theforest dwellers or forest-fringe dwellers.	Section 25 of the Assam Forest Regulation, as adapted by the State of Meghalaya, deals with any person who commits the offence of felling trees. .

2	Garo Hills Regulation, 1882	The Garo Hills Regulation enacted in 1882, applicable in Garo Hills District, prohibits non-natives from collecting or removing wood or jungle products without license. There are two types of permits, viz., trade permit and Gurkati permit. While 'trade permits' are for removal of forest produce where royalties are charged at a prescribed rate, the Gurkati permits are essentially for bonafide use /consumption of the local people for removal of thatching grass, bamboos, canes, poles etc. in such quantity as can be carried by the holder on his person. Thus, this old Regulation did take care of livelihood concerns of the local tribal populations.	Applicable to Project where collection of minor forest produce and processing may be involved.
3	Khasi Hills, Jaintia Hills and Garo Hills Autonomous District Council Acts	The Rules framed under this Act known as the United Khasi & Jaintia Hills Autonomous District (Management and Control of Forests) Rules, 1960 provides elaborate procedure for removal and transit of forest produce from all categories of forests under the control and management of the District Councils, which may be either trade permit or home consumption permit. The residents or communities are entitled to collect the nontimber forest products for domestic purposes, particularly from forest areas, which are under the ownership of the communities or clans. The Garo Hills Autonomous District Council Act, 1958 has also similar provisions applicable to Garo Hills.	These policies are applicable for harvesting of all produce from forests.
4	The Meghalaya Tree (Preservation) Act, 1976	An Act to make provisions for regulating the felling of trees for purpose of protection of catchment areas and soil from erosion and to preserve the special characteristics of the hilly areas, the vegetal cover and climate and to provide for matters connected there with and incidental thereto.	The Meghalaya Tree Preservation Act 1976 deals with felling of trees outside forest areas. However, the act does not apply to the entire state of Meghalaya but is limited to 10 Km radius of the municipal areas of Shillong and Shillong Cantonment area.
6	Meghalaya Water Policy (draft)	Water policy of the State is under formulation and draft of the same has been prepared. The objective of the draft Meghalaya Water Policy is to "ensure that water is used efficiently, shared equitably, managed sustainably, governed transparently and contributing to improving the health and livelihoods of all citizens".	The policy is applicable to the project as the spring shed development plans will be designed to ensure that water resources are protected, maintained, improved and utilized sustainably, and that ecosystem integrity and land productivity is maintained, enhancing the resilience to disasters and the impacts

			ofclimate change.

Autonomous District Council Policies and Policy instruments impacting NRM sector in Meghalaya

- The Garo Hills District (Jhum) Regulation, 1954
- The Garo Hills District (Forest) Act, 1958
- The United Khasi & Jaintia Hills Autonomous District (Management and Control of Forest) Act, 1958.
- United Khasi-Jaintia Hills Autonomous District (Management and Control of Forest Rules, 1960.
- United Khasi-Jaintia Hills Autonomous District (Management and Control of Forests, Rates of Royalty) Rules, 1959.
- Khasi Hills Autonomous District - Management and Control of Forests

Table 19: GoI and GoM Schemes relevant to the Project

No#	Name of the Project	Objectives of the Project	Linkages to MCLLMP
1.	Meghalaya-LAMP - Meghalaya Livelihoods and Access to Markets Project	It focuses on developing markets and value chains for sustainable livelihoods, and ensures that those livelihoods are adapted to Meghalaya's geographical context and to the effects of climate change.	MCLLMP will support increasing the productivity of natural resources (Forests, water, springs) which will further increase the productive potential of the LAMP interventions in agriculture, livestock, sericulture etc.
2.	The North-Eastern Region Community Resource Management Project (NERCORMP)	It is a rural development project to improve the livelihoods of vulnerable groups in a sustainable manner through improved management of their resource base in a way that contributes to protecting and restoring the environment.	MCLLMP will also support conservation and protection of the natural resource base, such that it is productive and profitable for the communities that depend on it, and continues to be managed in a sustainable way.

3.	Integrated Basin Development Livelihood Promotion Programme (IBDLP)	To facilitate the building of livelihood in an enterprise mode for ecologically sustainable and economically inclusive development of the state.	The project will be lead and coordinated under the umbrella of IBDLP. IBDLP has set up many institutional PIUs at the district and block level, that MCLLMP will strengthen through its knowledge and capacity building component.
4.	State Aquaculture Mission	Development of existing water bodies and creation of additional water area for large scale fish production, including reclamation/rehabilitation of marshy and swampy lands. Conservation of native, endangered and rare species of Meghalaya and developing breeding farms of species having commercial potential.	The project will support community led water management plans which would include creation of water harvesting structures, village ponds and ensure water sources are free of contamination. The community can thereafter promote aquaculture/fisheries in these water bodies.
5.	National Rural Livelihood Mission (NRLM)	To reduce poverty by enabling the poor households to access gainful self-employment and skilled wage employment opportunities, resulting in appreciable improvement in their livelihoods on a sustainable basis, through building strong grassroots institutions of the poor.	Like NRLM, MCLLMP seeks to transform natural resource management from an entitlement based approach for resource allocation to a performance based approach. The project will also support creation/strengthening of good quality institutions of the poor.
6.	The Khasi Hills Community REDD+ Project Restoring and Conserving Meghalaya's Hills Forests through Community	The project provides detailed and long-term plans for improving the livelihoods of 4,400 households, 80 to 90% of which live below the poverty	MCLLMP will also be implemented in the East Khasi Hills, with the similar objective to reverse the loss of community forests by

	Action	line. The project provides proven strategies and funding for addressing the area's root causes of deforestation. To reduce the number and severity of forest fires, fire lines have been established, maintained, and monitored during the fire season.	providing support, new technologies and financial incentives to conserve existing forests and regenerate degraded forests, control of forest fires, reduce fuelwood collection.
7.	Integrated Watershed Management Programme (IWMP)	To preserve and conserve the ecology, restore and develop degraded natural resources by arresting soil loss, improving soil health, soil-moisture regime augmentation, promote water harvesting, recharging ground water, enhancing crop production and promoting livelihood and enhancing gainful employment opportunities.	The project has spring shed activities for soil and moisture conservation and recharge of groundwater.
8.	Climate Change Adaptation – North Eastern Region of India (CCA-NER)	To strengthen the most vulnerable communities in rural areas of the region and to enhance adaptive capacities and livelihoods of people and enable them to encounter the impacts of climate variability and change.	The project will also be promoting land productivity cultivation techniques for land productivity, linked to the VILLAGE NRM PLANs and help build the adaptive capacity of the communities to climate change.
9.	Mission Organic Value Chain Development for North Eastern Region	A scheme initiated in the state in 2014-15, to support the development of certified organic production in a value chain mode to link growers with consumers and to support the development of the entire value chain starting from inputs, seeds, certification, to the creation of facilities for collection, aggregation, processing marketing and brand building initiative.	The project will also promote organic cultivation techniques, use of FYM, vermi compost and bio pesticides.

10.	Bio-monitoring of Important Rivers in Meghalaya	To obtain information about the state of ecological environment of the water bodies; To assess the physico-chemical and bacteriological characteristics; To generate base line data on the aspects of the bio-monitoring; To plan control strategies for restoration of the pristine water quality of the water bodies.	The findings of this monitoring will be important in designing the spring shed improvement plans as water quality is also a key limiting factor in Meghalaya.
11.	Cherrapunjee Ecological Project- Restoration of Degraded Lands under Sohra Plateau	To enhance Soil moisture/ water regime, ameliorate under scarcity during drier months, revitalizes water sources, eco- restoration and identify critical areas for immediate restoration of degraded soil.	The project will also be supporting optimisation of jhum cultivation, community forestry and revitalization of water resources in degraded areas.
12.	Watershed Development Project in Shifting Cultivation Areas (WDPSCA)	To protect hill slopes of Jhum areas through soil and water conservation measures on a watershed basis. Encourage and assist Jhum families to develop Jhum land for productive uses with improved cultivation and suitable package of practices leading to settled cultivation.	Similar to the scheme, the project is designed to protect and develop the hill slopes of jhum areas through different soil and water conservation measures to reduce further land degradation process, to encourage and assist the jhum families to develop jhum land leading to settle cultivation, to improve socio-economic status of jhum families.
13	Spring Shed Development in Meghalaya (MBDA)	A Statewide water security initiative is being enacted to protect springs and better manage groundwater. The initiative will include source area identification, protection and management at the village level through government support and capacity building. This includes building awareness and technical skill through	Spring Sheds will be an important component of the C-NRM plan. The spring shed programme presents an opportunity for contributing to water security efforts. The individual efforts of partners working in different districts demonstrate locally proven

		dissemination and training of hydrogeology, ecological restoration and other best practices at all stakeholder levels, particularly of government decision makers, field staff, village durbars and para-professionals.	models for various typologies, and as a whole, the combined experiences of the partners provide a broad dataset and case for State level efforts including a participatory and scientific approach to spring shed management.

3.3 Operational Policies and Directives of the World Bank in relation to CLLMP

The World Bank's environmental and social safeguard policies will be used by CLLMP as the guidelines for the project. The objective of these policies is to prevent and mitigate any socio economic or environmental impact emanating from the project activities and wherever possible enhance the environmental conditions through the project. The safeguards policies applicable are listed below:

Table 20 ***World Bank Environmental Safeguards Policies Applicable to CLLMP***

Safeguard Policies	**Objectives of the Policy**	**Applicability**	**Explanation (Optional)**
Environmental Assessment OP/BP 4.01	Requiresenvironmentalassessment(EA)ofprojectsproposedforBankfinancingtohelpensurethatheyareenvironmentallysoundandsustainable.	Yes	The project activities are expected enhance natural resource management in targeted landscapes, and are expected to be beneficial and sustainable from an environmental and social perspective. Although the project would be implemented within environmentally and socially sensitive areas, none of the planned project investments or activities are expected to generate significant adverse environmental impacts. In accordance with OP 4.01, the Government of Meghalaya has prepared an environmental management framework, that has identified likely impacts of the project, and prepared and guidelines to mitigate and address any adverse impacts.
Natural Habitats OP/BP 4.04	Projectsthatwhichwould leadtothesignificantlossor degradationofanyCriticalNaturalHabitats would not be supported. Thepolicystrictlylimitsthecircumstancesunderwhichany Bank-supportedprojectcandamagenaturalhabitats(landandwaterareaswhere mostofthenativeplantandanimalspeciesarestillpresent).	Yes	The project will affect natural habitats, forests and associated ecosystems in a positive manner. The project is designed to reduce ongoing patterns of degradation of natural habitats, by implementing measures to avoid promoting any further degradation. Due to the presence of sacred groves, which are considered as critical natural habitats, presence of some essential ecosystems with rich biodiversity, the policy is triggered. Given the fact that these unique and rich ecosystems must be protected, it should be ensured that they don't come under increased threat from agricultural development and increased productivity. The EMF will include the necessary provisions to screen activities and their impacts on natural habitats, activities that involve the significant conversion or degradation of critical natural habitats will not be supported. In fact, the overall objective is to restore landscapes, and that involves reforestation

			where deemed necessary to reduce incidence of soil erosion.
Forests OP/BP 4.36	Aim is to reduce deforestation, enhance the environmental contribution of forested areas, promote afforestation, reduce poverty, and encourage economic development. Support sustainable and conservation oriented forestry. Do not finance projects that involve significant conversion or degradation of critical forest areas.	Yes	The project is intended to bring about positive changes in the management, and sustainable utilization of forests. The positive impacts associated with the program are the conservation and restoration of degraded forest lands, the establishment of new plantations, and improved management and in some cases, rejuvenation of forest areas and their function. The project would invest in soil and water conservation measures and reforestation of degraded patches, and community forestry within community owned forest areas.
Pest Management OP 4.09	In Bank-financed agriculture operations, pest populations are normally controlled through IPM approaches, such as biological control, cultural practices, and the development and use of crop varieties that are resistant or tolerant to the pest. The Bank may finance the purchase of pesticides when their uses justified under an IPM approach.	No	The policy not triggered as the project will only be demonstrating integrated farming practices. The project will not support significant procurement and use of pesticides for cultivation or in the nurseries. The primary means of cultivation in Meghalaya has little reliance on chemical pesticides and fertilizers and the project will promote access/learning of these traditionalpractices from experienced farmers through organizing workshops, and field level demonstrations.
Physical Cultural Resources OP/BP 4.11	Investigate and inventories cultural resources potentially affected. Include mitigation measures when there are adverse impacts on physical cultural resources or avoid if possible	Yes	This policy is triggered as a preventative mechanism, the project landscapes may have various physical cultural resources located within them; including sacred forest groves which have a significant religious and cultural association for the protecting community. This policy is applicable as the project will involve works such as tree planting, soil and water conservation works that might uncover previously unknown relics. The ESMF will provide criteria and procedures to ensure the appropriate treatment of physical cultural resources; this includes chance finds procedures for any activities taking place within sacred groves such as soil and water conservation works.
Safety of Dams OP/BP 4.37	Requires that experienced and competent professionals design and supervise construction, and that the borrower adopts and implements dam safety measures through the project cycle. The policy distinguishes between small and large dams by defining small dams as those	No	The policy on the Safety of Dams is not triggered as the Project will not involve the construction of water retention structures that are likely to pose potential hazards to human or animal health and safety. The Project will not fund any dams as defined in OP 4.37 requirements for small and large dams. Project financed activities may involve construction of small check dams, but these will be below 3m height.

	normally less than 15 meters in height. Large dams are 15 meters or more in height.		

Chapter 4 Stakeholder Identification and Consultations

4.1 Identification of Key Stakeholders

To understand the impact of the project from national level to village level identification of key stakeholder's is essential to understand the concern and interest of each stakeholder who are directly/ indirectly benefitted/ affected including those who are involved in implementation of project or share interest in the project. The key stakeholders may include individuals, communities, government departments/agencies, civil society organizations, non-governmental organizations, non-profit organizations, corporate, academia, media etc.

The main objective for identification of key stakeholders is tooutlinethe roles, responsibilities and relationship of each stakeholder for the project implementation. Identification of key stakeholders will provide negative and positive feedback and will help address and mitigate the impacts during the implementation of project. This will also help in involving the stakeholder in decision making process.

The Stakeholders identified under different level and the key expectation from them has been listed in the Table 13.

Table 21 Stakeholder Identification Matrix

Level	Key Stakeholders	Description and Expectation under the CLLMP	Rationale for consultation
State level	Meghalaya Basin Development Authority (MBDA)/ Meghalaya Basin Management Agency (MBMA)	As Project Management Unit (PMU), MBMA shall provide technical and financial assistance, and also work as a Centre of Excellence for Traditional Knowledge and Grassroots Innovations	Consultation with the Project Management Unit (PMU) and Project Implementing Agency (PIA) will provide for better execution of the project and provide clarity in the responsibilities and roles of each of the nodal agency.
	Soil and Water Conservation Department, (SWCD), Government of Meghalaya	SWCD shall provide technical support in capacity of Project Implementing Unit (PIU) and Project Implementing Agency (PIA)	
	Line departments: a) Agriculture	Convergence for an inclusive and holistic implementation of	To disseminate information on the proposed project and to

	b) Horticulture c) Animal Husbandry d) Forest & Environment e) Soil & Water Conservation f) Sericulture g) Water Resources h) Industries	the project.	clarify on the roles and responsibilities of the line departments, understand the challenges faced by the departments, provide technical and non-technical assistance, provision for capacity building.
	Autonomous District Council: a) Khasi Hills Autonomous District Council, b) Jaintia Hills Autonomous District Council c) Garo Hills Autonomous District Council	Ensuring involvement of Traditional Institutions in project implementation and conflict management at grass roots level	With the project intervention, the ADC will ensure the involvement of traditional institution and for the provision of NOC or no objective certificate for project implementation
	Civil Society and NGOs: a) Meghalaya Water Foundation b) Informed Conscious and Responsible Existence (ICARE) c) North East Network (NEN) d) Bethany Society e) North East Educational & Development Society (NEEDS) etc	Conduct research study, training and capacity building during the project implementation for motivating communities for partnering in the project from planning to implementation and monitoring and evaluation of project	The Civil Society and NGOs present in the area will help in mobilising the community member during the project implementation and create awareness among the partners.
	Media	Will help in information dissemination and enhancing public awareness about the project	Provide awareness on the project implementation so that villages falling under the selection criteria can apply for the project.
District level	Deputy Commissioner	Coordination with line departments and ensuring convergence during project implementation	Under MBMA, the Deputy Commissioner is the chairman for any project implementation or intervention in the district. The consultation is to inform about the project and for necessary action needed to take for smooth functioning of the project. The DBDU will facilitate the community during the project
	District Basin Development Units (DBDU)	Collection of data and information for preparationof Community Plan for submission to the Project Management Unit (PMU)	

			implementation.
Block level	Enterprise Facilitation Centre	Field level interaction, consultation and capacity building of the community members	To involve during the project implementation at the community level.
Village level	Village Council (Dorbar), Village Executive Committee, Village Employment Council, etc	Dissemination of information on the project implementation, facilitating availability of community land for the project	At the village level, consultation with the community as a whole will provide awareness on the potential benefit from the implementation of CLLMP. The consultation will look into the existing practices of the community and understand their needs for development under the project. Also look into the need for training and capacity building of the community and community along with line department.
	Formal and Informal groups: *Rangbah Shnong*, *Nokma*, *Maharis*, *Seng Longkmie*, *Seng Samla*, *Dolloi/ Sordar/ Syiem*, community groups, *Rangbah Kur*, Self Help Group etc	Ensuring involvement of community in project implementation.	
	People at large (Individuals and Family)	Preparation, implementation and monitoring of the landscape management plan	
	Vulnerable group, Women, unemployed youth, school dropout, aged, land less, differently abled etc	Inclusion in planning, implementation, and monitoring of project process to safeguard interest of disadvantaged section of the society.	

4.2 First Stage Stakeholder Consultations

Public Consultation is aimed at ensuring and enhancing stakeholder involvement through two-way communication between the decision makers and the project partners. Public consultation shall be done to promote understanding and acceptance of the development activity by the people. This shall be achieved through minimizing potential and perceived environmental impacts through discussion and sharing of information. The principle of public consultation is to provide access to information for enhancing people's participation. Engaging the public in the decision-making process will help in constructive criticism of the project which shall be used to improve the project design and course correction.

Public consultation is a major focus area for the World Bank and it gives immense importance to the stakeholder's opinion. As such under the CLLMP project, consultation with the key stakeholders at the village level, district level and state level along with the representatives of World Bank Officials were undertaken to know their views, concern, perception and ideas, on the environmental issues of the project. The consultation work has been done through workshop and open discussion, where stakeholders gathered in a common forum to discuss the environmental impacts of the project.

The ESMF preparation included two round of stakeholder consultations, and the key Project stakeholders identified for consultations included government agencies, NGOs, farmers, women, community leaders and local communities in the study area.

The first stage of stakeholder consultations was to hold public consultations with the local communities and all other interested groups during the EMF development process. These consultations are aimed at briefing the communities about the project activities, how the activities will be carried out and what sectors of the environment are likely to be impacted. The public consultations were conducted in a participatory manner to encourage the communities to contribute to the formulation of the ESMF.Meetings were held with key officials and community leaders to gauge the level of awareness and involvement with the proposed Project, concerns of Project implementation, and to obtain relevant documents or baseline information. The consultations also served to gather information on institutional mandates and permitting requirements to inform the development of the Project.

The list of stakeholders contacted and issues discussed are summarized in Annex 1. The views and opinions of stakeholders relating to the impact of the project on the environment obtained through formal and informal discussion in the state level workshop and group discussions village level were collated and compiled. The following environmental issues and impacts emerged during the discussion.

A high-level Stakeholder meeting was held in July 2016 to discuss the National Forest Policy, this was conducted in all North-East States. Details and suggestions of the stakeholder workshop is attached in Annex 5. Suggestions have been considered for the project design and EMF guidelines.

4.2.1 State Level Workshops/ Focus Group Discussions

Table 22Stakeholder Concerns (State Level)

Stakeholder	Participants	Key concerns expressed (Round 1 Consultations)
Meghalaya Basin Development Authority (MBDA)	OSD, MBDA, Shri. Augustus S. Suting, Shri. Lam Shabong	• Highlighted on the key activities under IBDLP and LAMP • Highlighted on the status of various hydrological resources in the state and the potential areas for conserving the key water sources especially those that act as a source of domestic water as well as for livelihood of the people.
Soil and Water Conservation Department (SWCD)	Assistant Soil and Water Conservation Officer, Shri N.G.S Kharmalki	• Highlighted the need for watershed management in the state, particularly watershed management which can help address environmental degradation and disruption of livelihoods. • Highlighted the key feature of the Integrated Watershed Management Programme (IWMP), its relevance to the state, and the approach to implementing the project.
Fishery Department	Fishery Officer, Smt. M.A, Khongjliw,	• Pointed out the huge demand-supply gap for fish in the state and highlighted the potential for the fishery sector both as a major source of livelihood and as a source of nutrition • Highlighted on the 6 mini missions under the aquaculture

		mission that the department is engaged in, highlighting key facts and figures, milestones and future activities
World bank	Social Protection Expert, Mr.Foluso Okunmadewa and Climate Change Expert, Smt. Madhavi Pillai,	• Provide overview on the Community Demand Driven (CDD) project in African region which is relevant to the state of Meghalaya. • Stress on the key consideration for CDD projectby strengthening the decision making capacity of the indigenous people through capacity building and knowledge support. • World Bank role is to support in implementation of the project and not to intervene.
Media	Editor Shillong Time, Smt Patricia Mukhim	• Express concern on the increase number of wasteland in Meghalaya. • Requested MINR to map the wasteland and bring the matter to limelight. • Need for reclamation of abandoned coal mines through the project implementation. • Developing in build mechanism for social auditing to strengthen the community to monitor and evaluate their own project.
Research Organisation	Indian Institute of Public Health, Smt Sandra Albert	• Identification of impact or impact evaluation from CLLMP to understand the outcomes of the project.
Civil Society Organisation	ICARE, Shri Toki Blah Red Cross Project, Shri. TanborLyngdoh	• Emphasis on capacity development at the grass root level by setting up institution to address to the needs of the community. • Empowering of local youth for dissemination of information on the project. • The CLLMP should include media to spread awareness on the noble initiatives and include community member in decision making. Proper documentation of all work progress in the field
Non-Governmental Organisation	Mariang Multipurpose and Agricultural Project, Kairang, EJH, Shri K.R. Dkhar	• Narrated a success story of restoration of 20 ha of land degraded by cement plant which was subsequently put to cultivation of medicinal plants in the area. A good number of people from the village are now earning daily wages from the project.
University	NEHU, Dr.Syiemlieh and Prof. B.K. Tiwari	• Needs to understand and tactfully deal with the changes or behaviour of the natural system and its effect on the channels or areas where people are dependent on livelihoods. • According to Government Study, 78% of the rural people are landless people. Therefore, under the project there is a need for identification of the landless people for equity in project

		implementation.
Institutional Organisation	NECTAR, Shri Ankan Dey	• Lack of record on the ecosystem can be achieve by involving the community to develop a para hydrology of the ecosystem.
Block Development Unit (BDU)	South West Khasi Hills District, BDU Shri Sywell Lyndoh,	• Degradation of the ecosystem due to forest fire. The needs to impart training, education and awareness programme to the people by having proper accessibility to the people.
Community Respondent	Shri H.H Morhmen	• Highlighted the initiative taken by the village headman in Shnongpdeng village, West Jaintia Hills District, to protect areas of river Umngot from private parties and fishing. The step has improve the livelihoods condition of the people and has promoted tourism in the village.
Community respondent	Shri. Ricky Cooper Pathaw	• Involvement of Autonomous District Council (ADC) since people are more accountable to the ADC rather than the State government. • More community consultation to create awareness among the village council on the potential benefit of the project.
Youth	Nativity Higher Secondary School, Mawkyrwat, Shri FrankstarLyngdoh	• Highlighted the used of fishing ponds as a gambling ponds for fishing competition. • Requested the fishery department to concentrate more on the production of fish.

4.2.2 Village level Consultation

Village level consultation has been carried out to understand the existing issues in the village, steps taken by the community to mitigate existing issues of the village, and the likely environmental impacts likely to come up from the project implementation. The consultation has been done in the presence of community members, village council heads and Block Development Unit. List of participants in the consultation has been attached in Annexure 1

The identified study area selection criteria has been made on the following:

- Regional identification of major landscape issues in Khasi Hills, Jaintia Hills, Garo Hills has been selected on the basic of forest and water scarcity, coal mining, and shifting cultivation practices respectively.
- 70 to 75 percent of the population are dependent on forest and water scarcity, coal mining and shifting cultivation respectively as their major occupational or livelihood source.
- The identified villages are located away from the national highway and are in the interior part of the state, mainly from the rural area.

Village profile for Stakeholder Consultation and environmental baseline study

Nongkhlaw Village:

Nongkhlaw Village falls under the administrative block of Mairang Community and Rural Development Block in West Khasi Hills District. The village is located at a latitude of 25.68523^{o} N and at a longitude of 091.63697^{o} E lying at an elevation of 1384m above sea level. Nongkhlaw village land distributions are agricultural land, Forest land (Community and private forest), homestead and residential area, wasteland and water bodies. The village is divided into four localities namely Nongmynsai, Dongnongbah, Dong Sohkian nongliar and Dong Dumkut. The total population of the village is 1556 (census 2011) with 280 households having an average family size of 7 per household. The village has 1113 literate person and 443 illiterate people. 375 person are engage in main agricultural labourer with 8 person engage in cultivation. The types of crops grown are paddy field cultivation, maize, ginger, and potato. While only a few households are engage in the business or government service, 456 person are working population and 870 person are non- working population

The consultation took place on the 22th of November, 2016 at the community hall of Nongkhlaw village in the presence of 5 village council members. All the participants were male members. The objective is to understand the dependency of the community on forest product, trend leading to deforestation in the village, and the measure taken up by the community to address deforestation in the village.

Forest in Nongkhlaw village plays an extremely important role where forest and its products are used by the people to benefit them economically, generate employment, provide fuels for domestic used, materials for handicrafts, historical values and provide aesthetic values for promoting ecotourism in the village. Forest land in Nongkhlaw village falls under the unclassed category where majority of the land belong to private individual and about 10 acres of forest land falls under the community forest or *law shnong*. While collection of timber and logging are allowed only in the private forest, collection of forest products like local fruits, orchids, mushroom, *latyrpad, sohlinuit,* etc. are gathered from the community forest as well as the private forest. Most of the forest products are used by local people for self-consumption or self-sustenance and in case of surplus they are sold in the domestic market of the village. According to the elder people of the village, they have observed that afforestation has increase in the village due to awareness among the private owner on the economic value of trees. Though the village has forest degradation in private land, the issue on forest degradation has not increase in the village, however, it was put to notice that the village suffers from water scarcity in the region and they receive water only about 2 hours per day from the PHE water supply pipeline.

Table below list out the key issues, impact and risk, mitigation measure and the impact of project implementation on the key issues discussed at the village level consultation. For detailed list of participants at the village level refer to Annex 2.

Table 23 Stakeholder Consultation Nongkhlaw Village, West Khasi Hills.

Nongkhlaw Village, West Khasi Hills.			
Variables	**Environmental Concerns**	**Mitigation measures taken by the community to address the impact and risk**	**Implications for CCLMP design and EMF**

Key Issues in the village:	Forest degradation		
Change in land use pattern	• Conversion of pine trees area into open land • Small conversion of open forest to homestead area. • Conversion of barren community land, *lum panajam*, into open forest due to regeneration of the forest on its own	• No step has been taken in private land • Community land has seen natural afforestation	• Improve on afforestation in the village
Forest degradation	• Commercial logging is practice mainly in private land for sale as timber, causing fragmentation of forest into smaller patches • Forest fire destroys the trees sapling. • Cyclone is a common natural calamity in the region which destroys standing crops and young trees. • Charcoal making in privately owned land.	• No preventive measure has been taken up at the individual level. • Community forests arepreserved from human activities and afforestation within the community forest has been taken up many time. Violation in community forest by anyone will be penalised at Rs 200. • Charcoal making is allowed only in the outskirt of the village	• Creating awareness on the higher value of the forest when they are left standing, and its impact on climate change, soil conservation, flash flood among the community and private owner. • Provide technical support for identifying suitability of sapling within the region.
Water resources	• Since the village is located at a higher elevation, water scarcity is a problem during winter season. Poor infrastructure for water supply into the village has also cause water problem in the area.	• No step has been taken to conserve water.	• The project with technical assistance from the line department can set up rain water harvesting in the area, which also receive huge amount of rain. Capacity building of the community will be required.
Biodiversity	• Habitat loss and habitat fragmentation due to logging and clearing of forest area in private land • Edge effect on flora and fauna • Population growth has cause increase in homestead area into forest area	• No step has been taken up to prevent loss or fragmentation of habitat, flora and fauna	• Identification, preserving, and providing awareness to private owner and community as a whole about these sensitive zone and avoidance of encroachment into this area.

Sohkymphor Village:

Sohkymphor Village lies under the administrative block of Khliehriet Community & Rural Development Block in East Jaintia Hills District. The village is located at a latitude of 25.42538^{o} N and a longitude of 092.36954^{o} E at an elevation of 1228m above sea level. The total area of Sohkymphor village is about 25 km^{2}. The land distribution within the village falls broadly under the private owners with 10 km^{2} belonging to private forest; 2 Km^{2} falling under agricultural land; 4 Km^{2} falling under community forest; 8 Km^{2} falling under Homestead and residential area; 1 Km^{2} falling under waste land and 0.3 Km^{2} falling under water bodies. Sohkymphor village has 7 *dong*/ localities namely *wahsanphaw, dong umrubot, dong*

mulum, dong shongngiah, madan ktieh, ksiehkhain, dong pydengnop. The total population of the village is 3277 (Census 2011). The village has 489 households with an average family size of 8 per household. The village has 1201 literate person and 2976 illiterate person. While a majority of 432 indigenous people are engaged in cultivation, 90 are engage as agri- labourer. The village has about 2222 non-working person.

The consultation was held on the 24th of November, 2016 at the community playground where 13 participants participated varying from the age group of 40- 60 years who are members of the village council, farmers, daily wage workers, and government service. Majority of the participants are male member. The objective is to understand the change in livelihood activity of the people and its impact on the environment. Before coal mining started in Sohkymphor, the village was purely dependent on paddy field cultivation as a mean of livelihood but during the 1980s there was a change in the occupation of the people who took up coal mining as a major source of income generation activity. With the passing of years, it was seen that coal mining has increase in the village. Though no study has been conducted to identify the total area under coal mine in the village, consultation with the community has found that only about one fourth of the total village land is under coal mining. At present the village has three major coal mining area belonging to individual private owner and about 130 households indigenous people and immigrants people depends on these mine areas for their livelihoods. The total quantity produce from the village is not known as the village acts as a focal transportation area for coal coming from other nearby villages like Byrwai and Mynska. One of the main issue put forth by the community members is that, water degradation and decrease in water level in spring well has a direct linked to the rat hole mining activity within the region.

Table below list out the key issues, impact and risk, mitigation measure and the impact of project implementation on the key issues discussed at the village level consultation

Table 24 Stakeholder Consultation at Sohkymphor Village, East Jaintia Hills

Sohkymphor Village, East Jaintia Hills.			
Stakeholders met:			
Variables	**Environmental Concerns**	**Mitigation measures taken by the community to address the impact and risk**	**Implications for CCLMP design and EMF**
Key Issues in the village:	Coal Mining in the area		
Change in land use pattern	• The elders of the village recalled that earlier the locality /*Dong* of *madam ktieh* has a rich canopy of dense forest and paddy field cultivation was a common practice. However, coal mining in this region has degraded the forest land and	• No step has been taken up by the community to address to the change in land use pattern within the village • The community felt that the individual owners should take up some initiatives to cover	• One of the major activity of CLLMP is to work towards restoration of mine area • Measure like dumping of soil into abandoned

	the paddy cultivation is no longer taken up in this area. Water from the mine areas runoff to the agricultural land. • Increase in wasteland area due to coal mining activity especially in private owned land	degraded land, so far no step has been taken.	coal mines
Forest degradation	• Open forest (pine trees land) available in the interior part of the village, and dense forest are found only in the community forest. Coal mining in privately owned land have contributed hugely to the degradation of forest area. • Forest fire is another major concern in the village.	• Since most of the land are privately owned, the members of the village council has carried out bamboo plantation (under MGNREGS) and afforestation within community forest however, the sapling provided by the forest department has not survive due to unsuitability of plant in that area.	• The forest regeneration activity under CLLMP will help revive the degraded land with the introduction and provision for technical support of suitable plants and sapling in the region.
Water resources	• There are three river and stream in the village and Wah Myntriang is a dead river. It does not have any acquatic life in it and people has avoided using this river for any domestic purpose. Wah Umlubu is still used by the people for washing clothes only. Wah umpaai is in the interior part of the village and it is still used for by the people for fishing, domestic purpose. • Due to rat hole mining, the village has face problem due to the drop of spring shed water table.	• No step has been taken by the community to address to the dying river like Wah Myntriang, Wah Umlubu since the effect on the river also happens from upstream coal mining villages. • However, in wah umpaai the community has banned dumping and storing of coal near the river.	• CLLMP will work towards spring shed development and drainage land treatment, by prioritising the most affected area.

Biodiversity	• Fragmentation of Local flora and fauna has been identified in the mine area • Aquatic life in river has decrease and in some river they have disappeared for good.	• No step has been taken to address to the loss of biodiversity on land and loss of aquatic life	• Plantation of indigenous flora and trees to help support the loss of biodiversity. • Awareness on loss of biodiversity due to extensive coal mining should be done to avoid encroachment into sensitive biosphere
Pollution	• Water pollution and degradation from coal mining is a major concern • Dustiness is another problem due to huge number of vehicles travelling from that area.	• Storing and dumping of soil is allowed only on the outskirt of the village to avoid runoff of coal mine effluent into drinking water sources of the village.	• Capacity building and awareness on coal mine effluent and its impact on health and environment.
Employment	• Majority of the indigenous people and immigrants from other state are dependent on the mining area for their livelihoods. Stopping coal mining in the area will affect the market and employment of people.	• No step taken.	• CLLMP will help develop community development plan which will help in providing employment opportunity for the community as a whole.

Rombagre Village:

Rombagre Village falls under the administrative block of Rongram Community and Rural Development Block in West Garo Hills District. The village is located at a latitude of 25.55936^{o} N and at a longitude of 090.335665^{o} E lying at an elevation of 514m above sea level. The total area of the village is approximately 988 bigas more or less. The land use distribution are as follow; Shifting Cultivation is

about 20 bigas, wet land rice 10 bigas, Plantation/ cash crop 188 bigas, private forest not available, community forest 140 bigas, waste land 350 bigas, homestead and residential area 280 bigas and have 3 river and stream in the village. The village is divided into three localities namely Rombagre, RombaNohat, and Rombasongital. The total population of Rombagre village is 470 with 94 households (According to the Block Indicator, 2016). All the 94 households in the village are engage in shifting cultivation as a major source of livelihood, either for self-consumption or for supply in domestic market.

The consultation was done at the *nokma* house on the 28th of November, 2016 where 20 participants took part in the consultation varying from age groups of 35 to 75 years. Majority of the participants are male members and their major occupation is farming. Representatives from the Block development Unit were also presence at the consultation. The objective is to understand the agricultural practice of the village and its impact on the environment.

Shifting Cultivation is an age old practice among the community members of Rombagre Village which is practice every year at different plot of land. The site for shifting cultivation is about 1 km from the residential or homestead area. Since all the 94 households are engage in shifting cultivation, distribution of community land is done on the basic of individual requirement by the Nokma during the month of November each year. So far no conflict over land distribution has occurred in village. The land are clear by the community members after the land distribution and during the month of March and April, the nokma along with the community members fixed a date for burning the jhum area. This practice of burning jhum land at the same time prevent forest fire as well disturbance of standing crops. Since Mixed cropping is adopted in these jhum land, the types of crops grown in the jhum area are ginger, pumpkin, brinjal, maize, tapioca, yam, sweet potato, local spinach, turmeric, cow peas, cucumber, melon, lady finger, chillies, loofa, sesame, bitter gourds etc. are grown throughout the year and are used for self-consumption and for purchase in domestic market. Rice produce in the jhum land are used only for self-sustenance. Since the jhum cycle is done in the same place every year, degradation and loss of soil fertility happen only in the jhum place which has caused low productivity and low quality of crops products.

Table below list out the key issues, impact and risk, mitigation measure and the impact of project implementation on the key issues discussed at the village level consultation

Table 25 Stakeholder Consultation Rombagre Village, West Garo Hills

Rombagre Village, West Garo Hills			
Stakeholders met:			
Variables	**Environmental Concerns**	**Mitigation measures taken by the community to address the impact and risk**	**Implications for CCLMP design and EMF**
Key Issues in the village:	Age old practice of Shifting cultivation		
Change in land use pattern	• Expansion of population and increase in households over the	• To keep a check on the land use pattern, jhum cultivation is practice only on the	• The implementation of Community led

	year has increase the practices of shifting cultivation in the area, with more people having only a small portion of land which affect production. • Earlier the jhum cycle was 18 to 2o years which has reduce drastically to 6 to 5 years • The productivity from these jhum land has reduce and the quality of production has also reduce. • Short jhum cycle in the village has affected the soil fertility • Earlier only local crops were grown in jhum land but with the shortening of jhum cycle, hybrid plants has been introduced in the jhum land which provide for short span production as compared to local crops.	community land. • Lack of modern knowledge has prevented the community from adopting measure which prevent land use change in term of cropping pattern etc	landscape management in this area will help improve the land use pattern within the village which has a huge land under shifting cultivation. The project will provide technical assistance to the community on how to improve the wasteland created due to shifting cultivation.
Forest degradation	• Open Forest in the jhum area are cleared for cultivation, while in the private land plantation of areca nut, tea, orange, *cokwa,* pineapple, pears etc are grown for market production • There is a loss of local trees within the jhum	• The community are well aware about the importance of trees and has a reserve forest about 20 ha that is under the custodian of the community. Logging and shifting cultivation is not allow within this area, violation within the reserve forest will be penalised with a sum of Rs. 1000.	• Since the project will works towards forest regeneration this project will help address the grievance of the people on regeneration huge amount of open forest area and

	area but the forest regenerate on it owns in the jhum land during the fallow period.	• Other open forest area are also present in the village which has been given to the forest department for afforestation, but so far no plantation has taken place	unused land within the village
Water resources	• The practice of shifting cultivation has not affect any of the water bodies in the village.	• Simsang river in the village has been used as a fish scantuary to protect and preserve the acquatic life. • The catchment area in the reserve forest are preserve to meet the community drinking water source.	-
Biodiversity	• Local flora and small insects, fauna in the jhum land has decrease and fragmented from their natural habitant	• To preserve the aquatic life fish sanctuary has been reserve in the river and fishing is not allowed in this area. • To prevent the loss of natural environment the community has set up a reserve forest to preserve the natural flora and fauna of the region which has grown naturally.	• The project will provide technical support to the community on how to identify sensitive area and avoid encroachment into these sensitive area
Change in climatic condition	• Change in climatic condition over the year has made it hard for the local people to predict the weather condition. However, the village has not faced any drastic impact from the weather changes.	• To address to climate change, the community member has practice plantation within their private land	• Setting up capacity building institution or upgrading existing institution to provide and disseminate scientific information on weather forecast and temperature changes.
Employment	• Depending on land size and needs of individual owners, labourer are hired for Rs 200 per day • Average income	• Employment in jhum land has been done only through *Ajak* that is helping each other in needs • Provide employment under	-

	generation from the jhum land is about Rs 40,000 to Rs 1 lakh annually.	MGNREGS	

4.3 Second Stage Consultations

Three Regional Level Community Consultation Workshop on Community Led Landscape Management Project (CLLMP) were conducted by Meghalaya Basin Development Authority on the 28th, 29th and 30th March, 2017 in SMELC building (Garo hills), DC Conference hall (Jaintia Hills) and Meghalaya Agriculture Management and Extension Training Institute (MAMETI) (Khasi Hills & Ri-Bhoi) respectively. The workshop saw participation from various line departments like Agriculture, Horticulture, Forestry, Veterinary, Animal husbandry, Soil and Water Conservation, Industry, Fishery and Water resources, Block Development Officers, Non-Governmental Organisation, Water User Groups, Headman from various villages and staffs from IBDLP.The draft EMF was presented to solicit stakeholder inputs and concerns. A summary of the findings from the discussions to inform the finalisation of the EMF has been presented below.

Particulars	**Environmental Issues raised at the Regional Level Community consultation**
Forest	• Afforestation are done in community barren land and shrub area mostly. • Lack of support from line department and individual owners to help address to the concern of forest fragmentation. • Excessive cutting of trees for timber. • Cutting of afforested area for construction of infrastructural developmental work. • Survival rate of trees planted under different governmental programs is very less. • Lack of monitoring on the trees planted under governmental programs. • Forest fire during the winter season is a grave concern in the State which affects the sapling and mature trees. • Trees are cut down even before the trees mature • Need for afforestation in catchment area • Preservation of bio-forest in Garo Hills region • Wise selection of forestry species • Setting up community nursery.
Water	• Supply and usage of contaminated lime stone quarry water for drinking water purpose to downstream villages. • Need for rain water harvesting. • Poor maintenance of public water tap leading to free flow of drinking water. • Use of water storage tank especially for lean season to store rain water for domestic use and backyard garden. • Revival plan for dying river in Jaintia hills through natural process using limestone treatment. • Effect of coal mining on rivers flowing downstream to different villages. • Water crisis due to decrease in water flow. • Plantation of high water consumption plants (broom grass) has reduce the water availability in Jalaphet village. • Protection of spring areas. • Inclusion of Traditional Institution and VEC for water management. • Selection of water retaining species in catchment area for sustainability.
Land	• Change in land use pattern.

	• Change in agricultural practices to plantation has reduce the soil nutrient and productivity. • Loss or decrease of value when the land is barren. • Improve soil fertility for indigenous farming practices. • Soil testing to be carry out before implementing any cultivation. • Improve on the shifting cultivation practices by using different crop growing techniques and technology. • Negligence on traditional farming and cultural practices.
Biodiversity	• Protection of flora and fauna in the reserve forest. • Improve and balance the ecosystem within the region • Development of fish sanctuary across Garo Hills to conserve, preserve and promote indigenous fish. • Conserving the wildlife of the State. • Lack of awareness on the loss of biodiversity
Agro-climatic condition	• Used of exotic plants and seeds does not survive within the State. • Conservation and usage of local species to increase the survival rate of tree/ vegetative plantation. • Selection of crops should be based on particular region. • Favourable selection of seasonal plants of forestry and vegetative crop.
Waste Management	• Creation of an Action Plan for management of solid and liquid waste for protection of natural resources.
Livelihoods	• Promote Apiculture industry for income generation and help in marketing of organic honey from Garo Hills. • Selection of fish type to improve rearing based on the water type. • Development of forest based activities from bamboo and agar plantation to improve village level livelihood. • Lack of knowledge on the potential of forestry species outside the State. • Promotion of eco resort and eco-tourism.

Key stakeholders that participated in the consultations as those that would be directly benefit by the proposed interventions, the consultation processincluded public meetings, community and local meetings in the villages. Theultimatebeneficiariesofthisprojectarethecommunitieswhomanage thelandandforestsfortheirlivelihoods, and thus werethereforemostly thetargetforconsultation.The key institutional stakeholders responsible for natural resources and environmental management which will also benefit from improved technology, capacity development programmes and outreach and communication programmes were also consulted to solicit their views.

Theoutcomeofthe stakeholder consultation process, issues raised are included in the table below. The detailed questionnaire for field data collection is attached in Annex 4.

N	Location	Key Environmental Challenges/ Concerns	Project interventions

1.	Nongklaw Village, West Khasi Hills	• Severe degradation of forest lands due to community harvesting of pine trees. Commercial logging is practiced mainly on private land for sale as timber. • Forest fire destroying the trees sapling. • Cyclones is a common natural calamity in the region which destroys standing crops and young trees. • Charcoal making on privately owned land. • Habitat Fragmentation as a consequence of the above	Component 2 A&B Activities
2.	Sohklymphor Village, East Jaintia Hills	• Mining has abstracted large amounts of ground water for processing - no process in place to decontaminate water • Run off from mining areas has degraded rivers and streams, most of which have been reported as biologically dead. • Increase % of wastelands in the village area • Coal mining in privately owned land has contributed to the degradation of forest area. • Forest fire is another major concern in the village. • Dust and air pollution arising due to trucks carrying coal and minerals extracted	Component 2 A &B Activities
3.	Rombagre Village, West Garo	• Loss of Native species due to forest clearing, forest regenerate on it owns in the jhum land during the fallow period. Decrease of jhum cycle to 3-5 years • Quality of production has also reduced with reduction in soil fertility • Earlier only local crops were grown in jhum land but with the shortening of jhum cycle, hybrid plants have been introduced in the jhum land which provide for short span production as compared to local crops. • Local flora fauna in the jhum lands have decreased and fragmented from their natural habitat.	Component 2 A &B Activities
4	Consultation on National Forest Policy	• Community based forest management systems are under increasing pressure specially in the light of cultural changes, increasing presence of market forces, increasing population, mining of coal and limestone and competing government policies • Management of forests for water recharge needs to be prioritized. • Control and management of invasive species, forest fire and encroachment. • Strengthening of traditional knowledge and traditional institutions on sustainable forest and management principles.	Component 2 A &B Activities

4.	SMELC building (Garo hills),	• Lack of support from line department and individual owners to help address to the concern of forest fragmentation. • Excessive cutting of trees for timber. • Survival rate of trees planted under different governmental programs is poor. • Lack of monitoring on the trees planted under governmental programs. • Forest fire during the winter season is a grave concern in the State which affects the sapling and mature trees. • Need for rain water harvesting.Use of water storage tank especially for lean season to store rain water for domestic use and backyard garden. • Protection of spring areas. • Change in land use pattern. • Improve soil fertility for indigenous farming practices. • Soil testing to be carry out before implementing any cultivation. • Improve on the shifting cultivation practices by using different crop growing techniques and technology.	Component 2 A &B Activities ECOPs
5.	DC Conference hall (Jaintia Hills)		
6.	Meghalaya Agriculture Management and Extension Training Institute (MAMETI) (Khasi Hills & Ri-Bhoi)		

4.4 Disclosure

The World Bank disclosure policies require that all environmental safeguard documents for projects are made available to project affected groups, local NGOs, and the public/communities. The EMF has been disclosed on MBDA webpage (http://www.mbda.gov.in/publication/index.html) and on World Bank Inforshop.Copies of the EMF will also be made available to the public at the District and Block Development offices, the executive summary has been translated to local language.

Chapter 5 Anticipated Environmental Impacts/ Risks and Mitigation Strategies

By virtue of the project development objective, the project aims to reduce deforestation and forest degradation within Meghalaya.Although the project would be implemented within environmentally sensitive areas such as community forests, biodiversity hot spots and culturally significant sacred groves, project interventions are designed to beenvironmentally positive overall. None of theplanned project activities are expected togenerate significant adverse environmental impacts.The proposed activities which the communities would take up would be generally small to midsized works for soil and water conservation, improved cultivation techniques, soil fertility improvement measures, and afforestation activities, none of which are being implemented in protected areas or designated forest reserves. The project will not support any large scale civil works such as roads, and bridges.

Project activities would be screened for siting of interventions to ensure that these resources are carefully protected and that project locations do not interfere with cultural and natural heritage sites, sensitive habitats,well-preserved forest, or any other resources are not affected. Relevant environmental management measures in accordance with the screening measures and mitigation plans described later in this EMF must be implemented.

Increased recreational use of project sites as an induced impact of landscape restoration activities may lead to possible overuse of sites, increased waste, harvesting of wood for campfires, purposeful disturbance of flora and fauna and accidental fires. Similarly, as productivity and soil fertility is restored in jhum landscapes, shifting cultivation communities may adopt fruit and vegetable cultivation for domestic consumption as well an income generating livelihood, however, large shifting cultivation areas are away from the roads and the market infrastructure, which may increase the demand for feeder roads.

Promoting improved planning of forests landscapes,andsustainable management of community forests and other environmentallycompatible agricultural activities, including optimisation of shifting cultivation practices that are intended to reduce the ongoing pressures for deforestation and forest degradation. If project interventions are successfully implemented, restored and reforested landscapes would have improved the soil structure, reduce the surface runoff, improved soil conservation and increase the availability and quality of spring waterfrom improved land and water management (including management of mining activities). Restored landscapes would also provide valuable ecological services such as carbon sequestration through improved tree cover and soil conservation.

The project will finance a variety of planning, capacity building, knowledge management and institutional strengthening activities to promote the conservation and sustainablemanagement of landscapes, these could be considered environmentally benign with no adverse impacts, however the positive environmental implications of undertaking these activities have been highlighted in the impact matrix below

5.1 Anticipated Environment Risks and mitigation measures

Project Intervention	Potential Environmental benefit	Potential impact/risk	Proposed mitigation measures	Applicable EGs
Component 1: Strengthening Knowledge and Capacity for management of Natural Resources: **This component will help to strengthen Natural Resource Management (NRM) knowledge of communities, traditional institutions and other stakeholders for improved NRM with landscape approach.**	i. Documentation of indigenous and traditional knowledge, skills and practice in the domain of environmentally sustainable practices in forest management and shifting cultivation techniques and further build upon it with the participation of the communities ii. Opportunities for promoting unique NRM practices such as organic and scientifically-rigorous farming systems, traditional bamboo based irrigation system, that are economically viable, scalable, energy efficient, and support conservation of the environment. iii. Studies undertaken through component 1B on the drivers of deforestation, and demand for fuel wood and charcoal can further strengthen the project environmental baseline, based	Activities under this component are environmentally benign, the environmental /sustainable practices which have been identified through knowledge exchange and, capacity building activities- these can further inform the Environmental Guidelines prepared under CLMMP.	Under grassroots innovation, the project can support innovative pilots for addressing some of the key environmental challenges faced in the state, these could be (i) forest fire monitoring and safeguarding (ii) model for rapid regeneration of forest fallows due to shifting cultivation (iii) creation of PES schemes for plantation management, spring water management and maintenance of pristine landscape quality (iv) support to Organic Certification to crops to give comparative price and market advantage.	-N.A-

	on which the project can Continue to pursue and support greater collaboration across agencies and stakeholders and the development of Forestry, Plantation Manuals guidelines, and a Soil and Water Conservation Guidelines/manual			

Component 2A **Preparation of Community Natural Resource Management Plans (C-NRM plans)**	i. This component presents an opportunity to consult with local communities to determine appropriate land and resource management regimes, whilst introducing planning at the landscape level – this is needed to address ecological concerns such as biodiversity loss, water availability and quality, and forest fragmentation. ii. Communities undertake a detailed resource mapping and analyse the threats/issues faced in natural resource management, thereby identifying the management steps and investments needed for restoration of the landscape. Thisis a first of its kind approach, and can be adopted for planning in future government schemes.	Any impacts arising from impropriate site selection and selection of activities would be mitigated through a rigorous screening process outlined in the EMF. In addition,communities, will account for all arrangements and equipment needed for health and safety arrangements during the implementation of investments	i. Upstream participatory planning: and effective participation of the community in the C NRM plan ii. Focus on win-win investments in conservation, employment, income and respect for traditional knowledge iii. Screening checklist for ineligible activities, project sites and regulatory requirements will ensure all activities elected within the landscape would not have any adverse impacts on protected forests, natural habitats, cultural heritage sites. iv. The guidelines for EHS management will also ensure there is no risk of injury due to material handling and undertaking works.	EG 1.1-1.3 for site selection EG 11.1-11.3 for community health and safety management
		Significant long term change in land or water use can reduce the landscapes ability to maintain viable populations of its native species, resulting from natural processes, land or water uses or other human activities	i. The CNRM plan will ensure through screening process that there is no significant land use change, large scale clearing of forest land, sacred groves or dredging of water bodies. ii. Formulation of the C- NRM plan involves rigorous community capacity building, signing of a citizen's charter, where all the citizens will take responsibility for natural resource	EG 1.1-1.3 for site selection Guidelines for preparation of the CNRM plan would also be developed as part of the

			management and incorporation of 'best management practices'. This would be achieved through a thorough mapping of natural resources, their linkages, and problem analysis in their management. iii. There will also be continued and ongoing consultation and community engagement which would go beyond landscape planning which will enable communities to plan NRM related activities in the long term, and not limited to CLLMP duration.	community operations manual and will be adopted by the community
Component 2B: Project Investments – Implementation of CNRM Plans	Communities will implement investments/activities in soil and water conservation, afforestation measures, agroforestry, community forestry schemes and spring shed management within the identified landscapes. These can be landscapes facing degradation issue due to mining activities, shifting cultivation or forest fragmentation/open forests.	The CNRM plan activities presented below are indicative in terms of generic interventions for natural resource management and restoration of degraded landscapes. Impacts have been identified because of the typology of interventions, however these may vary due to the size, location and nature of investments, primarily, due to the face that they would not designed and implemented appropriately. The typology is presented as • Spring Shed and	EGs have been developed for planning, implementation and operationalisation of these activities to ensure activities do not result in any impacts, and are sustainable. EGs have also been developed to underline processes and management measures for Forest Fire Control, Pollution management, chance finds procedure, EHS guidelines and eco- tourism activities	EG 1.1-1.3 Site Selection guidelines EG 2.1- 2.17 S&W conservation works EG 3.1- 3.17 Spring shed management EG 4.1-4.11 Community water management EG 5.1- 5.14 Land

		Water management • Soil and Water Conservation • Afforestation • Land productivity Management • Community Forestry/Agroforestry However, there are cross cutting issues, for which irrespective of the typology of investment, if not managed appropriately could lead to environmental impacts, these are • Forest Fire Control • Management of Pollution sources • Management of Archaeological 'chance finds' • Environment Health and safety management measures • Management of natural, cultural heritage sites, pristine landscapes undertaking eco-tourism activities		Productivity Enhancement EG 6.1- 6.21 Afforestation measures EG 6.22-6.36 Maintenance of Plantations E.G 7.1- 7.8 Forest Fire management EG 8.1- 8.7 Ecotourism management EG 9.1 – 9.7 Chance Find procedure EG 10.1-10.7 Pollution management E.G 11.1-11.3 Environment Health and Safety management

Spring Shed and Community Water management - **Contour Trenches** - **Afforestation/reforestation of the upper catchment** - **Dug out pond** - **Check dams and DLT** - **Water harvesting structures for ground water recharge**	i. Increased annual water availability, especially in the dry season is a positive impact as a significant portion of rural Meghalaya is dependent on spring water for household needs and irrigation ii. Spring water resources will be improvement in terms of the quality (less surface runoff), protected, maintained, and utilized sustainably, thereby also enhancing the community's resilience to the impacts of climate change iii. Community water sources will be managed more efficiently with cooperative water budgeting iv. Water sources will be protected to maintain their pristine quality from contamination and domestic wastewater discharges	i. The rejuvenation of springs and increase in water availability should not adversely impact the natural hydraulic and geological regime in the area with increase water security could create additional wells for drinking water, diversion channels for increasing area under irrigation ii. Lack of systematic data base on springs, fragile eco systems, difficult terrain, and poor connectivity represent a higher level of investigations that is needed when designing spring shed catchment treatment works iii. Risk of contamination of the water if the spring area is not adequately protected from wastewater flows from domestic use. iv. Disputes over water sharing (domestic demand vs irrigation demand) may arise. v. Poorly designed spring shed catchment scheme may lead	i. The CNRM plan should support a detailed inventory and mapping of village-wise springs and spring fed streams, so that a comprehensive treatment of the catchment can be conducted. This will also provide opportunity for the communities situated on the higher ridges of the catchment of the springs towards controlling deforestation and mining activities which inevitably affect the quality and peak flows. ii. Efficient practices of land use (forest and non-forest land), and related water use, should be an integral part of the C-NRM plan,to maintain normal flow of springs, streams so as to not affect the vitality of ecosystems that depend on these flows downstream, including sediment transport and circulation. iii. Springs should be protected to prevent any household wastewater, sewage or solid waste dumping from contaminating the water quality. iv. In cases where the spring rejuvenation and catchment conservation work would be linked to potable water supply through convergence with drinking water schemes; a water quality control	E.G 3.1- 3.17 for spring shed management E.G 2.1-2.16 Soil and water conservation works E.G 4.1- 4.7 for community water management Linkages between the increase in spring discharge rates and (i) potable water supply schemes,(ii) rainwater harvesting schemes, (iv) small scale irrigation schemes undertaken by

		to slope stability issues and more hazards in downstream, localised water logging, algal growth due to increased nutrient levels in local streams. vi. New breeding grounds for mosquitoes and possible increase in waterborne and water related diseases if the connected village tanks/ponds are not routinely cleaned.	and treatment should be maintained; This should be a low maintenance system which uses local filter materials such as sand to get rid of any un-dissolved impurities and bacteriological contamination. v. Community can seek guidance from the project with regards to PES scheme, or setting up drinking water bottling as an economic activity vi. Development and demonstration of functional pilot for spring rejuvenation using land use management and optimised water allocations at the community level. vii. Document and scale up approaches such as indigenous bamboo based irrigation system to supply drinking water to villages.	different departments /projects should be identified and budgeted during the planning stage.
Soil and Water Conservation - **Stream bank protection measures** - **Gully Plugs (vegetative or earthen),** - **Field Bunds, Stone Outlets** - **Percolation Pits,** - **Well Recharge Pits**	i. Reduction in soil erosion and runoff. ii. Reduction in fertile top soil loss iii. Reduction in stream bank erosion and reduction in channel-bed gradients. iv. Stability of hill slopes	i. Check dams, gully plugs and associated works may bring localized changes in soil structure, eliminate certain soil biota that may impact soil productivity. ii. Native/endemic species may be accidently removed whilst undertaking works iii. Temporary adverse	i. Follow Community operational manual for construction methodology for soil and water conservation works. ii. The design and operation of community tanks, small check dams need to be done in such a way as to not interfere negatively with the host of water uses by local people downstream.	For S &W conservation EG 2.1- 2.17 EG 11.1-11.3 community health and Safety EG 9.1-9.7

- **Sunken Ponds, other water small storage structures,** - **Drainage line treatment** - **Vegetation cover on treated and reclaimed land such as grasses and trees on S&WC measures** - **Adoption of silvi-pature model** - **Fuel wood and energy plantations** - **shelter belts and wind breaks etc.**		impacts during implementation may also be caused due to improper construction methods or other practices leading to long-term slope instability, changes in flow, or deposition of soil, silt in water bodies. iv. Failures of structures such as check dams. v. Techniques of implementation land levelling, contour bunding, bench terracing may cause soil redistribution and slope morphology changes, like, causing rerouting and concentration of runoff and drainage water. vi. On more than 20 percent degree slopes, terraces, if they are not well designed, maintained or adapted to the conditions of climate, soil, and slope more rainfall infiltrate, and, under intense and prolonged rainfall soil	iii. Native endemic plans should not be removed as far as possible, cutting existing natural vegetation such as large trees / fruit trees and those that have landscape value should be preserved whenever possible, if they do not offer security risks while carrying out soil and water conservation works. iv. Implement buffer strips of undisturbed vegetation along streams to slow flows, allow suspended sediments to settle out, and ultimately reduce siltation of streams. v. To avoid any sediment-laden runoff that could adversely impact watercourses, it would be important to install sediment control structures where needed, to slow or redirect runoff and trap sediment until vegetation is established. vi. All measures should be taken to allow the normal flow of the streams to be involved in the project so as not to affect thevitality of ecosystems that depend on these flows downstream including sediment transport and circulation. vii. To avoid erosion around the small	chance find procedures

		moisture conditions triggering landslides and collapse of the same terraces.	check dams, the community should plant grasses and shrubs around the structure.	
Afforestation - **Tree plantation** - **Silvipasture Development** - **Homestead plantations** - **Vegetation cover on treated and reclaimed land such as grasses and trees on S&WC measures**	i. Afforestation has a key role to play in improved natural resource and environmental management. The most significant environmental role of afforestation is its potential erosion control, protection of surface water quality, biodiversity enhancement, and even landscape aesthetics. ii. Reforestation or afforestation of open land significantly reduces Sediment discharge may be significantly which may result in less severe flooding iii. Stabilization of hill slopes iv. Restoration of degraded lands v. Increased carbon sequestration vi. Reduced pressure on natural forests as provisions of fuel-wood will help communities meet their energy demands vii. Protection of streams from erosion	i. Improper selection of tree/vegetative species may cause decrease of ecological adaptability and stability of the landscape ii. Changes in the species composition of the area, when exotic fast growing species are used to showcase success resulting in threat to indigenous species. iii. Possibility of firewood/timber extraction from the afforestation plots raised through project interventions and community continuous dependence on use of firewood due to assured supply. iv. Nursery operations involving the use of fertilizers and polythene	i. Community will follow COM on Afforestation measures ii. Local native species of vegetation shall be selected for the planting and restoration of the natural landscape, native and a mixed arrangement of species should be planted to minimise disease attack. iii. No invasive or exotic species would be used for planting in sacred groves. iv. For highly degraded shifting cultivation areas, sylvicultural methods forest-fallow management is a good option to restore soil moisture balance. v. The risks of contamination will be minimized by not using chemical fertilizers and pesticides. Polythene tubes/bags will be collected after use and recycled to limit the need for more tubes/bags. vi. Fuelwood/ energy plantations can be undertaken as afforestation in wastelands, and community arrangements for with equity and	EG 1.1-1.3 Site Selection guidelines EG 6.1- 6.21 Afforestation measures EG 6.22-6.36 Maintenance of Plantations E.G 7.1- 7.8 Forest Fire management EG 9.1 – 9.7 Chance Find procedure EG 10.1-10.7 Pollution management E.G 11.1-11.3 Environment Health and Safety management

		tubes were identified as having a potential risk to pollute. v. Chemical fertilizer use has potential risk for polluting the local water sources, whereas polythene tubes/bags could also be a source of litter if not disposed of carefully. vi. Increased burden of costs and management, if exotic species escape the plantations and invade natural communities, along with the chance/risk of introduction of pests and diseases if monoculture plantation is implemented. vii. Expansion and development of HYC in homestead forests may divert community attention and efforts away from management of natural forests due to higher incentives. viii. Survival of plantations may be impacted by external	access to these resources should be outlined. vii. The project will prepare a list of available exotics allowed and being used in the landscape and will train the community to document changes in diversity of flora and fauna, and eradicate any new exotics that may have proliferated viii. Community will follow EGs for forest fire control, and Maintaince of plantations to ensure best management practices are put in place to ensure survival of plantations. Evergreen species that do not become flammable during summers ix. Promote non-conventional sources of fuel, LPG and electricity, along with fuel-saving devices like pressure-cookers, solar cookers. As forest fires are a high risk, especially in the winter season, if the source fires is for centralized heating purposes, the project will consider on a pilot basis, providing solar heaters.	

		factors such as forest fires, and lack of maintenance by the community.		
Land productivity enhancement • **Demonstration of integrating farming systems (combination of pulses, cereals, fruits vegetables)** • **Development of organic fertilizers, farm yard manure, green leaf, tank silt, vermi- compost units** • **Introduction of integrated nutrient management systems,** • **Treatment of alkali soils de-acidification or detoxification etc.** • **Introduction of health cards for nutritional related ailments,**	i. Restoration and enhancement of soil productivity and fertility. Community can rely on integrated farming practices to ensure food supply, income, and maintain soil fertility. ii. production of vermi-compost and farm yard manure in tandem with the introduction of integrated farming systems will promote a iii. Promote environment-friendly and scientifically-rigorous farming systems that are economically viable iv. Recognition of indigenous and traditional knowledge, skills and practice in the domain of environmentally sustainable agriculture and collect this knowledge to further build upon it with the participation of traditional farming communities v. Communities will create the	i. Farming is largely rain dependent and mono-cropped as after the monsoon season most springs dry up and there is a need for simple irrigation schemes to enhance winter productionof crops- this is a critical constraint when selecting farming systems ii. Following restoration of soil fertility and land productivity communities should not opt for monoculture of high value crops which may lead to deficiencies in soil nutrient status, and chances of crop failure due to frost/fog, insect/pest and diseases. iii. Expanding agriculture and horticulture which is economically viable,	i. A demonstration village could be established in each block exhibiting the efficient collection and storage of rainwater from rooftops for use in the drier seasons; should be displayed to visiting community groups that can take up this activity within their own village areas to supplement water in the dry season. ii. Primary reliance on prevention of pest attacks through biological control methods iii. The Project will implement the use of bio-fertilizers and organic farming techniques, setting up vermi-compost units, use of mulch, for moisture conservation and organic matter build up. iv. Crop rotations that recycle nutrients in crop by-products particularly from legumes, should be supported. v. Creating awareness among the farmers to grow pulses following crop rotations, for increasing production by restoration of soil fertility and biological nitrogen.	EG 1.1-1.3 Site Selection guidelines EG 4.1-4.11 Community water management EG 5.1- 5.14 Land Productivity Enhancement EG 10.1-10.7 Pollution management E.G 11.1-11.3 Environment Health and Safety management

	necessary infrastructure to exchange, buy, sell seeds, fodder, compost and rootstock of various crops with each other in situ and ex situ;	should not result in encroachment on forestlands. iv. Improper land levelling activities may also cause drainage and erosion problems resulting soil particles being transported into surface drainage networks thus, affecting the quality of natural water systems v. The incremental increase in water availability may change land use/agriculture pattern which may ultimately lead to increased use of fertilizers which have long terms impacts on local groundwater sources and stream systems vi. Introduction of new, sustainable forest fallow management practices in shifting cultivation may require closure of the area for an initial period. It may also require a gross	vi. Clearance of plots for cultivation should be identified and approved by the relevant technical authority (Department of Soil and Water Conservation) to reduce the impacts of vegetation removal on terrestrial flora and fauna. vii. Soils are generally acid to strongly acid, liming should become standard practice to avoid aluminium and iron toxicity, and phosphorus deficiencies	

		reduction in the annual area released to agriculture, thereby posing the problem of food security in the short-run.		
Management of Natural and Culturalheritage sites for ecotourism purposes	Fragmented approach to landscape management and eco-tourism development have been missed opportunities- this can be further integrated into the community led landscape management as a potential livelihood option, employment generation and payment for management of these areas.	i. Following the implementation of CNRM plans, bringing about the restoration and conservation of sacred groves, rejuvenation of degraded patches, springs and protection of specific endangered flora, communities may want to promote ecotourism activities, generate local employment, and finance for management of these areas. ii. The possible induced impacts due to un-controlled/un-managed expansion of ecotourism may create undesirable outcomes with induced human pressure on fragile and sensitive areas. iii. Another constraint in the growth of these activities is	i. The Village Committee should organize a formal meeting to decide on the following issues (i) Assess availability of infrastructure for tourism and regulate inflow of tourists as appropriate in fragile natural habitats (ii) Assess impact of increased tourists and accompanying demand on fuel wood from protected area, increased harvesting of selected NTFPs, or wild fruits, mushrooms herbs for consumption and sale (iii) NTFP-based household production for tourists and its impact on unsustainable harvesting ii. Communities can propose a sustainable ecotourism management plan which provides economic incentives for conservation and management of the sacred groves, and natural heritage sites such as the living root bridges- this can be supported under component 1 A of the project- Traditional knowledge and innovation	EG 8.1- 8.7 Ecotourism management E.G 7.1- 7.8 Forest Fire management EG 10.1-10.7 Pollution management E.G 11.1-11.3 Environment Health and Safety management

		the access to sacred groves and natural heritage is complex due to land ownership issues, and hence this needs a formal agreement with the village committee before any activity as such begins to avoid conflict within the community.		
Community Forestry/ Agro-forestry plantations, Sustainable NTFP management	i. Enhanced incomes of the community from sustainable harvesting forest products ii. Reduction in degradation due to past logging or agricultural activity iii. The community may not be interested in maintaining forest cover, preferring to clear it for agriculture or to make money; iv. Enhanced technical skills within the community to manage the existing forest or to plant new ones; v. Increase food security vi. Increase Climate resilience of the landscape vii. Increased participation and	i. Communities continuous dependence on use of firewood, some groups may utilize more of resources than others. ii. Overexploitation of natural resources, forest produce as they are made available through different plantation models. i. Improper selection of tree species may cause decrease of ecological adaptability and stability of forest plantations this can be through introduction of exotic species into local habitation, and /or genetically modified plants, hybrid plants, etc. that may	i. Encourage a sound understanding of forest systems, landscapes, forestry practices, and forest ecosystem services so that well-informed decisions can be made ii. Good native tree species should be selected as the main species for planting. The size of single plantation should be strictly controlled, including introduction of varieties. iii. List available exotics and non-natives and issue notification disallowing their use in plantation/restoration iv. Agro- forestry management plans to be prepared for all sites to also reflect community aspirations v. Regularly monitoring of plantations to eradicate any new exotics that may have proliferated.	EG 6.1- 6.21 Afforestation measures EG 6.22-6.36 Maintenance of Plantations E.G 7.1- 7.8 Forest Fire management EG 9.1 – 9.7 Chance Find procedure EG 10.1-10.7 Pollution management E.G 11.1-11.3 Environment Health and

	benefit sharing from community forests	affect the health of the environment. ii. Incidences of Forest Fire are abundant and may impact the survival rate of plantations. iii. Ensuring that support for agro forestry, land productivity management, and fuel wood plantation provides an alternative to further deforestation, rather than promoting any additional forest clearing iv. Possible impacts on soils such as decomposing leaf litter may reduce soil pH, which can also destroy soil organisms that cannot tolerate abnormal acidity. Altered soil pH may create conditions where alien invasive plants may thrive. v. Poor species selection and poor quality plants, poor management of plantations with a high failure rate, Inadequate training of plantation workers and inadequate management and	vi. Careful selection of tree species to ensure there is no complete replacement of the natural forests with plantations vii. Ensure that community forestry activities and any extraction are sustainable from an environmental standpoint viii. Assess impact of increased population and tourists and accompanying demand on fuel wood NTFPs, or wild fruits, mushrooms herbs for consumption and sale ix. Forest fire prevention and control activities must be an integral part of the CNRM plan which should establish a fire control protocol, define roles and responsibilities, and detail prevention, public education, patrolling, enforcement and fire response programs. x. Exotic species should be used only if their overall performance over the long term is demonstrably greater than that for native species. xi. Exotic species shall be monitored to detect unusual mortality, disease or insect attacks and adverse ecological impacts. xii. Where possible, seed collection should	Safety management

		supervision could lead to impacts on the environment. vi. Conversion of native vegetation to plantation or crops, which can affect catchment water balances vii. Forest fires may destroy young plantations supported under the project are one of the most significant risks to the profitability and sustainability of forest areas. viii. Lack of long-term management objectives or commitment to implementation of CNRM plans ix. Selection of appropriate species for climatic conditions is critical as trees will also not grow well if the temperature conditions are unsuitable. influencing where in the landscape they can be planted.	be performed to preserve the species form of disturbance intervention. This has the potential to secure necessary inputs for environmental compensation by way of replanting xiii. The use of pesticides, herbicides, defoliants or any types of chemicals should be prohibited regardless of their degree of toxicity. xiv. The plantation development will be phased in order to generate biomass which could be harvestable at a given time, this will significantly reduce the volumes of waste that has to be disposed of.	

Chapter 6: The Environmental Management Framework

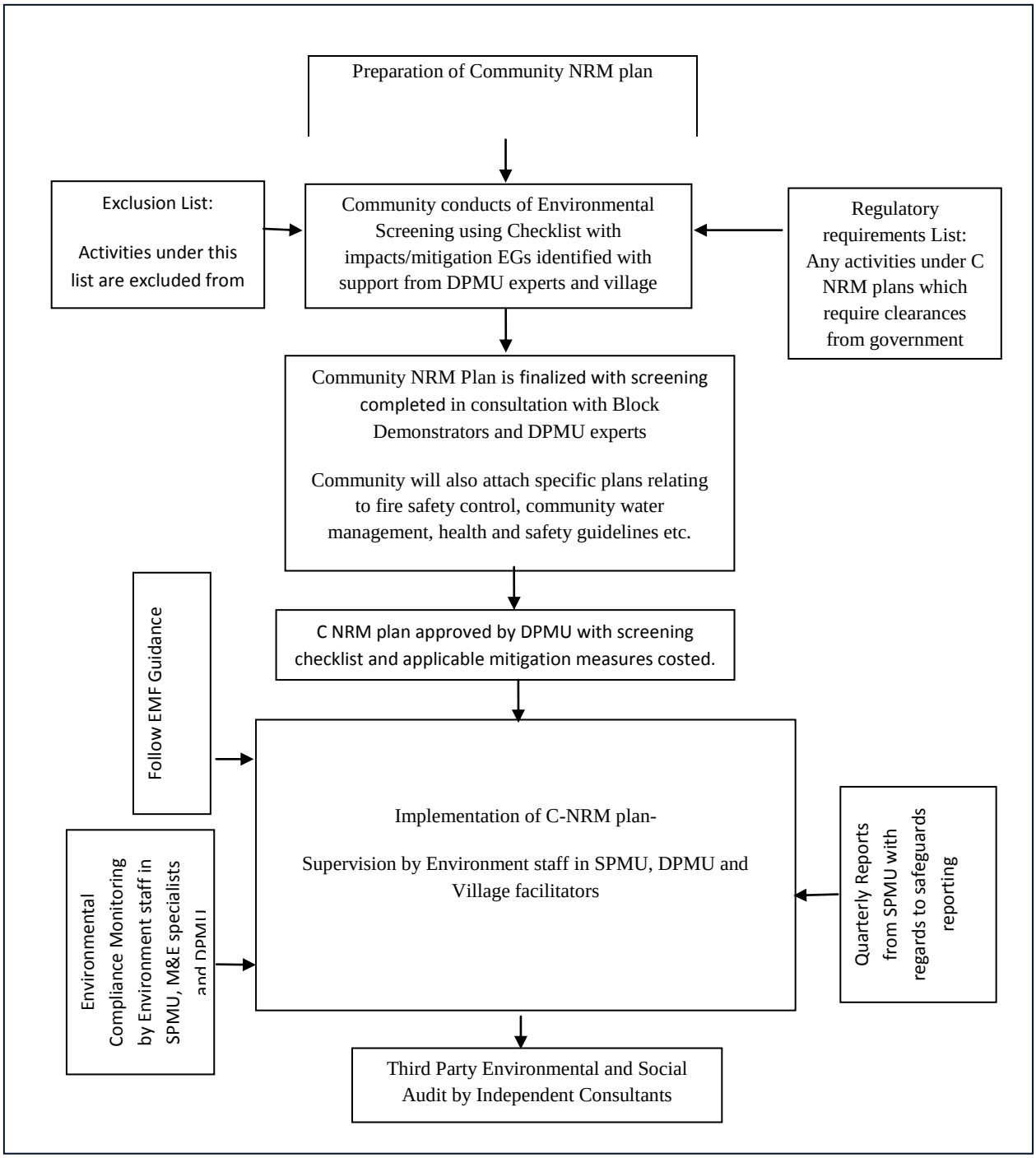
6.1 Rationale and Objectives

This Environmental Management Framework (EMF) has been prepared to screen, mitigate, and monitor the CLLMP Landscape management plans (Community-NRM plans) in order to ensure that the implementation and operation of these plans do not result in adverse environmental impacts or at a minimum reduce impacts to acceptable levels.
The specific features of the EMF are:

- Lay out the processes, procedures and requirements through which C-NRM activities will be implemented to ensure compliance with World Bank (WB) safeguards policies and GoI, GoM legislation;
- Minimize and mitigate any potential negative safeguard risks and impacts of the C-NRM activities
- Ensure that environmentally positive impacts are monitored, good practices are scaled up.
- Define the agency and organization roles and responsibilities for managing and monitoring environmental safeguards related to the Project's activities.
- Review and assess the adequacy of the proposed safeguard mitigation measures and monitoring plans.
- Ensure capacity building for Environment project staff to implement any required safeguard-related measures duringthe preparation and implementation of the CNRM plans.

The community NRM plan which will be framed under component 2A, will be the primary unit for planning and implementation for which safeguards will be applicable. The environment management framework has been developed around assessing the impacts relating to selection of activities in the CNRM plan, and associated monitoring and reporting arrangements for compliance. The EMF provisions will apply to all investments supported under CLLMP project and to linked investments under CNRM plans, where necessary.

A schematic arrangement of the key milestones under EMF are displayed in the figure below:


Preparation of Community NRM plan
Exclusion List:
Activities under this list are excluded from
Community conducts of Environmental Screening using Checklist with impacts/mitigation EGs identified with support from DPMU experts and village
Regulatory requirements List: Any activities under C NRM plans which require clearances from government
Community NRM Plan is finalized with screening completed in consultation with Block Demonstrators and DPMU experts
Community will also attach specific plans relating to fire safety control, community water management, health and safety guidelines etc.
Follow EMF Guidance
C NRM plan approved by DPMU with screening checklist and applicable mitigation measures costed.
Implementation of C-NRM plan-
Supervision by Environment staff in SPMU, DPMU and Village facilitators
Environmental Compliance Monitoring by Environment staff in SPMU, M&E specialists
Quarterly Reports from SPMU with regards to safeguards reporting
Third Party Environmental and Social Audit by Independent Consultants

6.2 Preparation of Village level C-NRM plans

The following steps will be used to identify and bring awareness under the project to develop and implement community NRM Plans :

Steps	Description	Responsibility	Timeline
1. Identification of Targeted Villages	Villages in critically degraded areas will be identified using Updated NESAC criteria.	SPMU	
2. Awareness and Sensitisation.	Information dissemination and sensitisation (to all critical landscape villages) on availability of technical and financial support from CLLMP for planning and implementing Village NRM plans and preparation of EOI. The villages will be sensitised to community led landscape management so as to facilitate screening by block level officials and demonstrators through village level meetings ensuring participation of all village households. The village level meetings will introduce CLLM-Programme, its operational manual along with a draft citizens charter to village communities. Here villages will be guided and encouraged to constitute their village NRM Committee and its executive committee and open their bank account as per the Community Operations Manual. Priority will be given to villages in critical and very critical landscapes for sensitisation and information dissemination under this step.	DPMU in partnership with BPMU. (contracting NGOs also feasible)	Within one month
3. Preparation of Expression of Interest and submission	Using agreed Template, EOI will be prepared and submitted to BPMC	Village NRM Committee (VNRMC) +	EOI deadline 3 weeks after completion

	for checking.	Traditional Institutions (Dorbar, Nokma and Dolois)	of Sensitisation to all identified villages ??
4. Screening and Selection of Targeted Villages.	Village selection (criteria includes: Green charter, Bank account, an NRM committee, land availability.) First set (400) of villages that submit their expression of interest for inclusion under CLLM-Project after having satisfied above criteria will receive financial and technical assistance for project planning and implementation. All those villages who submit their valid expression of interest and which are not covered under CLLM-Project will be covered under CLLM-Programme in a phased manner. This design will not only ensure competition for willing and active participation amongst villages to be covered under the project/programme but will also ensure timely and adequate absorption of project/programme funds.	DPMU screen and recommend to SPMU. SPMU approves and publish list.	2 weeks period
5. Training of village executive committee on Plan Preparation	Training of selected VNRMC on preparation of plan (Modules like: Leadership, PRA, Gender sensitisation, etc..)	SPMU (using specialised resource persons)	
6. Preparation of Village NRM plan	During the Village plan preparation stage, the traditional institutions uses the village service providers and experts from the block level (BPMU) prepare the Village NRM plan. Plan preparation grant to be	VNRMC supported by service providers and BPMU	3 – 4 months after Training.

	provided by SPMU via DPMU.		
7. Submission of VNRM plan	VNRMC will submit village NRM plan endorsed by Traditional Institutions.	VNRMC to DPMU via BPMU	
8. Review and approval of the Village NRM plan	Desk Review and Field Appraisal of NRM plan to ascertain feasibility and relevance of village plan	DPMU to undertake desk and field review and recommend to SPMU for approval	
9. Training of VNRMC on Plan Implementation and Signing of MOU.	VNRMC and designated Service providers and representatives of Traditional Institutions of the approved plans to be trained on village plan implementation (procurement, financial, safeguards, monitoring and reporting etc.). MOU is signed between SPMU/DPMU and VNRMC for the approved plan.	SPMU using relevant resource persons and units. SPMU/DPMU & VNRMC	
10. Project Launch and First Tranche fund Release.	Project Launch in each Village or for sets of Villages is undertaken and first fund release done at Project Launch	DPMU & VNRMC	
11. Implementation Starts	Procurement, Financial Management, Social and Environmental safeguards process undertaken and supervised by Traditional institutions, and district with State level oversight. Funds release in tranches as agreed in MOU.	VNRMC	
12. Monitoring, Evaluation and Reporting.	Participatory M&E at Village, Block, District and State levels	VNRMC, BPMU, DPMU and SPMU	

6.3 EMF Application to Preparation of CNRM plan

i. ***Health and Safety management***: During the preparation of the C NRM plans, communities should be trained and sensitised towards health and safety management practices while undertaking works. The project shall protect the health and safety of community workers by providing thenecessary and

approved protective clothing and by instituting procedures andpractices that protect the workers from dangerous operations. Community should consider the equipment required and include this aspect in the CNRM plan costing. There is also requirement for the Environmental, Health, and Safety Guidelines (known as the "EHS Guidelines") of the World Bank Group to be followed. The EHS Guidelines are technical reference documents with general and industry-specific examples of Good International Industry Practice. It contains the performance levels and measures that are normally acceptable to the World Bank Group and are generally considered to be achievable in new facilities at reasonable costs by existing technology.

ii. ***Associated Sub Plans:*** Following the resource mapping (availability of natural resources in and around villages) and an assessment of vulnerability of natural resources (agriculture, soil, forest, water). For this purpose, following the recommendations in the Environmental Guidelines could prepare plans for (i) Fire Safety control (ii) Community water management (maintenance of structures and water sharing) (iii) sustainable plan for NTFP harvesting, (iv) Plans for linking employment generation under MGNREGS with habitatimprovement activities, development of community vermicompost units etc. These plans may be developed depending on the environmental baseline conditions within the landscape, and demands for further planning and scaling up of activities.

iii. ***Integration of*** **'Payments for Ecosystem Services (PES)**' for conservation and protection activities under taken by the community. This involves the users of these services and the providers/community entering into a voluntary agreement to maintain or enhance an ecosystems ability, through engaging in a certain land-use or management regime and to provide a well-defined service for a specified period, for an agreed price, paid conditionally upon provision of the service in question. Theseinclude (i) provisioning services, such as food and spring water; (ii) regulating services, such asfire control; (iii) cultural services, such as spiritual, recreational, and cultural benefits. Potential PES segments that could be explored through the CLLMP include (i) PES segment for spring shed management; and(ii) PES segment for maintaining landscape beauty and pristine quality.

iv. ***Updating/changing the CNRM plan:*** the landscape plans can may be suitably modified/ adapted after field-testing of interventions with a formal meeting of the village executive committee. This would also require updating of the natural resource maps presently being prepared with the village community if new areas are to be identified for treatment and implementation of project interventions.

v. Application of Screening Criteria as outlined below

6.4Screening Checklists

A screening of all activities will be carried out by the community on the proposed village NRM plan activities for the selected villages. The purpose of the screening process is to determine early in the project the following

(i) To understand if the activities are in conformity with the regulatory requirements and do not trigger any activity on the negative list

(ii) Screening/Identification of environmental risks and impacts and applicable of environmental guidelines.

Where impacts are anticipated then the requisite environmental guidelines should be followed so that environmental impacts can be avoided, or mitigated as required. Where there may be doubt concerning project risks and impacts, the MBMA/DBDU/ Environmental and Focal Point should be consulted. MBMA will also assist in monitoring any residual impacts to ensure sustainability**.**

Project Data Sheet:

	Date of Screening	
	Name of Village/Identified Landscape	
1	Location	District _____ Block_____
2	Landscape area (ha)	
3	List of environmental resources in the project areas (i.e. forests, sacred groves, culturalheritage/sacredsites, water bodies etc.)	
4	Key environmental issues/challenges faced in the landscape area (e.g. degraded forest areas, pollution in water bodies, loss of native species etc.)	
5	Current land use management practices within the landscape	
6	Selected interventions under C-NRM Plan to address environmental issues/challenges	

Part A: Eligibility Screening

The Purpose of the eligibility screening is to avoid environmental impacts that cannot be adequately mitigated by project. The principle of avoidance usually applies for interventions that can create significant loss or damage to nationally important physical cultural resources, critical natural habitats, and critical natural forests. Such interventions would not likely be eligible for financing under the project.

Sl. No	**Activities/Subprojects with any of the attributes listed below will be ineligible for support under the proposed project due to environmental implications.**
1	Any subproject/activities that is not consistent with Acts of GoI and GoM
2	Subproject/activities that could intervene or damage/fragment and/or adversely affect/ impact natural habitats/ protected areas, reserve forests, conservation reserves, including but not limited to, the followingsites: • Siju Wildlife Sanctuary, South Garo Hills • Nongkhyllem Wildlife Sanctuary, Ri-Bhoi District • Baghmara Pitcher Plant Sanctuary, South Garo Hills

	• Balpakram National Park, South Garo Hills • Nokrek Ridge National Park, East Garo Hills • Nokrek Biosphere Reserve, East, West and South Garo Hills • Narpuh Wildlife Sanctuary, East Jaintia Hills
3	Subproject/activities that support forest harvesting on a large/industrial scale
4	Activity that involves construction of check dam >3m height
5	Subprojects/activities that promote or require pesticides that falls in WHO classes IA, IB, or II and/or procurement of large amount of pesticides or toxic agro-chemicals.
6	Subprojects/activities will not support large- scale clearing of land, dredging of water bodies, undercutting of slopes, replacement of natural vegetation that may cause permanent, irreversible impacts.
7	Any activity that has a significant potential of causing forest fires
8	Any project activity that leads to large-scale soil erosion and siltation of water bodies
9	Any activity that promotes or involves incidence of child labour.
10	Sub project/Activities that would adversely affect cultural sites, places of significance importance and protected historical assets (both living and built)
11	Sub project/Activities that involves the felling of the 'prohibited trees' without a permit
12	Sub project/Activities that seeks to impose restrictions or loss of access to using natural resources, including medicinal plants or those of economic value for livelihoods.
13	Any activities involving use of Asbestos Containing Materials (e.g. Pipes for community irrigation schemes).

***If Yes**- reject /modify activities to meet the C-NRM plan to meet the criteria.*

Part B Regulatory ComplianceScreening

The next stage of screening would involve consistency with existing legal, regulatory and policy environment. If the answer to the questions posed in the screening process below is 'Yes', mitigation measures would be required to be put in place.

S. No.	*Regulatory requirements*		*Implications for project*
i	Are any of the activities located within a notified Eco Sensitive Zone (ESZ)[20]? • Nokrek NP ESZ • Narpuh ESZ • Nongkhylleum WLS ESZ If yes, Are any of the activities on the list of activities regulated in ESZ? If yes, Has the required permission been taken?	Yes / No Yes / No Yes / No	1. Follow EGs on Soil and Water Conservation, Water Management, Afforestation activities 2. Follow MOEF Guidelines of Permissible activities in ESZ [21] 3. Given (2) If any project activity is still likely to negatively impact any sensitive habitat or species, a separate site-specific Environment Management Plan would need to be prepared by the project to ensure mitigation measures for containing the

[20] http://envfor.nic.in/content/esz-notifications
[21] http://www.moef.gov.in/sites/default/files/1%20Guidelines%20for%20Eco-Sensitive%20Zones%20around%20Protected%20Areas.pdf

			impacts.
ii	Are any of the activities involving construction located between 100-300 meters from an archaeological site/monument[22]. If yes, has permission been taken from the Archaeological Survey of India?	Yes / No Yes / No	Follow EGs on Chance find procedures
iv	Do any of the activities require license under the Fertilizer Order 1985 (selling, stocking, exhibitingfor sale or distribution of bio-fertilizers and organic fertilizers)[23]? If yes, has the license been taken?	Yes / No Yes / No	Follow General Rules under Fertilizer Order 1985[24]

Part C: Screening/Identification of environmental impacts

The screening sheet would be used as a tool to evaluate the possible environmental risks or impacts of the proposed C-NRM activities. To assess all the environmental impacts of activities, following Format should be used at the planning phase. Prior to making specific investments and implementing C-NRM plan. The environmental baseline parameters/issues(A to S) listed in the table below for which positive and negative environmental impacts need to be identified by communities, and then discussed with the Village facilitatorsand project officers at the district level.

Environmental impacts as analysed through the baseline assessment and impacts due to project activities would almost always be positive; however, in a few cases unintended impacts may accidentally occur, such as introduction of invasive species, or impacts on habitats through increased noise and disturbance, waste or accidental fires. In case negative impacts/risks are anticipated- application of appropriate mitigation measures and adoption of environmental guidelines should be indicated in the table. In case the mitigation measures are not feasible, then the subproject activity would need to be dropped.

Table 26 Possible Environmental Impacts

Codes	Environment Impacts through selection of activities under NRM plan
A	Surface Water (Quality/Quantity)

[22] List of ASI Monuments in Meghalaya http://asi.nic.in/asi_monu_alphalist_meghalaya.asp
[23] Bio fertiliser means the product containing carrier based (solid or liquid) living microorganisms which are agriculturally useful in terms of nitrogen fixation, phosphorus solubilisation or nutrient mobilization, to increase the productivity of the soil and/or crop.[23]http://ncof.dacnet.nic.in/Training_manuals/Training_manuals_in_English/BF_and_OF_in_FCO.pdf

B	Ground Water (Quality/Quantity)
C	Soil Erosion and gully formation
D	Run-off rate
E	Siltation of Water Bodies
F	Soil Fertility
G	Stability of hill Slopes
H	Forest Fire
I	Loss of Biodiversity (flora and fauna)
J	Aquatic Biodiversity
K	Invasion of Exotic Species
L	Places of Religious/Historial Importance/Monuments
M	Air / Noise Pollution
N	Sensitive, Endemic species, Medicinal plants
O	Loss of Natural Vegetation
P	Deforestation
Q	Harvesting of fuel wood
R	Community water sharing/budgeting
S	Pollution from domestic wastewater and solid waste into local streams (Quantity)

6.5 Application of Environmental Mitigation and Guidelines

Put X for any risks/impacts anticipated and √ for positive impacts. For interventions where any risks/impacts are identified, though these are likely only to be minor impacts, these are easily mitigated through the application of EGs, for site selection criteria, EGs for specific interventions, good construction practices and diligent management practices such as procedures for dealing with chance finds, control of pollution, and solid waste and wastewater management. The categories of project activities have been listed under (i) soil and water conservation works, (ii) land productivity and soil fertility enhancement (iii) spring shed management and (iv) afforestation/community forestry related activities. These activities will be applicable for all types of landscapes (abandoned mining areas, active and abandoned shifting cultivation areas, degraded forest land and sacred groves. In addition, if the community identifies activities that are not already listed in the screening checklist, this can be added.

The project and the EMF alsostresses community participation since local/traditional knowledge is important inidentifying, designing and planning the implementation of practical mitigationmeasures. It is especially important where the success depends on communitysupport and action, both in implementing mitigation measures and in monitoring theirsuccess.

Sl. No	Project activities	Codes for possible environmental impacts																					
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	***Insert Applicable Mitigation measures followed***	***Insert applicable mitigation measures and EGs followed.***	***Application of traditional knowledge for conservation /mitigation***
1	**Soil and Water Conservation Measures**			`																			
(i)	Contour Trenches,field bunds, gully plugs																						
(ii)	Small water storage structures Percolation Pits Well Recharge Pits, Sunken Ponds																						
(iii)	Drainage Line Treatment (Loose Boulder Structures, Gabion, check weir and small check dams)																						
(iv)	Afforestation																						
(v)	Assisted natural regeneration of degraded areas																						
(vi)	Slope stabilization																						
(vii)	Water harvesting ponds																						
2	**Land productivity Enhancement**																						
(vii)	Land levelling for cultivation																						
(viii)	De-siltation and rehabilitation of community ponds, tanks																						
(ix)	Treatment of alkali soils de-acidification or detoxification etc.																						
(xi)	Development of organic fertilizers, farm yard manure, green leaf, tank silt, vermi-compost units																						
(xii)	Organic Farming and homestead gardens																						

(xiii)	Adoption of Agri-horti-silvi -pastoral models.																						
3	**Spring Shed Management**																						
(xiii)	Afforestation, regeneration of natural forests in the immediate catchment of springs																						
(xiv)	Protection measures for spring shed																						
(xv)	Revival of existing water bodies dependent on springs																						
(xvi)	Measures to increase groundwater percolation, rainwater harvesting																						
(xvii)	Community management of water sources, common water storage structures																						
(xviii)	Creation of collection tanks																						
4	**Agro forestry**																						
5	**Plantation of fodder trees, grasses, Shrubs, Silvipasture treatments**																						
6	**Community forestry activities/planning**																						
7	**NTFP based activities**																						
8	**Seed production and nursery raising**																						
9	**Restoration of degraded sacred groves**																						
10	**Nurseries for endemic, rare species**																						

Activity	EG no#	Applicable Guidelines
General Guidelines Site Selection		
• Afforestation Activities • Soil and Water Conservation works and • Land levelling and treatment • Spring catchment treatment works	EG 1.1	The site selected for the activity must not be in areas that are: wildlife conflict areas, waste dumpsites, highly polluted/contaminated land or water areas, natural drainage courses, areas prone to floods.
	EG 1.2	Any cultural site including cemeteries and graves on proposed sites will, with the agreement of the community be well demarcated and the area will not be cleared or undergo any soil and water conservation measures or reforestation activities.
	EG 1.3	Avoid disturbing land on or near sites of historical significance and avoid using areas of historical importance for storing material, setting up nursery.
Soil and Water Conservation Works		
• Contour Trenches, • Stone Bunds, • Water Absorption trenches • Gully Plugs (vegetative or earthen), • Field Bunds, Stone Outlets • Percolation Pits, • Well Recharge Pits • Sunken Ponds, other water small storage structures, • Drainage line treatment • Vegetation cover on treated and reclaimed land such as grasses and trees on S&WC measures • Development of pastures • Adoption of silvi-pature models • Afforestation • Development of	EG 2.1	Ensure that material required for construction of bunds, nala bunds, water harvesting structures, etc., is procured on-site or from authorized quarries.
	EG 2.2	Ensure that the recharge structure is located at a safe distance (at least 15 metres) for possible sources of contamination (e.g., manure heaps, leach pit latrines, etc.)
	EG 2.3	Ensure that the design of the recharge structure includes silt trap and filter media to prevent contamination of the well.
	EG 2.4	Ensure that the open dug well is properly secured with a wall/fence and cover to avoid accidental falls.
	E.G 2.5	Special investigations should be conducted whilst undertaking vegetation cover in eco- sensitive catchments unless adequate buffer zones are in place.
	E.G 2.6	The material to be used for check dams will depend upon whatever is available locally and no check damming should be attempted unless suitable stone, brick, timber or brushwood is available at the location.
	E.G 2.7	All check dams constructed should not exceed 3 m height
	E.G 2.8	In view of high rainfall, contour bunding should be inward sloping. There should be guide furrows across slope to divert run off towards the inward side where a guide channel should be provided.
	E.G 2.9	When integrating agroforestry (alley cropping) into cultivated land, a 2 to 4-m spacing between trees is adequate for erosion control depending on species. The age of the perennials is also important as most species become effective sediment traps about two to three years after planting.
	E.G 2.10	Terracing must be constructed when the soil is neither too dry nor too wet. New terraces should be protected at their risers and outlets and should be carefully maintained, especially during the first two years.

fuel wood and energy plantations, shelter belts and wind breaks etc. • Rehabilitation of abandoned Shifting Cultivation areas	E.G 2.11	Terraces on steep slopes become unstable unless buttress is supported by grass sodding, stonewalls if stones are locally available.
	E.G 2.12	Proper arrangements are made for excess water disposal through grass sodded or stone pitched outlets. In case any runoff from higher hill slopes, forestlands or village is damaging the bench terraces, then diversion channels be made at upper portions to safely divert such run off to normal drainage ways.
	E.G 2.13	Vegetative barriers or vegetative hedges or live bunds are effective in reducing soil erosion and conserving moisture and are more economical than bunding onslope of 0.4 to 0.8 deg. In this system, the vegetative hedges act as barriers which slow down the run off velocity resulting in the deposition of eroded sediments and increased rainwater infiltration. It is advisable to establish the vegetative hedges on a small bund.
	E.G 2.14	The large quantities of farm run off collected from various fields should be finally discharged through well sodded grassed water way.
	E.G 2.15	Non-erosive velocities should continuously be maintained by grass sodding in the bed and sides of the streams.
	E.G 2.16	Fibrous rooted shrubs and grasses planted as hedges along the contour of the land slow the runoff, weaken the erosive power of water and cause it to deposit its load of valuable soil behind the hedgerows.
	E.G 2.17	In case of undertaking works in sensitive areas- all work must be done by manual means. All recognized natural habitats, wetlands and protected areas in the immediate vicinity of the activity must not be damaged or exploited.
Water Management		
Spring shed management • Inventory of springs • Afforestation • Regeneration of natural forest in the catchment • Protection of spring water • inventorisation of springs • protection of spring water	EG 3.1	The construction of a spring shed treatment often requires concrete structures and thus materials like cement, sand, gravel is required, as well as use of construction tools. For which general EHS guidelines should be followed.
	E.G 3.2	Construction of ponds and percolation pits, bunding, levelling, trenches, plantations in recharge zones should following Soil and water conservation manual, Forestry manual and Spring shed manual – which are all part of the community operations manual guidelines, and addressing open defection to ensure water quality should follow Swatch Bharat Mission guidelines.
	E.G 3.3	More detailed planning of plantation/afforestation activities would be required in catchments with good/pristine water quality status.
	E.G 3.4	In cases where a village already has one or more known water points connected to a spring, this may be linked to spring rejuvenation work, as many villages already have such systems but they may require extension or expansion.

from contamination • enhancement of water efficiency through revival of existing water bodies linked to springs • establishment of cadre of trained para-hydrogeologists	E.G 3.5	Ensure that any piped system connected to the spring has strainers/screens in place to block debris whilst implementing spring shed treatment works.
	E.G 3.6	Check that there are no latrines within 30 metres, particularly upstream of the spring.
	E.G 3.7	Make sure that, if the spring is to be connected to a piped water system, it is on higher ground than the area to be supplied so the water will flow with gravity.
	E.G 3.8	Only if needed, community water management scheme should utilize energy efficient pumps (e.g., BEE 5 star rated).
	E.G 3.9	No open defecation should be conducted within the protected area of the spring shed, wastewater from toilets as well as kitchens etc. pollution from livestock should not directly discharge in to any water body/spring. Sanitation schemes/Toilets could be financed through convergence with a combination of government programmes, such as Swatch Bharat Mission)
	E.G 3.10	Training local village men and women in basic hydrogeology and spring mapping and inventory to support identification of the spring shed area and recharge techniques, so that it can the area treatment may be scaled up to all springs within the catchment.
	E.G 3.11	Avoid use of AC (asbestos-cement) pipes for any community water management/irrigation lines
	E.G 3.12	If a collection tank is needed, ensure it is built on stable land, not land which is subject to erosion or flooding and that the flow from the protected spring itself will not cause erosion or damage
	E.G 3.13	The spring shed management plan should incorporate checking the quality of water after spring shed treatment works have been completed and ensure community which is dependent on the spring has the required skills and has taken the measures required to monitor and maintain the spring in good condition.
	E.G 3.14	In order to maintain safe drinking water quality, the permanent protection/fencing of the catchment and the direct spring surroundings is essential. The protection measures must be enforced and fully respected and understood by the community to guarantee long-term sustainability. Ensure that liquid or solid waste is not disposed of in the close vicinity of the springs.
	E.G 3.15	Monitoring spring revival is essential, including includes continuous spring discharge measurements for which revival plans have been implemented.
	E.G 3.16	Construct separate usage points (washing, bathing, irrigation) away from the spring and transport the water by pipelines from source to the usage point. Ensure that waste-water from the usage points are not put back directly into the stream without treatment.
	E.G 3.17	Protect the mouth of each spring and disallow activities like bathing and washing at the source.
Community management of water sources	E.G 4.1	Deposition of any excavated soil and silt through catchment treatment works should not be dumped into existing water bodies/ springs

	E.G 4.2	Community should adopt water conservation practices (e.g., use of efficient irrigation methods such as drip and sprinkler irrigation, etc.)
	E.G 4.3	Avoid wastage and over-consumption of water (e.g., avoid crops that are water intensive, avoid over-extraction of groundwater).
	E.G 4.4	Adopt energy efficient equipment such as 5 star rated pumps, and energy alternatives where feasible (e.g., solar lights, solar water pumps, etc.)
	E.G 4.5	Project should support training to community to repair / maintain the water pipelines and ponds to prevent any wastage of water in case of breakage/ damage due to natural calamity.
	E.G 4.6	All solid waste streams which could potentially impact the spring shed area should be separated, reused or recycled when possible without burning of wastes or vegetation on site.
	E.G 4.7	Activities such as community recycling centres should be adopted to minimise litter from being disposed near water bodies. All green wastes should be mulched.
	E.G 4.8	No diversion of water, creation of artificial sources within the spring shed area unless part of the NRM plan, this may result in less water being available to downstream communities.
	E.G 4.9	While desilting community water storage structures ensure safe disposal of desilted material (e.g., use on farm land) and avoid leaving desilted material close to the water storage structure.
	E.G 4.10	Community, through Gram Sabha to prepare rules and regulations as part of the Village NRM plan over sharing and rational use of water for households, and if needed to support recreational activities/eco-tourism.
	E.G 4.11	While refurbishing existing community water tank, ensure provision of protective fencing around the structure to prevent accidental falls.
Land Productivity andSoil Health Improvement		
• Land reclamation measures such as land levelling, de-siltation of village ponds, bunding etc. • Demonstration of integrating farming systems • Development of organic fertilizers, farm	E.G 5.1	Residues from the previous crop, grass, shrubs, farmyard manure, compost, by products of agro-based products can be used for mulching which helps in reducing the splash effect of the rain, decreasing the velocity of runoff, and hence reducing the amount of soil loss.
	E.G 5.2	Ensure that the soil amendments used meet the respective BIS standards (non-conformity to standards may lead to contamination): • IS-10170-1982 for By-product Gypsum • IS-6046-1982 for Gypsum for agricultural use • IS 14403: 1996 for Agriculture Grade Iron Pyrites
	E.G 5.3	Improved fallows of short periods with selected leguminous trees, shrubs and herbaceous cover crops, are important for soil conservation especially in farming systems without fertilizer input compared to longer fallows associated with shifting cultivation

yard manure, green leaf, tank silt, vermi-compost units • Replacement of chemical fertilizers and introduction of integrated nutrient management systems, • Treatment of alkali soils de-acidification or detoxification etc. • Introduction of health cards for nutritional related ailments • Optimisation of Shifting Cultivation	E.G 5.4	On very steep slopes erosion occurs more easily and any mulching and seeding laid down may be washed away before the new grass or vegetation are properly established. In these situations, a special matting material to provide a cover for the exposed soil is recommended.The matting allows grass to grow through while preventing the soil from moving as the runoff travels across the land surface.
	EG 5.5	Community should document traditional knowledge on organic farming practices, and promote use of indigenous bio-pesticides
	E.G 5.6	Ensure that there is no over-harvesting of local wild plant species for preparation of organic inputs to the soil.
	E.G 5.7	Demonstration of onsite production and adoption of vermi-compost should avoid alien species of earthworms (*E. foetida, E. euginiae*). Use native species of earthworms and adopt prescribed management practices to avoid infestation of flies and rodents within the compost preparation units.
	E.G 5.8	Use of soil test based nutrient application and proper method of stage of fertilizer application, including integrated nutrient management using farm yard manure.
	E.G 5.9	For acidification of high pH soils, organic matter will help to acidify the soil as microbes decompose the material, releasing CO_2which then forms carbonic acid. Organic acids are also released during humus decomposition.
	E.G 5.10	For acidic soils, applications of agricultural lime counter the acidification caused by cropping systems. Ultimately, the adoption of less acidifying farming practices should be ensured.
	E.G 5.11	Ensure safe disposal of desilted material from water bodies for use on farm land
	E.G 5.12	Ensure that the desilting activity in water bodies does not damage side slopes of the ponds or leave deep pits.
	E.G 5.13	Avoid leaving desilted material close to the water storage structure/pond
	E.G 5.14	No procurement of WHO banned Class I & Class II A and II B pesticides.
Afforestation/ Community Forestry Activities		
• Afforestation activities • Agro Forestry • Community Forestry • Fodder plantation • NTFP harvesting • Optimisation of Shifting Cultivation	E.G 6.1	Proper afforestation density in accordance with local conditions is vital for maintaining the stability of the forest ecosystem. The smaller the tree crown is, the bigger the afforestation density should be; conversely, the afforestation density should be smaller.
	E.G 6.2	Shrubs can be used for bio– fencing around plantations- they also have multiple benefits of being resistant to high wind velocity.
	E.G 6.3	In preparation of village NRM plan, the area selected for plantation in the plan/map will be furnished with a complete list of desired species selected for plantations.
	E.G 6.4	Community should maintain appropriate journals should be developed and maintained. These should detail the treatments undertaken, species planted and the survival rate.

	E.G 6.5	No species shall be planted on a large-scale until local trials and/or experience have shown that they are ecologically well-adapted to the site, are not invasive, and do not have significant negative ecological impacts.
	E.G 6.6	Restoration of degraded lands should preferably be done through diverse set of local indigenous species and for better maintenance of forest ecosystem stability and prevent and control the incident of pests/diseases
	E.G 6.7	Prepare a list of available exotics and non-natives and issue notification to the community for disallowing/allowing their use in plantation/restoration Community will not deliberately introduce any alien species with a high risk of invasive behaviour or any known invasive species, and will exercise diligence to prevent accidental or unintended introductions
	E.G 6.8	Vegetation protection belt should be maintained between the edges of the forest plantation plot and the farmland;
	E.G 6.9	Sensitize community regarding forest fire and its negative impacts on forest and other natural resources. Plantations raised under the project must be protected against fire incidences.
	E.G 6.10	Use certified seeds for raising nursery plantations.
	E.G 6.11	Nurseries should not be located on highly sloped areas, should be mainly flat with good drainage. This can be done by providing gentle slope and channels to drain out excess water from the nursery.
	E.G 6.12	Most of the tree species need shade in the early stage of germination when the seedlings are still tender, and has a great effect in increasing the survival of seedlings.
	E.G 6.13	The species selected should also have multiple benefits of meeting, food, fruit and other requirements of the villagers living in the vicinity, and also suit the needs of birds and wild animals dwelling in the area.
	E.G 6.14	Encourage planting of fodder yielding trees for increased biomass on homesteads, degraded forestlands, community land and private non-arable areas.
	E.G 6.15	Community should consult with subject matter specialists and district level forest officials when selecting area with slope over 35° for afforestation.
	E.G 6.16	Project will support and facilitate participation in hands-on training and/or demonstration of new techniques or practices which facilitate sound, sustainable utilization of NTFPs
	E.G 6.17	Nurseries should be established as near the planting site as possible to avoid time delays in transporting plants from nursery to plantation sites, ensure proper logistic and transit facilities.

		Dry grass, bamboo mat, palm leaves or wheat straw can be used as shading material but tin sheets should be avoided. Shade should be slanting towards North-South to protect the seedbeds or seedlings from the hot sun.
	E.G 6.18	Proper collection of unused and damaged polythene bags for seedlings will be placed at the nursery site.
	E.G 6.19	The species selected should also have multiple benefits of meeting, food, fruit and other requirements of the villagers living in the vicinity, and also suit the needs of birds and wild animals dwelling in the area.
	E.G 6.20	In some areas, if community identifies sensitive species is present, works should not be carried out during sensitive periods (e.g. breeding season).
	E.G 6.21	The use of chemical pesticides in nurseries will not be permitted.
Maintenance of plantations Agroforestry Community forestry	E.G 6.22	Firewood collection of the forest litters should not be conducted in young plantations- to enhance the water retention capacity and soil fertility of the plantations. The application of inorganic fertilizer will be restricted to the period just after transplanting if needed following IPM and NM plan. This is to ensure that the fertilizer is available to the young transplanted trees.
	E.G 6.23	In order to ensure planting of quality plants, loosen the soil and weeding around the young trees. Efforts should be made to retain the natural vegetation of the young plantations. The vegetation residue after weeding should be kept in-site as mulches.
	E.G 6.24	In case of enrichment planting, there should not be too much of age difference between the old and new plants.
	E.G 6.25	Develop maps to delineate forestlands (wooded and shrubby areas) to ensure that they are left undisturbed and not converted to pastures later on.
	E.G 6.26	Ensure that all agroforestry plots have been planted with other species of herbs and shrubs for a viable under-story (as silvipasture treatments) for increasing the production of intermediate forest products, which will sustain interest and involvement of people and will also result in increased protection of land surface from erosion. In case of enrichment planting, there should not be too much of age difference between the old and new plants.
	E.G 6.27	Ensure local biodiversity is maintained within tree plantations and also along waterways and streams within the plantations. Ensure that all agroforestry plots have been planted with other species of herbs and shrubs for a viable under-story (as silvipasture treatments) for increasing the production of intermediate forest products, which will sustain interest and involvement of people and will also result in increased protection of land surface from erosion.

	E.G 6.28	If during project implementation, the project workers encounter archaeological relics, fossils, human remains, or other items of historical or other cultural value EGs for chance finds will be followed. Ensure biodiversity is maintained within tree plantations and also along waterways and streams within the plantations.
	E.G 6.29	Protection measures for young saplings should be encouraged through windbreaks, shelter belts, weeding and biological control of insects and pests.If during project implementation, the project workers encounter archaeological relics, fossils, human remains, or other items of historical or other cultural value, the community will temporarily suspend any works which might damage these items.
	E.G 6.30	Avoid plantation of too many species at a given site in intimate mixtures, as this reduces their utility and lead to unwanted competition between species for nutrients, moisture and sunlight. Protection measures for young saplings should be encouraged
	E.G 6.31	The plantation development will be phased in order to generate biomass which could be manageable at a given time. Biomass generated should be made available as fire wood, communities should support creation of local biomass energy market. Avoid plantation of too many species at a given site in intimate mixtures, as this reduces their utility and lead to unwanted competition between species for nutrients, moisture and sunlight.
	E.G 6.32	A constant phyto-sanitary observation will be maintained to help prevent the outbreak and spread of any potential disease/pest into the whole plantation. The plantation development will be phased in order to generate biomass which could be manageable at a given time
	E.G 6.33	Monitoring for any signs of nutrient deficiency (e.g. yellowing of conifer needles) and applying the necessary remedy based on laboratory tests of the foliage and/or soil. Community should be trained in fire- fighting techniques
	E.G 6.34	Dead, dying or dry plants should be replaced within 15 days of completion of planting work. The use of fungicides and herbicides will not be encouraged on plantations.
	EG 6.35	In cases where any NTFP is collected, ensure proper storage of through ventilation, humidity control, etc. to prevent wastage of produce and to avoid health risk.
	E.G 6.36	Where Silvipastoral systems are stablished, livestock productivity should be monitored regularly. Training should be imparted for health of animals and nutritional standards and regular checking of diseases should be adopted.
Forest Fire Control	E.G 7.1	Community, through C- NRM plan, must identify causes of forest fire, and prepare a forest fire control plan working out the detailed plans for fire prevention, public education, patrolling, and fire response programs

	E.G 7.2	Fire prevention and control of the plantations under the project must be integrated with the state forest fire management system at all levels. Dead, dying or dry plants should be replaced within 15 days of completion of planting work.
	E.G 7.3	If the selected landscape is under threat from wildfire/jhum induced fires, then the community should be equipped with fire suppression equipment appropriate for the size of operations and that meets internationally recognized technical specifications to ensure that project financed investments do not come under threat.
	E.G 7.4	Fire prevention education and outreach to be included as part of Training activities under component 1B, to reduce the number of preventable fires. The width of these fire lines depends on many factors such as, type of forests, density, terrain, wind speed in the area etc. Such fire lines are usually cleared before the start of the fire season in order to avoid the spread of fires from one area to another.
	E.G 7.5	Project will support communities with new technology to enhance ability to plan for fire suppression, predict fire and develop a Community Fire Protection Plan.
	E.G 7.6	The project should promote non -conventional sources of fuel, like LPG and solar cookers to meet the needs of household fuel to combat burning of forests for fuel wood and charcoal.
	E.G 7.7	If inspection paths need to be constructed, they should be laid along contour line as much as possible, and with a maximum use of existing paths. Large scale excavation should be prohibited to avoid soil erosion. Maintenance and repair of inspection paths needs to be costed in the NRM plan.
	E.G 7.8	Regulate inflow of tourists as appropriate and assess accompanying demand on fuel wood from protected area, increased harvesting of selected NTFPs, or wild fruits, herbs et al for consumption and sale.
Eco tourism and Maintence of natural, cultural heritage sites	E.G 8.1	Undertake orientation and training of local people involved in eco-tourism especially with relation to negative impacts of tourism on the environment and forest resources, including solid waste disposal.
	E.G 8.2	Incorporate green technology in the design, development and renovation of outdoor recreational opportunities, including energy saving, environmentally friendly, and cost efficient alternatives to past infrastructure construction and maintenance practices
	E.G 8.3	Assess location of tourist spots and ensure sites are not in fragile natural habitat areas.
	E.G 8.4	Undertake seasonal analysis of tourist inflow and co relate with breeding cycles of species those are attractive to tourists.
	E.G 8.5	Ensure all tourist areas are clearly marked with signage, have garbage disposal arrangements, and fire management equipment.People should be encouraged to keep to the designated paths.
	E.G 8.6	Provide orientation and briefings to tourists about protected area, make available educational and awareness material in appropriate language.

	E.G 8.7	Stop the construction activities in the area of the chance find and delineate the discovered site or area.
Chance Finds Procedure	E.G 9.1	Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities take over.
	E.G 9.2	Notify the Village *Gramsabha* who in turn will notify responsible local or national authorities in charge of the Cultural Property of Meghalaya
	E.G 9.3	Relevant local or national authorities would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures. This would require a preliminary evaluation of the findings to be performed. The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values
	E.G 9.4	Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archeological importance) conservation, preservation, restoration and salvage.
	E.G 9.5	If the cultural sites and/or relics are of high value and site preservation is recommended by the professionals and required by the cultural relics authority, the community will need to make necessary design changes to accommodate the request and preserve the site.
	E.G 9.6	Decisions concerning the management of the finding shall be communicated in writing by relevant authorities.
	E.G 9.7	Construction works could resume only after permission is granted from the responsible local authorities concerning safeguard of the heritage.
Pollution Management	E.G 10.1	Ensure that all generator sets (if used) (diesel, petrol, kerosene, LPG, CNG) meet the 'CPCB noise and emission control standards for Generator Sets'.
	E.G 10.2	Ensure that all vehicles, machinery used in the project have a valid Pollution Under Control certification.
	E.G 10.3	Ensure that all waste water meets the 'CPCB General Standards' prior to disposal.
	E.G 10.4	Avoid release of waste water into water bodies, streams, without any treatment.
	E.G 10.5	Dispose non-biodegradable wastes at locations specified by the government (e.g. proper disposal material containers).
	E.G 10.6	Avoid burning of wastes (crop residues, leaf litter, plastic wastes, etc.), as far as possible, compost organic wastes.
	E.G. 10.7	In cases where community has milk cooling / processing unit- disposal of wastewater from the premises should be done into a soak pit located at least 15 metres away from any drinking water source.
Community Health and Safety	E.G 11.1	Adopt prescribed safety practices, including use of personal protection equipment (PPE), for handling, storage, use and disposal of pesticides (refer to Pest Management Guidelines).

	E.G 11.2	Adopt prescribed safety practices, including use of personal protection equipment (PPE), for handling any machinery.
		Ensure that all pits, holes, water storage structures, etc., must be adequately secured to prevent accidental falls.
		General EHS Guidelines for Community while undertaking workshttp://www.ifc.org/wps/wcm/connect/554e8d80488658e4b76af76a6515bb18/Final%2B-%2BGeneral%2BEHS%2BGuidelines.pdf?MOD=AJPERES
	E.G 11.3	The project will not support any activities involving pesticides that are in Classes Ia, Ib and II of the WHO Recommended Classification of Pesticides by Hazard .

Chapter 7: Institutional and Implementation Arrangements

7.1 Institutional Overview

The CLLMP will be implemented by a Meghalaya Basin Management Agency (MBMA) – A section 8 company (erstwhile Section 25 company) which has the primary responsibility of implementing Externally Aided Projects under IBDLP. The Board of Directors of MBMA under the chairmanship of the Chief Secretary, GoM, with the support of a Deputy CEO and Principal Secretary Finance (member) will have an advisory and supervisory role under the Project. The Deputy Commissioner at the district level and traditional institutions at the village level will be responsible for guiding and overseeing the project execution.

The project management structure consists of four levels.

- **SPMU:** will comprise of (i) One State Project Director; (ii)Two Deputy Project Directors for East Region [Garo area] and West Region [Khasi and Jaintia area]; (iii) Five Additional Project Directors for Soil, Water, Forest, Community and Rural Development and Administration. (iv) Managers for Environment, Social Safeguards, Monitoring, Administration, Training, Monitoring and Evaluation and Knowledge Management will be hired. It was agreed that the SPMU staff will be in place on a full-time basis, dedicated to the project.
- **DPMU:** The project will support operationalization and staffing in 7 DPMUs in the state. At the district level the project unit will be headed by the Deputy Commissioner and managed by two District Project Managers, comprising of DPM (operations) who will provide technical and safeguards oversight and DPM (administration) responsible for planning, M&E, procurement, finance and capacity building. The core technical team comprising of managers from the Departments of Soil & Water, Forests and C&RD.
- **BPMU:** At the block level, the Block Development Officer will be in-charge of implementation of the project with the help of officers from the Department of Soil and Water Conservation, Water Resource Department, Forest Department, and Community and Rural Development Department (C&RD) who provide technical support, trainings and demonstrations at the village level.
- **VPMU:** At the village level, the Village Natural Resource Management Committee (VNRMC) comprising of all adult male and female members of the village will elect the Village Executive Committee with a total membership of 9 wherein 50% are women. The VNRMC would be established with functional bank accounts in order for the village to submit an EOI to participate in CNRM plan preparation under component 2 A.

  Village Facilitators*:* during the sensitization phase, a village would nominate up to 8 youth to undertake trainings in the core areas of forest, soil and water, environment, social, community and rural development management to be eligible as a village facilitator/ green volunteer under the CLLM project. During CNRM plan preparation and implementation, the community would budget for the services of these facilitators, according to the type of supported required. The village facilitators will be provided the skills and training under the project to sustain themselves as service providers in the long term.

- ***Line Department officials***[25] for technical support, and to implement activities for reclamation and rehabilitation of mine spoiled areas.

The Project will be executed by the MBMA in collaboration with other partners particularly, SIRD (for training and capacity building), Department of Soil and Water Conservation, Water Resource Department, Forest Department, specifically with respect to safeguards management and CNRM plan preparation.

This chapter presents the institutional and administrative arrangement at different level, environmental monitoring and reporting arrangement, capacity building and training plan, mapping EMF implementation and EMF budget for the project implementation.

7.2 Institutional Arrangements within the Project and Key Environment staff

The MBMA has established a state project management unit (SPMU) and will use existing GoM structures at the District and Block levels and the traditional tribal institutions (Dorbars, Nokma, Doloi) at the village level for implementing the project.

7.2.1 State Level

The State Project Management Unit is the primary unit for planning and implementing the CLLM-Project. The main responsibility for implementing the EMF Rests with the SPMU, which will be staffed with a full time Manager for Environment, supported by a project Associate for implementation of the safeguards under this project. They will be supported by additional environmental and social experts (as needed) based in the district level. The environment manager will oversee the implementation of all actions related to safeguards at the field level to prepare assessment reports and oversee the implementation of mitigation actions for adverse environmental impacts.

The SPMU will be responsible for the following

- Undertake overall planning and implementation of the Programme
- Review and finalize fund flow mechanism and ensure budgetary allocation in the State Budget for the Programme in consultation with the Programme Finance Sub-Committee
- Coordinate with other units responsible for implementing similar projects (e.g. Megha-LAMP).
- Provide continuous feedback to Operational and Finance Sub-Committees and the State Level Steering Committee.
- Plan and establish SPMU, DPMU, BPMU and appoint staff required for programme execution
- Prepare guidelines and technical manual for Programme activities such as land management, water management, farm forestry, green energy, management of shifting cultivation areas and rehabilitation of mined-out areas, risk management etc.

[25]Line department will implement only component related to reclamation of mined out areas because of technical nature of this intervention. All other components of the project will be implemented and managed by State, District, Block and Village Project Management Units.

- Prepare Community Implementation Manual i.e. guideline for community consultation and preparation of Integrated Village Development Plans (micro-plans) with emphasis on Landscape management in consultation with the traditional institutions.
- Plan and identify resources and resource institutions within and outside MBMA for training and capacity building and prepare training material.
- Conduct workshop for analysis and better understanding of Log-Frame, Programme/ project objectives and expectations, roles and responsibilities of various stakeholders.
- Organize training and capacity building programmes for skill up-gradation
- Prepare and implement plans for development and strengthening of traditional institutions
- Conduct M&E functions such as baseline survey, independent mid-term and end term Project/ Programme evaluation and impact assessment etc.
- Develop and implement web-enabled interactive MIS for concurrent monitoring and supervision
- Plan and establish State Center for Knowledge Management, Innovations and Communication

7.2.2 District Level (Facilitation of the Village Management Unit under CLLM-Project)

District support units will function under the direct supervision of respective Deputy Commissioner (for convergence, administrative support and accompanying measures). In order to ensure focused project planning and implementation the DC office will have exclusive core staff for CLLMP operations in the field of soil management, water management, forest management, community and rural development Dedicated stafffor environmental safeguards management will be appointed. within the seven DPMUs supported under the project.

Various other functions conducted by the District facilitation units will be:

Functions of District level units

- DPMU will constitute a committee to review, appraise and approve village CNRM plans. The village plans, if not found to be in order, can be returned by DPMU to VPMU for improvement and amendments.
  The DPMU will prepare the District Plans which will be aggregation of a) All village CNRM plans b) Block sub-plans c) and District sub-plan.
- Ensure that project lessons and experiences are mainstreamed in the overall planning and development of the district.
- Plan and conduct monitoring and evaluation of the plans in the division and take corrective measure to achieve objectives.
- Coordinate with MBMAand centres of ecellence including for Knowledge Management and Communication and implement their action plans

7.2.3 Block Level for Facilitation of the Village Management Unit under CLLM-Project

Each concerned Block Development Officer will ensure deployment of all resource of the Government needed for project planning and implementation. Responsibility of the block offices will be as under:

- BPMU will conduct a quality assessment of the Village CNRM Plan.
- BPMU will prepare a consolidated statement of all village CNRM plans received by it
- BPMU can suggest/ make qualitative improvements in the plans in consultation with the VPMU Executive Committee before sending it to DPMU
- BPMU will also prepare their block –sub plans

- Consolidated block plan will be sent by BPMU to respective DPMU along with village CNRM plans and recommendations thereon.
-
- A cluster facilitation team of technical demonstrators will be constituted to support village project management units. These facilitators will be from Department of Soil and Water Conservation, Water Resource Department, Forest Department and C&RD Department etc.
- Enterprise Resource Persons of EFCs (Enterprise Facilitation Centers) will support the village management unit in planning for development of enterprises in each of the project village.

7.2.4 Village level

Village Project management Unit

- Each Village NRM Committee shall prepare its CNRM Plan with the assistance of the cluster facilitation staff / technical staff at the block level and also by using expertise of the traditional knowledge holder.
- Village CNRM Plans will have annual plans and 6 monthly milestones for release of funds.
- Village CNRM plans will be endorsed by the head of traditional institutions at the village level (headman) and sent to BPMU for onward submission to DPMU

Village Facilitators

The village level project management unit will be supported by the project through village facilitators. Each village will have 8 village facilitators working in the field of forest, water, soil, accounts, knowledge management, GIS, environmental safeguards and social safeguards village facilitators will have following functions:

- To work as project frontline functionaries in social mobilization and awareness generation on project objectives, principles of participation, fund flow, social and environmental safeguards etc.
- To educate and sensitize the peoples' groups on various socio-economic aspects of the project.
- To assist in amicable resolution of disputes/conflicts, if any, through involvement of traditional heads and institutional framework.
- To assist and facilitate the preparation and approval of the CNRM plans of the village and their regular review.
- To assist DPMU/BPMU of CLLMP-Programme in identification of type of support required by village and technologies for achieving the objectives of the Project.
- To assist in preparation of various records, information, reports, studies, case studies, success stories etc.
- To facilitate social audit and regular self-monitoring and evaluation of the Project activities at village level.

7.2.5 Environment Safeguards Staffing Capacity

SPMU (state level)	*DPMU (district level)*	*Block units(Block level)*	*VPMU (village level)*
1. **Full time Environmental Manager** 2. **Full time Environment**	Assistant Manager – Environment	There is no dedicated Environment Specialist, however, Block units can allocate technical experts which will assist the	Village Facilitator-Environment

Project Associate		village executing agencies in CNRM plan preparation, supervision and implementation	

Table 27 Roles and responsibilities by implementation agency

Agency	Roles and Responsibilities of Environment Officers
State Level	▪ The Environmental manager will be supported with a project associate who will report to PD, admin. ▪ To prepare Annual Plans for EMF activities ▪ Review and Approve C-NRM plans and Safeguards screening forms ▪ Provide technical inputs on environmental aspects being undertaken in the project ▪ The Project Associate shall assist Environmental Manager in checking EoI, Plan screening and monitoring of C-NRM plan activities. ▪ Shall conduct Internal environmental audit. ▪ Shall be responsible for compiling the semi-annual and annual audit report for the World Bank. ▪ Organise and Provide orientation, training to concerned personnel of District level on EMF provisions, undertake field visits and participate in consultations periodically; ▪ Organize exposure visits as necessary; ▪ Operationalize EMF in Management Information System (MIS) up to grass root level for internal monitoring of environmental safeguards indicator
District Level	▪ The environment asst. manager will report to Environment Manager, SPMU and Deputy Project Director (operations) and will be responsible for implementation of EMF provisions. ▪ Shall assist in screening of subprojects and assessing C NRM plans, and mitigation measures identified. ▪ Shall conduct regular environmental monitoring of the interventions to Field level. ▪ Provide necessary support to M&E agency in collection of Baseline data ▪ Participate, interact, consult with all level district level stakeholders on preparation and implementation of C-NRM plan ▪ Support DPMU Unit in ensuring adherence to selection of C-NRM plan and their approval ▪ provide support to District Level Coordination Unit in internal monitoring of project activities and specifically on EMF and support activities of M&E agency throughout project cycle
Village Level Facilitator	▪ Shall provide guidance on environment aspects of interventions that are beingundertaken in the project. ▪ To work as project frontline functionaries in social mobilization and awareness generation on project objectives, principles of participation, fund flow, social and environmental safeguards etc. ▪ To assist and facilitate the preparation and approval of the CommunityNRM PLANs of the village and their regular review. ▪ To assist DPMU/PBPMU in identification of type of support required by VEC and technologies for achieving the objectives of the Project. ▪ Carry out Supervision and monitoring of the implementation of CommunityNRM PLANs at Field level ▪ Shall be responsible for training on EMF aspects to all field level project

Agency	Roles and Responsibilities of Environment Officers
	functionaries, beneficiaries, training module and preparing dissemination material

Chapter 8 Environment Monitoring, Evaluation and Reporting arrangements

8.1 Overview of M&E system at the Project Level

A dedicated core team would be set up at the SPMU to monitor and report the progress of the project. An M&E officer and a project level MIS system will also be constituted.

The environment manager based in the SPMU will prepare monitoring plans to assist in determining the progress of implementation of the safeguard provisions, and overall outcome of implementing the environmental guidelines/good practices. The project is monitoring a variety of indicators linked to area brought under improved management practices, adoption of soil and water conservation and land productivity management practices, and improvement in natural resource management, however, specifically for EMF, the following paraments should be monitored, as these pertain to the adoption of the environmental guidelines and mitigation measures.This will be linked to the overall project monitoring and evaluation systems.

Institutional

(i) Environmental Managers at SPMU, DPMUs (yearly)
(ii) Number of trainings organized by type of training (Quarterly)

Application of EMF

(i) Number of communities/C-NRM plans framing guidelines for community water sharing and management
(ii) Reduction (%) in firewood collection
(iii) Area (ha) of degraded sacred groves restored
(iv) Water quality improvement in Spring after spring shed management measures have been undertaken
(v) Number of communities/C-NRM plans preparing a forest fire control plan
(vi) Number of communities/C-NRM plans maintaining plantation journals- species planted and the survival rate.
(vii) Survival of plantations (%) – and highlight causes of low survival rates
(viii) Increase is discharge rate of the treated springs over the baseline
(ix) Any instances where chance finds have been identified, and the procedure followed.
(x) Amount of organic manure produced (tons) at community level – following demonstrations
(xi) No. of Ha of land brought under organic inputs of fertilizer and manure
(xii) No. of traditional knowledge conservation practices identified and documented for further scaling up

(xiii) Changes in sighting and abundance of rare, vulnerable and endangered species
(xiv) Number of communities taking up conservation activities – such as setting up ofnurseries for rare, endemic/ medicinal plants; Plan for sustainable extraction of NTFPs
(xv) Any induced impacts/activities arising from undertaking the project financed investments such as demand for (a) rural/feeder roads, (b) nature based tourism (c) change in agriculture crops, due to increase availability of water.

In addition, environment staff at the district and state level may undertake inspection field visits to the community sites to check on implementation of the C NRM plans. Having screened the activities in the preparation phase, it would be useful to check the effectiveness/adoption of mitigation measures and EGs, any other issues in implementing the mitigation measures, and if cases where there are residual environmental impacts. This reporting format should cover (i) Environmental Impacts which were identified at screening and (ii) Environmental Impacts observed during the field visit against the predicted impacts and level of undertaking mitigations.

8.2 Supervision and Reportingat the Project Level

CNRM plan Preparation

Community Operations Manual provides detailed guidance on preparation of landscape plans. Communities, with the help of project facilitating teams (subject matter specialists) at block level and village level service providers will prepare plans which will allow communities to (i) optimize synergies between programs and funding streams; (ii) plan holistically rather than be program/ scheme-driven to meet targets; and, (iii) take a leadership role for the management of natural resources under their stewardship.

Plan preparation in a village will be preceded by community mobilization; formation of Village NRM Committee and selection of an executive committee within the village to coordinate and manage the process on behalf of the village; submission of expression of interest by the village for participating in CLLM Project/ Progrmme; training and capacity building of village service providers and members of the executive committee. The process will be further enhanced with communities receiving support in the use of latest geo-spatial tools for planning and monitoring. During development of these plans communities will identify the leading causes of degradation of natural resources in their area and agree on actions to address those and capitalize on new opportunities and on trade-offs.

The Village Service providers/ facilitators will be trained by SIRD, Forest Training Institute, Conservation Training Institute of Soil and Water Conservation Department, MINRM, MIG and Knowledge Services Division of MBDA etc. on various aspects of CNRM plan preparation and implementation.

The village CNRM plan is prepared by the community in consultation with Block Demonstrators and DPMU experts. The environment service provider will ensure that the community has undertaken the natural resource mapping and identification of issues in line with the principles of the EMF, further to this, before the plan is approved by DPMU, the environment manager will verify the screening checklists have been duly completed, and signed off by the VPMU, and any environmental issues and their mittigation are identified at an early stage. The environmental manager can undertake field inspection visits to verify the baseline data presented in the screening forms is accurate and evaluate all the available information /on environmental

aspects. Based on this level of screening, field visits, compiling with regulatory requirements the sub-project is eligible for selection or rejection.

CNRM plan Implementation

Supervision and monitoring of EMF implementation would encompass environmental monitoring during CNRM implementation as described in details below:

a) To analyse and record the positive environmental attributes to undertaking the activities in the CNRM plans
b) to measure the effectiveness of mitigating actions (e.g. if there is a mitigating action to control noise during construction, the monitoring plan should include noise measurements during construction);The monitoring program should clearly indicate the linkages between impacts identified in the EMF report, and mitigation measures and methods to be used, the Table below provides an example for supervision and monitoring plan that can be used.

Table 28A sample monitoring plan

No	**C-NRM Activities**	Positive environmental Implications	Mitigation measures taken	Implementation of applicable EGs	Any issues identified	**Training & capacity-building programs implemented**	**Lessons learnt**	**Remarks**

Environmental safeguards audit

An independent Environment Compliance Monitoring Audit will be conducted by third party inspection agency to review implementation of environmental management framework of CLLMP. The consultant firm/agency can select randomly the plans to be audited, which should include a good geographical distribution, stage of implementation including design, under implementation, and completed stages. The audit will include both a desk audit/review and a field audit

The audit will review C- NRM plan preparation and implementation, specifically (i) screening of activities (ii) application of environmental guidelines, and mitigation measures (iii) the deviations in implementing environmental measures, if any, (iv) positive measures taken at the community level, (v) application of tradition knowledge conservation practices, and where it can be scaled up (vi) suggestions for further improvement of environmental management practices at the community level and (iv) capacity building and training requirements for the project staff.

Semi Annual Progress Monitoring

A semi-annual progress report will be submitted to the Bank as part of the overall project reporting arrangements; this will include a section on the safeguards application in project implementation in accordance with the EMF. This will also include the details pertaining to trainings provided to community and project staff, C NRM plan screening, application of EGs, mitigation measures, stakeholder consultation and monitoring indicators. The table below outlines the work flow of reporting within the key agencies responsible for the implementation of the project. Compliance monitoring comprises on-site inspection of activities to verify that measures identified in the EMP, are being implemented.

Table 29Monitoring and Reporting Arrangements as per the community- NRM plan

Phase	EMF Activity	Objectives	Process	Responsibility	Outcome
Pre-planning	**Adequate dissemination of EMF awareness to Communities** **Capacity building and training programmes** **Screening of selected activities**	To ensure that sub-projects with potentially significant environmental/ social issues are identified at an early stage and avoided.	Evaluate all the available information /on environmental aspects. Based on this level of screening, field visits, compiling with regulatory requirements the sub-project is eligible for selection or rejection. Village facilitators to support communities in preparation of safeguard checklists.	SPMU, DPMU Environment Officers	Plan selected/ rejected Based on screening, ascertain if any mitigation is required. Selection of C-NRM Planactivities to be taken up for planning and design and finalizing procedures to ensure Environmental compliance.
Planning	**Preparation of C-NRM plan, application of EGs**	To ensure that relevant environmental issues have been identified and appropriate mitigation measures have been designed to address them.	C-NRM planswith, environmental guidelines and mitigation measures detailed in the EMF shall be approved by environment manager in SPMU	District level Environment Development Specialist /Block level officials	Costs of EMF mitigation measures and monitoring incorporated into the C-NRM Plan.
Implementation	**Implementation of Environmental Guidelines and mitigation measures.** **Compliance with EMF provisions and monitoring measures**	To ensure that the prescribed environmental mitigation measures are implemented.	Environment: The prescribed environmental mitigation measures as identified through the EMF are adequately implemented, indicators are monitored.	District and Village environment specialists monitor implementation.	Semi-annual safeguards progress report will indicate (i) That EGs have been incorporated into the implementation phase of low impact subprojects (ii) monitoring as per list of indicators
O&M	**Supervision, Monitoring and Evaluation** Environmental supervision and monitoring	To ensure that environmental guidelines are integrated into the sub-projects	Environment: Monitoring of indicators will be conducted as per project monitoring protocol.	environment specialists in SPMU, DPMUs	PMU will submit bi annual reports to The World Bank on Safeguards Implementation.

Chapter 9:Institutional Capacity Building Plan and Budget

9.1 Capacity Building for Project Institutions

Training and development of Project Staff to environmental management is an essential part for effective and timely project implementation. Training and capacity building should be done at all institutional and implementing levels for environmental safeguards management. The training program for various stakeholders will include orientation on project, refresher training, and creating awareness on the EMF of the project and will also include field visitsetc. The capacity of MDMA to carry out their respective design, planning, approval, permitting, monitoring and implementation roles will, to a large extent, determine the success and sustainability of the CLLMP. All the institutions have very limited or no experience in environmental assessment and therefore will require extensive training at all levels to be able to fully participate in the project. The capacity building will include training workshops and production of guidance reports and tools. The training programmes will also be provided during the preparation of the Community NRM plans. The project will be drawing support from the SIRD to implement trainings, which will be led by technical inputs from the environment manager in SPMU. The main trainings are highlighted below:

1. **Orientation Program** will be organized at the project launch, with key decision makers, and officials of all project agenciesand each line departments. The workshop will also be organised at midterm review.
2. **State Level Workshop** Thiswill be organized once a year for consequently three years to acquaint SPMU, DPMU, line department officers at VillageLevel with respect to the EMF (environmental management, monitoring and supervision).This will be done through presentations, workshops and field visits.
3. **Field Level Training** will be held every year for the VECs and village facilitators, and other project functionaries at the field level on all aspects of environmental management in the project. This will be done through focus group discussions, workshops and field visits.

9.2 Institutional Strengthening and Capacity Building of Environmental Officers in the Project

The training and awareness creation will be annual/ bi annual events and the primary targets will be the technical and environment staff at SPMU, DPMU and Village facilitators. The first step in pursuing capacity building will be to identify the capacity needs of the various project functionaries, as depicted in table below. The capacity building will include training workshops and production of guidance reports and tools on the following areas

Table 30*Capacity building and training plan for environment safeguards*

Stakeholders/ target Groups	Content	Training type	Time period
SPMU, DBDU, BBDU Green Volunteers	Orientation training on EMF Staff development program	Lecture and presentations	Before project implementation and yearly.
State level – Environment Specialist, PMU, PIU Line department, NGO, other interest person of the project.	Orientation and sensitization on the environment impact and its mitigation measure; training of trainers Training on EMF data collection, Environmental guidelines, monitoring and reporting, institutional arrangement and implementing agencies EMF	On field demonstration, case studies and best practices Lectures and presentation	Yearly

		Exposure visits	
District level- **PIU, MIG, service provider and other person of interest.** **Deputy Commissioner, DBDU** **Representatives of villages, TIs, ADCs, line departments**	Environment issues and mitigation Training on EMF data collection, Environmental guidelines, monitoring and reporting, institutional arrangement and implementing agencies EMF Awareness, training and monitoring under the project component	Refresher training for each district where project has investment	Yearly -One for each district
Block Level- **BDO, PIUs, service provider** **Representatives of villages, TIs, ADCs, line departments**	Environment issues and mitigation Training on EMF data collection, Environmental guidelines, monitoring and reporting, institutional arrangement and implementing agencies EMF Awareness, training and monitoring under the project component	Refresher training for each district where project has investment	Yearly - One for each district
Village level- **Representatives of villages, community members, TIs, and facilitators**	Environment issues and mitigation Training on EMF data collection, Environmental guidelines, monitoring and reporting, institutional arrangement and implementing agencies EMF Awareness, training and monitoring under the project component Facilitate for village level comprehensive plan Developing a community plan	On field demonstration, case studies and best practices Lectures and presentation Exposure visits Workshop	Yearly

9.3 Budget

Under the Project Implementation Plan (PIP), the cost for EMF implementation comprises of staffing arrangements at SPMU level, District Level and facilitators at the village level. The EMF will also support application of environmental best practices in preparation and implementation of the C-NRM plans, trainings, capacity building workshops, action/innovation research, monitoring, toolsetc. Most of the mitigation actions are already mainstreamed into the project design and do not require activities such as special constructions, though in few cases the project costs as recommended by EMF may include purchase of firefighting equipment, and solar cookers, heaters, to mitigate the incidences of fires. The EMF will also support through technical and financial resources creation of business plans, PES schemes where requested by the community. The cost of implementing some of the provisions of the EMF, over 5 years of the project, is up to 1% of the total project cost, for ensuring implementation of all activities proposed under the EMF.

Annexure 1: List of Participants at State Level Consultation Workshop:

1. Shri RM Mishra,Principal Secretary Planning (Govt. of Meghalaya), CEO – MBDA and Project Director – Megha-LAMP
2. Shri Vijay Kumar Mantri, IAS, Executive Director – MBDA
3. Mr. Foluso Okunmadewa, Social Protection Expert, World Bank
4. Smt. MadhaviPillai, Climate Change Expert, World Bank
5. Shri D. Langstieh, Director, Soil and Water Conservation
6. Shri A.B.S. Swer, OSD – MBDA
7. Shri Augustus S. Suting, OSD, MBDA
8. Shri Lam Shabong, OSD, MBDA
9. Shri N.G.S. Kharmalki, Assistant Soil and Water Conservation Officer, S&WC Deptt
10. Smt. M.A, Khongjliw, Fishery Officer, Fishery Department
11. Mr. Piyush Dogra – World Bank
12. Smt. Patricia Mukhim, Editor Shillong Times
13. Smt. Sandra Albert, Indian Institute of Public Health
14. Shri. Toki Blah, President, ICARE
15. Prof. H. J. Syiemlieh, NEHU
16. Shri. H.H. Morhmen, Community Respondent
17. Mr Tambor Lyngdoh, Red Cross Project
18. Mr Ankan Dey, NECTAR
19. Professor B K Tiwari NEHU
20. Mr K. R. Dkhar, Mariang Multipurpose and Agricultural Project, Kairang, EJH
21. Other community and organizational representatives

Annexure 2: List of Participants at Village level Consultation workshops

List of participants at Nongkhlaw Village, public Consultation.

Attendance Sheet for Community Led Landscape Management Project (CLLMP), Shillong
Conducted by Meghalaya Basin Development Authority (MBDA)

Place: NONGKHLAW VILLAGE

Date: 22 November 2016

Sl.no	Name (Kyrteng)	Occupation / Designation (Kam trei)	Contact (Phone nos)	Signature (Jing soi)
1	Shri. Kitbok war (Secretary)	Teacher	7085152861	
2	Shri [illegible] (Rangbah Dong)	Business	7085333729	
3	Shri. [illegible] Nongrang (Member)	Teacher	9856328207	
4	Shri. S.L. Marbaniang (Member)	Business	9856330822	
5	Shri. D. Lyngdoh (Member)	Govt Servant (H.L)	9856815854.	
6	Shri. W. Syiemlieh	P.A (MLG)	—	

List of participants at Sohkymphor Village, public Consultation.

Attendance Sheet for Community Led Landscape Management Project (CLLMP), Shillong
Conducted by Meghalaya Basin Development Authority (MBDA)

Place: SOH KYMPHOR

Date: 24 Nov 2016

Sl.no	Name (Kyrteng)	Occupation / Designation (Kam trei)	Contact (Phone nos)	Signature (Jing soi)
1	Mr. Herbert Lapasam	Labour Daily Wage	8974923008	
2	Lambha Lyngdoh	— do —	9862393975	
3	Maloric Lapasam	Farmer	9612159780	
4	Shaiwas Dkhar	Farmer	8014535075	
5	Moles Langstang	Business	9612708778	
6	Protasius Suiam	Business	8974300889	
7	Kmen Lapasam	Labour Daily Wages	9612463673	
8	F. Lyngdoh	Farmer	—	
9	Me Lyngdoh	Farmer	—	
10	Gabriel Lapasam	Daily Wages	9874782136	
11	Phah Biang Langstang	— do —	8414084327	
12	BESTERLI LAPASAM	Farmer	8729861457	

List of participants at Sohkymphor Village, public Consultation.

Attendance Sheet for Community Led Landscape Management Project (CLLMP), Shillong
Conducted by Meghalaya Basin Development Authority (MBDA)

Place: Sohkymphor

Date: 24 Nov 2016

Sl.no	Name (Kyrteng)	Occupation / Designation (Kam trei)	Contact (Phone nos)	Signature (Jing soi)
13.	Wiles S. Langstang	School teacher	8974062640	[illegible]

List of participants at Rombagre Village, public Consultation.

COMMUNITY LED LANDSCAPE MANAGEMENT PROJECT
M.B.D.A ATTENDANCE SHEET
DATE: 28/11/16.

SL-NO	NAME	OCCUPATION	SIGNATURE
1	[illegible]	[illegible]	[illegible]
2	Shri Billhon Ch. Marak	farmar	B.marak
3	" [illegible] Ch. Marak	farmers	[illegible]
4	" Gojen [illegible] Sangma	farmers	[illegible]
5	" Satling Ch. Marak	"	[illegible]
6	" Sparking Sangma	"	[illegible]
7	Philsing Ch. Marak	Farmers	[illegible]
8	[illegible] Ch. Marak		[illegible]
9	[illegible] Sangma	M.T.A.	[illegible]
10.	Chingme [illegible]	Asst. Manager Rongram RFC.	[illegible]
11	[illegible] B. Marak	Asst. Manager BDU Tura	[illegible]
12,	Smt. Balme Ch. Marak	Nokma Rombagre	[illegible]
15,	Shri, [illegible] A. Sangma	Secretary of [illegible] Council	[illegible]
16.	Philip - Sangma		[illegible]
17	Gatrang M. Sangma.	[illegible] Farmer	G. M. S.
18	Forthingbirth Ch. Marak	[illegible] BDU	[illegible]
19.	Smt Bindary Ch Marak	Farmers	B.marak
20	" Jengre Ch Marak	"	J.Marak

Annexure 3: Traditional Institutions for forest, land and water management

Land and Resource Management Issues among the Traditional Institutions

The pattern of land ownership plays an important role in land use and agricultural development and planning (Nongkynrih 2014). The land tenure system in Meghalaya follows the traditional system. The system involves both traditional and non-traditional institutions. The traditional institutions function on the basis of local customary laws and traditions and traditions which have not been codified. The non-traditional are codified and enforced by constitutional bodies such as the Autonomous District Councils

Garo Hills

Amongst the Garos, community and clan ownership of land is the practice among although private ownership also exists in some pockets, particularly in areas where terrace cultivation and horticulture are prevalent. Clan land or *a-king* land is owned and controlled by the *Nokma*. It is managed by her husband, also called a *Nokma* (traditional village chief). All inhabitants of a village are entitled to cultivate whatever land they require and may cultivate whatever they chose within the village boundary. Unused land of the a-king is free land which is distributed under the auspices of the *Nokma*.

Table 14:Traditional Classification of Land in Garo Hills

Sl. No	**Traditional Classification of Land in Garo Hills**	
1.	*A-mate* land	Plot of land acquired by an individual by purchase or through gift. Some of a-mate a-king lands acquired are: *Jongmegre a-king* land purchased for Rs 100/ and two *gongs.* *Wa-gaesi a-king* land
2.	*A-jinma* or *A-joma* land	Land owned by the community. It is the common land of one motherhood.
3.	*A-jikse* land	This is common for both the husband and the wife. This land comes into existence through the system of common inheritance and through unity by a bond of inter clan relationship.
4.	*A-milam* land	This particular land lies in between the two a-king unclaimed by anyone. In other words it is “no-man’s land”

In 1928, a few sections of the Assam Land Revenue Regulation, 1886 were brought into force in the Garo Hills. However, it became relevant only to the plains portion of the Garo Hills. In the hilly portion, the perennial customs continues though the District Council has passed some Acts and Regulations in certain matters. These prevail over more than 94 % of the total area which is hilly and 6% are plain areas over which this Act prevails. The annual *patta* is now issued by the District Council with consent of the *Nokma* of the particular *a-king* on application. Once the *patta* is issued the land goes out of the *a-king*, out of the control of the *Nokma* and clan members and becomes individual private property.

Jaintia Hills

In the Jaintia Hills land is basically classified into two types, name *Hali* land and High land. Hali lands are the permanently cultivated terraced wet rice land and are of two kinds; the difference being in the method of irrigation.

Table 15: Type of land in Jaintia Hills

Sl No.	**Type of Land in Jaintia Hills**	
	High Land	Hali Land
1.	Private Lands - . The High lands which are private can be bought, sold or mortgaged at the will of the inheritors.	Raj Lands – property of the erstwhile syiems/rajas which became the property of the government which leased it to private individuals in accordance with customary laws
2.	Government Lands	Service Lands - land that was given rent free to Dolois, Pators Chiefs and other officials as remuneration for the services provided by them.
3.		Village Puja Land - consists of the lands held by the *Lyngdohs or the Dolois* who performs the *pujas* of the *doloiships*
4.		Private Land - lands held by private individuals and can be transferred, mortgaged and sold or otherwise at the will of the owners.
5.		Patta Land - encompasses lands that were allotted or transferred to individuals or institutions by the British during their administration, whose power has now been substituted by the Autonomous District Councils.

Khasi Hills

The land tenure system amongst the Khasis is classified into two main heads – Ri Raid and Ri Kynti. Ri Raid is generally community owned land or 'public' land wherein no individual has propriety over it. The Raid lands or community lands have no boundary stones to demarcate its extent. The land is free to use for all and is under the Village Council and the Syiem who has the authority to allot the land for use and occupancy to individuals. The clans on the other hand, also have heritable and inheritable rights as well as propriety rights as most of Ri Raid is owned by the clans and gifted to the community. Ri Raid lands are lands set apart for the community over which no persons have propriety heritable or transferable rights except the right to use and occupy as long as one occupies and use the land for purposes such as construction of houses or for cultivation. The individual may sell the produce from the land but cannot sell the land.

Type of Ri Raid (Community Land)

Sl. No.	**Type of Ri Raid (Community Land)**	
1.	Ri Shnong	This is part of the village which villagers can use for cultivation and to occupy but not transfer
2.	Ri Lyngdoh	Land which has been set aside for the support of Lyngdohs who perform religious rites and ceremonies.
3.	Ri Bam Syiem	Land which has been set aside for the ruling chiefs.
4.	Ri Bamlang	Community land which has been set aside for the use by the community.
5.	Ri Leh Mokutduma	Land acquired through litigation
6.	Ri Aiti Mon or Ri Nongmei-Nongpa	Land that has been donated or gifted willingly by the owners for use by the public
7.	Ri Raphlang - Ri Bamduh	Barren land which anyone can use
8.	Ri Diengsai – Diengjin	Forests area that is covered with vegetation between the uplands and low lying areas of the lands
9.	Ri Samla	Land acquired by an unmarried person who has the right to dispose off as one likes
10.	Ri Umsnam	Land acquired through wars

The Ri Kynti is private lands which are in absolute possession by the owners. It can be sold, mortgaged, leased and disposed off in any manner they deem fit. These lands are demarcated by boundary stones and landmarks. In certain cases, the Syiem, *Sordar* or Village Councils have no rights over these lands. But, in case they decide to sell, mortgage or transfer such lands, they must do so with the consent of the owners, locality, community, who have the authority and powers vested in them according to the customary law and practices.

Type of Ri Kynti (Private Property)

Sl. No.	**Type of Ri Kynti (Private Property)**	
1.	Ri Nongtymmen	Land that has been inherited from generations to generations.
2.	Ri Maw	Land that has been acquired through purchase or through the right of apportionment.
3.	Ri Seng and Ri Khain	Undivided family owned land
4.	Ri Khurid	Land that has been purchased or bought over which the purchaser has the propriety, heritable and transferable rights over land.
5.	Ri Bitor	Land that has been acquired on receipt of a ceremonial bottle of liquor
6.	Ri Dakhol	Land that has been obtained by the right of occupation
7.	Ri Shyieng	Portion of land that has been given to the youngest daughter of a clan for meeting the expense on performance of religious rites and ceremonies.
8.	Ri Phniang	Part of the land of Ri Kur or Ri Nongtymmen that has been given to female members who acts as custodian and assists in the preparation of religious ceremonies or for looking after them in

		times of trouble.
9	Ri Iapduh	Land of a family or a clan that has become extinct which is kept as Ri Raid or Ri Bam Syiem
10.	Ri Lyngdoh	Land that belongs to the Lyngdoh clan
11.	Ri Syiem	Land set apart for the maintenance of the Syiems' clan.
12.	Ri Shiak	Land that has been acquired by the husband and the wife which is given to the clan.

Institutional arrangements on land in Meghalaya can be broadly classified into two types traditional institutions and non-traditional institutions of authority.

Traditional Institutions: All the three major tribes of the state have their own customary laws and practices that govern land resources. However, these traditional institutions and authorities have no constitutional power whatsoever and are functioning on customary laws based on the goodwill of the people. Traditional institutions have by customary practices and conventions have the authority to preside over land ownership. However, their decisions are not fully binding as per law as they are non-constitutional authorities and are accountable to the ADCs and are under their regulation.

Non-Traditional Institutions: The Autonomous District Councils was established under the Sixth Schedule. As per paragraph 8 of the Schedule the ADC has the power to assess and collect revenue in respect of all lands within the district except those lands which are in the areas under the authority of regional councils, if any, in accordance with the standard followed by the state government. It also has the power to levy and collect taxes on lands and building ans tolls from persons falling within their jurisdiction. After the attainment of statehood the Government of Meghalaya enacted a number of Acts related to land laws. The most important among these are The Meghalaya Transfer of Land (Regulation) Act, 1971 and The Cadastral Survey and Preparation of Records of Rights Act, 1980.

Table 18: *District Land use classification*

District-wise Land Use Classification

(Area in Hectares)

	District	Jaintia Hills	East Khasi Hills	West Khasi Hills	Ri-Bhoi	East Garo Hills	West Garo Hills	South Garo Hills	MEGHALAYA
Area Reporting for Land Utilization Statistics	Area Under Forest	154108	107045	208463	86917	124596	165008	101996	948133
	Land not available for cultivation	30953	50816	70302	33319	10440	21827	8264	225921
	Other un-cultivated land excluding Fallow land	133061	65284	140803	86182	62158	39772	26184	553444
	Fallow land	26896	10690	65861	15062	26097	45812	25035	215453
	Net Area Sown	36082	38365	31671	22220	36009	94481	25321	284149
	Total	381100	272200	517100	243700	259300	366900	186800	2227100
	Area Sown more than Once	366	7685	6533	2898	5303	24896	5564	53245
	Gross Cropped Area	36448	46050	38204	25118	41312	119377	30885	337394

Source: Directorate of Economics & Statistics, Meghalaya (Statistical Abstract 2009)

Forests and Non-Timber Forests Product

Forest is the primary livelihood resource for most of the rural population of Meghalaya. The state has an estimated forest areas of 9,506 sq. km of which less than one per cent is under the control of the State Forests Department. The rest is under the indirect control of the District Councils. 88 per cent of forests

in the state are under the control of communities or private individuals. In total there are 24 reserve forests and 5 protected forests in the state which are controlled and managed by the government. The system of sacred forests provides ecosystem services such as the protection of upper catchments of watersheds, conservation of biodiversity and medicinal plants[26]. Community forests are well managed as can be seen from the forests in Nongpyndeng village, Mawshun village, Pynursla village[27]. Typically the forests in Meghalaya can be categorised into:

Type of forests in Meghalaya

Sl. No.	**Type of forests in Meghalaya**	
1.	Law Ri Kynti	These forests belong to private individuals or clan or joint clans which are raised or inherited by them. These are generally small in size and are owned and managed by individuals. These forests are used and managed by individuals. These forests are used according to the requirement and wishes of the owner.
2.	Law Kur	Forests land owned and managed by clans wherein all members of the clans are entitled to a share of the benefits which are derived from forests. However, access to the clan forest and collection of forest products are permitted only for households belonging to the particular clan.
3.	Law Raid	These forests are looked after by the heads of the Raid (traditional institutions comprising of a cluster of villages) and are under the management of the local administrative heads.
4.	Law Lyngdoh, Law Kyntang, Law Niam	These are forests set apart for religious purposes and are managed by the Lyngdoh (priests) of a particular village. They are also called Sacred groves which are primary forest and are well preserved.
5.	Law Adong and Law Shnong	These are forests set aside as catchment areas for use by the community or village that may be decided by the durbar.
6.	Law Balang	These are church forests, whose main purpose is for cremation and burial of dead bodies. These forests are usually gifted by private individuals or clans to the church or at times bought by the Church.
7.	Law Ri Sumar	Forests belonging to the individual, clan or joint clan which are either grown or inherited by any of the individuals, clan or joint clan.
8.	Champe. A	These are regeneration forests found in Garo Hills. These forests are managed by the Nokma and felling of trees are not allowed in such forests.
9.	Wa. Grin	These are bamboo reserves found in Garo Hills and are managed by the Nokma. The villagers have full access to the bamboo reserves and collect the bamboos for their needs.

[26]Tiwari, B.K, Tynsong, H and Lynser, MB – Forest Management Practices of the Tribal People of Meghalaya, North-East India, *Jopurnal of Tropucal Foret Service,* 22(3),2010, pp. 329-342

[27]Ibid.

With the establishment of state control over some forest lands, new classes of forests have emerged. This has brought large tract of forests land under state control through a system of reservation. These are:

Government Forests Under District Councils

Sl. No.	**Government Forests Under District Councils**	
1.	Unclassed State Forests	Direct control of district councils
2.	Clan/Community Forests	(District Council control is limited to the collection of royalty on timber exported by the owners.)
3.	Private Forests	
4.	Forest Lands	Protected forests – declared by the District Council for the growth of trees for the benefit of local inhabitants. Green blocks- forests declared to an individual family or clan or joint clans and grow on Raid lands and are protected for aesthetic beauty and water supply to urban areas. Reserve forests- declared by the executive committees of the District Councils. The felling of trees or cutting of branches is prohibited. Unclassed Forests- private forests over which local self-government have some control. They are mostly on hill slopes and are used by local inhabitants for jhum cultivation.

The people of the state manage forests through traditional institutions, these local-administrative units look after the well-being of the communities but the management of natural resources of the area under its jurisdiction. Their main task is to formulate rules and laws for smooth administration and management of common property resources and oversee the effective implementation of the customary laws. Violators of forests rules are normally made to pay fixed penalties with in-kind services or cash. Subject to the conditions laid down by these institutions, the communities enjoy rights to access and use of CPRs. In a few of the villages, the role of traditional institutions in management is weakening and giving way to the privatisation of natural resources. Formal forest administration started with the demarcation of the first reserve forest in Saipung in the 1870s. The Forest Department of Meghalaya started to function independently in Meghalaya apart from the Autonomous District Council

Apart from the management and classification of forests in Meghalaya, one must also take into consideration the forest products both timber and non-timber forest products. The extraction of forest produce from community forests is free for all. The people can extract honey products, medicinal plants, firewood, timber to construct houses, etc. For some products like medicinal plants the access to them are whole year through. However, it is the village durbar that decides how timber is to be allotted to whom at what time and how much. The tribal communities depend extensively on the forests for their varied needs for timber and NTFPs.

The policies and policy instruments for the management of natural resources is formulated at three levels, the national level, at state level and at autonomous district council level. As most of the natural resources are listed in the concurrent list or the state list, the responsibilities of policy making therefore lies with both state and national governments. Besides this, in the state the ADCs have the responsibility to formulate policies for the management of natural resources within their respective area. One of the traditional way in which water has been harnessed for the people is through bamboo drip-irrigation. This method is widely adopted by tribal farmers in the Khasi and Jaintia Hills. In areas where water becomes scarce in lean periods especially during the winter months this method is adopted.

Water sources

Spring and streams are the principal source of water in south Meghalaya. Villagers pay ample regard to these water sources. They use this water for drinking and make efforts to keep them clean and unpolluted. As such, they do not permit their cattle at the places from which they collect drinking water; do not allow anyone to throw garbage in its source. In villages where government supplies water are inadequate or absent, water from these community forests play an important role in their daily requirements. Ponds and wells are made at most water sources where in some villages a signboard is put up having cautionary notes on how to use the water. Some community forests act as a source for government water supply.

There is a dichotomy between rain and water supply in the state of Meghalaya. The state receives between 2,000 mm-12,000 mm of rain for 6-8 months, leaving the dry months with lots of water scarcity problems. The river system of Meghalaya comprises mainly of rivers draining to the Brahmaputra basin in the north and the Meghna Basin in the South. There is no defined custodian of water resources in the state. It does not have any specific law defining ownership and rights over water resources. Rights are derived from customary beliefs and practices which in turn are supported by several legislations. Rights over water in rivers and lakes are exercised by the community/clans and individuals according to the customary laws and beliefs, a bit of which derives its genesis from the land tenure system. This freedom to use land in any manner they deem suitable has affected the lakes and rivers.

The Constitution of India provides that the natural resources are property of the nation and that the property rights in all rivers, streams, other natural watercourses and canals vest with the state. However, Meghalaya is a Sixth Scheduled state and the autonomous district councils have some power to legislate on water for agricultural purposes. It can also make laws with respect to the use of any canal or watercourse for agriculture.

Under customary law in the state no specific water related institutions exists. Rather, water related matters have always been considered part of the associated land use interests and are generally handled through the village dorbar. Traditionally, the user of land had the use of water on that land. Streams, rivers, etc. under customary law are considered to be common property. When Kench's Trace was purchased by the government the rights over water in streams were retained by the Syiem. Similarly, drinking water in localities outside the Shillong municipal area is managed by the village dorbar.

Annex 4 Stakeholder Consultation Questionnaire

Community Led Landscape Management Project

Focus Group Discussion conducted by Meghalaya Basin Development Authority

Shillong

Date:

PART A. Village Profile

Village:

Block:

District:

Hima:

GPS reading:

PART A

Land use:

Land use	**Area**		**Comments**
Total area of the village			
Shifting Agriculture	Cultivated	Fallow	
Wet land rice			
Plantation /Cash crops			
Community Forest			
Private Forest			
Waste land			
Homestead and Residential			
Water body			

Socio-economic

Description	**Total**	**Details**	
Sub-villages/Dong and population			
Population		Male	
		Female	
No. of households			
Literacy rate		Male	
		Female	
Occupation	Agri-labourer		
	Non-agri labourer		
	Farmers		
	Business		
	Private service		

	Government service	
	Others	

PART B:

1. How far is the closest forest area from the village habitation?
2. How do you classify the forest type present in your Village?

Description	**Types**	**Total number**	**Area (Sq.m)**	**Custodian**
Community Forest	Village Forest (Law shnong)			
	Law adong			
	Sacred Forest			
Private Forest	Individual Forest			
	Clan forest			
Reserve Forest	Community			
	Government			

3. What type of products are procured from the forest?

Description	**Community Forest**	**Private Forest**	**Reserved Forest**	**Sacred Forest**
Fuel Wood				
Timber				
NTFP				
Others				

4. What are the types of benefit emanating from the Forest?
    a) Cash generation
    b) Employment
    c) Land for agriculture
    d) Land for habitation
    e) No benefits.
5. What are the most important benefits accruing from the forest?
    a) Fuel for cooking
    b) Food
    c) Construction of Materials
    d) Raw materials for handicraft
    e) Others
6. Is cutting down of trees allowed from all forest type? If Yes/ No, explain?
7. Which of the following livelihood activities are the major drivers of deforestation?
    a) Agriculture
    b) Fuel wood collection
    c) Sawmills
    d) Habitation expansion
    e) Others,

8. What is your average annual income derived from engaging in forest resources exploitation?

   a) Below 10,000
   b) 10,001- 20,000
   c) 20,001- 50,000
   d) 50,001- 1Lakh
   e) above 1 lakh

9. How will you describe the forests coverage at present from 10- 20 years back?
10. How has forest related livelihood activity affected the natural resource like water and soil in the Village?
11. How has forest related livelihood activity affected the local fauna and flora?
12. Has there been any afforestation activity in the village by organization or Govt. departments? If yes/ No explain?
13. Has the village council taken up any initiative to protect the forest? If yes/ No explain?
14. Would you like to add more to the discussion?

ANNEX 5: Inputs from Workshop on National Forest Policy conducted in North East States July 2016

Regional stakeholder consultation on National Forest Policy was attended by States of Sikkim, Assam, Arunachal Pradesh, Nagaland, Meghalaya, Mizoram, Tripura, Manipur and West Bengal.65% of the total geographical area of NER is covered with forest. However, the issue raised on forestry sector of the region are the declining forest cover and fragmentation which has been recorded as per FSI SFR 2013. Of all the total forest cover, more than 60% (~77,100 km^2) is community owned forest which comes under "unclassified" category. These USF are owned by households, clan, community and have not been clearly surveyed or demarcated and are under increasing threat from privatization, and commercialization. Community based forest management systems are under increasing pressure especially in the light of cultural changes, increasing presence of market forces, increasing population, mining of coal and limestone and competing government policies. About 450,000 families practicing Jhum Cultivation in the region and the total area affected by jhum is about 44,000 km^2 which has degraded secondary forest. The jhum spaces are dominated by weeds and bamboo thickets. High rainfall, steep slopes, weak geology and seismic activity makes the NER a fragile landscape and there is a pressing need to conserve the health of these watersheds. NER also house several endangered fauna which need special protection. Wild conservation has gain ground off late in few locations.

The following input from the consultation are:

Water Project	• Community based forest management systems are under increasing pressure specially in the light of cultural changes, increasing presence of market forces, increasing population, mining of coal and limestone and competing government policies • Management of forests for water recharge needs to be prioritised.
Forest	• Control and management of invasive species, forest fire and encroachment. • Degraded forest need to be set aside for intensive production forestry. • Strengthening of traditional knowledge and traditional institutions on sustainable forest and management principles. • Strengthen forest governance especially in District Council • Forest management hampered by acute shortage of funds from State and central government.
Spoiled Mine area	• Regulation of mining activities
Agricultural practices	• Effort to make shifting cultivation more sustainable by reducing the extent and increasing the productivity to improve livelihood and food security. Promotion of suitable cash crops as alternative livelihood measure in jhum areas. • Investment for reclaiming abandoned jhum land and to conserve community owned forest.
Biodiversity	• Elephant corridors are not legally recognised or protected.
Livelihood	• Tapped potential of bamboo forest for providing livelihood

Annexure 6 Forest Resource Inventory

Inventory Report of F.S.I. (1990) categorizes forests of Meghalaya into six types. Growing stock for each of the forest type which are defined as given below has been presented in the report. The six forest types with the definition as given below have been identified on the basis of predominance of economically important tree species.

No.	**Forest Type**	**Percentage Area (%)**
1	Khasi Pine Forest	10.91
2	Teak Forest	0.84
3	Sal Forest	3.76
4	Hardwood mixed with conifers	2.14
5	Upland hardwood	0.77
6	Miscellaneous Forest	81.59

No.	**Name of Reserved Forests**	**Gazette Notification and date**	**Area (in sq. km.)**
1	Jaintia Hills District		
	Saipung R.F.	Number 26/7/1876 and 5 of 17.10.1877	150.35
	Narpuh Bl. I	Number 3978 F of 17.6.1909	62.42
	Narpuh Bl. II	Number 1106 R of 9.3.1918	98.68
	Total: 311.45		
2	East Khasi Hills District		
	Riatkhwan R.F.	Number 806 R of 5.3.1892 & 4287 R of 1.9.1892	3.91
	Shyrwat R.F.	Number FOR.179/80/187 of 28.3.1988	0.44
	Riat Laban R.F.	Number FOR 179/80/183 of 28.3.1988	2.05
	Total: 6.40		
3	Ri-Bhoi District		
	Nongkhyllem R.F.	Number 4692 F of 23.7.1909 & 864 G. J of 4.2.1939	125.91
	Umsaw R.F.	Number G.F.R. 234/46/3 of 16.12.1946	0.44
	Total: 126.35		
4	East Garo Hills District		
	Chimabongshi R.F.	Number 28, dt 19.6.1883 & FOR/Sectt/492/63/4 dt 22.12.1965	23.28
	Dhima R.F.	Number 28 of 19.6.1883 & 3715 R of 11.8.1904	20.72
	Dilma R.F.	Number 28 of 19.6.1883	2.59
	Rajasimla R.F.	Number 28 of 19.6.1883 & 665 R of 15.2.1899	18.13
	Ildek R.F.	Number 28 of 19.6.1883	2.59
	Darugiri R.F.	Number 28 of 19.6.1883 & 373 R of 29.1.1932	10.36
	Rongrenggiri R.F.	Number 28 of 19.6.1883 & 375 R of 29.1.1932	36.26

	Dambu R.F.	Number 22 of 12.3.1880 & 4276 R of 14.10.1962	18.13
	Songsak R.F.	Number 29 of 1.10.1885 & 3583 R of 5.9.1902	23.31
	Total: 155.37		
5	West Garo Hills District		
	Dibru Hills R.F.	Number 28 dt.19.6.1883 & 3526 R of 10.12.1930	15.02
	Tura peak R.F.	Number FOR.10/75/32 dt 23.6.1982	4.19
	Total: 19.21		
6	South Garo Hills District		
	Baghmara R.F.	Number 12 dt 24.2.1887	43.91
	Angratoli R.F.	Number 3 dt 7.11.1883 & 2478 R of 15.6.1915	30.11
	Rewak R.F.	Number 44 dt. 7.11.1883 & 1699 R of 26.7.1932	6.47
	Emangiri R.F.	Number 44 dt. 7.11.1883 & 1699 R of 26.7.1932	8.29
	Siju R.F.	Number 44 dt. 7.11.1883 & 1699 R of 26.7.1932	5.18
	Total: 93.96		
	Total Reserved Forests :	**712.74**	

No.	**Area acquired but yet to be declared as Reserved Forest**	**District**	**Area (sq. km.)**
1	Nongumiang	West Khasi Hills	0.31
2	Cittingiri	South Garo Hills	2.40
	Total		**2.71**

No.	**Name of Protected Forest**	**District**	**Area (sq. km.)**
1	Upper Shillong P.F.	East Khasi Hills	7.66
2	Short Round P.F.	East Khasi Hills	1.13
3	Laitkor P.F.	East Khasi Hills	3.25
4	Green Block Number 2	East Khasi Hills	0.21
5	Umkhuti P.F.	Ri-Bhoi	0.14
	Total		**12.39**