



# Critical Ecosystem Restoration Plan (CERP) of Ratuwa River System



**Building a Resilient Churia Region in Nepal (BRCRN)**



National Project Director

मिति २०७८।०२।२७ को वन तथा वातावरण मन्त्रालयको श्रीमान् सचिवस्तरीय निर्णयबाट स्वीकृत भएको Critical Ecosystem Restoration Plan (CERP) Preparation Manual को बुँदा नं.४ को प्रावधान बमोजिम PPMU हरुको सिफारिशमा PMU को मिति २०८०।०२।२३ को निर्णयबाट प्रारंभिक स्वीकृत (Initially Approve) भएको यस नदी प्रणालीको CERP मिति २०८०।०२।२६ मा बसेको आयोजना निर्देशक समिति (Project Steering Committee) को निर्णय बमोजिम अनुमोदन (Endorse) भएको ।

  
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National Project Director

Disclaimer:

This CERP report has been prepared based on the extensive field consultations, onsite visit and applying the RS/GIS tools and technologies. This report contains data and information collected and collated from the field applying CERP steps and methodology spelled -out in MOFE approved CERP manual. The draft report was shared in three provincial and one national validation workshops organized from December 2022 to February 2023 and incorporated the suggestions obtained from the workshops.

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APPROPRIATE TECHNOLOGY DEVELOPMENT AND RESEARCH

Date: 27<sup>th</sup> March 2023

## DECLARATION OF AUTHENTICITY

We the following team members of CERP formulation process from Grid-ECN-Sunakhari JV hereby declare that the data and information provided in the CERP reports of Koshi province are correct to best of our knowledge and duly in-line as per MOFE approved CERP manual, using participatory approach with sample site verification. Thus, this document is our original outcomes of local, river cluster, province and federal level consultations/ validations. We hereby verify to prove its originality and authenticity; we will not allow our team and other sources to make it copied resources in one way or the other without citing copyright that is GoN-BRCRN project. We duly acknowledge BRCRN'S FAO-TA for their active involvement in every stage of CERP development..

Thanking you  
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## ACRONYMS AND ABBREVIATIONS

AKC	:	Agriculture Knowledge Center
ANR	:	Assisted Natural Regeneration
BRCRN	:	Building a Resilient Churia Region in Nepal
CBFMG	:	Community Based Forest Management Groups
CBO	:	Community Based Organization
CBS	:	Central Bureau of Statistics
CCA	:	Climate Change Adaptation
CCM	:	Climate Change Mitigation
CERP	:	Critical Ecosystem Restoration Plan
CF	:	Community Forest
CFUG	:	Community Forest User Group
CRLUP	:	Climate Resilient Land Use Planning
D&FD	:	Deforestation and Forest Degradation
DFO	:	Division Forest Office
DHM	:	Department of Hydrology and Meteorology
DoS	:	Department of Survey
DRR	:	Disaster Risk Reduction
EIA	:	Environment Impact Assessment
FFS	:	Farmer Field Schools
FGD	:	Focus Group Discussion
FOP	:	Forest Operational Plan
FPIC	:	Free, Prior and Informed Consent
GESI	:	Gender Equality and Social Inclusion
ha	:	hectare
ICIMOD	:	International Centre for Integrated Mountain Development
IEE	:	Initial Environmental Examination
IP	:	Indigenous People
IPacks	:	Intervention Packages
IPM	:	Integrated Pest Management
Km	:	Kilometer
LRP	:	Local Resource Person
m	:	meter
MCA	:	Multi Criteria Analysis
MoFE	:	Ministry of Forests and Environment
PCTMCDB	:	President Chure Terai Madhesh Conservation Development Board
PCTCMMP	:	President Chure Terai Madhesh Conservation and Management Master Plan
PPMU	:	Provincial Project Management Unit
RS	:	River System
SDFO	:	Sub-division Forest Office
SDG	:	Sustainable Development Goals
SFM	:	Sustainable Forest Management
SNRM	:	Sustainable Natural Resource Management
TOF	:	Training of Facilitators
VDC	:	Village Development Committee



## EXECUTIVE SUMMARY

The project entitled “Building a Resilient Churia Region in Nepal (BRCRN)” aims to promote widespread adoption of climate-resilient land use practices; confront the challenges of deforestation and forest degradation (D&FD); better maintain the forest ecosystem in the Chure hills; and build resilience to climate-induced hazards by linking the Chure hills, Bhavar and Terai. BRCRN has adopted the river system-based approach and follows boundaries earlier identified and delineated by President Chure Terai Madhesh Conservation and Management Master Plan 2017. The said master plan projected integrated conservation plan on the basis of river systems. The Critical Ecosystem Restoration Plan (CERP) is prepared to foster Climate Resilient Sustainable Natural Resource Management (CR-SNRM) in the river system so that this CERP will be launched to implement the concept of upstream-downstream linkage based on perspectives of the ecosystem services. The CERP process has followed participatory rural development planning approach including civil society organizations (CSOs), community-based organizations (CBOs), women lead organization, and groups, and government entities at different levels. It is based on ‘Theory of change’ approach integrating problem and solution tree analysis that explains how a given intervention, or set of interventions, is expected to lead to specific development change, drawing on a causal linkage based on available evidence. From problem and solution tree analysis the main problems along with their causes and effects are recorded, to come up with clear and manageable goals and the strategies to combat them. There are two main stages to this process: (1) the identification of negative aspects of existing situations (or key challenges) in the form of problem trees, and (2) the change of the problems into objectives leading to solution trees showing potential solutions or strategies that respond to the main drivers and underlying causes. In addition, the integrated and gender-specific approach was adopted during the process to ensure gender equality and women empowerment in sustainable natural resource management. The integrated approach adopted gender-inclusive actions such as ensuring equal participation, gender prospect in problem-solution analysis, and ensuring participation of women lead organizations in the consultation workshops. However, due to the limited involvement of women in the integrated approach, a gender-specific approach was adopted, and a separate study focusing only on women and women lead organizations was conducted during the process. In addition, the approach adopted particular research tools such as seasonal calendars, problem and solution community workshops, and focus group discussions among women, Dalits, IPs, women, and other marginalized communities. Also, the consultation process includes a consultation with women and women lead organizations.

Ratuwa is originated from the hill, just upstream to Main Boundary Thrust and extend over  $26.394492^{\circ}$  to  $26.854306^{\circ}$ N and  $87.618454^{\circ}$  to  $87.801388^{\circ}$  E. The river system lies on Morang and Jhapa districts. The river system faces rapid urbanization with the annual rate of 9.90% per year from 2000 to 2019. It appears that the total forest area increased by 414.7 ha at the annual rate of 0.23 % during these 19 years. The ecosystem degraded areas termed as “hotspot” areas are identified initially by spatial analysis of 16 different variables from secondary spatial data sources. The variables were categorized into adaptation and mitigation themes and Geographical Information System (GIS) based Multi-Criteria Analysis (MCA) was used to identify preliminary hotspot areas. The maps generated from spatial analysis were taken to problem and solution workshops that took place at the local level. Participants from Community Based Organizations (CBOs) user groups- with a focus on women, indigenous people, poor and Dalit (community and collaborative forest user groups, farmer groups, and climate-induced disaster management groups, soil and water conservation groups) as well as government organizations (forest sub-division offices and local government at community level) were represented in the workshops. Identification of key drivers, problem analysis, solution analysis and hotspot map delineation were done in two thematic groups of climate change adaptation and mitigation. The mapped hotspot locations were

verified/updated in workshops and visited-verified in the field followed by discussions with the local communities. Additional two-day expert planning workshop in the river system discussed and validated the findings, focusing on identifying drivers and underlying causes of the two thematic problems.

Deforestation and forest degradation are related to climate change and pose threats to biodiversity and livelihood of forest dependent local communities. Forest degradation relates to loss of biomass (carbon) and reduction in the capacity of forests to produce ecosystem services on longer terms. The findings from local stakeholder and expert consultations indicate that unsustainable/illegal harvesting of forest products, forest fire, open/uncontrolled grazing, adopting inappropriate cropping systems, encroachment of forestlands, ineffective forest management practices and infrastructure development are major drivers of deforestation and forest degradation in Ratuwa river system. Climate-led hazards like erosion/landslide and flood are other drivers contributing to forest loss and degradation. These drivers are the results of several underlying causes- high forest resource dependency; poverty and limited livelihood opportunities available to local communities; ineffective forestry sector governance; weak law enforcement; ineffective sustainable forest management; financial and human resource constraints in community based forest user groups and forest offices; and weak coordination and cooperation among concerned agencies that have led to such degradations in this river system.

Climate induced disaster and climate impact on agriculture productivity are two key challenges representing vulnerable ecosystem and community in the river system. Flood, erosion/landslide, and weak disaster risk management are major drivers, and are triggered by both natural and anthropogenic factors. Inappropriate land use practices like cultivation in slopy areas more than 30 degree, forest degradation, unplanned and unregulated road construction, and unmanaged riverbed material excavation are main human-induced causes. Heavy/erratic rainfalls, steep slopes and other topographic conditions are major natural causes. Climate stress on agriculture productivity has direct impact on people's livelihood especially women, elderly and children through low family income and food insecurity. It eventually makes forest ecosystem vulnerable through increased burgeoning pressure on forest resources. The major drivers identified are inadequate farm skills and financial resources; insects, pests and diseases; insufficient irrigation; and soil quality degradation.

The strategic actions identified to reduce deforestation and forest degradation include reducing forest dependency by addressing poverty and alternative livelihood issues; promoting agroforestry, livestock management and private forestry; strengthening forest fire control system; controlling open grazing; improving law enforcement and overall forestry sector governance; promoting sustainable forest management; controlling further encroachment of forestlands; and capacity enhancement of user groups and government forestry staffs. Afforestation and reforestation activities are proposed to enhance forest density and species richness for improving ecosystem services. One of the important aspects of enhancing adaptation/resilience of ecosystem and community would be climate resilient farming practices and enhancing agricultural productivity. Increase in agriculture productivity will improve livelihood of small holding farmers and at the same time, it will decrease dependency on nearby forest resources. Strategic actions proposed for disaster risk reduction are landslide treatment, erosion control, riverbank stabilization and strengthening disaster risk management. In addition, the focus is also on enhancing gender inclusive governance to mainstream women, Dalits, indigenous people, and marginalized communities in the implementation of ecosystem restoration plans for the river system.

Based on the activities and key results identified from local stakeholder workshops, via problem tree and solution tree analysis, six intervention packages (IPacks) have been developed. This CERP only covers those key results and IPacks that correspond to local level interventions. CERP brings out issues on a number of vital areas of interventions that can take place at national level such as- resolution of land

tenure issues; and interventions to regulate infrastructure development in forest area, however does not suggest specific interventions as guided by CERP manual. Feasibility analysis is used to assess the strengths and weaknesses of the IPacks where risks and obstacles to implementation of each IPacks were assessed. Safeguard analysis is done to identify social and environmental risks or threats, as well as to identify where CERP interventions can contribute to significant social or environmental co-benefits. The measures to mitigate risks and enhance benefits are also assessed. Budget plan and monitoring protocol for CERP are also prepared adopting several matrixes. However, geographic focus of activities is not considered as a primary criterion for activity grouping during IPack formulation.

The IPacks developed mainly focused on reducing deforestation and forest degradation; enhancing adaptation/resilience of vulnerable ecosystem and local communities; raising awareness and enhancing capacity of CBOs and government staffs; and integrating gender and social equity issues. The IPacks provide adaptation and mitigation activities for forest management and subsequent carbon enhancement; climate resilient agriculture and land use practices; and reducing ecosystem and community vulnerability to climate-induced disasters. Since the upstream is not protected, the downstream people are facing serious problems of siltation in their private lands and loss of their properties and hence CERP activities are designed with focus on upstream-downstream linkages based on perspectives of the ecosystem services. The activities such as agroforestry, enhancing forest cover (enrichment plantation/assisted natural regeneration in forests of Chure and Bhavar), gulley control, landslide treatment, and climate resilient land use practices to build resilience of smallholder farmers against climate change impacts in upstream are intended to enhance resilience against climate-induced soil erosion, reduce runoff and enhance infiltration, thus reducing risks related to sedimentation and flooding in downstream areas. Riparian plantation is proposed at midstream and downstream to enhance tree cover, as well as riverbank stabilization together with embankments and bioengineering. Majority of the woodlots development and climate resilient agriculture projects are concentrated at downstream. These projects are believed to reduce pressure on remaining upstream forests and hence improve resilience to climate change impacts. Reducing rate of deforestation and forest degradation in Chure and Bhavar, and enhancing tree cover in downstream will produce important climate change mitigation benefits while also preserving and enhancing vital ecosystem services that are essential to the resilience of communities (linking both upstream and downstream) throughout the river system.

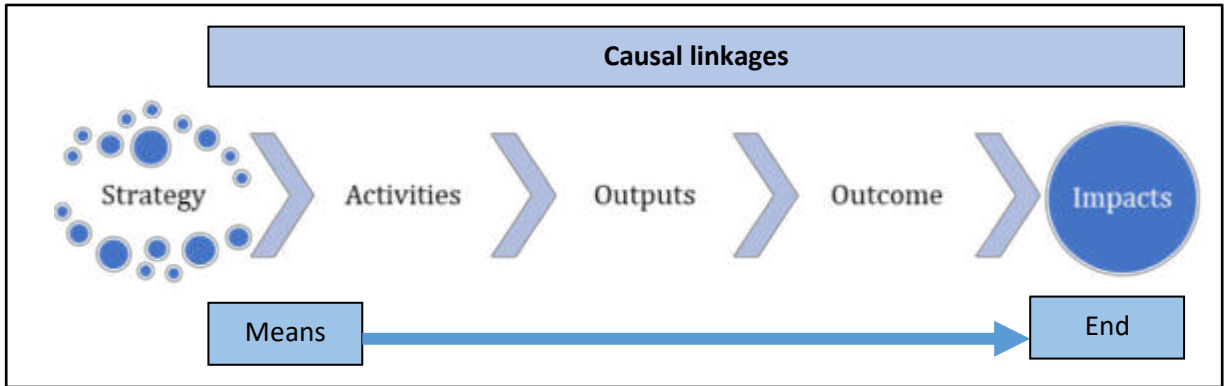
# CHAPTER I : INTRODUCTION TO CRITICAL ECOSYSTEM RESTORATION PLAN

## 1.1 Background

The project entitled “Building a Resilient Churia Region in Nepal (BRCRN)” is implemented in 26 critical river systems (RS) in the southeast region of Nepal, covering parts of Provinces I, Madhesh and Bagmati. The project will be linking the Chure hills, Bhavar and Terai, and aims to promote widespread adoption of climate-resilient land use practices, confront the challenges of deforestation and forest degradation (D&FD), better maintain the forest ecosystem in the Chure hills, and build resilience to climate-induced hazards.

The Chure Hill is an ecologically highly sensitive and risk-prone landscape due to complex geology, tectonics, climate, hydrology, and biodiversity. Ecologically Churia is an integral part of Terai, thus, it should be considered as a landscape. Watershed level institution building and its well-functioning including upstream and downstream stakeholders can contribute in conservation and management of upstream watershed resources. This CERP has been planned in a way which ensures protection of upstream areas and hence downstream will have perpetuated ecosystem services on longer terms. The region is particularly vulnerable to erosion, landslides, and flooding due to ongoing tectonic processes, fragile geology, the material composition of the hills, and prolonged and intense rainfall during monsoon (Ghimire, 2011). A changing climate is further contributing to landslides, erosion, and flash flooding in the hills. These processes in the hills have shaped the active geomorphological process in the Bhavar region through aggradation and transportation of sediments. Over the last half-century, Bhavar have undergone tremendous changes in demography, land use, settlement and urbanization, and road infrastructures, which have extremely altered the landscape. Moreover, haphazard extraction of the riverbed material has altered the geomorphic processes in the Bhavar (Dahal & Paudyal, 2022). Higher sediment yield in Chure hill and alteration of geomorphological processes in Bhavar have profound impact on the morphology of the river and related disaster in the downstream area of Terai flood plain (Ghimire, 2020). The agricultural land of Bhavar and Terai are already in stress of climate variability, further degrading through compounding effects of upstream resource destruction.

In these connections, Critical Ecosystem Restoration Plan (CERP) is prepared to foster Climate Resilient Sustainable Natural Resource Management (CR-SNRM) in the river system. CERP activities are designed with focus on upstream-downstream linkages based on perspectives of the ecosystem services. The CERP has followed a participatory rural development planning approach including civil society organizations (CSOs), community-based organizations (CBOs) and government entities at different levels. These methodology and process is based on international best practices, including the ‘Theory of change’ approach to planning, implementation, monitoring & evaluation and impact assessment in different time intervals.



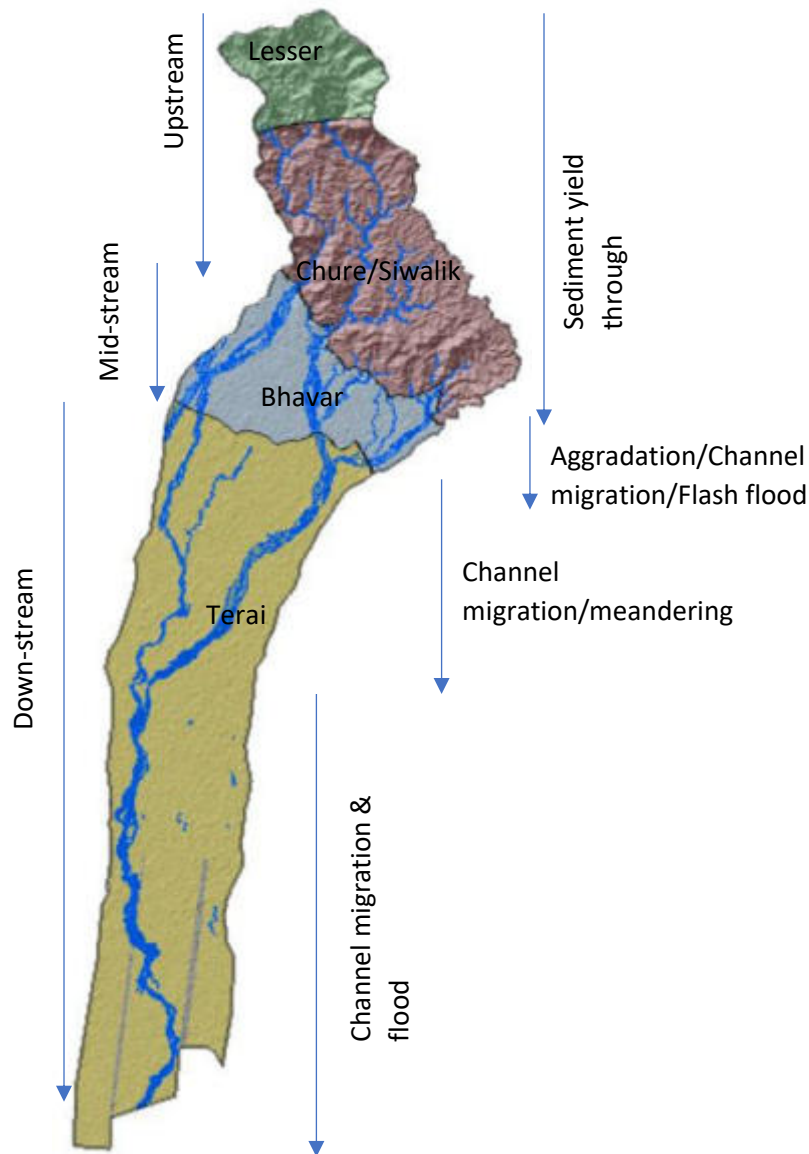
(Source: CERP manual, 2021)

**Figure 1: Establishing casual linkages with theory of change analysis**

The “Theory of change” approach explains how a given intervention, or set of interventions, is expected to lead to specific development change, drawing on a causal linkage based on available evidence. It includes an understanding of the desired activities, inputs, outputs, outcomes and impacts of the project as well as the current situations and dynamics including their incentives for change.

**1.2 River System Concept: Holistic Approach of Integrated Watershed Management**

The President Chure Terai Madhesh Conservation and Management Master Plan 2017 projected integrated conservation plan based on river systems. A river system is a land mass of drainage basin where all river and its tributaries meet to have a common outlet. BRCRN follows the river system boundaries earlier identified and delineated by President Chure Terai Madhesh Conservation and Management Master Plan (PCTMCDB 2017). It is a part of watershed system that should ideally follow hydrological boundary, however, river system delineation in PCTMCMMP also considers land mass as a management unit that is delineated based on the geographical and socio-ecological variability.



**Figure 2: Upstream-midstream-downstream linkages in Ratuwa river system**

Ratuwa river system can be divided into three zones based on the landform and river geomorphic behaviors as shown in Figure 2. Sediment generated through erosion and slope failure process in the upstream cause aggradation in Bhavar region, which leads to bank scour/cut/erosion and then channel migration. Flowing downstream, channel become meandering in upper Terai region due to the loose and unconsolidated sediment in river bank. In downstream region, rise of riverbed due to sediment aggradation causes large flooding and inundation.

### 1.3 Ecosystem Restoration

An ecosystem is a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Ecosystem degradation is a negative trend in ecosystem condition, caused by direct or indirect human-induced processes including anthropogenic climate change, expressed as long-term reduction or loss of at least one of the following: biological productivity, ecological integrity, or value to humans.

Ecosystem restoration is any intentional activities that accelerate the recovery of degraded, damaged, or destroyed functional services that an ecosystem provides. The restoration planning requires multi-dimensional observation and analysis of core problems followed by a multi-stakeholder engagement and lead decision making process. Relating ecosystem services with relevant stakeholders for their perceptions of the services is vital for informed decision making about land use changes and resource management.

To design restoration practices effectively, land use and change information needs to be provided to the key stakeholders. The tools presented herein help trainee participants to understand the land cover data preparation process, data collection using satellite imageries, classifying the land cover types, spatially identify land use/land cover changes and map them to have a basic understanding of land cover change dynamics at river system levels.

In fact, CERP focuses on river system scale intervention planning to achieve ecosystem restoration at landscape level. Moreover, the CERP is guided by and perfectly in-line with the principles of ecosystem restoration of United Nations decade 2021-2030 that highlights following 10 principles that underpin ecosystem restoration:

- Ecosystem restoration contributes to the UN SDGs and goals of Rio conventions.
- Ecosystem restoration promotes inclusive and participatory governance, social fairness and equity from the start and throughout the process and outcomes.
- Ecosystem restoration includes a continuum of restorative activities.
- Ecosystem restoration aims to achieve the highest level of recovery for biodiversity, ecosystem health, integrity, and human wellbeing.
- Ecosystem restoration addresses the direct and indirect causes (drivers) of ecosystem degradation.
- Ecosystem restoration promotes knowledge generation and exchange throughout the process.
- Ecosystem restoration is based on well-defined goals.
- Ecosystem restoration is tailored to the local ecological, cultural and socio-economic contexts, while considering larger landscape.
- Ecosystem restoration includes monitoring, evaluation and adaptive management throughout and beyond the lifetime of project.
- Ecosystem restoration is enabled by policies and measures that promote its long term progress, replication and scaling-up.

#### **1.4 Rationale of CERP**

Most part of Churia is covered by forests while some parts are inhabited and cultivated. Increasing human interferences and expanding infrastructures coupled with climate vagaries on top of its own fragile-composition are causing serious threats to this region and downstream also. It has varying elevation, climate and vegetation from one to another part. Churia (upstream) area has been considered to be very important for conservation to protect downstream Terai and its agriculture land. CERP has been formulated in a way which implements the concept of upstream-downstream linkage based on perspectives of the ecosystem services. The development of CERPs will contribute to the provision of climate-informed extension and advisory services. It ensures that adaptation to climate change (CC) and Disaster Risk Reduction (DRR) has been integrated into provincial and local development planning. The project achieves this through promoting and integration of climate resilient land use practices in agriculture and forestry, subsequently integrating them into local decision-making processes. This will

ultimately guide the adoption of prioritized low-carbon and climate resilient – Sustainable Natural Resource Management.

The goal is that government and development partners together improve local and provincial service delivery through river system interventions in CR-SNRM sector. The CERP is also the basis for monitoring and evaluation (M&E) of ecosystem restoration actions at the landscape scale as well as outreach and targeted budgeting on local level. Additionally, the data generated in the annual follow-up of the CERP intervention packages, and their success or failure will inform government reporting on climate change related international commitments and instruments. The reports on the cumulative impacts of the CERPs should be a part of the country's overall Nationally Determined Contributions (NDC) reporting on land use change and greenhouse gas emissions at national scale.

CERP is envisioned at a river system scale to foster upstream-midstream-downstream connectivity by analyzing complex inter-linkage of causes and effect dynamics of climate vulnerability over the specific geographic regions and interventions to help build the climate resilience with interlinked and cascading impact from head to tail of the river systems. In this sense, it adopts a holistic integrated watershed management approach.



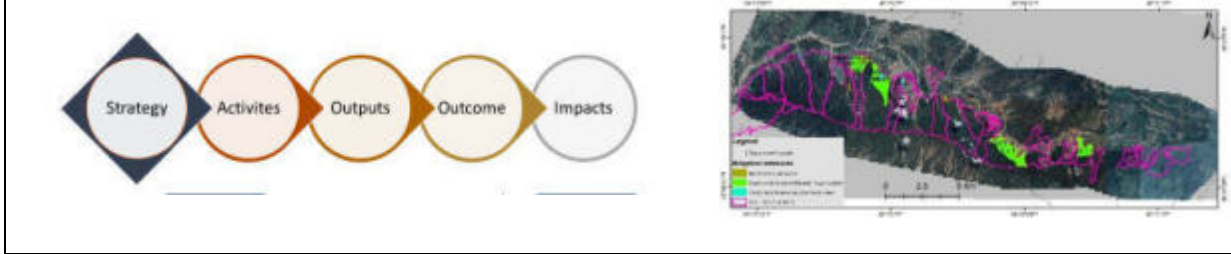
## CHAPTER 2 : METHODOLOGY AND THE PROCESS

### 2.1 CERP Development Phase

Following nine steps were followed during the CERP development phases:



Step 9: Development of workflow and finalization of intervention packages



**Figure 3: Steps of spatial analysis for CERP development**

### 2.2 Spatial Planning as a Base for CERP

Mapping and spatial analysis have a vital role in the CERP development process. Maps and spatial analysis are generated by a combination of geospatial tools (i.e. GIS, Remote Sensing), desk-based research and fieldwork. Relevant analogue maps and data prepared by national and international agencies were collected and reviewed for the inclusion of the information in the digital spatial data as well as integration in the GIS.

**Table 1: Data types, acquisition and their processing methods**

Themes	Parameters	Data types	Sources	Processing methods
Climate mitigation	Deforested area	Forest loss (2000-2020)	Global Forest Watch data.globalforestwatch.org	- Revised & update from temporal Google earth images
	Degraded forest	Open forest (Canopy <20%)	Sentinel image, 2021	- NDVI and supervised classification - Inputs, revised & update from temporal Google earth images
	Forest fire	Fire incident	NASA's Website ( <a href="https://firms.modaps.eosdis.nasa.gov">https://firms.modaps.eosdis.nasa.gov</a> )	- Overlay analysis on temporal GE images and draw tentative burnt area which will verify during participatory workshops
	Potential enhancement area	Private land/Public land forest (Proxy indicators)	Cultivated land & Riverbed (DoS, 1996)	- Abandoned agricultural land (Cultivated land in the 1990's/2000's and barren/bushes in 2020's): Google earth overlay & Mapping - Abandoned river/reclaim (River in 1990's/2000's and other land use in 2020's): Google earth overlay & Mapping
	Firewood consumption	Household using firewood for cooking	CBS, 2011	- Household using firewood attributed in then VDCs and transferred into RS
	Landslide on forest area	Landslide	PCTMCDB (TU-CDG, 2021)	- Landslide distribution in forest
	Road network on Chure hillslope	Road network on Chure hillslope	PCTMCDMP (PCTMCDB, 2016)	- Updated form Google earth
Climate adaptation	Agricultural land in slope area	Agricultural land Slope (Digital elevation model)	ALOS DEM (12.5m) (asf.alaska.edu)	Overlay analysis
	Agricultural land exposed to landslide hazard	Landslide hazard	PCTMCDB (TU-CDG, 2021)	
	Agricultural land exposed to Flood hazard	Flood hazard	PCTMCMMP (PCTMCDB, 2016)	
	Land capability	Land capability	Soil and Terrain Database (SOTER) (FAO, 2009)	

Themes	Parameters	Data types	Sources	Processing methods
	Landslide hazard	Landslide hazard	PCTMCDB (TU-CDG, 2021)	Overlay analysis
	Flood hazard	Flood hazard	PCTMCDMP (PCTMCDB, 2016)	Flood hazard is revised and updated based on recent geomorphic change in flood plain using the temporal images of GE
	Settlement exposed to landslide hazard	Settlement	Land cover, 2015 (PCTMCDB, 2016)	Overlay analysis
	Settlement exposed to flood hazard	Settlement	Land cover, 2015 (PCTMCDB, 2016)	
	Wetland/water recharge	Wetland/water recharge	Wetland (DoS, 1996 & PCTMCDB, 2016)	
	House structure	Indices	CBS, 2011	Spatial representation was created on then VDCs and transferred into river systems
	Ethnicity			
	Female literacy (Gender)			

CERP is the core process of the project in identifying the problems and solutions that lead to project interventions (activities). The CERP objectives were to balance both mitigation and adaptation for climate resilience building of local vulnerable communities. Hence, mitigation and adaptation potentials of the project are considered as primary entry points for MCA to identify hotspot sites and considered as major themes. Mitigation potential is addressed through identifying areas (hotspots) where BRCRN interventions have potential to reduce emissions and enhance the subsequent carbon stock. Similarly, adaptation potentials are addressed through identifying areas (hotspots) where BRCRN interventions have potential to address vulnerable ecosystems and vulnerable local communities.

Following graphics demonstrate adaptation and mitigation logic adopted for which careful choice of themes, variables, process and results were:

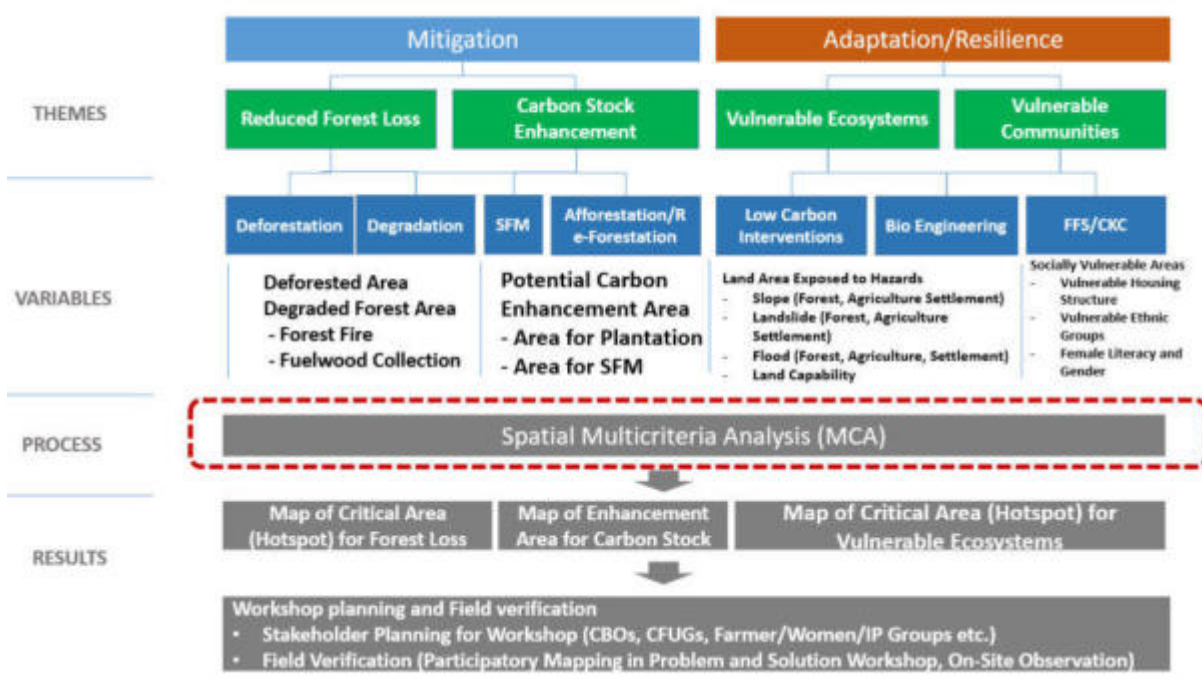


Figure 4: Multi-criteria analysis

## 2.3 Local Stakeholder Consultation

### 2.3.1 Selection of Participants

The selection process of participants for the two consecutive workshops i.e. Problem Analysis and Solution Analysis was vital for the validity and quality of CERP process. The selection process was carried out in collaboration with Division Forest Office (DFO) of Ilam, Jhapa and Morang district. The selection process prioritized to include women and women lead organizations including Indigenous Peoples and their institutions at the river system level. The DFOs informed respective sub-division offices to support in selecting participants, who are well informed about the issues of River System. Similarly, the study team coordinated with local government (*Palikas* and wards) to trace out the representatives who are directly associated with the agriculture and disaster issues. The participants are from Sub-division Forest Office, Community Forest User Groups, Damak Multi-technical College, Agriculture Cooperatives, Farmers Group, River Control Committee, Gauradaha Municipality office and other local Community Based Organizations (CBOs) while considering social inclusion i.e. representatives from poor, women, Indigenous Peoples (IPs) and Dalits.

### 2.3.2 Workshop

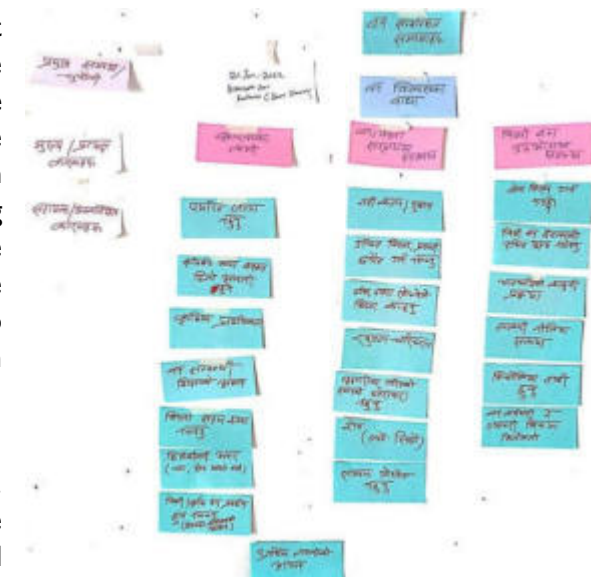
Workshops were conducted at three locations for Ratuwa river system- upstream, midstream and downstream. The two-day workshop was organized at upstream section on 26 and 27 April 2022. The workshop venue was Humse Dumse CFUG office hall at Beldangi, Damak-3, Jhapa. There were 33 participants in total. Among the participants, 16 were from IP groups and altogether 15 females and 18 males. The workshop for midstream section was organized on 19 and 20 June 2022. The workshop venue was office hall of Gauradaha Municipality-5 at Maharanijhoda, Jhapa. There were 31 participants in total. Among the participants, 7 were from IP groups and altogether 13 females and 18 males. The workshop for downstream section was organized on 21 and 22 June 2022. The workshop venue was Bishwonath Temple hall at Sijuwa, Ratuwamai-7, Morang. There were 26 participants in total. Among the participants, 8 were from IP groups and altogether 4 females and 22 males (Annex 2).

The day one of the workshop was focused to prepare problem tree while day two was dedicated to develop solution tree as per the problem tree developed in day one.

#### A. Problem Analysis (Day One)

The workshop facilitators firstly briefed about introduction of the BRCRN and the objectives of the workshop. This session was followed by the discussion on the topics of 'Climate Change Mitigation' and 'Climate Change Adaptation'. The aim of this session was to bring common understanding among the participants, facilitators regarding the concept of 'Climate Change Mitigation' and 'Climate Change Adaptation' that would be instrumental to bring clear, and precise local issues associated with River System. This was robust basis to design intervention packages for the BRCRN.

The participants were divided into two groups viz. 'Climate Change Mitigation (CCM)' and 'Climate Change Adaptation-(CCA)'. Each group nominated their spokespersons for the documentation of



thematic issues and women were encouraged to be a spokesperson. Adding to this, CCM group was requested to discuss on the issues of deforestation, forests degradation and enhancement activities whereas CCA group was focused on the issues of agriculture and disaster. Both the groups were oriented on how problem and solution trees were to be formulated. They were asked to identify the key problem, direct and underlying causes of the problem and impacts of problem. The participants were also oriented about mapping of hotspots for interventions. For this map of the river system, overlaying boundary and satellite image were displayed through projector. Printed maps were also used for orientation. Participants were oriented about the features of maps like forest area, cultivated area, river/streams, roads etc.

All issues of four thematic areas (deforestation, forest degradation, agriculture and disaster) were documented in the meta cards. Meta cards were displayed on the walls of the workshop hall in a sequence of key problem/challenge at the top, the drivers in the middle and then meta cards with underlying causes at the bottom to develop a problem tree.

- **Group Exchange**

The problem trees prepared by each groups were displayed and group exchange was done for verification and inputs. The spokespersons of respective CCM and CCA groups were assigned to present their problem trees. During the presentation, CCM groups received inputs from participants of CCA groups and vice versa. This process provided ample space to refine the local issues on case to case basis manually.



- **B. Solution Analysis (Day Two)**

On the second day, same participants were asked to remain in their respective groups of CCM and CCA. As informed them on the day before each group was asked to prescribe solutions of respective issues identified in problem analysis. They were asked to identify activities against problems, output of the activities, outcomes and finally impacts. The facilitators played same role as in problem analysis. All solutions were documented in the meta cards and displayed for the group exchange. Meta card with outcomes was pasted at the top followed by outputs and activities at the bottom to develop a solution tree.

- **Group Exchange**

The group exchange processes were carried out same as in Day One.

### **2.3.3 Identifying and Mapping of Hotspots**

In the problem analysis day, the map of River System was displayed in both hardcopy and power point presentation including interactive Google Earth Images and carried out participatory discussion to identify hotspots of the respective River System (RS). These participatory discussions were instrumental to trace out the hotspots in terms of their severity, which would be basis for designing intervention packages for the BRCRN project with reference to climate change mitigation and climate change adaptation discussed in the problem analysis and solution analysis. The study team noted the name and physical location of the hotspots identified by the participants for field verification.

### **2.3.4 Field Visit and Focus Group Discussions (FGDs)**

The study team went to field after the two-day workshops to verify identified hotspots. Maps and checklists were used for field verifications of hotspots. The study team had also conducted key informants interview to understand the depth of the problems in the respective hotspots. The study

team discussed with local people on the major problems of the hotspots and rationale interventions to address the problems along with the local safeguard information. Indigenous people (IPs), Dalits social groups, and women were focused in consultations for inclusiveness, customary practices, norms, values and existing indigenous institutions, their roles in community and encourage them for their meaningful participation and insist them to be vocal on their problems in the face of climate change mitigation and climate change adaptation. The study team documented all the issues raised in field consultations, which would be reflected in the CERP.

## **2.4 Expert Planning Workshop**

### **2.4.1 Expert Planning Workshop Participants**

The experts from Division Forest Offices, Sub-division Forest Offices from respective river systems, Province Forest Directorate, President Chure Terai Madesh Conservation Development Board, Food Technology and Quality Control Office and Agriculture Knowledge Center participated in the two-day workshops. Experts were invited in collaboration with BRCRN-PPMU and FAO-TA and Province ministries. All participants were informed through formal letter from Ministry of Agriculture and Ministry of Forest, Environment and Soil Conservation.

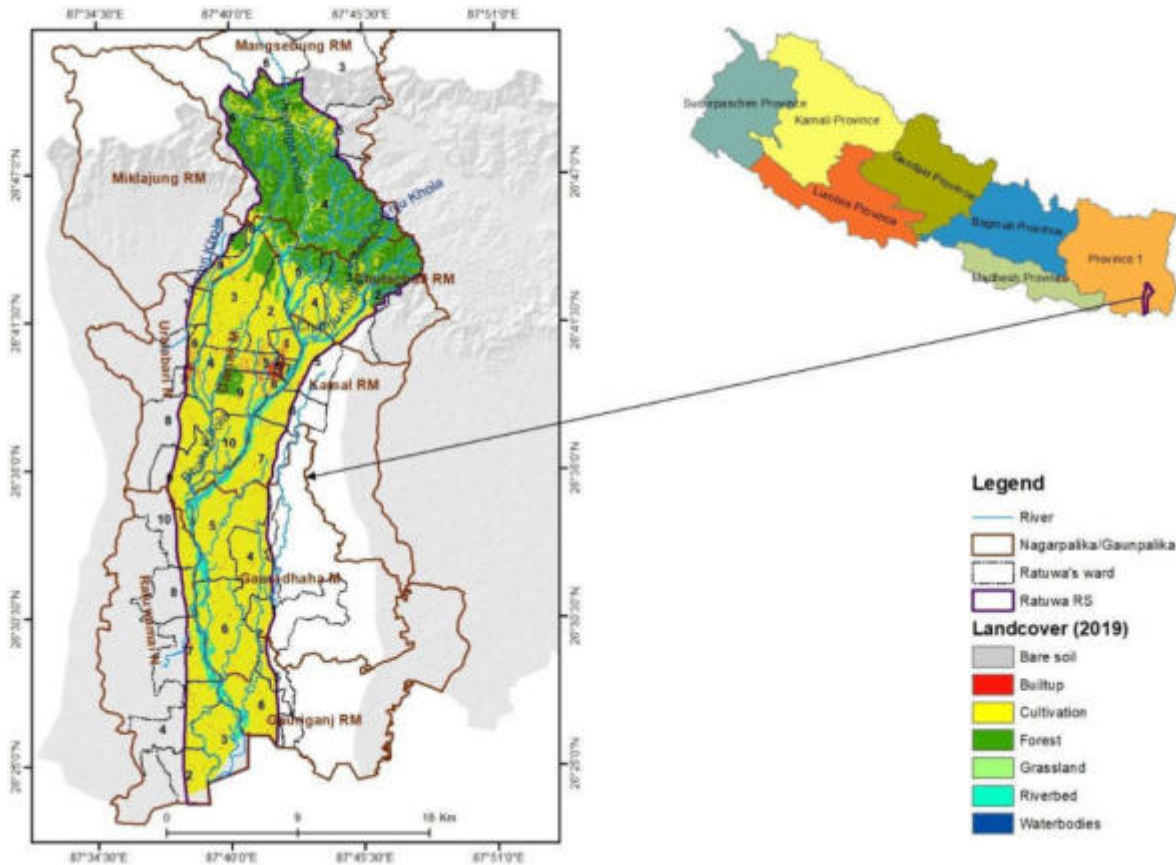
### **2.4.2 Workshop**

The two-day expert planning workshop was conducted at Birtamod of Jhapa district on 16 and 17 August 2022. The workshop was conducted for Ratuwa, Kankai, Biring and Mechi river systems of Jhapa and Illam district. Ratuwa river system covers some parts of Morang district. The preliminary CERP of Ratuwa was also discussed in workshop organized at Belbari of Morang district on 14 and 15 August 2022. The workshops were intended to validate the preliminary CERPs prepared from local stakeholder consultations. In the workshop, BRCRN-PPMU firstly briefed about introduction of the BRCRN project and objectives of the study. This session also included study process followed. In the workshop, detailed outcome derived from problem analysis, solution analysis and hotspot verification were shared. Issue related with deforestation, forest degradation, agriculture and disaster raised in local stakeholder workshops were shared with respective experts. Problem tree, solution tree, hotspot map, intervention packages, activities, safeguard analysis matrix, benefit enhancement activities were shared and discussed/verified in the workshop for individual river system. Comments and suggestions collected from the workshops are incorporated in relevant sections for improvement of the Critical Ecosystem Restoration Plan.

## CHAPTER 3 : INTRODUCTION TO RATUWA RIVER SYSTEM

### 3.1 Physiography, Land Cover and Hydrology

Ratuwa is originated from the hill, just upstream to Main Boundary Thrust and extend over  $26.394492^{\circ}$  to  $26.854306^{\circ}$ N and  $87.618454^{\circ}$  to  $87.801388^{\circ}$  E. The River system lies on Morang and Jhapa districts.



**Figure 5: Location of Ratuwa river system**

The geology of RS can be divided into lesser Himalaya group, Siwalik group (Lower, Middle and Upper Siwalik) and Terai-Quaternary group based on the rock types and their characteristics. The upper Siwalik is composed of conglomerates, sandstone and few mudstone beds. Whereas, middle Siwalik is comprised of fine to very coarse-grained sand, as well as pebbly sandstone, which alternate with mudstone. The proportion of sandstone beds is higher than that of the mudstone and coarseness of the sandstone increases towards the upper formation region (ADB, 2019). The Lower Siwalik consists of an interblending of mudstone and sandstone. Likewise, the Main Frontal Thrust (MFT), Mai Khola Thrust, Main Boundary Thrust (MBT), and Main Central Thrust (MCT) thrust together with several folds, faults and joints characterized the geomorphic process in RS.

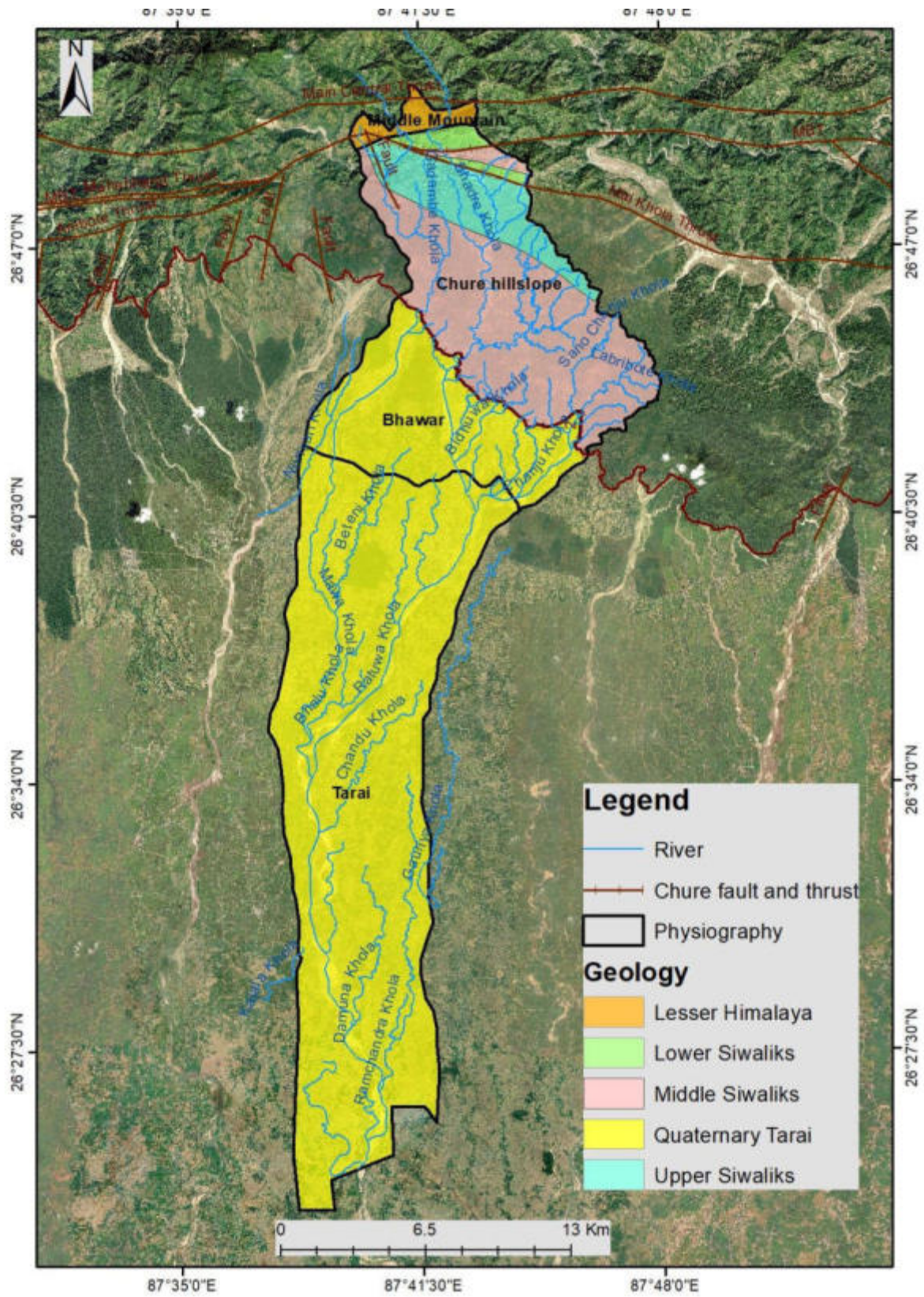


Figure 6: Geology of Ratuwa river system



In last two decades, built-up and forest<sup>1</sup> area of Ratuwa RS have increased by 571.7 ha and 414.7 ha at annual rate of 9.90% and 0.23% respectively, whereas other land covers were decreased. Higher rate of expansion of built-up area can be observed in and around of Damak and Urlabari area.

Field consultation revealed that development of river forest corridor and reforestation in abandoned Bhutanese refugee camp and private land plantation in Terai are contributing factors for increase in forest cover within the river system.

**Table 2: Land cover change in Ratuwa river system**

Land cover	2000		2019		Change area (ha)	Rate of Change (%/yr.)
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)		
Built-up	114.2	0.3	685.9	1.8	571.7	9.90
Cultivation	24758.0	66.5	23981.7	64.4	-776.4	-0.17
Forest	9282.1	24.9	9696.8	26.1	414.7	0.23
Grassland	547.6	1.5	435.8	1.2	-111.8	-1.19
Water bodies	200.2	0.5	182.7	0.5	-17.5	-0.48
Riverbed	2320.3	6.2	2239.4	6.0	-80.9	-0.19

Source: (ICIMOD & FRTC, 2021)

The Hydest WEC-DHM method estimated that overall discharge at the driest month (March) is 3.86m<sup>3</sup>/s and high discharge (71.89m<sup>3</sup>/s) occurred on August.

**Table 3: Average monthly discharges in Ratuwa RS and its tributaries**

Month	Long Term Average Discharge (m <sup>3</sup> /s)
January	4.96
February	4.22
March	3.86
April	4.12
May	5.75
June	19.45
July	60.17
August	71.89
September	55.17
October	23.99
November	10.60

<sup>1</sup> Land with tree crown cover of more than 10 percent and area covering more than 0.5 ha, with minimum height of the trees to be 5 m at maturity and in-situ conditions. The land may consist either of closed forest formations where trees of various storied and undergrowth cover a high proportion of the ground, or of open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10 percent.

December	6.82
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### 3.2 Climatic Conditions

The RS has subtropical climate with dry season (from October to May) and rainy season (from June to September). The annual average temperature is 24.3°C, ranging from 16° C in the coldest month to 29° C in the hottest month. The temperature rises from March to June-July while it decreases from October to January. The average annual rainfall is 2374.6 mm (DHM, 2021).

**Table 4: Rainfall distribution in Ratuwa RS**

Station	Average long-term rainfall (mm)		
	Annual	Monsoon	Maximum 24 hours
Damak	2374.6	1912.4	330

Source: DHM, 2021

The climate change scenarios analysis performed for National Adaptation Plan (NAP) process indicated that average annual mean temperature of Morang district is likely to rise, Representative Concentration Pathway (RCP) 4.5 projected that increased by 0.84°C and 1.2°C in medium-term and long term respectively. Increase in temperature of Jhapa district is projected as 0.83°C and 1.03°C for medium-term and long term respectively. The highest rates of mean temperature increase are expected for the post-monsoon season followed by the winter season (MoFE, 2019). Raising temperature further will create the water stress during the dry months through decreasing the agricultural production and thereby increasing food insecurity in one way or the other.

**Table 5: Climate change scenario in Ratuwa RS**

Temperature	District	°C	Change (°C)			
			RCP 4.5		RCP 8.5	
		Reference Period (1981-2010)	Medium Term (2016-2045)	Long Term (2036-2065)	Medium Term (2016-2045)	Long Term (2036-2065)
	Morang	23.2	0.84	1.2	1.04	1.76
	Jhapa	24.2	0.83	1.03	24.2	1.18

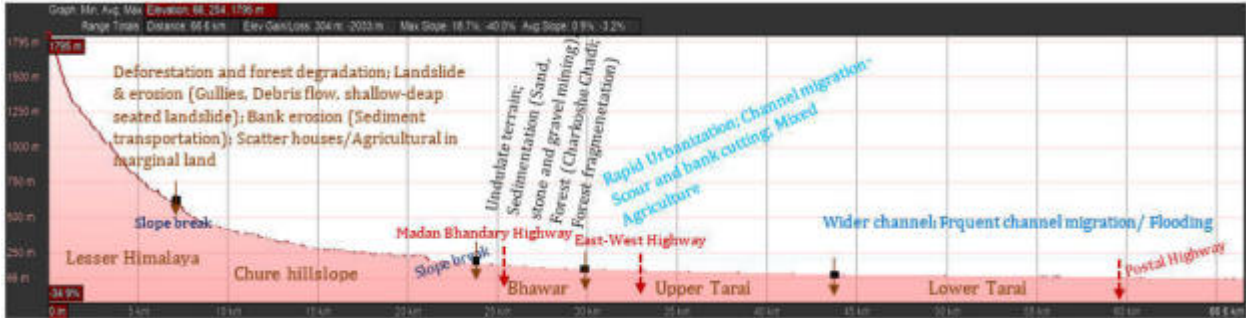
Precipitation		mm	Change (%)			
			RCP 4.5		RCP 8.5	
		Reference Period (1981-2010)	Medium Term (2016-2045)	Long Term (2036-2065)	Medium Term (2016-2045)	Long Term (2036-2065)
	Morang	2015	2.88	3.53	2.12	6.49
	Jhapa	2450	3.18	3.72	2450	6.54

Source: (MoFE et al., 2019)

Similarly, average annual precipitation is likely to change in both the medium-term and long-term periods. Precipitation of Morang district is likely to increase by 2.12% and 6.59% in the long period based on RCP 4.5 and RCP 8.5 respectively. Likewise, Jhapa district will receive 3.72% and 6.54% in the long period based on RCP 4.5 and RCP 8.5 respectively.

### 3.3 Socio-ecological Process

The hill and Terai indigenous groups cover the major ethnic groups in the Chure-hill and Terai respectively, whereas, mixed communities are found in Bhavar region. More than 82.9 % of total land of Chure hill is covered by forest, accompanied with 15.1% cultivated land. Forest coverage in Bhavar and Terai is very less and covers only 12 % and 3.1 % respectively.



**Figure 7: Elevation profile of Ratuwa RS, showing natural and social process**

Farmers in the Chure hill increasingly involved sustainable farming including commercial vegetable farming, horticulture and multiyear cropping together with animal husbandry such as Goat and Pig farming. Despite of these efforts, unsustainable farming practices are still existed. While the Bhavar and Upper Terai region is experiencing rapid urban expansion.

Family forestry in Mawa river has set an exemplary work on stabilization of river coarse which has several co-benefit such as livelihood improvement and enhance ecosystem services. Up-scaling of such good examples are however limited due to financial difficulties and inadequate knowledge transformation. Ratuwa has formed wider channel in the downstream where the channel migration and inundation are prominent, increasing the vulnerability of farmers adjacent to the river corridor.

## CHAPTER 4 : PROBLEM AND SOLUTION ANALYSIS

### 4.1 Problem Analysis

#### Theme I: Climate Change Mitigation

##### 4.1.1 Drivers and Underlying Causes of Deforestation and Forest Degradation

The major challenges of the forests sector identified at Ratuwa River System are deforestation and forest degradation. Causes of deforestation and forest degradation are usefully separated into direct drivers and underlying causes. Drivers of D&FD are mostly associated with anthropogenic activities.

The drivers are prioritized and presented in sequential order in Table 6.

**Table 6: Direct drivers and underlying causes of deforestation and forest degradation**

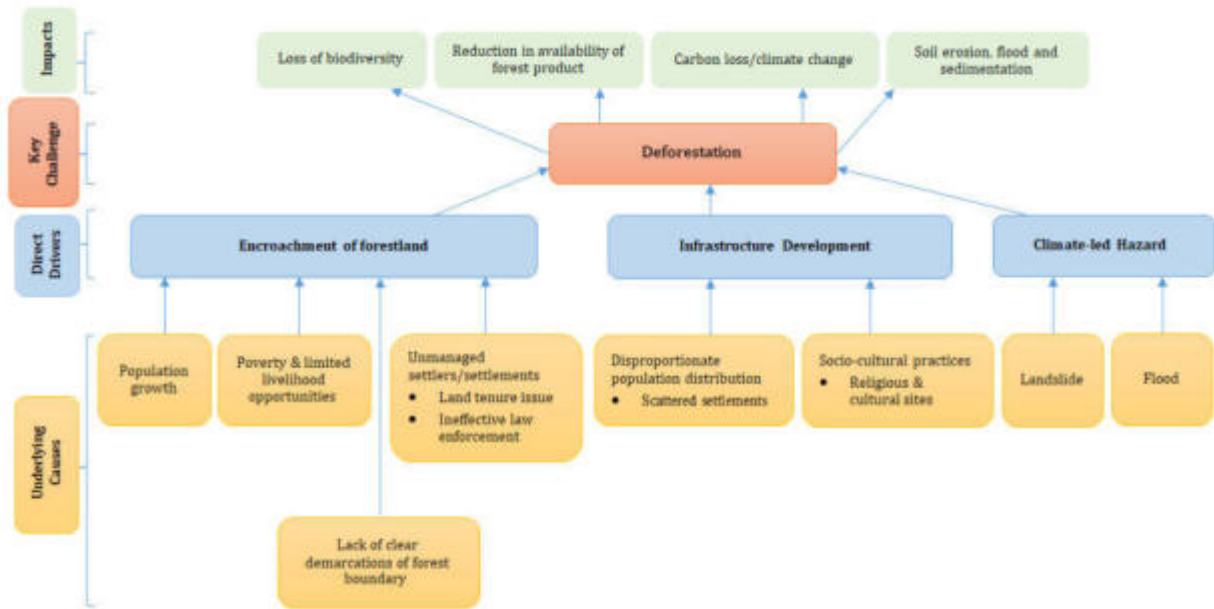
Drivers of D&FD	Underlying Causes	
Unsustainable harvesting and illegal logging	Poverty and limited livelihood opportunities	Forest products being a source of income generation to poor/marginalized
	Demand-supply gap of forest products	Delay in harvest and supply of forest products from Community forests
	Insufficient private land forests	Discouragement in private forests due to longer income return period; Inadequate supply of demanded species; Inadequate knowledge and skill of farmers on species selection, plantation and silvicultural operations for private land forest development
Forest fire	Lack of awareness	
	Carelessness from herders and forest dwellers	Throwing of cigarette butts, careless handling of fires etc.
	Intentional fire	Intentions of illegal poaching, improved forest products like forage & wild vegetables- Niguro; charcoal production
	Inadequate preparations for forest fire management	Inadequate skilled human resources for firefighting; Inadequate firefighting equipment in CFUGs; Inadequate management of fire lines; Inadequate efforts in removal of dry biomass accumulated in forest floor
Open and uncontrolled grazing	Lack of grazing land management	No specified grazing lands
	Inadequate fodder production in private lands	Small landholdings

Drivers of D&FD	Underlying Causes	
	Weak forest protection	Insufficient fencing for forest protection; poor enforcement of rules and regulations
Encroachment of forestland	Population growth	Settlement expansion; Agriculture land expansion
	Poverty and limited livelihood opportunities	
	Unmanaged settlers/settlements	Inadequate efforts of government in addressing land ownership issues
	Lack of clear demarcations of forest boundary	
Ineffective forest management practices	Limited financial and technical capacity of CFUGs	Low income of CFUGs; Inadequate skill, equipment and technicians for forest management; Forest Operational Plans (FOPs) without sensitivity analysis based on physiographic locations
	Barriers in forest enhancement	Problems associated with plantation & its protection- inadequate irrigation, open grazing, riverbank cutting and cutting of saplings by fodder, firewood collectors
	Weak governance	Declining accountability of CFUGs; Deficiency in forest sector transparency; Weak coordination and cooperation among stakeholders
Infrastructure development	Disproportionate population distribution	Construction of roads through forest areas to serve scattered settlements
	Socio-cultural practices	Construction of religious and cultural sites, cemeteries etc.; Customary practices; local norms and values; relationship between different religious groups etc.
Climate-led hazards	Erosion/landslide	Topography; Forest degradation in Chure; Construction of road without adopting detail engineering study and design; Heavy/erratic rainfall
	Flood	Heavy/erratic rainfall; Unmanaged excavation of riverbed materials as sand and gravel

❖ **Problem Analysis**

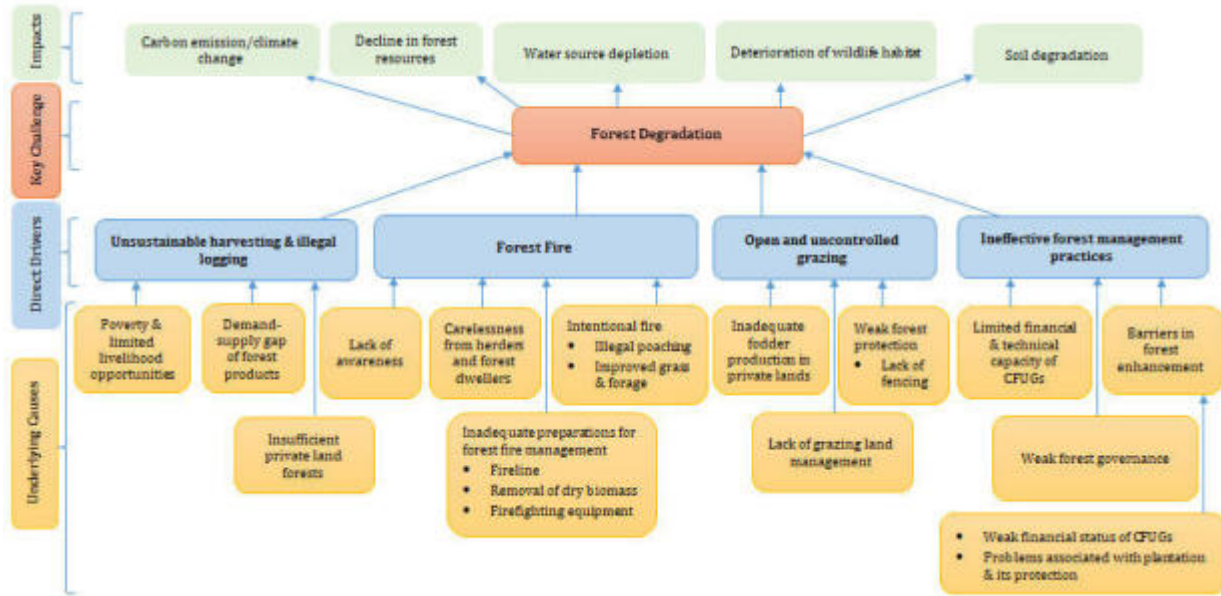
The findings from local stakeholder consultations and expert consultations indicate that unsustainable/illegal harvesting of forest products, forest fire, open/uncontrolled grazing, encroachment of forestlands and infrastructure development are the major drivers of deforestation and forest degradation in Ratuwa River System. Climate-led hazards like erosion/landslide and flood are other drivers of forest loss and degradation. Ineffective forest management practices also contribute to forest degradation.

Direct drivers of deforestation and forest degradation are the results of several underlying causes. The major underlying causes are high forest dependency; poverty and limited livelihood opportunities; ineffective forestry sector governance; weak law enforcement; lack of sustainable forest management; financial and human resource constraints in CFUGs and forest offices; and weak coordination and cooperation among concerned agencies.



**Figure 8: Problem tree for deforestation**

Deforestation and forest degradation are related to climate change and pose threats to biodiversity and livelihood of forest dependent local communities. Deforestation refers to complete loss of forest cover. One of the major drivers is encroachment of forestlands for agriculture land and settlement expansion. The underlying causes are population growth, limited livelihood options of households and unmanaged settlers (land tenure issues) near forest areas. Nowadays, in community forests, encroachment is minimal due to regular monitoring of forests by local community forest user groups. Any expansion is limited to minor shifting of boundaries into forestland at some locations. Infrastructure development in forest area is found to be other driver of forest loss. Unplanned and unregulated opening of road networks to serve scattered settlements, religious and cultural sites etc. are other causes of forest loss. Landslide and flood triggered by both human-induced and natural factors also cause forest loss. Inappropriate land use practices are main human-induced causes; and heavy/erratic rainfalls, steep slopes and other topographic conditions are the major natural causes (Figure 8).



**Figure 9: Problem tree for forest degradation**

Forest degradation relates to loss of biomass (carbon) and reduction in the capacity of forests to produce ecosystem services. Unsustainable and illegal harvesting is other driver of forest degradation. Harvesting of forest products comprise felling of trees and saplings (mostly illegally) for timber and poles, firewood collection for household use and sale, and repeated and unsustainable harvest of fodder. Unemployment has motivated many people for illegal collection of timber, firewood for sale. Demand-supply gap of forest products through legal channel also motivates people for illegal and unsustainable harvest. The other important causes are unregistered lands and insufficient private land forests due to small landholdings. People are demotivated in private forestry due to inadequate knowledge and technology on forest management and longer income return period with private forestry among others. Forest fire is other major drivers of forest degradation. It damages and hinders regeneration, seedling growth and destroys non-timber forest products under lower strata of forest floor. It is also believed to trigger soil erosion due to the destruction of natural vegetation. Forest fire is caused either due to careless handling of fire by forest dwellers and herders or intentionally by poachers for hunting; and local communities for improved forest products like forage & wild vegetables- Niguro and charcoal production. The spread of forest fire has been difficult to handle due to inadequate trained human resources and firefighting equipment. Early preparations for forest fire like fire line management, removal of dry biomass are also inadequate. Open and uncontrolled grazing negatively affects regeneration and growth of seedlings and ultimately causes forest degradation. People are dependent on forests for grazing due to loss of grazing lands, inadequate fodder production in private lands and lower financial capacity to switch to stall feeding. Ineffective forest management practice is also one of the drivers of forest degradation. It is mainly associated with institutional weakness caused by lower financial capacity and technical resources; barriers in forest enhancement; and weak forest governance due to deficiency in forest sector transparency, declining accountability, and weak coordination and cooperation among forest stakeholders. Poor financial status of CFUGs; and inadequate inputs and protection of plantation sites due to open grazing, riverbank cutting and cutting of saplings by fodder, firewood collectors are major barriers of forest enhancement in the area (Figure 9).

**Theme 2: Climate Change Adaptation**

#### 4.1.2 Drivers and Underlying Causes of Vulnerable Ecosystem and Community

Climate induced disaster and climate stress on agriculture productivity are two key challenges representing vulnerable ecosystem and local community in Ratuwa River System. These two key issues have impacts on the ecosystem and livelihood generations through damage to natural vegetation, loss and damage of agricultural lands, loss of life and properties, low family income and food insecurity.

The drivers are prioritized and presented in sequential order in Table 7.

**Table 7: Direct drivers and underlying causes of vulnerable ecosystem and community**

Drivers	Underlying Causes	
<b>Climate Induced Disaster</b>		
Flood	Upstream landslide and erosion	Fragile geological condition and slope terrain
	Heavy/erratic rainfall	High intensity rainfall and continuous rainfall for several days
	Unmanaged excavations of river bed materials	Lack of environment assessment; Higher demand of river bed materials due to urban growth
	Riverbed rise due to siltation	
	Riverbank encroachment	
	Inadequate drainage management	Inadequate consideration of water drainage during construction of infrastructures like roads, causing inundation
Erosion/landslide	Topography	Fragile geological condition and slope terrain
	Heavy/erratic rainfall	High intensity rainfall and continuous rainfall for several days
	Forest degradation	Forest fire, open & uncontrolled grazing, unsustainable harvesting
	Cultivation in marginal lands	Limited productive lands for the community
	Road construction without adopting engineering study and design	Use of heavy machineries in road construction
Weak disaster risk management	Inadequate capacity and coordination	Insufficient and scattered investments; weak coordination and collaboration at national level; inadequate pre-preparedness
	Ineffective Disaster Risk Reduction (DRR) policy and planning	Low capacity of local governments in DRR planning and implementation; Less priority to disaster preparedness; lack of integrated planning for DRR



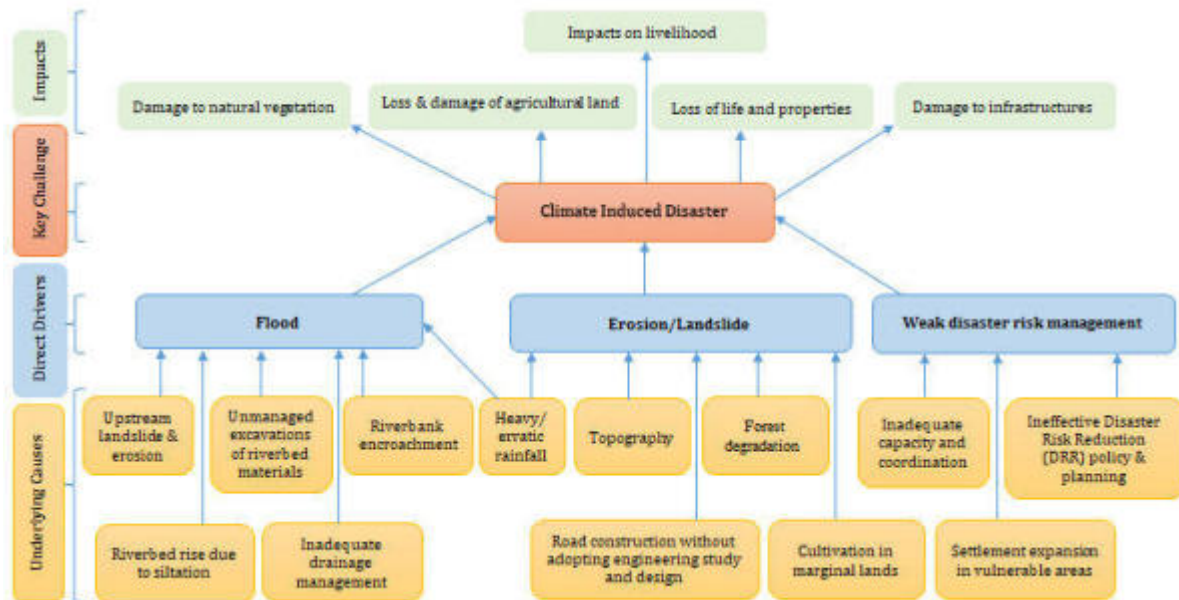
Drivers	Underlying Causes	
	Settlement expansion in vulnerable areas	Risk acceptance due to poverty and greed for financial gain, opportunity cost of land
<b>Climate Stress on Agriculture Productivity</b>		
Inadequate capacity and resources	Limited farm skill and technology use	Inadequate skilled farm technicians at local level
	Low investment capacity of farmers	Governments failure to identify and support real farmers (dominance of elites/paper farmers)
	Inadequate irrigation facilities	Dry area, limited water sources (upstream); Irregular and low voltage electricity supply (downstream)
	Poor market access and infrastructures	Higher cost of production and low market price of sale; Market dominated by intermediaries; Lack of storage facilities
Pests and diseases	Decline in organic content of soil	Use of chemical fertilizers and pesticides; Prescriptions of pesticides by agriculture technicians without site inspection; Lack of soil quality test and monitoring
	Use of less immune hybrid varieties	Low production from native varieties; Loss or limited availability of native varieties due to lack of conservation; Inadequate technical knowledge, skill and facilities for seed selection, grading and storage
	Loss of farmer friendly insects due to mechanization	
	Inadequate weeding and monitoring of croplands	
	Inadequate knowledge and skill of farmers on identification and treatments of pests and diseases	
	Climate impacts like heavy rainfall, fogs and others	
Soil quality degradation	Low organic inputs	Insufficient compost manure due to declining livestock farming

Drivers	Underlying Causes	
	Use of chemical fertilizers and pesticides	Low production in use of compost manure; Inadequate knowledge, skill and technology for compost, bio-pesticides production

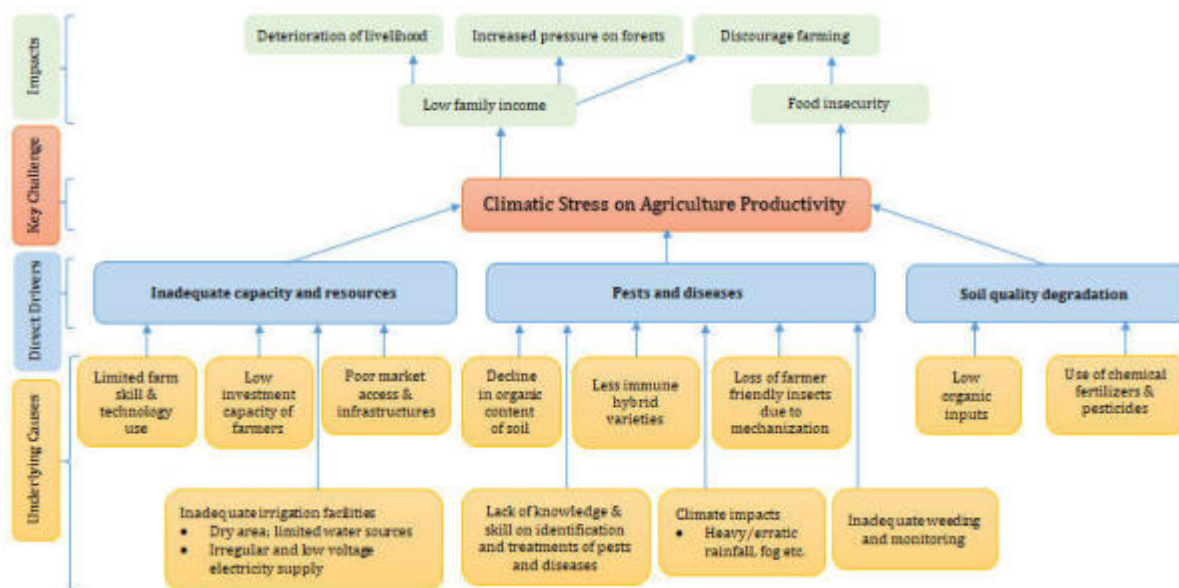
❖ **Problem Analysis**

Flood, erosion/landslide, and weak disaster risk management are major drivers of climate induced disaster that enhances ecosystem and local community vulnerability. Flood and landslide have caused loss and damage of natural vegetation, agricultural land, and properties affecting local people’s livelihood. Impacts of flood are associated with inundation, riverbank cutting, and channel migration. Inundation is higher in downstream region. The underlying causes among others are inadequate drainage management and riverbed rise due to siltation. These disasters are triggered by both natural and anthropogenic causes. Inappropriate land use practices like cultivation in slope lands, forest degradation, unplanned and unregulated road construction, and unmanaged riverbed material excavation are main human-induced causes. Heavy/erratic rainfalls, steep slopes and other topographic conditions are major natural causes. Weak disaster risk management has further exacerbated exposure to these disasters. The reasons behind this are weak coordination and collaboration among concerned sectors and ineffective Disaster Risk Reduction (DRR) policy and planning. The investments in DRR are inadequate and scattered. Settlement expansion in vulnerable areas also makes it difficult in disaster risk management (Figure 10).

Climate stress on agriculture productivity is the other aspect of vulnerable community. It has direct impact on people’s livelihood through low family income and food insecurity. It eventually makes forest ecosystem vulnerable through increased pressure in forest resources. The major drivers are inadequate farm skills and financial resources; pests and diseases; insufficient irrigation; and soil quality degradation. Farmers have limited skill for commercial and climate resilient farming practices. There is less use of technology and equipment to enhance agriculture productivity. Irrigation facilities are not sufficient. The problems associated with irrigation are limited water sources (dry area), and irregular and low voltage electricity supply to operate pump sets for irrigation. Investment capacity of small farmers is low due to poor financial status. Government support is inadequate. Moreover, poor market access and infrastructures have demotivated farmers to adopt commercial agriculture. Production cost is higher compared to market price of sale of products. Market is dominated by intermediaries. Lack of farm labors due to youth migration abroad, lack of agriculture technician at local level and inadequate promotional programs (incentives, subsidies, farm equipment support) are other problems in agriculture sector. Farmers depend on chemical fertilizers and pesticides for increasing agriculture yield. It has resulted in low organic content deteriorating soil quality. It also increases pests and diseases. Crop insects, pests and diseases are also increasing due to use of less immune hybrid varieties. Farmers use hybrid varieties due to seed unavailability and low production from native varieties. The other causes of pests and diseases are loss of farmer friendly insects due to mechanization; lack of weeding and monitoring; and climatic impacts like heavy rainfall, fog etc. Farmers lack technical skills on identification and treatment of pests and diseases (Figure 11).



**Figure 10: Problem tree for climate induced disaster**



**Figure 11: Problem tree for climate stress on agricultural productivity**

#### 4.1.3 GESI Issues Observed in Problem Analysis

Women, IPs, Dalits, poor and marginalized groups have less access to finance, technology and skill to address the deforestation problems and policy gaps in addressing gender governance. Women are not able to ask for their equal rights to natural resources management. Women and marginalized groups are not having adequate knowledge and awareness in policies and law for sustainable forest management. Gendered governance, participation and integration was found to be low in all the issues and their voices are not heard or skills and technological access is weak. Women not having land titles and settlement with unregistered lands do not allow women, IPs or marginalized communities to get benefits from the project interventions. The GESI issues identified from problem analysis are presented in Table 8.

**Table 8: Problems associated with GESI**

Drivers	Underlying Causes	
Inadequate exercise of gender-inclusive governance in climate change, sustainable natural resource management (SNRM) practice	<ul style="list-style-type: none"> <li>• Male- supremacy and dominance in decisions</li> <li>• Limited access of women to information and communication (especially climate change and SNRM-related information, facility, fund, notice, and subsidies)</li> <li>• Less consultation with women regarding agenda and time of meetings</li> <li>• Unavailability of disaggregated data</li> <li>• Lack of recognition of traditional knowledge of women in climate resilient land use practices (CRLUP)/SNRM</li> <li>• Articulation of CRLUP/SNRM /DRR as scientifically complex subjects</li> <li>• Limited knowledge on gender mainstreaming approach and value among officers/key people</li> <li>• Gendered power relations within households and in society and restricted mobility of women</li> </ul>	<ul style="list-style-type: none"> <li>• Hesitation to speak in meeting</li> <li>• Less knowledge on CFUG management</li> <li>• Less knowledge on climate change adaption</li> <li>• Insufficient women participation</li> <li>• Increased vulnerability of women towards environmental changes</li> <li>• Slower women leadership development in natural resource management (NRM), forest management and DRR</li> <li>• Low income of women</li> <li>• Less control of women over high value forest products</li> </ul>

**4.2 Solution Analysis**

**Theme I: Climate Change Mitigation**

**4.2.1 Activities for Reducing Forest Loss and Enhancing Forest Density**

Various activities have been identified for reducing forest loss and enhancing forest density and enrichment. The activities are proposed to mitigate deforestation and forest degradation by providing solutions to direct and underlying drivers. The strategic actions include reducing forest dependency by addressing poverty and livelihood issues; promoting agroforestry, livestock management and private forestry; strengthening forest fire control system; controlling open grazing; improving law enforcement and overall forestry sector governance; promoting sustainable forest management; controlling further encroachment of forestlands; and capacity enhancement of user groups and government forestry staffs. Afforestation and reforestation activities are proposed to enhance forest density (Table 9).

**Table 9: Activities for reducing forest loss and enhancing forest density**

Drivers of D&FD	Activities against Drivers	
Unsustainable harvesting and illegal logging	Enhance income generation opportunities for poor/marginalized forest users	Skill development trainings and equipment support; Promote forest based industries
	Promote woodlots/commercial plantation in private lands	Seedling distribution (fast growing and high value)- Supari (Areca nut), Nimaro ( <i>Ficus roxburghii</i> ), Badahar ( <i>Artocarpus lacucha</i> ), Banana, Litchi ( <i>Litchi chinensis</i> ) etc.; Provide fencing support; Training on plantation measures and silvicultural practices; Sensitization on forest

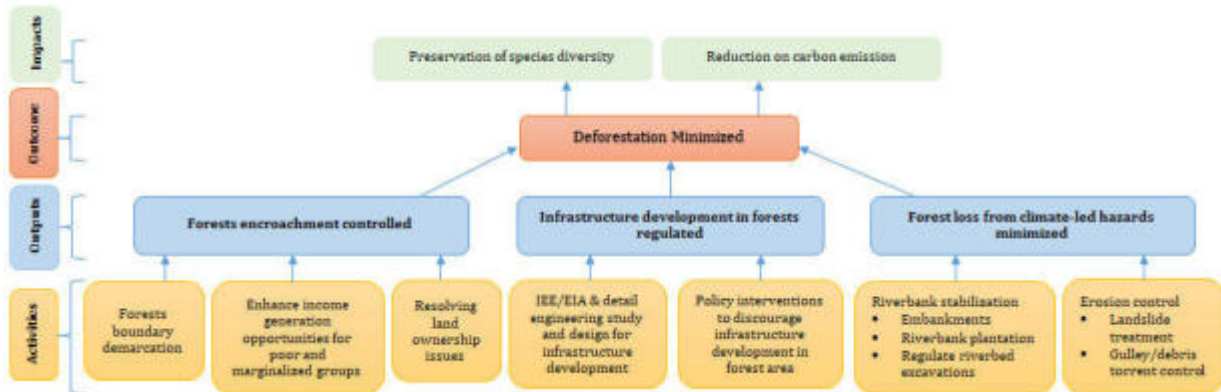
Drivers of D&FD	Activities against Drivers	
		policies and laws; Implement programs like “one household ten trees)
	Promote agroforestry	Promote multiyear high value species and horticulture
	Improve legal supply of forest products	
Forest fire	Sensitization/awareness programs	Sensitize communities on the impacts of forest fire on ecosystem functions/services and their restoration; Strengthen forest monitoring and activities to control illegal poaching; Provision of reward/recognition to informants
	Firefighter training and support firefighting equipment to CFUGs	Coordination and collaboration with DFOs/DRRMC and security forces
	Construction and improvement of fire lines	Capacity development and funding support for fire line construction
	Enhance water availability during forest fire	Construction of conservation ponds in forest area for water storage
	Removal of dry biomass	Promote compost production from dry leaf litters and unwanted bushes
Open and uncontrolled grazing	Promote stall feeding	Training and support on commercial livestock farming and shed improvement; Support commercial farming of pig, goat, buffalo etc.
	Support fodder banks in private and public land	Distribution of seeds/seedlings of fodder trees (Bamboo, Bakaino ( <i>Melia azedarach</i> ), Tanki ( <i>Bauhinia purpurea</i> ), Epil Epil ( <i>Leucaena leucocephala</i> ) and nutrient grasses; Provide technical trainings
	Fodder and grass plantation in specified areas of CFs	
Encroachment of forestland	Resolving land ownership issues	Policy commitments/Policy interventions
	Forest boundary demarcation	Technical and financial support to DFOs/sub-DFOs

Drivers of D&FD	Activities against Drivers	
	Enhance income generation opportunities	Trainings and subsidies for entrepreneurship development to poor/marginalized households residing close to forests; Promote commercial farming
Ineffective forest management practices	Implementation of sustainable forest management	Review/upgrade/renewal of forest operational plans of CFUGs; Sensitization/awareness programs on sustainable forest management; Training on silvicultural operations and equipment use
	Establish/upgrade nurseries	Demand based seedlings production
	Implement forest enhancement activities	Enrichment plantation, assisted natural regeneration, riverbank plantation etc.
	Strengthen forest governance	Joint coordination meeting of government staffs and CFUGs to enhance accountability and transparency
Infrastructure Development	Regulate infrastructure development in forest area	Promote environment friendly infrastructures; IEE/EIA & detail engineering study and design for infrastructure development; Discourage construction of concrete structures in cemeteries
Climate-led hazards	Landslide treatment	
	Erosion/gulley control	
	Riverbank stabilization	
	Regulate riverbed excavation	Coordination among local government, other associated government agencies and CFUGs; Environment assessment (EIA/IEE) for riverbed excavations

❖ **Solution Analysis**

Solution trees are prepared to minimize deforestation and restore degraded forests. Deforestation is associated with encroachment of forestlands, infrastructure development and natural hazards. The foremost activity to control encroachment is to resolve land tenure issues. This requires interventions at policy level. Forest boundary demarcation also resolves land tenure issue and requires strong law enforcement to avoid further encroachment. Poverty and livelihood issues can be addressed by enhancing income generation opportunities for poor/marginalized groups through skill development trainings and forest based entrepreneurship. Infrastructure development in forest areas can be regulated through policy interventions; enhancing inter-agency coordination and cooperation; and provision of environment assessment (IEE/EIA), detail engineering study and designs. Infrastructures in forest areas

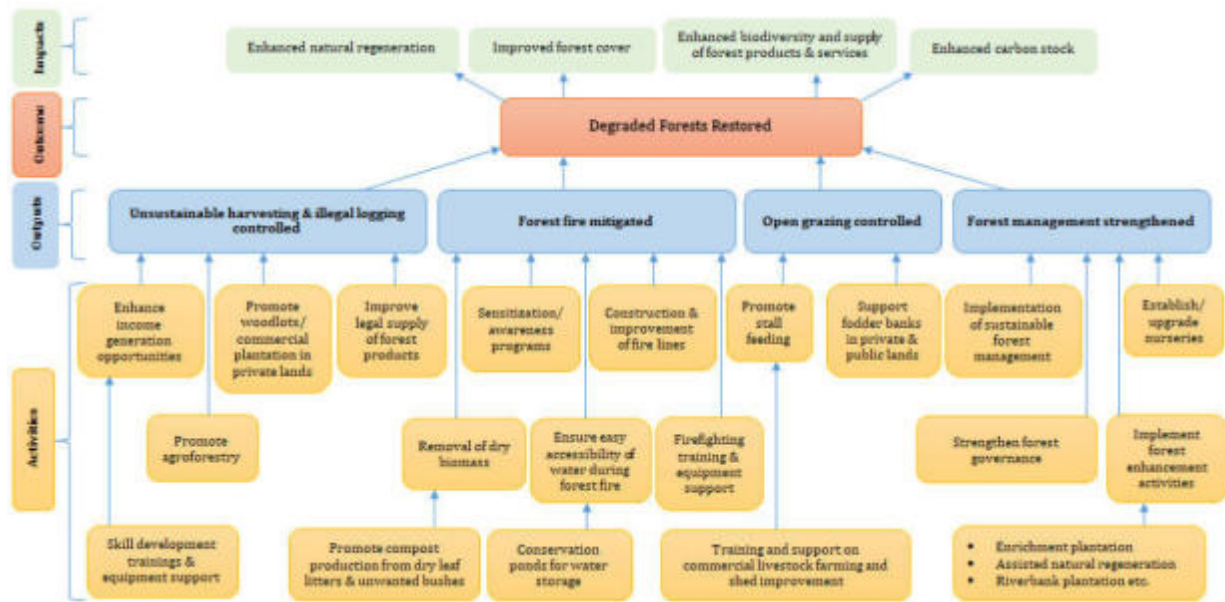
should be environment friendly. Forest loss from natural hazards can be reduced through landslide treatment, gully/debris torrent control and riverbank stabilization (Figure 12).



**Figure 12: Solution tree for minimizing deforestation**

Degraded forests can be restored through mitigation of direct and underlying drivers of forest degradation, improving natural regeneration and plantations. Illegal harvesting of forest products can be minimized by enhancing income generation opportunities for poor/marginalized forest dependent people and improving legal supply of forest products. The socially and economically marginalized forest dependent people can be provided with skill development programs; and support for entrepreneurship development, commercial agriculture and livestock farming. Promoting agroforestry and private forestry also reduces forest dependency. Local government needs to be sensitized on private forestry. Promotion of agroforestry and private forestry require seedlings and technical support. Fodder trees and nutrient grasses can be promoted in private and public lands. This enhances fodder availability outside forests and reduces pressure of open grazing in forests. Open grazing can also be controlled through livestock breed improvement and stall feeding. Providing training and support on commercial livestock farming and shed improvement can be helpful in promoting stall feeding. Forest fire can be mitigated by enhancing firefighting capacity and early preparations. The CFUGs need to be well trained and equipped to control forest fire. Periodic removal of dry biomass and construction of fire lines reduces forest fire spread. In turn, the bushes, dry leaf litters can be used for compost/manure production. Construction of water storage ponds in potential strategic locations enhances water availability during forest fire. Moreover, forest monitoring should be enhanced in coordination with Nepal police; and provision of daily allowance, rewards/recognition to those involved in forest patrolling to control illegal harvest of forest products and poaching.

Forest management can be improved through FOP implementation and strengthening of sustainable forest management practices, implementation of forest enhancement activities and strengthening of forest sector governance. All the CFUGs should have valid sustainable forest management operation plan. They should be well trained and equipped for its implementation. Forest enhancement can be done through afforestation and reforestation. Seedling/sapling availability can be ensured by construction/upgradation of nurseries. Priority should be given to local native species while other commercial species can also be introduced through proper study and in line with safeguard measures. Nurseries should produce saplings of demand based species that will encourage plantation. Moreover, government staffs and CFUGs' executive committee members should be sensitized and capacitated to strengthen forest sector governance (Figure 13).



**Figure 13: Solution tree for restoration of degraded forests**

❖ **Major Activities and Outputs**

The major activities and outputs proposed for reducing forest loss and enhancing forest density are presented in Table 10.

**Table 10: Major activities and outputs for reducing forest loss and enhancing forest density**

Major Activities	Outputs
Forest fire control	Restored degraded forests area halting forest fire, illegal harvesting and grazing
Agroforestry promotion	
Income source of poor/marginalized forest users enhanced halting illegal harvesting	
Improvement of forest cover within national forest through enrichment plantation/ANR	Improved natural forest management and increased forest area outside the forest
Restoration, enhancement and maintenance of forests and tree cover in the river system landscape through Public and private forestry	
Strengthening forest management	

❖ **Key Observations/Recommendations from Expert Planning Workshop**

- It would be effective to enhance cooperation and collaboration with security institutions (Nepal police, Armed Police Force, Nepal Army) for forest fire management as well as control of poaching. They should be provided with essential equipment like fire extinguisher, fireproof jackets, water jet spray etc. as well as rewards/recognition.
- There should be provision of reward/recognition and compensation/insurance for forest firefighters. Trainings on use of firefighting equipment and safety measures.
- Provision to include source of timber during approval of building construction might be helpful in reducing illegal logging.
- Farming of improved livestock breeds that are favorable to stall feeding can be one of the solutions to minimize open grazing. Multiyear fodder trees and grasses should be supported to farmers. The other solution is promotion of silage production.
- Women involved in illegal harvesting have been difficult to deal with due to lack of female forest guards. So female forest guards should be appointed.



- Sensitization programs to raise awareness on seedling/sapling distribution, data collection on seedling/sapling with higher demand in coordination with ward administration and train people on plantation. Make videos/documentaries on seedling/sapling plantation.
- About 20% fruit trees can be included in enrichment plantation, demonstration plantation and others. It can be effective in reducing human-wildlife conflict especially monkey.
- Support should also be provided for fencing using mesh wire to protect plantation sites.
- Provision of public hearing for approval of forest operational plans. Sanitization of FOPs to CFUGs and local government. FOPs should have fewer contents and must be easily readable by CFUGs.
- Preliminary soil tests for risk reduction in implementation of enrichment plantation.
- Include trainings on processing and semi-processing for skill and entrepreneurship development.
- Coordination with local government should be ensured for activities such as skill development training, entrepreneurship development and others that draw attention of the local government.
- Mitigation of human-wildlife conflicts.
- Prevention on spreading of invasive species (weeding at least four times a year) will be cost-effective.

## Theme 2: Climate Change Adaptation

### 4.2.2 Activities for Enhancing Adaptation/Resilience of Ecosystem and Community

Various activities are identified for disaster risk reduction, supporting climate resilient farming and enhancing agriculture productivity based on direct and underlying causes of vulnerable ecosystem and community. The activities are proposed to cope with those drivers and enhance adaptation/resiliency of ecosystem and local community (Table II).

**Table II: Activities for enhancing adaptation/resilience building of ecosystem and community**

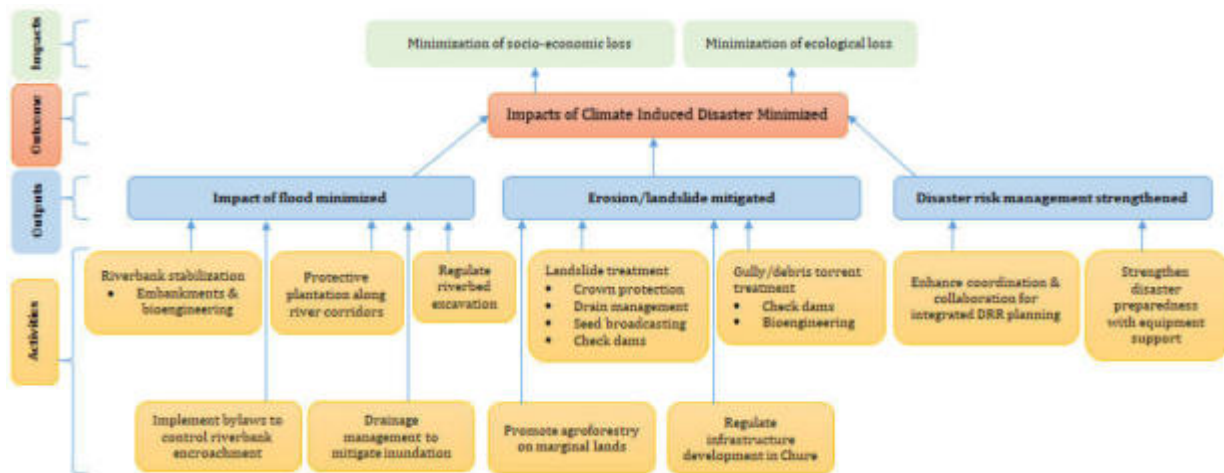
Drivers	Activities Against Drivers	
<b>Climate Induced Disaster</b>		
Flood	Riverbank stabilization	Embankments and bioengineering
	Protective plantation along river corridor	Control grazing in riverbanks
	Regulate riverbed excavation works	Coordination among local government, other associated government agencies and CFUGs; Environment assessment (EIA/IEE) for riverbed excavations
	Implement bylaws to control riverbank encroachment	
	Drainage management to minimize inundation	
Erosion/landslide	Landslide treatment	Crown protection, drain management, seed broadcasting, check dam etc.

Drivers	Activities Against Drivers	
	Construction of check dams and bioengineering for gully/debris torrent protection	
	Promote agroforestry on marginal land	Promote high value/multi-year species, fodder and grasses
	Regulate infrastructure development in Chure hillslope	IEE/EIA & detail engineering study and design for infrastructure development
Weak disaster risk management	Enhance coordination and collaboration among concerned agencies for integrated DRR planning	Participatory planning approach including women, Dalit, IPs and poor and marginalized groups
	Strengthen disaster preparedness with equipment support	Hazard risk assessment and preparation of Risk Sensitive Land Use Plan by local government; Preparation of bylaws and implementation of setbacks for construction of houses in flood prone areas
<b>Climate Stress on Agriculture Productivity</b>		
Inadequate capacity and resources	Establish Farmer Field Schools (FFS)	Trainings on climate resilient farming and land use practices
	Incentives to promote commercial farming	Provide seed money, soft loans, subsidies in equipment, production based subsidies, and support shed improvement for commercial farming
	Promote alternative irrigation practices	Training and support drip irrigation, rainwater harvesting, earth bag ponds etc.; Construction of water conservation ponds, rainwater harvesting ponds
	Establishment of collection, storage and processing facilities	
Pests and diseases	Train farmers on identification and treatments of crop and livestock diseases	
	Promote conservation of resilient native crops and local livestock breeds	Training and support selection, grading and storage of seeds; Improvement of local livestock breeds and crop varieties for resiliency and higher production

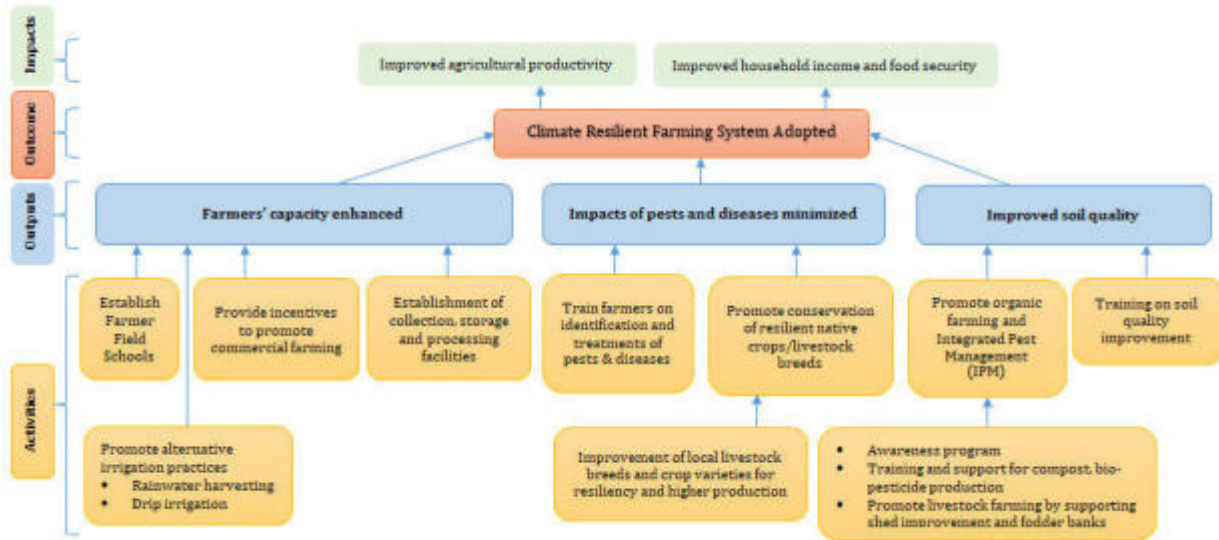
Drivers	Activities Against Drivers	
Soil quality degradation	Promote organic farming and Integrated Pest Management (IPM) through FFS	Awareness programs on negative impacts of chemical fertilizers and pesticides; Promote livestock farming by supporting shed improvement and fodder banks
	Training on soil quality improvement	Trainings on IPM and compost production; Trainings on measures to use compost and bio-pesticides for various crop cultivation; Support soil quality test

### ❖ Solution Analysis

The strategic actions proposed for disaster risk reduction are riverbank stabilization, landslide treatment, erosion control, and strengthening disaster risk management. Riverbank stabilization requires construction of embankments. Riverbed material excavation must be regulated in coordination among local government, other associated government agencies and CFUGs to reduce flood risk. Riverbank encroachment must be controlled through preparation of bylaws and other regulatory measures. Moreover, drainage management is required to avoid inundation. Landslide treatment can be done through crown protection, drain management, seed broadcasting etc. gullies/debris torrent can be treated by constructing check dams. To avoid erosion from human-induced causes like infrastructure development (road constructions) must be regulated. Promoting agroforestry, livestock management and conservation agriculture in slopy lands also help in reducing soil erosion. Plantation of high value species, multi-year plant species, fruits not only reduces erosion but also provides the source of income. Bioengineering can be integrated for effectiveness along with structural measures. It also enhances vegetation cover. The other important activity to minimize disaster risk is to enhance coordination and collaboration between different agencies working for disaster risk management. The disaster risk reduction plans of various agencies should be integrated that provides solution to inadequate and scattered investments thereby enhancing effectiveness of DRR activities. Local governments should be encouraged to prepare Risk Sensitive Land Use Plans and strengthen disaster preparedness. Disaster preparedness can also be strengthened through equipment support. Settlement expansion in flood prone areas can be controlled through preparation of bylaws and implementation of setbacks for construction of houses in those areas (Figure 14).



**Figure 14: Solution tree for minimizing impact of climate-induced disasters**



**Figure 15: Solution tree for climate resilient farming practices**

One of the important aspects of enhancing adaptation/resilience building of ecosystem and local community would be climate resilient farming practices and enhancing agricultural productivity. Increase in agriculture productivity will improve livelihood of small farmers and at the same time, it will decrease forest dependency. To achieve this, foremost priority should be to enhance capacity of farmers. Farmer Field Schools can be the best solution where farmers will be trained on climate resilient farming practices and enhancing agriculture productivity. Training farmers alone would not be sufficient to encourage farmers. Providing seed money, soft loans, subsidies in equipment, production based subsidies, improving irrigation facilities and livestock shed improvement can encourage farmers to commercial farming. Alternative irrigation practices like rainwater harvesting, drip irrigation can be promoted along with conservation of water sources to improve irrigation facilities. Organic farming and Integrated Pest Management (IPM) can be promoted to improve soil quality by reducing use of chemical fertilizers and pesticides. It can be promoted by providing trainings and equipment support. Promoting commercial livestock farming can further enhance organic farming. Farmers should be provided with technical support and incentives for commercial livestock farming and shed improvement. They can be encouraged to establish fodder banks in private land by providing seedlings of fodder trees and nutrient grasses. It will be helpful in promoting stall feeding and decreases impact on forest due to open grazing. Promoting organic farming and IPM can also be beneficial in reducing crop pests and diseases. Farmers can also be trained on identification and treatment of pests and diseases. Conservation of resilient native crops and local livestock breeds should be promoted. Breed improvement of native crop/livestock varieties can improve resiliency and enhance productivity (Figure 15).

❖ **Major Activities and Outputs**

The major activities and outputs proposed for enhancing adaptation/resilience building of ecosystem and local community are presented in Table 12.

**Table 12: Major activities and outputs for enhancing adaptation/resilience building of ecosystem and community**

Major Activities	Outputs
Controlling erosion/landslide and management of sedimentation	Minimized impacts of climate induced disasters (erosion,
Agroforestry promotion in marginal/sloping lands	

Major Activities	Outputs
Minimization of negative impact of Flood	landslides/ sedimentation and flooding)
Strengthening disaster risk management and awareness creation on climate resilient NRM	
Establish and operationalize Farmers Field Schools (FFS)	Farmers adopted climate resilient farming practices
Implementation of climate-resilient land use practices (pest and disease minimized, soil quality improved, irrigation facility enhanced)	

❖ **Key Observations/Recommendations from Expert Planning Workshop**

- Provide support to private landowners to promote tree plantation in adjoining private lands along with riparian/riverbank plantation.
- Promote climate resilient agriculture practices and coordinate with agriculture offices.
- Terrace improvement can be done if landowner is not willing to accept multi-year cropping on existing terraces.
- Assessment of soil suitability for promotion of agroforestry. Promote fast growing species and ensure seedling quality. Use of fast growing techniques like grafting for quick return of income.
- Establishment of agriculture based library at ward level can be effective for promotion of agriculture.
- Rewards to farmers, provision of crop insurance and incentives/subsidies in equipment to promote agriculture.
- Trainings related to agriculture should at least be focused on one crop cycle rather than short-term trainings. It would be better to train farmers on seasonal crop cycles so as to enhance their knowledge, skill and capacity in crop farming at various seasons. These trainings not necessarily be conducted in daily basis, rather weekly basis trainings would be sufficient.
- There is increasing demand for compost/vermi-compost fertilizers. Thus community composting should be promoted. For this efficient CFUGs should be identified and supported.
- Market linkage should be ensured along with the skill development trainings. Enhance coordination and collaboration to involve local government for such activities.
- Address gender inclusive governance, which has been the weakness in addressing policy issues and practicing good governance.

**4.2.3 Gender Inclusive Action Plan and Process**

Gender inequality and social norms limit women’s access to resources and sufficient opportunity to participate in the decision-making process, particularly in sustainable natural resource management. Women are playing a significant role in the conservation of forests and increasing the adaptability of climate change impact. The entire CERP process has adopted gender-inclusive actions such as ensuring equal participation during the consultation. The process adopted a gender-specific approach to collect problems, especially among women's user groups, through the Himalayan Grassroots Women's Natural Resource Management Association (HIMAWANTI). The gender-specific approach adopted particular research tools such as seasonal calendars, problem and solution community workshops, and focus group discussions among women, Dalits, IP's women, and other marginalized communities. Also, the consultation process includes a consultation with women and women lead organizations. The male leaders were also involved in advocating gender equality and women’s engagement in the climate change planning process. The gender mainstreaming approach is included in problem and solution analysis and the recommendation has been incorporated in the plan. Key issues and solutions on gender equality in SNRM:

**Table 13: Gender issues and gender inclusive actions**

Key issues	Solution
1. Unequal representation and influence of women in NRM, CCA, and DRR governance	1. Equal representation of women and consideration of specific adaptation needs is a must to realize inclusive SNRM and CCA
2. Women's issues and capacity are not considered in the planning process	2. Involvement and integrating women and women's concerns need to include in the programming process (planning, budgeting, monitoring, evaluation, and redesigning of the plans and project)
3. Women are just counted as vulnerable groups and passive beneficiaries of development interventions	3. Plan/conduct gender mainstreaming training, learning events, and advocacy campaigning for gender integration for the government officers, CBOs executive, local resource persons, and other stakeholders
4. Women are more involved in labour contributions both in conservation and management of natural resources	4. Learning and sharing platforms for grassroots-level women at their settlements can help to identify their issues and problems in the group
5. Women have less control over high-value products such as timber and the commercialization of non-timber forest products as compared to men	5. Provide business opportunities, build the leadership skills to communicate or negotiate with men/leadership/decision makers to access information and resources and initiate entrepreneurship, promote men into governance-related activities, and present men as change makers "Champions."
6. Underrepresentation of women in the process is the major reason and the challenges to women's representation are the gender role, restricted mobility	6. Conduct a rapid assessment to generate the case study and build the capacity of municipality people to keep the record-gender disaggregated data
7. Lack of gender-disaggregated data in government offices	7. Building the technical capacity of women-led organizations helps to raise the collective voice of women contributing to advocating for gender-inclusive planning and budgeting at local levels
8. Lack of equal representation of women in decision-making process	8. Sensitization on the gender differential impact of climate change has been strongly suggested in a community workshop, focused group discussion, and discussion with women-led organizations
9. Loss of women's control over valuable resource	9. Institutionalization of gender analysis as part of program design helps to increase gender-related actions-

Key issues	Solution
	such as promoting women's participation, providing information, and integrating gender in a planning process
10. Less achievement/progress on gender specific reports, activities, and progress	10. Application of gender budgeting for the effective implementation of gender-inclusive planning
11. Women are not aware about the plan, policy, subsidies, and other facilities	11. Capacity development of local government based on capacity need assessment for gender-inclusive planning and budgeting
12. less agriculture productivity	12. Increased access of women to climate resilient agriculture practices, availability of drought tolerant plants, seeds through farmer's field school
13. Food scarcity and hunger especially among poor, Dalits, and indigenous women.	13. Promote cash crops such as seasonal and off-season vegetable farming through FFS. Promote the concept of community farming or group farming
14. Limited understanding about the socioeconomic impact of gender inequality	14. Advocacy campaign to promote gender equality (community radio, community theatre, communication materials; booklets, best practices, posters, flex with key messages, day celebration (International women's day celebration, 16 days of activism against gender-based violence, etc)

#### 4.2.4 Solution to Gender Issues

Gender and women empowerment issues and concerns are integrated into all activities. However, considering the importance of gender-inclusive governance as a key element to mainstream gender into the implementation, the plan is focused on one gender-specific IPack on gender-inclusive governance. Therefore, the solutions to gender issues are associated with enhancing gender-inclusive governance.

The solutions to GESI issues are associated with enhancing gender-inclusive governance.

**Table 14: Activities to enhance gender-inclusive governance**

Drivers	Activities Against Drivers
Inadequate exercise of gender-inclusive governance in climate change, SNRM practice	<ul style="list-style-type: none"> <li>• Create informal learning and sharing platforms for grassroots-level women</li> <li>• Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership</li> <li>• Produce and publish best practices and learning in gendered governance</li> <li>• Conduct rapid assessment on women's contribution and involvement in SNRM/ CRLUP and management</li> <li>• Provide gender mainstreaming trainings/ workshops to local government and CBOs and concerned stakeholders</li> </ul> <ul style="list-style-type: none"> <li>• Increase women's participation</li> <li>• Share information about the latest news, update, notice, fund, plans and budget</li> <li>• Time information about training and meetings</li> <li>• Promote and engage leadership</li> <li>• Include and integrate males in advocacy</li> </ul>

Drivers	Activities Against Drivers	
	<ul style="list-style-type: none"> <li>• Conduct GESI focused social audits and public hearing</li> <li>• Conduct advocacy campaign to promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups. This will include day celebration, integration of gender in local radio program, learning events, etc.</li> <li>• Engage male involvement to advocate gender and women's issues and concern in advocacy and media campaign.</li> </ul>	campaigns and radio programs (the radio program will be integrated with other SNRM themes and activities )

#### ❖ Major Activities and Outputs

The activities and outputs proposed for enhancing gender-inclusive governance are presented in Table 15. **Error! Reference source not found.**

**Table 15: Major activities and outputs of enhancing gender-inclusive governance**

Major Activities	Outputs
Increase access of women to SNRM and knowledge and information	Gender inclusive governance practiced and adopted climate resilient practices
Integrate gender and women's participation in local planning processes in SNRM	

#### 4.2.5 Integration of GESI and IP's Issues into Solution Activities

The following special attention is required to mainstreaming women, Dalits, indigenous people, and marginalized communities in the implementation of ecosystem restoration plans for the river system:

- a. Provide opportunities to build capacity in natural resource management for users, particularly women, indigenous peoples, the Madhesis, Dalits, and forest-dependent marginalized communities.
- b. Improve and synchronize CFUGs' operational plans in order to improve users' capabilities (women, the Madhesis, Dalit, IPs, and marginalized users) and build a strong mechanism for GESI in the river system's forestry sector.
- c. Provide an opportunity for women with specific, major actions in the restoration of the hotspots, for example:
  - Provide women's capacity-building training in nursery establishment and seedling production.
  - Provide capacity-building training to CFUGs and farmers' groups on river bank and gully stabilization.
  - Provide skill-building training to women for the promotion of afforestation in river reclaimed lands and the promotion of agroforestry and other opportunities (for example, the development of fruit orchards).
  - Invest in women's decision-making capacity building, especially in forestry activities for Churia region women and agriculture activities for Terai region women.
  - Reduce social barriers (social and economic insecurity and lowered education and understanding level) for Dalit, the Madhesis, indigenous people, and other vulnerable ethnicity women to participate in ecosystem restoration activities



- such as sustainable forest management and agriculture land restoration (on both public and private lands);
- Engage women in agroforestry, FFS, and climate resilient land use practices to ensure their incomes and knowledge enhancement.

❖ **Inclusive Process and Plans for Indigenous People**

Special attention is given on FAO, FPIC Manual for Project Practitioners 2016, focused on an Indigenous Peoples' right and a good practice for local communities. Free, Prior and Informed Consent (FPIC) process is required for the implementation of any activities highlighted in the CERP. For this, implementing agency (CBOs) and project manager must follow 6 steps in different actions during CERP implementation in the river system:

**Step 1:** Identification of Indigenous Peoples' concerns and their representatives

**Step 2:** Document geographic and demographic information through participatory mapping

**Step 3:** Design a participatory communication plan and carry out iterative discussions through which project information will be discussed in a transparent way

**Step 4:** Reach consent, document Indigenous Peoples' needs that are to be included into the project and agree on feedback and complains mechanism

**Step 5:** Conduct participatory monitoring and evaluation of the agreement

**Step 6:** Document lessons learned and disclose information about project achievements.

## CHAPTER 5 : INTERVENTION PACKAGE

### 5.1 Formulation of Intervention Packages

From problem and solution tree analysis the main problems along with their causes and effects are recorded, to come up with clear and manageable goals and the strategies to combat them. There are two main stages to this process: (1) the identification of negative aspects of existing situations (or key challenges) in the form of problem trees, and (2) the change of the problems into objectives leading to solution trees showing potential solutions or strategies that respond to the drivers and underlying causes.

It is important to understand and recognize stakeholder engagement and listen to the voices and concerns of forest dependent and poor/marginalized social groups in the process of prioritizing the CERP activities. All these intervention packages (IPacks) were developed based on the activities and key results identified from local stakeholder workshops and verified from expert planning workshops involving most of the key stakeholders. The IPacks developed mainly focused on reducing deforestation and forest degradation; enhancing adaptation/resilience building of vulnerable ecosystem and local community; and integrating gender and equity issues in governance practices in natural resource management and climate resilient land use practices. It provides activities for forest and carbon enhancement; climate resilient agriculture practices and land use practices; and reducing ecosystem and community vulnerability from climate-induced disasters.

Problem, Solution analysis and map demarcations done by participants are considered as a foundational step for formulating IPacks to group the activities. First the similar activities that are identified in solution analysis and their map demarcations are carefully reviewed against the underlying causes obtained in problem analysis. In next step, the activities are grouped based on adaptation and mitigation themes making sure it addresses the underlying causes and major problems (key drivers) identified during problem analysis. In addition, the findings of gender – a specific field study conducted by HIMAWANTI are integrated into the ipack. The gender study identified three key interventions focused on gender and women empowerment. However, the intervention package integrated most of the gender-related concerns in the ipack and added one gender-responsive government ipack as an advocacy campaign in the plan.

Ipacks are formulated based on this grouping such that each Ipacks address the major problems (drivers) and activities relate with solution analysis process. However, all activities identified in solution analysis are not reflected in IPack activities – as in reference to guidance from CERP manual Box 14 and section C1.2 based on which policy level interventions that are already reflected in REDD+ national strategy are not included in IPacks. Ipacks geographic focus and coverage areas were also closely reviewed to make sure that the upstream-downstream linkage issues are addressed, although geographic focus are not considered as a primary criterion for activity grouping.

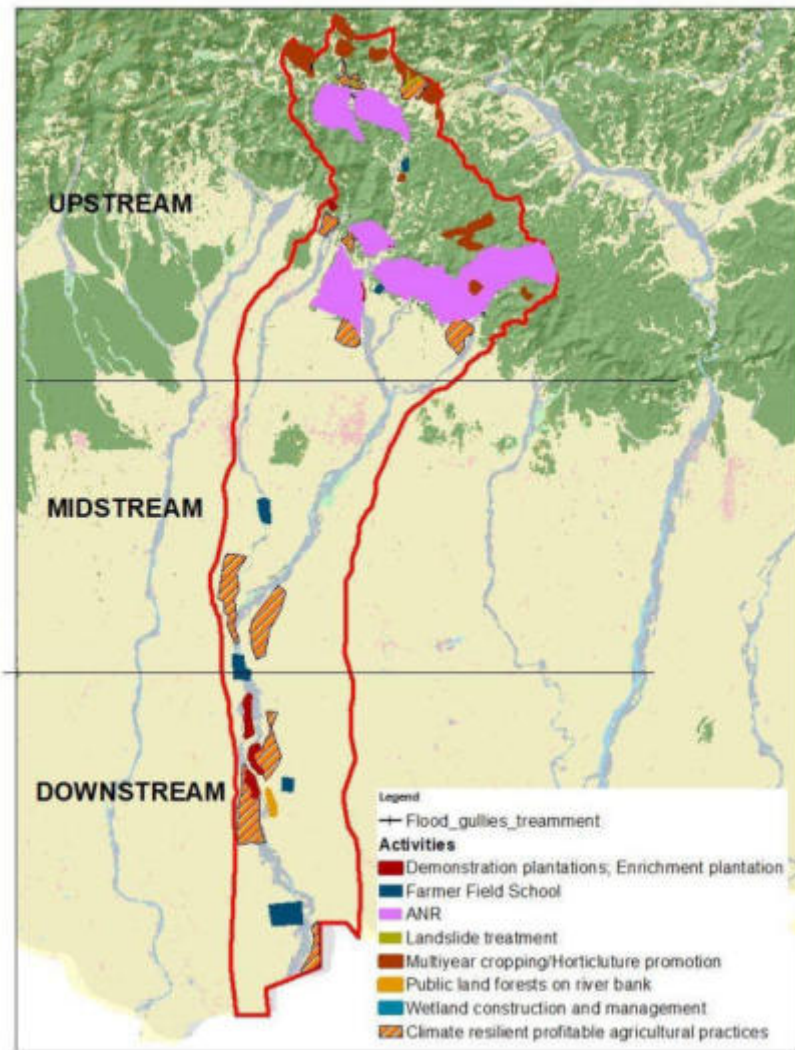
A number of activities that do not directly relate with ecosystem restoration were also noted during the problem-solution analysis process. These activities primarily include large scale infrastructure development along river corridors, revising national/provincial level policies, construction of local infrastructure, irrigation infrastructure, food security, water supply etc. Based on the guidance from project documents and CERP manual most strategic interventions that are feasible through activity prioritization are included in IPack formulation.

#### Table 16: Intervention packages for CERP

Intervention Packages (IPacks)	Outputs	Drivers or barriers addressed
IPack 1: Climate resilient agriculture and land use practices	Farmers capacitated in climate resilient agriculture	Inadequate capacity and resource; Pests and diseases; Soil quality degradation
	Improved climate-resilient land use practices	
IPack 2: Improving/maintaining river system landscape through soil and water conservation	Agroforestry promoted	Erosion/ landslide; Flood; Unsustainable harvesting and illegal logging
	Erosion/landslide controlled and sedimentation managed	
	Flood mitigation	
	Disaster risk management strengthened	
IPack 3: Capacity enhancement for sustainable forest management	Forest management strengthened	Weak forest management practices; Unsustainable harvesting and illegal logging; Encroachment of forestland
IPack 4: Restoration and rehabilitation of degraded forests	Improved forest cover through enrichment plantation and ANR	Unsustainable harvesting and illegal logging; Forest fire; Encroachment of forestland
	Forest fire mitigated	
	Income source of poor/marginalized forest users enhanced	
IPack 5: Restoration of river system landscape (within and outside national forest)	Forests and tree cover are restored, enhanced and maintained in the river system landscape	Unsustainable harvesting and illegal logging; Open and uncontrolled grazing; Erosion/ landslide; Flood
IPack 6: Advocacy campaign: Gender-inclusive governance campaign	Increased access of women to SNRM and knowledge and information	Lack of gender integration in SNRM, CCA, and DRR planning and implementation process
	Integrated gender and women's participation in local planning processes in SNRM	

This CERP only covers those key results and IPacks that correspond to local level interventions. However, it also reveals a number of vital areas of interventions that can take place at national level such as- resolution of land tenure issues, interventions to regulate infrastructure development in forest area and others. These higher-level measures or interventions should also be incorporated into national strategies for successful implementation of CERP.

IPack activities also reflect up-mid-downstream linkages to foster integrated management approach. An activity mapped below at river system scale demonstrates that those activities under IPack 2 (such as landslide/erosion control, water sources conservation, flood mitigation) and IPack 3, 4 (such as ANR, Fire control, capacity building SFM) focus on upstream churia hill regions that are expected to reduce sedimentation and have profound impact on the morphology of the river and related disasters in the inner river valley. IPack 1 on CRA and IPack 5 on restoration of riverine landscape with plantation focus on these inner river valleys. IPack 6 being an advocacy-Gender governance package, focuses on the entire river system.



### ❖ **Strategies and Activities**

For each of the IPacks there are strategies (Table 17) and activities (Table 18). Strategies are followed by activities and provision of incentives that could encourage stakeholder's participation, as well as change their current practices that would enhance resilience and mitigation benefits (Table 17). All the activities developed are considered realistic and practical as regards their implementation. Ambiguous activities that are difficult to obtain clear and measurable outcomes have been excluded.

### ❖ **Summary of Feasibility Analysis**

Feasibility analysis was used to assess the strengths and weaknesses of the IPacks (Table 19), which can lead to desired results of the CERP. In the feasibility analysis, the risks and obstacles to implementation of each IPacks were assessed, and this provided the basis for assessing the overall feasibility of each IPack. Cost-effectiveness is also a vital criterion in feasibility analysis. The scores obtained through overall feasibility analysis at output levels indicate that all the IPs are reasonably feasible (

Table 20). Erosion/landslide control and flood mitigation seem moderately feasible taking account of the risk that its implementation cost will be high with moderate cost effectiveness, as well as influential decisions on prioritization of sites for interventions. The feasibility analysis was duly verified from expert planning workshop.

❖ **Summary of Safeguard Analysis**

Safeguard analysis was done to identify social and environmental risks or threats (Table 21), as well as to identify where CERP interventions can contribute to significant social or environmental co-benefits (

Table 22) Social risks are negative social side effects on poor and marginalized social groups while implementing the proposed IPacks. Women, IPs and marginalized minority groups, including Dalits among others, can experience discrimination and may face additional barriers to their participation and engagement that could limit their engagement within the project. Similarly, environmental risks are potential side effects from proposed interventions such as natural forest conversion, negative effects on biodiversity or other ecosystem services among others. In safeguard analysis, the measures to mitigate risks and enhance benefits were also assessed. The safeguard analysis matrix was duly verified during expert planning workshop.

❖ **Budget Plan**

The budget plan for CERP activities has been prepared based on approved district rate, and in close coordination with government officials at expert planning workshop, The quantitative implementation targets defined in the planning stage are the starting point for the budgeting process, followed by detail analysis of the activities, tasks and resources needed. The summary of budget plan for each IPacks is presented in Table 23. The detail budget plan with locations for interventions is presented in Annex 3.

❖ **Monitoring**

It is clearly essential to monitor the CERP implementation both for adaptive management of CERP and to be able to compensate or incentivize local stakeholders for their contribution to positive outcomes. For this, a monitoring protocol has been prepared (Table 24).

## 5.2 General Description of Intervention Packages

Table 17: General descriptions of IPacks

Intervention Packages	IPacks description	Objectives	Strategies	Activities/ incentives for Participation and Changing Stakeholder Practices
<p><b>IPack 1:</b> Climate resilient agriculture and land use practices</p>	<p>Farmers vulnerability have been increasing due to limited farm skill and technology, low investment capacity, inadequate irrigation facilities, increasing pest and diseases and poor market access which relates with inability to cope with climate change impacts. Eventually the result is increased pressure in forest resource. This intervention package thus provides solution to combat climate change impacts and enhance farm sustainability. Farmers are also facing problems of higher cost of agriculture input and low market price on sale.</p>	<ul style="list-style-type: none"> <li>• To capacitate vulnerable farmers, women, Dalits to adopt climate resilient agriculture practices</li> <li>• To enhance agriculture yield</li> </ul>	<ul style="list-style-type: none"> <li>• Improving resilience of farmers to climate change, disasters, price volatility and other shocks</li> <li>• Increase agricultural productivity of Forest dependent and other smallholders (equal participation of men and women)</li> </ul>	<ul style="list-style-type: none"> <li>• Train farmers (prioritizing women) on climate resilient agriculture</li> <li>• Incentivize poor/marginalized farmers (skill development and equipment support)</li> <li>• Promotion of alternative irrigation practice, local livestock breed/crop varieties' improvement and cooperative farming to enhance yield</li> <li>• Promote organic farming with provision of compensating yield loss to reduce chemical inputs</li> <li>• Disease/pest control</li> <li>• Support agriculture commercialization</li> </ul>
<p><b>IPack 2:</b> Improving/maintaining river system landscape through soil and water conservation</p>	<p>Landscape degradation within the river system is a combined effect of natural and anthropogenic causes. It is mainly associated with fragile topography, climate instability and unsustainable use of natural resources. Natural hazards like erosion, landslide, flood, forest fire and declining ecosystem services like declining water resource, forest resource and agriculture yield all are associated with landscape</p>	<ul style="list-style-type: none"> <li>• To mitigate disaster risks to reduce community and ecosystem vulnerability</li> <li>• To enhance restoration of ecosystem services</li> <li>• To enhance local knowledge, awareness and capacity on CRLUP and SNRM</li> </ul>	<ul style="list-style-type: none"> <li>• Increase non-carbon benefits of forest ecosystems</li> <li>• Minimizing erosion, landslide and floods through infrastructure development and also adopting indigenous knowledge, skills and customary practices</li> <li>• Promote changing annual crop into multiyear crop in Chure hill slopes</li> <li>• Implementation of projects in the collaboration with local government</li> </ul>	<ul style="list-style-type: none"> <li>• Incentivize multiyear cropping/ horticulture</li> <li>• Promotion of agroforestry in marginal lands</li> <li>• Promote water conservation ponds in Chure hills as well as lowlands</li> <li>• Promote fodder grass sloppy public lands</li> <li>• Project implementation in-line with priority of local government</li> <li>• Formation of school based eco-clubs</li> <li>• Training/capacity building on soil and watershed conservation using bio-engineering</li> </ul>



Intervention Packages	IPacks description	Objectives	Strategies	Activities/ incentives for Participation and Changing Stakeholder Practices
	<p>degradation. This IPack thus focuses on restoration and maintaining the degraded landscape and livelihood improvement of local communities.</p>		<ul style="list-style-type: none"> <li>• Awareness raising through schools, media and other relevant measures</li> <li>• Trainings for capacity enhancement in CRLUP and SNRM</li> </ul>	
<p><b>IPack 3:</b> Capacity enhancement for sustainable forest management</p>	<p>Forest management regimes within the river system reflect Community Forest and Government Forest. These forest areas are subject to immense pressure with increasing population. The problem of unsustainable harvesting and illegal logging prevails due to demand and supply gap. There is robust legal and policy framework in forest sector but lacks compliance in many ways. Limited access of CFUG members in decision-making, lack of clarity and uncertainty over forestland use, tenure, and resolution of households with unregistered land, widespread reports of corruption among different actors and law breaking in forest sector have weakened forest management efforts, accountability and transparency. This IPack focuses on improving forest management to resolve disparity among CFUGs and</p>	<ul style="list-style-type: none"> <li>• To improve forest quality through effective implementation of sustainable forest management</li> <li>• To improve forest governance</li> </ul>	<ul style="list-style-type: none"> <li>• Improve capacity, institutional performance and service delivery of the forestry sector institutions (including intra district/province level coordination)</li> <li>• Improving capacity of CFUGs as well as other stakeholders for sustainable forest management</li> <li>• Improve collaboration, cooperation and synergy among sectoral policies, sectors and actors</li> <li>• Enhance the role of private sector in forestry to promote forest-based enterprises for livelihood and economic development</li> <li>• Promote GESI and increase access of indigenous people in sustainable forest management</li> </ul>	<ul style="list-style-type: none"> <li>• Financial and equipment support to encourage CFUGs for climate resilient sustainable forest management</li> <li>• Enhance forest sector transparency thereby, enhancing accountability of forest users and also reducing illegal activities</li> <li>• Promote women and GESI in participation and benefit sharing</li> <li>• Policy intervention for resolution of land tenure issues</li> <li>• Promote forest-based entrepreneurship</li> <li>• Decentralization of district based timber supply system</li> <li>• Development of compensatory mechanism for accidents during legal forest management activities</li> <li>• Incentive to security forces for capturing loggers and loggings.</li> </ul>

Intervention Packages	IPacks description	Objectives	Strategies	Activities/ incentives for Participation and Changing Stakeholder Practices
	government agencies and enrich forest resources.			
<b>IPack 4:</b> Restoration and rehabilitation of degraded forests	Forest encroachment, unsustainable harvesting and illegal logging, open grazing and forest fire are the major D&FD drivers in the river system. It is further worsened by weaknesses in forest enhancement. Limited livelihood opportunities of forest users and management weaknesses of CFUGs have hindered restoration and rehabilitation of degraded forests. This IPack seeks measures to tackle these weaknesses and restore degraded forests. It also supports enrichment of existing forests through assisted natural regeneration.	<ul style="list-style-type: none"> <li>• To enhance forest cover through enrichment plantation</li> <li>• To capacitate CFUGs in handling forest fire</li> <li>• To provide forest dependent people with alternative resource and income generation opportunities</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce carbon emissions, enhance forest carbon stocks, and improve supply of forest products</li> <li>• Promote livelihood improvement programs for poor and marginalized forest dependent people</li> </ul>	<ul style="list-style-type: none"> <li>• Support for nursery establishment and enrichment plantation</li> <li>• Enhancing technical capacity of CFUGs in plantation and nurturing of seedlings</li> <li>• Strengthen forest firefighting</li> <li>• Provide skill development trainings to increase income source of poor/marginalized forest users</li> </ul>
<b>IPack 5:</b> Restoration of river system landscape (within and outside national forest)	Landscape degradation have been the concern and focused area of this project for restoration. Together with aforementioned IPacks, this IPack is focused on ecosystem restoration of this river system through enhancement of vegetation cover mostly in private and public lands	<ul style="list-style-type: none"> <li>• To enhance vegetation cover through public and private land plantation</li> <li>• To decrease pressure in natural forests</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce carbon emissions, enhance forest carbon stocks, and improve supply of forest products</li> <li>• Promote private and public land forestry</li> </ul>	<ul style="list-style-type: none"> <li>• Support for nursery establishment with production of on-demand seedlings</li> <li>• Incentives for shed improvement and fodder banks to support commercial livestock</li> <li>• Community ownership for plantation in public lands</li> <li>• Campaign for encouraging plantation in private lands with provision of tree insurance and production based subsidies</li> <li>• Demonstration plantation</li> </ul>

Intervention Packages	IPacks description	Objectives	Strategies	Activities/ incentives for Participation and Changing Stakeholder Practices
				<ul style="list-style-type: none"> <li>Promote 50% share of woodlots development in lands with women and indigenous ownership</li> </ul>
<p><b>IPack 6:</b> Advocacy campaign: Gender-inclusive governance campaign</p>	<p>The under-representation of women in the decision-making process has resulted in the exclusion of women's specific needs and capacities in SNRM, CCA, and DRR. Increased influence of women in governance is important to identify and include gender-responsive program interventions to increase the adaptive capacity of vulnerable women. The advocacy campaigns will include local-level stakeholders and the community and leverage local-level funds and resources.</p>	<ul style="list-style-type: none"> <li>Increase women's leadership in NRM, CCA, and DRR</li> <li>Building women's knowledge and skills in resource conservation and management Increase women's participation in decision-making forums</li> <li>Increase common understanding towards gender equality and women empowerment in SNRM</li> </ul>	<ul style="list-style-type: none"> <li>Build network among women and women-led organizations for an enabling environment</li> <li>Engage male and government representatives in the campaign</li> </ul>	<ul style="list-style-type: none"> <li>Consider women's convenience while setting meeting agenda and venue</li> <li>Provide transportation costs for attending the trainings</li> <li>Ensure that women are aware of meetings or activities in an appropriate way</li> <li>Provide opportunity to participate in learning events /platforms for women leaders and women champions</li> </ul>

### 5.3 Major Activities and Sub-Activities

Table 18: IPacks, major activities and sub-activities

Intervention Packages	Major Activities	Sub-activities
<b>IPack 1: Climate resilient agriculture and land use practices</b>	<b>Establish and operationalize Farmers field schools (FFS)</b>	Identification and operationalization of FFS Capacity-building in the use of weather information and its application in agricultural practices
	<b>Implementation of climate-resilient land use practices</b>	Implement climate resilient agriculture practices
		Train and support farmers to adopt and apply climate-resilient land use practices
	<b>IPack 2: Improving/maintaining river system landscape through soil and water conservation</b>	<b>Agroforestry promotion</b>
<b>Controlling erosion/landslide and management of sedimentation</b>		Landslide treatment
		Construction of check dams and bioengineering for gully/debris torrent protection
<b>Minimization of negative impact of Flood</b>		Construction of embankments with bioengineering
<b>Strengthening disaster risk management and awareness creation on climate resilient NRM</b>		Strengthening climate and disaster risk reduction mechanism in collaboration with local government
	Training/capacity building on soil and watershed conservation using bio-engineering	
	Climate resilient awareness campaign through Eco-clubs	
<b>IPack 3: Capacity enhancement for sustainable forest management</b>	<b>Strengthening forest management</b>	Support review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)
		Training and capacity development for implementation of FOPs

Intervention Packages	Major Activities	Sub-activities
		<p>Equipment support for implementation of FOPs</p> <p>Capacitate government staffs and CBOs on climate resilient forest management (ToF)</p> <p>Governance training to government staffs and CFUGs to enhance accountability and transparency</p>
<p><b>IPack 4: Restoration and rehabilitation of degraded forests</b></p>	<p><b>Improvement of forest cover within national forest through enrichment plantation/ANR</b></p>	<p>Enrichment plantation</p> <p>Implement Assisted Natural Regeneration</p>
	<p><b>Forest fire control</b></p>	<p>Firefighter training and support firefighting equipment to CFUGs</p>
		<p>Support firefighting equipment to security institution</p>
		<p>Training and equipment support to promote compost production from bushes and leaf litters</p>
		<p>Construction and improvement of fire lines</p>
		<p>Customize fire alert system in Community Based Forest Management</p>
	<p><b>Income source of poor/marginalized forest users enhanced halting illegal harvesting</b></p>	<p>Skill development trainings and equipment support</p>
<p><b>IPack 5: Restoration of river system landscape (within and outside national forest)</b></p>	<p><b>Restoration, enhancement and maintenance of forests and tree cover in the river system landscape through Public and private forestry</b></p>	<p>Establish and support multi-purpose tree nurseries</p>
		<p>Production of saplings</p>
		<p>Establish On-farm tree nursery</p>
		<p>Demonstration plantation</p>
		<p>Riparian/riverbank plantation</p>

Intervention Packages	Major Activities	Sub-activities
		Technical guidance and support to establish woodlots
<b>IPack 6:</b> <b>Advocacy campaign: Gender-inclusive governance campaign</b>	<b>Increase access of women to SNRM and knowledge and information</b>	Create informal learning and sharing platforms for grassroots-level women
		Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership
		Produce and publish best practices and learning in gendered governance
	<b>Integrate gender and women's participation in local planning processes in SNRM</b>	Conduct rapid assessment on women's contribution and involvement in SNRM
		Provide gender mainstreaming trainings/ workshops to local government and CBOs
		Conduct GESI focused social audits and public hearing
		Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups
Engage male involvement to advocate gender and women's issues and concern in campaign		

## 5.4 Feasibility Analysis

Table 19: Feasibility analysis

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
<b>IPack 1: Climate resilient agriculture and land use practices</b>					
Farmers capacitated in climate resilient agriculture	Identification and operationalization of FFS	<ul style="list-style-type: none"> <li>Exclusion of poor and marginalized farmers</li> <li>Lower investment capacity of small farmers</li> <li>Drop out of participants of FFS</li> </ul>	<ul style="list-style-type: none"> <li>Build transparent selection criteria</li> <li>Incentives for small farmers</li> <li>Encourage and incentivize the participants</li> </ul>	<ul style="list-style-type: none"> <li>Selection criteria to include poor and marginalized are in place</li> <li>100 % farmers attending FFS are incentivized to adopt climate resilient agriculture</li> <li>At least 80% of FFS participants complete FFS package</li> </ul>	<ul style="list-style-type: none"> <li>Selection criteria</li> <li>Proportion of farmers incentivized</li> <li>% of participants who complete FFS package</li> </ul>
Improved climate-resilient land use practices	Train and support farmers to adopt and apply climate-resilient land use practices				
<b>IPack 2: Improving/maintaining river system landscape through soil and water conservation</b>					
Agroforestry promoted	Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	<ul style="list-style-type: none"> <li>Unwillingness due to higher opportunity cost of land</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of high value agroforestry</li> <li>Incentivize socially and economically marginalized households</li> </ul>	<ul style="list-style-type: none"> <li>Agroforestry in 535 ha land</li> <li>Proportionate sharing of benefits among women, Dalit Janajati and marginalized groups</li> </ul>	<ul style="list-style-type: none"> <li>Land area with agroforestry</li> <li>% of women, Dalit Janajati and marginalized groups incentivized</li> </ul>
Erosion/landslide controlled and sedimentation managed	Landslide treatment	<ul style="list-style-type: none"> <li>Local knowledge and practices missing in the stabilization measures</li> <li>Influential decision in implementation</li> </ul>	<ul style="list-style-type: none"> <li>Integrate local knowledge and practices</li> <li>Risk prioritization prior to implementation in coordination with local government</li> </ul>	<ul style="list-style-type: none"> <li>At least 3 landslides treated with integration of structural &amp; bioengineering measures and risk prioritization</li> <li>Local knowledge and practices integrated for the landslide treatment</li> </ul>	<ul style="list-style-type: none"> <li>Number of landslides treated</li> <li>Number of landslide treatment with local knowledge and practices</li> </ul>
	Construction of check dams and	<ul style="list-style-type: none"> <li>Local knowledge and practices missing in the</li> </ul>	<ul style="list-style-type: none"> <li>Integrate local knowledge and practices with structural and</li> </ul>	<ul style="list-style-type: none"> <li>At least 3 gullies/debris torrent stabilized with</li> </ul>	<ul style="list-style-type: none"> <li>Number of gullies stabilized with local</li> </ul>

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	bioengineering for gully/Debris torrent protection	bioengineering for the protection • Influential decision in implementation	non-structural (bioengineering) measures • Risk prioritization during mitigation	integration of structural & non-structural measures and risk prioritization	knowledge and practices
Flood mitigation	Construction of embankment with bioengineering	• Higher cost of mitigation (higher opportunity cost of investment)	• Integrate indigenous knowledge, skills and customary practices and resources for low-cost solutions	• 565 m riverbank stabilization integrating structural & non-structural measures	• Length of riverbank stabilized with indigenous knowledge, skills and customary practices
Disaster risk management strengthened	Training/capacity building on soil and watershed conservation using bio-engineering	• Disparity in selection of participants	• Build transparent selection criteria	• At least 50 % women, 13 % Dalit and 31 % indigenous peoples representatives trained on soil and watershed conservation using bio-engineering	• Number of women, Dalits and indigenous representatives trained
<b>IPack 3: Capacity enhancement for sustainable forest management</b>					
Forest management strengthened	Review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	• Unwillingness of CFUGs due to lack of budget and technical knowledge	• Provide financial and technical support	• At least 18 CFUGs receive financial and technical support	• Number of CFUGs receiving financial and technical support
	Training and capacity development for implementation of FOPs	• Disparity in selection of participants (recommendation of participants from CFUGs)	• Build transparent selection criteria for CFUGs	• At least 50 % women, 13 % Dalit and 31 % indigenous peoples representatives trained in implementation of climate resilient FOPs	• Number of women, Dalits and indigenous representatives trained
	Equipment support for implementation of FOPs	• Inadequate technical knowledge in handling of equipment	• Sensitize about BRCRN project scope and deliverables • Technical trainings on equipment handling	• At least 18 CFUGs receive equipment support with trained individuals	• Number of CFUGs receiving equipment and its handling support



Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	Capacitate government staffs and CBOs on climate resilient forest management (ToF)	<ul style="list-style-type: none"> <li>Level of understanding on climate resilient forest management practices among the trainee and trainers</li> </ul>	<ul style="list-style-type: none"> <li>Adoption of peer learning method</li> </ul>	<ul style="list-style-type: none"> <li>At least 4 events of joint training (government staff and CBO representatives)</li> </ul>	<ul style="list-style-type: none"> <li>Number of joint trainings</li> </ul>
	Governance training to government staffs and CFUGs to enhance accountability and transparency	<ul style="list-style-type: none"> <li>Gaps in understanding of governance in forest management procedures between government authority &amp; CFUGs</li> </ul>	<ul style="list-style-type: none"> <li>Joint trainings/ roundtable discussion</li> </ul>	<ul style="list-style-type: none"> <li>Bi-annual joint trainings for 5 years</li> </ul>	<ul style="list-style-type: none"> <li>Number of joint training events organized</li> </ul>
<b>IPack 4: Restoration and rehabilitation of degraded forests</b>					
Improved forest cover through enrichment plantation and ANR	Enrichment plantation/ANR	<ul style="list-style-type: none"> <li>Conflict on site and seedling species selection</li> </ul>	<ul style="list-style-type: none"> <li>Prior consultation with CFUGs</li> </ul>	<ul style="list-style-type: none"> <li>At least 1 consultation meeting with each CFUGs</li> </ul>	<ul style="list-style-type: none"> <li>Number of prior consultations</li> </ul>
Forest fire mitigated	Firefighter training and support equipment to CFUGs	<ul style="list-style-type: none"> <li>Lack of technical knowledge in handling of equipment</li> </ul>	<ul style="list-style-type: none"> <li>Technical trainings on equipment handling</li> </ul>	<ul style="list-style-type: none"> <li>At least 10 CFUGs are well equipped with trained firefighting groups</li> </ul>	<ul style="list-style-type: none"> <li>Number of well-equipped CFUGs with trained firefighting groups</li> </ul>
	Training and equipment support to promote compost production	<ul style="list-style-type: none"> <li>Elite capture</li> <li>Cheaper alternatives to compost in the market</li> </ul>	<ul style="list-style-type: none"> <li>Transparent selection to include most fire prone CFs</li> <li>Awareness raising programs on the significance of composting conducted for CFUGs with opportunities to the market linkages</li> </ul>	<ul style="list-style-type: none"> <li>At least 5 most fire prone CFs are included</li> <li>At least 5 awareness raising events conducted covering 5 CFUGs</li> </ul>	<ul style="list-style-type: none"> <li>Number of most fire prone CFs included</li> <li>Number of awareness raising events</li> </ul>

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	Construction and improvement of fire lines	<ul style="list-style-type: none"> <li>Selected sites might demand cutting of trees in significant number</li> </ul>	<ul style="list-style-type: none"> <li>Selection of site with minimal tree removals</li> <li>Improvement of fire lines will be prioritized</li> </ul>	<ul style="list-style-type: none"> <li>At least 4 km of fire lines constructed/ improved</li> </ul>	<ul style="list-style-type: none"> <li>Length of fire lines</li> </ul>
Income source of poor/marginalized forest users enhanced	Skill development trainings and equipment support	<ul style="list-style-type: none"> <li>Low investment capacity of trainees on small and medium enterprise establishment</li> </ul>	<ul style="list-style-type: none"> <li>Incentivize to develop small and medium enterprise (nursery, agroforestry)</li> </ul>	<ul style="list-style-type: none"> <li>More than 50% trainees involved in income generation</li> </ul>	<ul style="list-style-type: none"> <li>% of trainees involved in income generation</li> </ul>

**IPack 5: Restoration of river system landscape (within and outside national forest)**

Forests and tree cover are restored, enhanced and maintained in the river system landscape	Establish and support multi-purpose tree nurseries	<ul style="list-style-type: none"> <li>Disparity in site and species selection</li> </ul>	<ul style="list-style-type: none"> <li>Prior consensus with communities for site and species selection</li> </ul>	<ul style="list-style-type: none"> <li>At least 2 consultation workshops organized</li> </ul>	<ul style="list-style-type: none"> <li>Number of consultation workshops conducted to select site and species</li> </ul>
	Establish On-farm nursery	<ul style="list-style-type: none"> <li>Disparity in site and species selection</li> </ul>	<ul style="list-style-type: none"> <li>Prior consensus with communities for site and species selection</li> </ul>	<ul style="list-style-type: none"> <li>At least 1 consultation workshops organized</li> </ul>	<ul style="list-style-type: none"> <li>Number of consultation workshops conducted to select site and species</li> </ul>
	Demonstration plantations	<ul style="list-style-type: none"> <li>Disparity in species selection</li> </ul>	<ul style="list-style-type: none"> <li>Consensus among user members</li> </ul>	<ul style="list-style-type: none"> <li>31 ha of demonstration plantation with prior consent</li> </ul>	<ul style="list-style-type: none"> <li>Area of demonstration plantation</li> </ul>
	Riparian/Riverbank plantation	<ul style="list-style-type: none"> <li>Conflict of land use change (eg. Current grazing sites)</li> </ul>	<ul style="list-style-type: none"> <li>Community consultation before plantation site selection</li> </ul>	<ul style="list-style-type: none"> <li>All the plantation sites are free from conflict</li> </ul>	<ul style="list-style-type: none"> <li>Number of sites free of conflicts for riparian plantation</li> </ul>
	Technical guidance and support to establish woodlots	<ul style="list-style-type: none"> <li>Unwillingness due to higher opportunity cost of land</li> </ul>	<ul style="list-style-type: none"> <li>Distribution of high value and fast growing tree species</li> <li>Provide financial support for field preparation, protection and management of woodlots</li> </ul>	<ul style="list-style-type: none"> <li>100% landowner who establish woodlots receives financial support</li> </ul>	<ul style="list-style-type: none"> <li>% of landowner who establish woodlots receiving financial support</li> </ul>

**IPack 6: Advocacy campaign: Gender-inclusive governance campaign**

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
Increased access of women to SNRM and knowledge and information	Create informal learning and sharing platforms for grassroots-level women	<ul style="list-style-type: none"> <li>• Possibility of elite women capture</li> <li>• Possibility of the exclusion of Dalits and IPs women</li> <li>• Social norms and values restricting women to participate and give time for informal learning and sharing platforms</li> </ul>	<ul style="list-style-type: none"> <li>• Promote inclusion/participation of Dalits and IPs (Women)</li> <li>• Organize sensitization learning events to remove restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• At least 20% participants are Dalits and IPs women</li> <li>• At least one gender sensitization learning event per year</li> </ul>	<ul style="list-style-type: none"> <li>• % of Dalits and IPs women</li> <li>• Number of gender sensitization learning events</li> </ul>
	Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership	<ul style="list-style-type: none"> <li>• Change in gender roles not easily accepted posing threats to social norms and values</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct GESI trainings and awareness campaigns and policy reviews to strengthen the GESI initiatives</li> </ul>	<ul style="list-style-type: none"> <li>• 50% men and women know about the GESI policy and integration strategies</li> </ul>	<ul style="list-style-type: none"> <li>• Province and local level policy reviewed</li> </ul>
	Produce and publish best practices and learning in gendered governance	<ul style="list-style-type: none"> <li>• Gendered governance restricting women to participate</li> <li>• Women participation in NRM sectors can pose threat to social change</li> </ul>	<ul style="list-style-type: none"> <li>• Document of good and best practices in gendered governance that has minimized social discrimination and women empowered reducing GBV as well</li> </ul>	<ul style="list-style-type: none"> <li>• Gendered governance best practices documented and learning shared for social change</li> </ul>	<ul style="list-style-type: none"> <li>• Best practices in gendered governance documented and published</li> </ul>
Integrated gender and women's participation in local planning processes in SNRM	Conduct rapid assessment on women's contribution and involvement in SNRM	<ul style="list-style-type: none"> <li>• Women not being empowered could hinder their participation</li> <li>• Leadership discrimination among women and elite captures</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid assessment on women's contribution and involvement in NRM/CRLUP and management to be conducted and shared for minimizing social barriers</li> </ul>	<ul style="list-style-type: none"> <li>• % of women's contribution and involvement analyzed and further plans developed</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid assessment conducted</li> </ul>

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	Provide gender mainstreaming trainings/ workshops to local government and CBOs	<ul style="list-style-type: none"> <li>• GESI not prioritized</li> </ul>	<ul style="list-style-type: none"> <li>• Trainings to be provided to mainstream gender increasing the trend of preparing action plans as GESI priority</li> </ul>	<ul style="list-style-type: none"> <li>• % of understanding level and mainstreaming of GESI well adopted</li> </ul>	<ul style="list-style-type: none"> <li>• GESI mainstreaming training and workshops raised awareness</li> </ul>
	Conduct GESI focused social audits and public hearing	<ul style="list-style-type: none"> <li>• Inclusive transparency and practices limited and not prioritized</li> </ul>	<ul style="list-style-type: none"> <li>• Regularly conduct GESI focused audits and public hearing to increase transparency and good governance</li> </ul>	<ul style="list-style-type: none"> <li>• % of local institutions practice GESI focused social audits and public hearing for social and strong governance practice</li> </ul>	<ul style="list-style-type: none"> <li>• GESI focused social audit and public hearing conducted regularly</li> </ul>
	Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	<ul style="list-style-type: none"> <li>• Gender responsive awareness not shared or available as they are not prioritized</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness promotion on gender responsive information and ensure to make available to all</li> </ul>	<ul style="list-style-type: none"> <li>• % of CBOs and women groups made aware on gender responsive information and access to resources increased</li> </ul>	<ul style="list-style-type: none"> <li>• Gender responsive information and availability access made easy</li> </ul>
	Engage male involvement to advocate gender and women's issues and concern in campaign	<ul style="list-style-type: none"> <li>• Men not interested for social change and not supportive too</li> <li>• Women participation not ensured in NRM/CRLUP and management</li> </ul>	<ul style="list-style-type: none"> <li>• Advocating GESI and women's issues among male and inform on transformative change and recognizing women's voice for change, reduce GBV</li> </ul>	<ul style="list-style-type: none"> <li>• % of male engagement in GESI and women's issues help change the social norms and values</li> </ul>	<ul style="list-style-type: none"> <li>• Male involvement increased in advocacy of GESI and women's issues and minimized social disparities</li> </ul>

**Table 20: Overall feasibility analysis of IPacks**

<b>Intervention Packages</b>	<b>Outputs</b>	<b>Implementation risks/obstacles L=3/M=2/H=1</b>	<b>Cost effectiveness of risk reduction measures H=3/M=2/L=1</b>	<b>Cost to implement L=3/M=2/H=1</b>	<b>Opportunity cost L=3/M=2/H=1</b>	<b>Incentive Measures H=3/M=2/L=1</b>	<b>Total score</b>
<b>IPack 1: Climate resilient agriculture and land use practices</b>	Farmers capacitated in climate resilient agriculture	3	3	2	3	2	13
	Improved climate-resilient land use practices	3	3	2	3	2	13
<b>IPack 2: Improving/maintaining river system landscape through soil and water conservation</b>	Agroforestry promoted	3	3	2	3	2	13
	Erosion/landslide controlled and sedimentation managed	2	2	1	2	3	10
	Negative impact of flood minimized	2	2	1	1	2	8
	Disaster risk management strengthened	2	3	3	3	2	13
<b>IPack 3: Capacity enhancement for sustainable forest management</b>	Forest management strengthened	2	3	2	2	3	12
<b>IPack 4: Restoration</b>	Improved forest cover through enrichment plantation and ANR	2	3	1	3	2	11

Intervention Packages	Outputs	Implementation risks/obstacles L=3/M=2/H=1	Cost effectiveness of risk reduction measures H=3/M=2/L=1	Cost to implement L=3/M=2/H=1	Opportunity cost L=3/M=2/H=1	Incentive Measures H=3/M=2/L=1	Total score
and rehabilitation of degraded forests	Forest fire mitigated	3	2	2	2	2	11
	Income source of poor/marginalized forest users enhanced	2	3	2	1	3	13
<b>IPack 5:</b> Restoration of river system landscape (within and outside national forest)	Forests and tree cover are restored, enhanced and maintained in the river system landscape	3	3	2	2	3	13
<b>IPack 6:</b> Advocacy campaign: Gender-inclusive governance campaign	Increased access of women to SNRM and knowledge and information	2	3	3	3	3	14
	Integrated gender and women's participation in local planning processes in SNRM	2	3	3	3	3	14

## 5.5 Safeguard Analysis

Table 21: Safeguard analysis (risk)

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
<b>IPack 1: Climate resilient agriculture and land use practices</b>					
Farmers capacitated in climate resilient agriculture	Identification and operationalization of FFS	<ul style="list-style-type: none"> <li>Participation from elite groups might be high</li> </ul>	<ul style="list-style-type: none"> <li>Ensure participation of farmers including socially and economically marginalized group (IPs, women, Dalit etc.)</li> </ul>	<ul style="list-style-type: none"> <li>At least 50% women, 13% Dalit and 31% Indigenous people are included in group at FFS</li> </ul>	<ul style="list-style-type: none"> <li>% of women, Dalit and Indigenous people included in group at FFS</li> </ul>
Improved climate-resilient land use practices	Train and support farmers to adopt and apply climate-resilient land use practices	<ul style="list-style-type: none"> <li>Lack of commitment by marginalized farmers</li> </ul>	<ul style="list-style-type: none"> <li>Ensure participation of farmers including socially and economically marginalized group (IPs, women, Dalit etc.)</li> <li>Incentives for small farmers</li> </ul>	<ul style="list-style-type: none"> <li>50% women, 13% Dalit and 31% Indigenous people are included</li> <li>100 % farmers involved are incentivized to adopt climate resilient agriculture</li> </ul>	<ul style="list-style-type: none"> <li>% of women, Dalit and Indigenous people included</li> <li>Proportion of marginalized farmers incentivized</li> </ul>
<b>IPack 2: Improving/maintaining river system landscape through soil and water conservation</b>					
Agroforestry promoted	Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	<ul style="list-style-type: none"> <li>Human-wildlife conflicts due to improved habitat and connectivity</li> </ul>	<ul style="list-style-type: none"> <li>Sensitization events for human-wildlife conflict</li> </ul>	<ul style="list-style-type: none"> <li>At least 10 sensitization events (1 at each hotspot) on reducing human wildlife conflict; improving habitat and connectivity)</li> </ul>	<ul style="list-style-type: none"> <li>Number of sensitization events conducted</li> </ul>
Erosion/landslide controlled and sedimentation managed	Landslide treatment	<ul style="list-style-type: none"> <li>Durability of the structure due to fragile geology and climatic extremes</li> </ul>	<ul style="list-style-type: none"> <li>Ensure technically sound structure following the design guideline</li> </ul>	<ul style="list-style-type: none"> <li>Number of planned structures follow design guideline</li> </ul>	<ul style="list-style-type: none"> <li>Number of structure following the guidelines</li> </ul>
	Construction of check dams and bioengineering for gully/Debris torrent protection	<ul style="list-style-type: none"> <li>Durability of the structure due to fragile geology and climatic extremes</li> <li>Occupational hazard for the construction workers</li> </ul>	<ul style="list-style-type: none"> <li>Ensure technically sound structure following the design guideline</li> <li>Provide awareness on the occupational hazards and the protective gear for the construction related works</li> </ul>	<ul style="list-style-type: none"> <li>Design guideline followed</li> <li>100 % construction workers aware about the occupational hazards with the protective gear</li> </ul>	<ul style="list-style-type: none"> <li>Number of structures following the guidelines</li> <li>Proportion of the construction workers aware on the occupational hazards with the protective gear</li> </ul>

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
Negative impact of flood minimized	Construction of embankment with bioengineering	<ul style="list-style-type: none"> <li>Improper design &amp; implementation can lead to further degradation</li> <li>Occupational health risks</li> </ul>	<ul style="list-style-type: none"> <li>Ensure such infrastructure is planned in an integrated manner with involvement of DRR/ land use management/ engineers and/or watershed planning experts</li> <li>Occupational Health and Safety training and equipment support</li> </ul>	<ul style="list-style-type: none"> <li>100% of planned structures follow design guideline</li> <li>At least one OHS trainings for a site</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of structures following design guideline</li> <li>Number of OHS trainings</li> </ul>
<b>IPack 3: Capacity enhancement for sustainable forest management</b>					
Forest management strengthened	Review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	<ul style="list-style-type: none"> <li>Similar FOPs in varying topographical settings</li> </ul>	<ul style="list-style-type: none"> <li>Incorporate sensitivity analysis including topography, geology &amp; geomorphic process</li> </ul>	<ul style="list-style-type: none"> <li>100% updated FOPs are based on sensitivity analysis</li> </ul>	<ul style="list-style-type: none"> <li>FOPs with sensitivity analysis</li> </ul>
	Training and capacity development for implementation of FOPs	<ul style="list-style-type: none"> <li>Selection bias of participants can lead to lower level of outcome</li> </ul>	<ul style="list-style-type: none"> <li>Establish transparent selection criteria</li> </ul>	<ul style="list-style-type: none"> <li>100% eligible and efficient personnel</li> </ul>	<ul style="list-style-type: none"> <li>More than 90% achievement level in sustainable forest management</li> </ul>
	Equipment support for implementation of FOPs	<ul style="list-style-type: none"> <li>Occupational health risks (injuries) due to inappropriate safety measures</li> </ul>	<ul style="list-style-type: none"> <li>Training on OHS good practices, protocols and equipment to Trainers/ extension staff</li> </ul>	<ul style="list-style-type: none"> <li>6 trainings to CFUGs</li> </ul>	<ul style="list-style-type: none"> <li>Number of person trained</li> </ul>
<b>IPack 4: Restoration and rehabilitation of degraded forests</b>					
Improved forest cover through enrichment plantation and ANR	Enrichment plantation/ANR	<ul style="list-style-type: none"> <li>Introduction of nonnative species can pose a risk to the local biodiversity</li> <li>Loss of species having current social use can worsen</li> </ul>	<ul style="list-style-type: none"> <li>Promote tree species which are locally adapted/native</li> <li>Provision of alternatives to affected marginal households</li> </ul>	<ul style="list-style-type: none"> <li>100 % of the species will be locally adapted/native species</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of local species in enrichment planation</li> </ul>



Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
		livelihood of marginal households			
Forest fire mitigated	Firefighter training and support firefighting equipment to CFUGs	<ul style="list-style-type: none"> <li>• Firefighting without sufficient protective equipment or with inappropriate practices could lead to personal injuries</li> <li>• Possibility of exclusion of women</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure trained groups are well aware of protective measures and procedures of fire controlling in the field through demonstration &amp; examination</li> <li>• Promote inclusion/participation of women</li> </ul>	<ul style="list-style-type: none"> <li>• All members are trained</li> <li>• At least 20% participants are women</li> </ul>	<ul style="list-style-type: none"> <li>• Number of trained members on the use of firefighting equipment</li> <li>• Proportion of women participants</li> </ul>
	Construction and improvement of fire lines	<ul style="list-style-type: none"> <li>• Excessive construction of fire line can lead to habitat fragmentation and impact on habitat connectivity</li> </ul>	<ul style="list-style-type: none"> <li>• Use existing road/trail/river/stream as fire line</li> </ul>	<ul style="list-style-type: none"> <li>• 4 Km of fire line constructed/ improved</li> </ul>	<ul style="list-style-type: none"> <li>• Length of fire line constructed/ improve</li> </ul>
<b>IPack 5: Restoration of river system landscape (within and outside national forest)</b>					
Forests and tree cover are restored, enhanced and maintained in the river system landscape	Establish and support multi-purpose tree nurseries	<ul style="list-style-type: none"> <li>• Land tenure issues on nursery site</li> <li>• Limited availability of quality seed of demanded species</li> </ul>	<ul style="list-style-type: none"> <li>• Consultation meetings</li> <li>• Demand analysis for choice of seedlings species</li> </ul>	<ul style="list-style-type: none"> <li>• At least 2 consultation meeting to screen and address the land tenure issues</li> <li>• At least 50% seedlings produced are of native species</li> </ul>	<ul style="list-style-type: none"> <li>• Number of nursery sites screened and land tenure issue addressed</li> <li>• Proportion of native species' seedlings produced</li> </ul>
	Establish On-farm nursery	<ul style="list-style-type: none"> <li>• Land tenure issues on nursery site</li> <li>• Limited availability of quality seed of demanded species</li> </ul>	<ul style="list-style-type: none"> <li>• Consultation meetings</li> <li>• Demand analysis for choice of seedlings species</li> </ul>	<ul style="list-style-type: none"> <li>• At least 1 consultation meeting to screen and address the land tenure issues</li> <li>• At least 50% seedlings produced are of native species</li> </ul>	<ul style="list-style-type: none"> <li>• Number of nursery sites screened and land tenure issue addressed</li> <li>• Proportion of native species' seedlings produced</li> </ul>

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
	Demonstration plantations	<ul style="list-style-type: none"> <li>• Introduction of nonnative species can pose a risk to the local biodiversity</li> <li>• Loss of current social use can worsen livelihood of marginal households</li> </ul>	<ul style="list-style-type: none"> <li>• Promote tree species which are already locally adapted</li> <li>• Provision of alternatives to affected marginal households</li> </ul>	<ul style="list-style-type: none"> <li>• At least 50% of enrichment plantation will use native species</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion of native species in enrichment plantation</li> </ul>
	Riparian/riverbank plantation	<ul style="list-style-type: none"> <li>• Land tenure issue</li> <li>• Introduction of nonnative species can pose a risk to the local biodiversity</li> <li>• Loss of current social use can worsen livelihood of marginal households</li> <li>• Loss and damage from flood</li> </ul>	<ul style="list-style-type: none"> <li>• Consultation meetings with local community and municipality</li> <li>• Promote tree species which are already locally adapted</li> <li>• Provision of alternatives to affected marginal households</li> <li>• Protective plantation with integration of structural measures and bioengineering techniques</li> </ul>	<ul style="list-style-type: none"> <li>• At least 1 consultation meeting to screen and address the land tenure issues</li> <li>• At least 50% of plantation will use native species</li> </ul>	<ul style="list-style-type: none"> <li>• Number of nursery sites with screened and addressed land tenure issue</li> <li>• Proportion of native species in plantation</li> </ul>
	Technical guidance and support to establish woodlots	<ul style="list-style-type: none"> <li>• Conflicts with neighboring landowner</li> <li>• High value alternative crop can change woodlot practice</li> </ul>	<ul style="list-style-type: none"> <li>• Provide support to group of landowners rather than individual</li> </ul>	<ul style="list-style-type: none"> <li>• 90% landowners who received support will develop woodlots</li> </ul>	<ul style="list-style-type: none"> <li>• Area of woodlots established</li> </ul>
<b>IPack 6: Advocacy campaign: Gender-inclusive governance campaign</b>					
Increased access of women to SNRM and knowledge and information	Create informal learning and sharing platforms for grassroots-level women	<ul style="list-style-type: none"> <li>• Possibility of elite women capture</li> <li>• Possibility of the exclusion of Dalits and IPs women</li> <li>• Social norms and values restricting women to participate and give time for informal learning and sharing platforms</li> </ul>	<ul style="list-style-type: none"> <li>• Promote inclusion/participation of Dalits and IPs (Women)</li> <li>• Organize sensitization learning events to remove restrictions</li> </ul>	<ul style="list-style-type: none"> <li>• At least 20% participants are Dalits and IPs women</li> <li>• At least one gender sensitization learning event per year</li> </ul>	<ul style="list-style-type: none"> <li>• % of Dalits and IPs women</li> <li>• Number of gender sensitization learning events</li> </ul>
	Conduct local level policy discourses to	<ul style="list-style-type: none"> <li>• Change in gender roles not easily accepted posing threats to social norms and values</li> </ul>	<ul style="list-style-type: none"> <li>• Conduct GESI trainings and awareness campaigns and</li> </ul>	<ul style="list-style-type: none"> <li>• 50% men and women know about the GESI policy and integration strategies</li> </ul>	<ul style="list-style-type: none"> <li>• Province and local level policy reviewed</li> </ul>

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
	ensure gender responsiveness and women's participation, access, control and leadership		policy reviews to strengthen the GESI initiatives		
	Produce and publish best practices and learning in gendered governance	<ul style="list-style-type: none"> <li>Gendered governance restricting women to participate</li> <li>Women participation in NRM sectors can pose threat to social change</li> </ul>	<ul style="list-style-type: none"> <li>Document of good and best practices in gendered governance that has minimized social discrimination and women empowered reducing GBV as well</li> </ul>	<ul style="list-style-type: none"> <li>Gendered governance best practices documented and learning shared for social change</li> </ul>	<ul style="list-style-type: none"> <li>Best practices in gendered governance documented and published</li> </ul>
Integrated gender and women's participation in local planning processes in SNRM	Conduct rapid assessment on women's contribution and involvement in SNRM	<ul style="list-style-type: none"> <li>Women not being empowered could hinder their participation</li> <li>Leadership discrimination among women and elite captures</li> </ul>	<ul style="list-style-type: none"> <li>Rapid assessment on women's contribution and involvement in NRM/CRLUP and management to be conducted and shared for minimizing social barriers</li> </ul>	<ul style="list-style-type: none"> <li>% of women's contribution and involvement analyzed and further plans developed</li> </ul>	<ul style="list-style-type: none"> <li>Rapid assessment conducted</li> </ul>
	Provide gender mainstreaming trainings/ workshops to local government and CBOs	<ul style="list-style-type: none"> <li>GESI not prioritized</li> </ul>	<ul style="list-style-type: none"> <li>Trainings to be provided to mainstream gender increasing the trend of preparing action plans as GESI priority</li> </ul>	<ul style="list-style-type: none"> <li>% of understanding level and mainstreaming of GESI well adopted</li> </ul>	<ul style="list-style-type: none"> <li>GESI mainstreaming training and workshops raised awareness</li> </ul>
	Conduct GESI focused social audits and public hearing	<ul style="list-style-type: none"> <li>Inclusive transparency and practices limited and not prioritized</li> </ul>	<ul style="list-style-type: none"> <li>Regularly conduct GESI focused audits and public hearing to increase transparency and good governance</li> </ul>	<ul style="list-style-type: none"> <li>% of local institutions practice GESI focused social audits and public hearing for social and strong governance practice</li> </ul>	<ul style="list-style-type: none"> <li>GESI focused social audit and public hearing conducted regularly</li> </ul>
	Conduct advocacy campaign and promote awareness on gender responsive information,	<ul style="list-style-type: none"> <li>Gender responsive awareness not shared or available as they are not prioritized</li> </ul>	<ul style="list-style-type: none"> <li>Awareness promotion on gender responsive information and ensure to make available to all</li> </ul>	<ul style="list-style-type: none"> <li>% of CBOs and women groups made aware on gender responsive information and access to resources increased</li> </ul>	<ul style="list-style-type: none"> <li>Gender responsive information and availability access made easy</li> </ul>

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
	available provisions and resources among CBOs/ women groups				
	Engage male involvement to advocate gender and women's issues and concern in campaign	<ul style="list-style-type: none"> <li>• Men not interested for social change and not supportive too</li> <li>• Women participation not ensured in NRM/CRLUP and management</li> </ul>	<ul style="list-style-type: none"> <li>• Advocating GESI and women's issues among male and inform on transformative change and recognizing women's voice for change, reduce GBV</li> </ul>	<ul style="list-style-type: none"> <li>• % of male engagement in GESI and women's issues help change the social norms and values</li> </ul>	<ul style="list-style-type: none"> <li>• Male involvement increased in advocacy of GESI and women's issues and minimized social disparities</li> </ul>

**Table 22: Safeguard analysis (benefits)**

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
<b>IPack 1: Climate resilient agriculture and land use practices</b>					
Farmers capacitated in climate resilient agriculture	Identification and operationalization of FFS	<ul style="list-style-type: none"> <li>Increased farm productivity</li> </ul>	<ul style="list-style-type: none"> <li>Continuity of FFS for longer period (one crop cycle may not be sufficient)</li> <li>Integration of FFS in municipal agriculture section<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>FFS operated for whole project period</li> <li>All FFS will be integrated in respective municipal agriculture section</li> </ul>	<ul style="list-style-type: none"> <li>Number of FFS operated for whole project period</li> <li>Number of FFS owned and run by local government</li> </ul>
Improved climate-resilient land use practices	Train farmers on climate-resilient land use practices	<ul style="list-style-type: none"> <li>Enhance soil organic carbon</li> <li>Sustain farm productivity</li> </ul>	<ul style="list-style-type: none"> <li>Provide financial, equipment and technological support to farmers adopting climate resilient land use practices<sup>3</sup></li> <li>Promote climate resilient commercial farming in collaboration with local government<sup>4</sup></li> <li>Promote organic farming and Integrated Pest Management system</li> </ul>	<ul style="list-style-type: none"> <li>At least 50% farmers adopting climate resilient land use practices will be supported</li> <li>Project will support at least one municipality for institutional procedures and marketing</li> <li>At least 50% share of fertilizer and pesticides is organic</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of farmers supported</li> <li>Number of municipality assisting institutional procedures and marketing</li> <li>Decrease in use of chemical fertilizer and pesticides</li> </ul>
<b>IPack 2: Improving/maintaining river system landscape through soil and water conservation</b>					
Agroforestry promoted	Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	<ul style="list-style-type: none"> <li>Erosion control</li> <li>Enhance income generation opportunities</li> <li>Decrease in forest dependency</li> </ul>	<ul style="list-style-type: none"> <li>Prioritize cash crops, fast growing fodder trees and grasses</li> </ul>	<ul style="list-style-type: none"> <li>At least 50% cash crops and fodder trees</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of cash crops and fodder trees in plantation</li> </ul>

<sup>2</sup> Development of FFS as on-farm learning center in the long run (even after project completion)

<sup>3</sup> Seed money, soft loans, crop/livestock insurance, production based incentives, seed bank, subsidies in farm equipments, support for alternative irrigation facilities (earthbag ponds, drip irrigation, rainwater harvesting, deep boring, solar pumps and others), storage (cold store, chilling center) and processing facilities

<sup>4</sup> Assist in institutional procedures including registration, PAN acquisition, accounting, renewal and others; marketing support (branding, packaging, negotiations)

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
Erosion/landslide controlled and sedimentation managed	Landslide treatment	<ul style="list-style-type: none"> <li>• Reduce loss and damage</li> <li>• Reduce sedimentation</li> </ul>	<ul style="list-style-type: none"> <li>• Prioritize high value multipurpose plant species for bioengineering</li> </ul>	<ul style="list-style-type: none"> <li>• At least 50% use of high value multipurpose plant species for bioengineering</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion use of high value multipurpose plant species for bioengineering</li> </ul>
	Construction of check dams and bioengineering for gully/Debris torrent protection	<ul style="list-style-type: none"> <li>• Reduce sedimentation in downstream</li> <li>• Reduce risks of flash floods and minimize settlement vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>• Prioritize high value multipurpose plant species for bioengineering</li> </ul>	<ul style="list-style-type: none"> <li>• At least 50% use of high value multipurpose plant species for bioengineering</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion use of high value multipurpose plant species for bioengineering</li> </ul>
Negative impact of flood minimized	Construction of embankment with bioengineering	<ul style="list-style-type: none"> <li>• Reduce riverbank erosion and loss and damage from flood</li> </ul>	<ul style="list-style-type: none"> <li>• Construction of sedimentation dams in midstream</li> <li>• Extraction and utilization of siltation through detail environmental assessment</li> <li>• Use of bamboo/other income generating plants for bioengineering</li> </ul>	<ul style="list-style-type: none"> <li>• At least 8 sedimentation dams</li> <li>• 100% embankments with plantation</li> </ul>	<ul style="list-style-type: none"> <li>• Number of sedimentation dams</li> <li>• Proportion of embankments with plantation</li> </ul>
<b>IPack 3: Capacity enhancement for sustainable forest management</b>					
Forest management strengthened	Review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	<ul style="list-style-type: none"> <li>• Support annual silvicultural operations for sustainable forest management</li> </ul>	<ul style="list-style-type: none"> <li>• Update FOPs with sensitivity analysis based on local scenario</li> <li>• Integrate forest based entrepreneurship development and income generation</li> <li>• Multi-stakeholder sharing for quality assurance of FOPs</li> </ul>	<ul style="list-style-type: none"> <li>• 100% CFUGs update FOPs with sensitivity analysis and integrating forest based entrepreneurship development</li> </ul>	<ul style="list-style-type: none"> <li>• Proportions of CFUGs with updated FOPs</li> </ul>
	Training and capacity development for implementation of FOPs	<ul style="list-style-type: none"> <li>• Enhance capacity of CFUGs on sustainable forest management</li> </ul>	<ul style="list-style-type: none"> <li>• Involve all CFUGs within River System in trainings</li> </ul>	<ul style="list-style-type: none"> <li>• 100% CFUGs participate in trainings</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion of CFUGs participating in trainings</li> </ul>

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
	Equipment support for implementation of FOPs	<ul style="list-style-type: none"> <li>Enhance capacity of CFUGs on sustainable forest management</li> </ul>	<ul style="list-style-type: none"> <li>Support all CFUGs within River System</li> </ul>	<ul style="list-style-type: none"> <li>100% CFUGs receive equipment support</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of CFUGs receiving equipment support</li> </ul>
	Capacitate government staffs and CBOs on climate resilient forest management (ToF)	<ul style="list-style-type: none"> <li>Increase skilled manpower on climate resilient forest management</li> </ul>	<ul style="list-style-type: none"> <li>Sensitize 100% users of community forest on climate resilient forest management</li> </ul>	<ul style="list-style-type: none"> <li>At least 90% users will be aware of climate resilient forest management</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of users participating in sensitization program</li> </ul>
	Governance training to government staffs and CFUGs to enhance accountability and transparency	<ul style="list-style-type: none"> <li>Good forest governance</li> </ul>	<ul style="list-style-type: none"> <li>Public hearing</li> <li>Make information available in DFO websites</li> </ul>	<ul style="list-style-type: none"> <li>Bi-annual public hearing and update of website information</li> </ul>	<ul style="list-style-type: none"> <li>Number of public hearings annually</li> <li>Availability of information in websites</li> </ul>
<b>IPack 4: Restoration and rehabilitation of degraded forests</b>					
Improved forest cover through enrichment plantation and ANR	Enrichment plantation/ANR	<ul style="list-style-type: none"> <li>Enhance forest quality and carbon stock</li> </ul>	<ul style="list-style-type: none"> <li>Plantation of fast growing and locally adapted plant species</li> <li>Promoting natural regeneration</li> <li>Bio-fencing for protection</li> </ul>	<ul style="list-style-type: none"> <li>At least 70% of fast growing and locally adapted/native plant species</li> </ul>	<ul style="list-style-type: none"> <li>Proportion of fast growing and locally adapted/native plant species</li> </ul>
Forest mitigated fire	Firefighter training and support firefighting equipment to CFUGs	<ul style="list-style-type: none"> <li>Enhance capacity on forest fire control</li> </ul>	<ul style="list-style-type: none"> <li>Collaborate with security institutions and also provide equipment support</li> </ul>	<ul style="list-style-type: none"> <li>At least 6 sets of firefighting equipment to security institutions</li> </ul>	<ul style="list-style-type: none"> <li>Sets of firefighting equipment supported</li> </ul>
	Training and equipment support to	<ul style="list-style-type: none"> <li>Increase in soil organic content in farmlands</li> </ul>	<ul style="list-style-type: none"> <li>Compensate litter collectors and provide subsidy to compost manure</li> </ul>	<ul style="list-style-type: none"> <li>At least 50% share of fertilizer is compost manure</li> </ul>	<ul style="list-style-type: none"> <li>Number of households practicing composting</li> </ul>

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
	promote compost production		<ul style="list-style-type: none"> <li>• Production based subsidy in organic farming</li> </ul>		
	Construction and improvement of fire lines	<ul style="list-style-type: none"> <li>• Provides barrier to slow or stop the progress of wildfire</li> </ul>	<ul style="list-style-type: none"> <li>• Regular maintenance</li> <li>• Construct fire line as forest product collecting route</li> </ul>	<ul style="list-style-type: none"> <li>• Annual maintenance before fire season</li> </ul>	<ul style="list-style-type: none"> <li>• Number of fire line free of litters in dry season</li> </ul>
<b>IPack 5: Restoration of river system landscape (within and outside national forest)</b>					
Forests and tree cover are restored, enhanced and maintained in the river system landscape	Establish and support multi-purpose tree nurseries	<ul style="list-style-type: none"> <li>• Enhance seedling availability for plantation</li> </ul>	<ul style="list-style-type: none"> <li>• Demand based seedling production (fruit, fodder etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Seedling production will meet 100% demand</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion of seedlings used for plantation</li> </ul>
	Establish On-farm nursery	<ul style="list-style-type: none"> <li>• Enhance seedling availability for plantation</li> </ul>	<ul style="list-style-type: none"> <li>• Demand based seedling production (fruit, fodder etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Seedling production will meet 100% demand</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion of seedlings used for plantation</li> </ul>
	Demonstration plantation	<ul style="list-style-type: none"> <li>• Increase biodiversity</li> <li>• Enhance carbon stock</li> </ul>	<ul style="list-style-type: none"> <li>• Ecotourism promotion and research center</li> </ul>	<ul style="list-style-type: none"> <li>• At least 1 demonstration plantation site used for ecotourism promotion and research center</li> </ul>	<ul style="list-style-type: none"> <li>• Number of demonstration plantation site used for ecotourism promotion and research center</li> </ul>
	Riparian/riverbank plantation	<ul style="list-style-type: none"> <li>• Increase biodiversity</li> <li>• Enhance carbon stock</li> <li>• Reduce riverbank erosion</li> </ul>	<ul style="list-style-type: none"> <li>• Plantation of fodder species, fruits, bamboo, Khayar (<i>Acacia catechu</i>), Sissoo (<i>Dalbergia sissoo</i>) and other high value species including grass</li> <li>• Ownership of plantation area to local community</li> </ul>	<ul style="list-style-type: none"> <li>• At least 50% fodder species</li> </ul>	<ul style="list-style-type: none"> <li>• Proportion of fodder species</li> </ul>
	Technical guidance and support to establish woodlots	<ul style="list-style-type: none"> <li>• Reduces forest dependency and hence forest degradation</li> <li>• Enhance carbon stock</li> </ul>	<ul style="list-style-type: none"> <li>• Facilitate woodland development in unregistered lands on collaboration with local government</li> <li>• Additional incentives to promote woodlots in adjacent private land along river banks</li> </ul>	<ul style="list-style-type: none"> <li>• At least 50% additional incentives for woodlot development in adjacent private land along river banks</li> </ul>	<ul style="list-style-type: none"> <li>• Number/area of woodlots in adjacent private land along river banks</li> </ul>



Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
<b>IPack 6: Advocacy campaign: Gender-inclusive governance campaign</b>					
Increased access of women to SNRM and knowledge and information	Create informal learning and sharing platforms for grassroots-level women	<ul style="list-style-type: none"> <li>• Women empowered and their voices being respected</li> </ul>	<ul style="list-style-type: none"> <li>• Create and manage learning platform</li> </ul>	<ul style="list-style-type: none"> <li>• Five learning events</li> </ul>	<ul style="list-style-type: none"> <li>• Number of learning events</li> </ul>
	Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership	<ul style="list-style-type: none"> <li>• Women's participation, access, control and leadership developed and supported</li> </ul>	<ul style="list-style-type: none"> <li>• Interaction held between policy makers and targeted women</li> </ul>	<ul style="list-style-type: none"> <li>• One event</li> </ul>	<ul style="list-style-type: none"> <li>• Number of events</li> </ul>
	Produce and publish best practices and learning in gendered governance	<ul style="list-style-type: none"> <li>• Documentation and publication of gendered governance strengthened and institutionalized</li> </ul>	<ul style="list-style-type: none"> <li>• Sharing and publicity</li> </ul>	<ul style="list-style-type: none"> <li>• One best practice documented</li> </ul>	<ul style="list-style-type: none"> <li>• Number of best practices documented</li> </ul>
Integrated gender and women's participation in local planning processes in SNRM	Conduct rapid assessment on women's contribution and involvement in SNRM	<ul style="list-style-type: none"> <li>• Women's contribution and participation increased</li> </ul>	<ul style="list-style-type: none"> <li>• Gender data disseminated</li> </ul>	<ul style="list-style-type: none"> <li>• One Sharing event</li> </ul>	<ul style="list-style-type: none"> <li>• Number of sharing events</li> </ul>
	Provide gender mainstreaming trainings/ workshops	<ul style="list-style-type: none"> <li>• Women's capacity enhanced in GESI integration and local government and CBOs take the issues seriously</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge enhancement, accountability</li> </ul>	<ul style="list-style-type: none"> <li>• One training event for 20 government staffs</li> </ul>	<ul style="list-style-type: none"> <li>• Number of training events</li> </ul>

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
	to local government and CBOs				
	Conduct GESI focused social audits and public hearing	<ul style="list-style-type: none"> <li>• Social transparency increased and regularly practiced</li> </ul>	<ul style="list-style-type: none"> <li>• Coverage of wider audience target group</li> </ul>	<ul style="list-style-type: none"> <li>• Two events</li> </ul>	<ul style="list-style-type: none"> <li>• Number of events</li> </ul>
	Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	<ul style="list-style-type: none"> <li>• Gender responsive information making women and marginalized groups empowered</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness raising sessions</li> </ul>	<ul style="list-style-type: none"> <li>• Three events</li> </ul>	<ul style="list-style-type: none"> <li>• Number of events</li> </ul>
	Engage male involvement to advocate gender and women's issues and concern in campaign	<ul style="list-style-type: none"> <li>• Male roles changing and supportive for women empowerment</li> </ul>	<ul style="list-style-type: none"> <li>• Continues encouragement of male change agent to promote gender</li> </ul>	<ul style="list-style-type: none"> <li>• Two events</li> </ul>	<ul style="list-style-type: none"> <li>• Number of events</li> </ul>

## 5.6 Budget

Note: Budget estimations are tentative and done based on consultation workshops with key stakeholders at river system level during 2022. However, during time of implementation, the rate and amount mentioned in the CERP plans are subjected to change based on the changes in market situation as well as the field condition. Respective Provincial Project Management Offices (PPMUs) can make necessary changes based on field situation following the norms and rates as per the Nepal government rules and regulations.

**Table 23: Budget plan**

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
<b>IPack 1: Climate resilient agriculture and land use practices</b>				
Identification and operationalization of FFS	No	6	700,000	4,200,000
Capacity-building in the use of weather information and its application in agricultural practices	No	3	100,000	300,000
Implement climate resilient agriculture practices	ha	8982.01	2,000	17,964,026.11
Train and support farmers to adopt and apply climate-resilient land use practices	Events	12	450,000	5,400,000
<b>Total Budget for IPack 1 (NRs)</b>				<b>27,864,026.11</b>
<b>IPack 2: Improving/ maintaining river system landscape through soil and water conservation</b>				
Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	ha	535	6,000	3,210,000
Landslide treatment	No	3		7,500,000
Construction of check dams and bio-fencing for gully/debris torrent protection	Gully/debris torrent	3		7,500,000
Construction of embankments with bioengineering	m	565	30,000	16,950,000

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
Strengthening climate and disaster risk reduction mechanism in collaboration with local government	Municipality/Rural municipality	6	300,000	1,800,000
Training/capacity building on soil and watershed conservation using bio-engineering	Event	1	500,000	500,000
Climate resilient awareness campaign through Eco-clubs	School	10	50,000	500,000
<b>Total Budget for IPack 2 (NRs)</b>				<b>37,960,000</b>
<b>IPack 3: Capacity enhancement for sustainable forest management</b>				
Support review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	No	18	200,000	3,600,000
Training and capacity development for implementation of FOPs	No	18	250,000	4,500,000
Equipment support for implementation of FOPs	No	18	200,000	3,600,000
Capacitate government staffs and CBOs on climate resilient forest management (ToF)	Event	4	300,000	1,200,000
Governance training to government staffs and CFUGs to enhance accountability and transparency	Event	10	240,000	2,400,000
<b>Total Budget for IPack 3 (NRs)</b>				<b>15,300,000</b>
<b>IPack 4: Restoration and rehabilitation of degraded forests</b>				
Enrichment plantation	ha	21	50,000	1,050,000
Implement Assisted Natural Regeneration	ha	637	20,000	12,740,000

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
Firefighter training and support firefighting equipment to CFUGs	CFUG	10	300,000	3,000,000
Support firefighting equipment to security institution	Set	6	150,000	900,000
Training and equipment support to promote compost production from bushes and leaf litters	CFUG	5	150,000	750,000
Construction and improvement of fire lines	Km	4	300,000	1,200,000
Customize fire alert system in Community Based Forest Management (CBFM)	No	1	LS	300,000
Skill development trainings and equipment support	Hh	250	25,000	6,250,000
<b>Total Budget for IPack 4 (NRs)</b>				<b>26,190,000</b>
<b>IPack 5: Restoration of river system landscape (within and outside national forest)</b>				
Establish and support multi-purpose tree nurseries (150,000 capacity)	No	1	1,000,000	1,000,000
Establish and support multi-purpose tree nurseries (50,000 capacity)	No	1	500,000	500,000
Production of saplings	No	200,000	40	8,000,000
Establish On-farm tree nursery	No	1	600,000	600,000
Demonstration plantation	ha	31.06	500,000	15,531,323.50
Riparian/River bank plantation	ha	272.78	600,000	163,667,380.20

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
Technical guidance and support to establish woodlots	ha	150	250,000	37,500,000
<b>Total Budget for IPack 5 (NRs)</b>				<b>226,798,703.7</b>
<b>IPack 6: Advocacy campaign: Gender-inclusive governance campaign</b>				
Create informal learning and sharing platforms for grassroots-level women	Event	5	50,000	250,000
Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership	Event	1	50,000	50,000
Produce and publish best practices and learning in gendered governance	Event	1	50,000	50,000
Conduct rapid assessment on women's contribution and involvement in SNRM	Event	1	100,000	100,000
Provide gender mainstreaming trainings/ workshops to local government and CBOs	Event	1	100,000	100,000
Conduct GESI focused social audits and public hearing	Event	2	150,000	300,000
Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	Meeting	3	50,000	150,000
Engage male involvement to advocate gender and women's issues and concern in campaign	Event	2	50,000	100,000
<b>Total Budget for IPack 6 (NRs)</b>				<b>1,100,000</b>
<b>Grand Total Budget (NRs)</b>				<b>335,212,729.81</b>

Note: Budget estimations are tentative and are subjected to change based on the changes in market situation as well as the field condition.

### 5.7 Monitoring and Reporting Protocol

River system level monitoring and reporting will be carried out by Ministry of Forest and Environment through PMU and PPMU of BCRN.

Following monitoring protocol will be adopted to monitor the outputs of the CERP:

**Table 24: Monitoring Protocol**

Results	Indicator	Baseline	Target	Means of verification	Assumption
Output 1: Restored degraded forests area halting forest fire, illegal harvesting and grazing	Area (in ha.) of natural forest restored through ANR and enrichment plantation	0	658 ha of natural forest restored through ANR including 21 ha of enrichment plantation	PMU and PPMUs reports Project report	This river system has 9808 ha of forest and 280.4 ha of other wooded land (baseline survey report 2022)
Output 2: Improved natural Forest management and increased forest area outside the forest	xx ha of forest area of xx groups under implementation through updated forest management plan	0	8543 ha area managed by 18 community forestry user groups	PMU and PPMUs reports Project report	18 community forestry user groups manage 8543 ha of forest having 7564 ha (88.55%) of natural forest, 150 ha (1.76 %) plantation forest and 828 ha (9.69%) degraded forest (CBO profile 2022)
	xx ha of new plantation outside forest area; and their survival rate (public land forestry and private forestry)	0	Area: 453.84 ha. Survival rate: 80%  (Demonstration plantation: 31.06 ha; riverbank plantation: 272.78 ha and wood lots: 150 ha)	PMU and PPMUs reports Project report	Local government supported and owned public land and private forestry initiatives under their own jurisdiction



Results	Indicator	Baseline	Target	Means of verification	Assumption
Output 3: Minimized Impacts of climate induced disasters (erosion, landslides/ sedimentation and flooding)	Volume of sedimentation (Cubic meter of soil volume per unit area)	NA	25% in comparison before constructing structures to	PMU and PPMUs reports Project report	Other climate-resilient SNRM practices (including Activities on climate-resilient land use, sustainable management of forests and reforestation) are successfully implemented, further reducing potential for erosion and sedimentation
Output 4: Farmers adopted Climate resilient farming practices	Ha. of agricultural land under climate resilient farming/agriculture system	0 ha	8982.01 ha	FFS record PPPMUs Reports Project report	
	Proportion of farmers trained by the project who begin to apply climate- resilient land use practices on their fields in the relevant season following their respective trainings	0	At least 80% of the farmers involved in project trainings begun to apply project-promoted climate-resilient land use practices in the season following their training	PMU and PPMUs reports Project report	The final selection of practices to be promoted at each specific training site are highly relevant to targeted farmers' cropping systems and conditions, as well as the climate change challenges with which they must contend. Trainings are delivered in a form and manner that is accessible to and relevant for, targeted farmers.

Results	Indicator	Baseline	Target	Means of verification	Assumption
Output 5: Integrated gender and equity issues in governance practices in NRM/ CRLUP and management	% of women in leadership positions of CBO's executive committee	Out of 187 leadership position in CFUGs, 69 (36.9%) women are	At least 50% women in leadership position	DFO/PPMU/Group records	Proportional representation of all social groups ensured
	Access of women in Natural resources management, CRLUP, knowledge and information	0	At least 50% women participation in all events	Group record/PPMU records	Proportional representation of all social groups ensured
	Integrate gender in local planning processes in NRM/ CRLUP and management	0	18 Gender sensitive forest management operational plan of forestry user groups	PPMU/DFO/Group records	Gender dimensions ensured in climate resilient plan including forest management operational plan of groups

Outcome and impact level result assessment will be carried out based on result framework of CERP (Annex-1) using BRCRN monitoring and evaluation framework. Output level results of this CERP fully aligned with the BRCRN outcome and impact indicators.

Activity level monitoring will be carried out based on work plan and budget. Joint monitoring mechanism will be established to monitor the activity and results.

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## Annex-I: Result Framework of Ratuwa Critical Ecosystem Restoration Plan

**Vision:** Climate resilient and sustainably managed Natural Resources and local communities in Ratuwa River system

### Result Framework

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means verification of	Assumptions
<b>Impacts</b>					
<p><i>GCF core indicator (Mitigation)</i></p> <p><i>A4.0 Improved resilience of ecosystems and ecosystem services (proxy indicator 2 to 5)</i></p>	<p>Tonnes of carbon dioxide equivalent (tCO<sub>2</sub>eq) reduced or avoided.</p> <p><b>Proxy indicator:</b> Area of</p> <p>(1) Deforestation rate:                      (2) Sustainable forest management area:                      (3) ANR area                      (4) Plantation area                      (5) Area of Climate Resilient Agriculture (CRA)</p>	<p><b>Proxy indicators:</b></p> <p>Deforestation rate: 0                      Sustainable forest management area: 0 ha                      ANR: 0 ha                      Plantation area: 0 ha</p> <p>Climate Resilient Agriculture: 0 ha</p>	<p><b>Proxy indicator:</b></p> <p>Deforestation rate: 0                      Sustainable forest management area: 8543 ha                      Plantation area: 453.84 ha                      ANR: 658 ha (including enrichment plantation 21 ha)                      Climate Resilient Agriculture: 8982 ha.</p>	<p>PPMUs/PMU report</p> <p>GCF/BRCRN GHG mitigation calculation tool-based calculation sheet</p>	<p>This river system has 9808 ha of forest and 280.4 ha of other wooded land (baseline survey report 2022)</p> <p>CERP land use data shows changes in forest area between 2000 and 2019 is +414.7 ha. Hence, 0% deforestation rate.</p> <p>In this river system, 18 forestry user groups are managing 8543 ha of forest (CBO profile 2022)</p>
<p><i>GCF core indicator (Adaptation)</i></p>	<p>Total number of direct and indirect beneficiaries (gender disaggregated)</p>		<p>Direct                      Male: 30383                      Female: 30424                      Total: 60807</p>	<p>PMU and PPMUs report                      Project report</p>	<p>This river system has 18 forestry user groups having 11367 HHs as members with 60807 population including 30383 male and 30424 female.</p>

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means of verification	Assumptions
<b>Outcomes</b>					
M9.0 Improved management of land or forest areas contributing to emissions reductions	M9.1 Hectares of land or forests under improved and effective management that contributes to CO <sub>2</sub> emission reductions	0	Sustainable forest management area: 8543 ha  Plantation area: 453.84 ha  ANR: 658 ha (including enrichment plantation 21 ha)  Climate Resilient Agriculture: 8982 ha.	PMU and PPMUs report  Project reports	Beneficiaries adopt climate-resilient land use practices
A8.0 Strengthened awareness of climate change threats and risk reduction processes	A8.1 Number of males and females made aware of climate threats and related appropriate responses	0 men 0 women 0 total	Direct Male: 30383 Female: 30424 Total: 60807	Project report  Workshop/training Attendance sheets and materials	Beneficiaries are interested in adopting climate resilient land use practices
<b>Outputs</b>					
Output 1: Restored degraded forests area halting forest fire, illegal harvesting and grazing	Area (in ha.) of natural forest restored through ANR and enrichment plantation	0	658 ha of natural forest restored through ANR including 21 ha of enrichment plantation	PMU and PPMUs reports  Project report	This river system has 9808 ha of forest and 280.4 ha of other wooded land (baseline survey report 2022)
Output 2: Improved natural Forest management and increased forest area outside the forest	xx ha of forest area of xx groups under implementation through updated forest management plan	0	8543 ha area managed by 18 community forestry user groups	PMU and PPMUs reports  Project report	18 community forestry user groups manage 8543 ha of forest having 7564 ha (88.55%) of natural forest, 150 ha (1.76 %) plantation forest and 828 ha (9.69%) degraded forest (CBO profile 2022)
	xx ha of new plantation outside forest area; and their survival rate (public	0	Area: 453.84 ha. Survival rate: 80%	PMU and PPMUs reports	Local government supported and owned public land and private forestry

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means of verification	Assumptions
	land forestry and private forestry)		(Demonstration plantation: 31.06 ha; riverbank plantation: 272.78 ha and wood lots: 150 ha)	Project report	initiatives under their own jurisdiction
Output 3: Minimized Impacts of climate induced disasters (erosion, landslides/sedimentation and flooding)	Volume of sedimentation (Cubic meter of soil volume per unit area)	NA	25% in comparison to before constructing structures	PMU and PPMUs reports Project report	Other climate-resilient SNRM practices (including Activities on climate-resilient land use, sustainable management of forests and reforestation) are successfully implemented, further reducing potential for erosion and sedimentation
Output 4: Farmers adopted Climate resilient farming practices	Ha. of agricultural land under climate resilient farming/agriculture system	0 ha	8982.01 ha	FFS record PPPMUs Reports Project report	
	Proportion of farmers trained by the project who begin to apply climate-resilient land use practices on their fields in the relevant season following their respective trainings	0	At least 80% of the farmers involved in project trainings begun to apply project-promoted climate-resilient land use practices in the season following their training	PMU and PPMUs reports Project report	The final selection of practices to be promoted at each specific training site are highly relevant to targeted farmers' cropping systems and conditions, as well as the climate change challenges with which they must contend. Trainings are delivered in a form and manner that is accessible to and relevant for, targeted farmers.

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means of verification	Assumptions
Output 5: Integrated gender and equity issues in governance practices in NRM/ CRLUP and management	% of women in leadership positions of CBO's executive committee	Out of 187 leadership position in CFUGs, 69 (36.9%) are women	At least 50% women in leadership position	DFO/PPMU/Group records	Proportional representation of all social groups ensured
	Access of women in Natural resources management, CRLUP, knowledge and information	0	At least 50% women participation in all events	Group record/PPMU records	Proportional representation of all social groups ensured
	Integrate gender in local planning processes in NRM/ CRLUP and management	0	18 Gender sensitive forest management operational plan of forestry user groups	PPMU/DFO/Group records	Gender dimensions ensured in climate resilient plan including forest management operational plan of groups

## Activities

Activities	Description	Sub-activities	Remarks/Deliverables
<b>Output 1: Restored degraded forests area halting forest fire, illegal harvesting and grazing</b>			
1.1 Forest fire control	Support and strengthen forestry-related CBOs to combat forest fire.	1.1.1 Firefighter training and support firefighting equipment to CFUGs 1.1.2 Training and equipment support to promote compost production 1.1.3 Support firefighting equipment to security institution/DFO/Groups (from budget plan) 1.1.4 Construction and improvement of fire lines 1.1.5 Customize fire alert system in Community Based Forest Management (CBFM)	At least 10 CFUGs of most fire prone community forests supported with firefighting equipment  About 4 km of fire lines established/improved
1.2 Income source of poor/marginalized forest users enhanced halting illegal harvesting	Enhance income generation opportunities for forest dependent women, IPs, Dalits and poor/marginalized people to reduce pressure on forest resources.	1.2.1 Skill development trainings and equipment support	Approximately 250 household beneficiaries
<b>Output 2: Improved natural Forest management and increased forest area outside the forest</b>			
2.1 Strengthening forest management	Improving the application of sustainable forest management practices in all forest land managed by forestry-related CBOs within project area, ensuring silvicultural practices are implemented and maximizing ecosystem service provision and resilience, as well as generating significant climate change benefits.	2.1.1 Review/upgrade/renew of forest operational plans (FOPs) of community based forest user groups (CFUGs) and provide implementation support 2.1.2 Training and capacity development for implementation of FOPs 2.1.3 Equipment support for implementation of FOPs 2.1.4 Capacitate government staffs and CBOs on climate resilient forest management (Training of Facilitators) 2.1.5 Governance training to government staffs and CFUGs to enhance accountability and transparency	Approximately 18 forest operational plans developed and/or strengthened.  Approximately 4 ToF events organized to capacitate government staffs and CBOs on climate resilient forest management.
2.2 Improvement of forest cover through enrichment plantation and ANR	Support different types of forest plantation to build resilience and deliver important mitigation benefits.	2.2.1 Enrichment plantation/Assisted natural regeneration in forest area	Enrichment plantation/ANR implemented on 658 ha of community managed forest land.



Activities	Description	Sub-activities	Remarks/Deliverables
2.3 Restoration, enhancement and maintenance of forests and tree cover in the river system landscape through Public and private forestry	Establish tree nurseries in the project area to support tree planting and forest restoration under this project, as well as planting and restoration by communities throughout the project area during and after the project implementation. Support expansion of forest cover and restoration of forest landscapes in critical locations of river system, thereby restoring crucial ecosystem functions and ecosystem resilience while also generating significant mitigation benefits.	2.3.1 Establish and support multi-purpose tree nurseries 2.3.2 Demonstration plantation 2.3.3 Riparian/River bank plantation 2.3.4 Technical guidance and support to establish woodlots and incentivize tree plantation	2 multi-purpose nurseries established 31.06 ha of demonstration plantation established 272.78 ha of riparian/river bank plantation established 150 ha of woodlots established in private land
<b>Output 3: Minimized impacts of climate induced disasters (erosion, landslides/sedimentation and flooding)</b>			
3.1 Controlling erosion/landslide and management of sedimentation	Construct local structures, as well as bioengineering that will reduce community vulnerability to erosion and landslides.	3.1.1 Landslide treatment 3.1.2 Construction of check dams and bioengineering for gully/Debris torrent protection 3.1.3 Training/capacity building on soil and watershed conservation using bio-engineering	Establish relevant structures and practices to stabilize 3 landslides and 3 gully/debris torrents mostly in Churia hills
3.2 Minimization of negative impact of Flood	Construct local structures, as well as bioengineering that will reduce community vulnerability to flooding	3.2.1 Construction of embankments with bioengineering	Establish relevant structures and practices for riverbank stabilization
3.3 Strengthening disaster risk management and awareness creation on climate resilient NRM	Improving disaster risk management in collaboration with local government and capacity strengthening for disaster risk reduction, as well as awareness creation for climate resilient natural resource management	3.3.1 Strengthening climate and disaster risk reduction mechanism in collaboration with local government 3.3.2 Training/capacity building on soil and watershed conservation using bio-engineering 3.3.3 Climate resilient awareness campaign through Eco-clubs	5 days training for Government staffs/CBFMG/Farmer groups on soil and watershed conservation using bio-engineering Student-run eco-clubs established
<b>Output 4: Farmers adopted Climate resilient farming practices</b>			

Activities	Description	Sub-activities	Remarks/Deliverables
4.1 Establish and operationalize Farmers field schools (FFS)	Establish training sites on which farmers can be trained on climate resilient farming practices during and after the project.	4.1.1 Operationalize Farmer's Field Schools on adopting climate resilient land use practices 4.1.2 Capacity-building in the use of weather information and its application in agricultural practices	6 FFS established and operational
4.2 Implementation of climate-resilient land use practices (pest and disease minimized, soil quality improved, irrigation facility enhanced)	Support and strengthen farmers' capacities to adopt/apply climate-resilient farming practices in their own fields.	4.2.1 Implement climate resilient agriculture practices (including pest and disease control, soil quality improvement, irrigation facility enhancement) 4.2.2 Train and support farmers to adopt and apply climate-resilient land use practices	Climate-resilient land use practices adopted/applied in 8982.01 ha of farmlands
4.3 Agroforestry Promotion	Support and strengthen farmers' capacity to adopt/apply suitable agroforestry and livestock management practices on their own land.	4.3.1 Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation 4.3.2 Establish on-farm tree nursery and support livestock rearing 4.3.3 Production/Purchase of saplings	1 on-farm tree nursery established. Agroforestry established in 535 ha marginal land
<b>Output 5: Integrated gender and equity issues in governance practices in NRM/ CRLUP and management</b>			
5.1 Increase access of women to SNRM and knowledge and information	Establish platforms for women's involvement and access to knowledge and information, as well as build capacity in natural resource management and climate resilient land use practices	5.1.1 Create informal learning and sharing platforms for grassroots-level women 5.1.2 Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership 5.1.3 Produce and publish best practices and learning in gendered governance	With enhanced access to knowledge and information, more women involved in natural resource management and climate resilient land use practices
5.2 Integrate gender in local planning processes in SNRM	Sensitize CBOs, women groups, local government and other concerned stakeholders on gender responsive information, available provisions and resources to ensure GESI integration in local planning processes for natural resource management and climate resilient land use practices	5.2.1 Conduct rapid assessment on women's contribution and involvement in SNRM 5.2.2 Provide gender mainstreaming trainings/workshops to local government and CBOs and concerned stakeholders 5.2.3 Conduct GESI focused social audits and public hearing 5.2.4 Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	GESI integration ensured in local planning processes for natural resource management and climate resilient land use practices

Activities	Description	Sub-activities	Remarks/Deliverables
		5.2.5 Engage male involvement to advocate gender and women's issues and concern in campaign	

## Annex-2: List of Participants

### A. Problem and Solution Analysis Workshop (Upstream)

<b>Name of River System</b>		Ratuwa
<b>Section</b>		Upstream
<b>Date of Workshop</b>		April 26 - 27, 2022
<b>Venue</b>		Humse Dumse CFUG Office Hall
<b>Location</b>		Beldangi, Damak-3, Jhapa
<b>Participants' Information</b>	<b>Total Participants</b>	<b>33</b>
	<b>Male Participants</b>	<b>18</b>
	<b>Female Participants</b>	<b>15</b>
	<b>Total No. of Dalits</b>	<b>6</b>
	<b>Total No. of Ips</b>	<b>16</b>

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
1	Parbati Rai	Chulachuli-5	Kanchanjunga CFUG	Member	9863617113
2	Jeevan Kumar Rai	Chulachuli-5	Kanchanjunga CFUG	Chairman	9844682278
3	Tanka Prashad Koirala	Chulachuli-6	Noonsari CFUG	Member	9805396771
4	Bhima Aangdembe	Chulachuli-3	Sukuna CFUG	User	9824057556
5	Sanu Maya Rai	Chulachuli-3	Sukuna CFUG	User	
6	Mina Rai	Chulachuli-3	Sukuna CFUG	User	9814057105
7	Laxmi Shrestha	Chulachuli	Shree Ranidhara CFUG	User	9811382836
8	Durga Prashad Acharya	Chulachuli-6	Noonsari CFUG	Chairman	
9	Mandira B.K.	Chulachuli-6	Noonsari CFUG	User	9829319817
10	Tika B.K.	Chulachuli-6	Noonsari CFUG	Member	9839303017
11	Bhawana Rai	Chulachuli-6	Shree Ranidhara CFUG	Member	9840744396
12	Januka Nepali	Chulachuli-6	Shree Ranidhara CFUG	Member	981738399
13	Krishna Basnet	Chulachuli-6	Shree Ranidhara CFUG	Member	9862228853
14	Bishnu Maya B.K.	Chulachuli-5	Shree Ranidhara CFUG	Member	9819391794
15	Rajna B.K.	Chulachuli-5	Shree Ranidhara CFUG	Member	9745257397

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
16	Mahat Kumari Yewe	Damak-1, Himalayatol	Himalaya CFUG	Member	9816060677
17	Chandra Devi Sharma Basnet	Damak-1, Himalayatol	Himalaya CFUG	Chairman	9806028448
18	Dal Bahadur Tamang	Chulachuli-5	Bukuwa CFUG	Member	
19	Chandra Bir Bishwokarma	Damak-3, Dumse	Humse Dumse CFUG	Staff	9806080569
20	Dil Bahadur Magar	Damak-3, Dumse	Humse Dumse CFUG	Staff	9817993316
21	Kumar Dhakal	Damak-3, Dumse	Humse Dumse CFUG	Staff	9807080579
22	Bijay Rai	Damak-1	Himalaya CFUG	Member	9813374302
23	Man Bahadur Tamang	Chulachuli-5	Bukuwa CFUG	Chairman	9843146303
24	Dhan Kumar Yonghang	Mangsebung	Tribeni CFUG	Vice-Chairman	9866252205
25	Swet Shrestha	Damak-3, Dumse	CF Department	Staff	9818113229
26	Kumar Dhakal	Damak-3, Dumse	CF Department	Staff	9817993316
27	Dil Bahadur Magar	Damak-3, Dumse	CF Department	Staff	9815985971
28	Durga Prashad Dhakal	Damak-3, Dumse	CF Department	Staff	9823036313
29	Pundarik Kafle	Damak-3, Dumse	Damak Multi-Technical College	Office Helper	9803681396
30	Suman Dhakal	Damak-3, Dumse	Damak Multi-Technical College	Guard	9806080578
31	Yekraj Dahal	Damak Sub-Division Forest Office, Beldangi	CF Department		9852678858
32	Radha Devi Dhakal	Chulachuli-6	Noonsari CFUG	User	9815365282
33	Jyoti Rai	Damak-1	Himalaya CFUG	Secretary	9824972532

### Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Parbati Rai		1	1						
2	Jeevan Kumar Rai	1		1						
3	Tanka Prashad Koirala	1				1				
4	Bhima Aangdembe		1	1						
5	Sanu Maya Rai		1	1						
6	Mina Rai		1	1						
7	Laxmi Shrestha		1	1						

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
8	Durga Prashad Acharya	1				1				
9	Mandira B.K.		1		1					
10	Tika B.K.		1		1					
11	Bhawana Rai		1	1						
12	Januka Nepali		1		1					
13	Krishna Basnet	1					1			
14	Bishnu Maya B.K.		1		1					
15	Rajna B.K.		1		1					
16	Mahat Kumari Yewe		1	1						
17	Chandra Devi Sharma Basnet		1				1			
18	Dal Bahadur Tamang	1		1						
19	Chandra Bir Bishwokarma	1			1					
20	Dil Bahadur Magar	1		1						
21	Kumar Dhakal	1				1				
22	Bijay Rai	1		1						
23	Man Bahadur Tamang	1		1						
24	Dhan Kumar Yonghang	1		1						
25	Swet Shrestha	1		1						
26	Kumar Dhakal	1				1				
27	Dil Bahadur Magar	1		1						
28	Durga Prashad Dhakal	1				1				
29	Pundarik Kafle	1				1				
30	Suman Dhakal	1				1				
31	Yekraj Dahal	1				1				
32	Radha Devi Dhakal		1			1				
33	Jyoti Rai		1	1						
<b>Total</b>		<b>18</b>	<b>15</b>	<b>16</b>	<b>6</b>	<b>9</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>

**B. Problem and Solution Analysis Workshop (Midstream)**

<b>Name of River System</b>	Ratuwa
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<b>Section</b>		Midstream
<b>Date of Workshop</b>		June 19 - 20, 2022
<b>Venue</b>		Gauradaha Municipality, Ward 5 Office Hall
<b>Location</b>		Maharanijhoda, Gauradaha-5, Jhapa
<b>Participants' Information</b>	<b>Total Participants</b>	<b>31</b>
	<b>Male Participants</b>	<b>18</b>
	<b>Female Participants</b>	<b>13</b>
	<b>Total No. of Dalits</b>	<b>1</b>
	<b>Total No. of Ips</b>	<b>7</b>

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
1	Madan Prasad Adhikari	Gauradaha-5	Ratuwa River Control Committee; Chandu Drinking Water and Sanitation	Chairman; Chairman	9852683882
2	Bhim Bahadur Subedi	Gauradaha-5		Local Farmer	9810334265
3	Mohan Kumar Rai	Gauradaha-5	Gauradaha Municipality-5	Ward Member	9804022950
4	Bhola Rai	Gauradaha-6		Local Farmer	9806050630
5	Pitambar Poudel	Gauradaha-4		Local Farmer	9842621132
6	Ambika Devi Adhikari	Gauradaha-5	Baluwathan Pragati Agriculture Cooperatives	Manager	9844600055
7	Ramchandra Bastola	Gauradaha-5	Baluwathan Pragati Agriculture Cooperatives		9807943580
8	Shanta Poudel	Gauradaha-5		Local Farmer	9814995515
9	Prakash Khadka	Gauradaha-4		Local Farmer	
10	Dagari Bahadur Katuwal	Gauradaha-5		Local Farmer	9815025333
11	Toyanath Prasai	Gauradaha-6	Gauradaha Municipality-6	Ward Chairman	9804926707
12	Devimaya Acharya	Gauradaha-4		Local Farmer	9807330157
13	Homa Katuwal	Gauradaha-4		Local Farmer	9804926138

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
14	Muna Shrestha	Gauradaha-4		Local Farmer	9849245741
15	Bhima Shrestha	Gauradaha-4	Maharaniyhoda Sana Kishan Agriculture Cooperatives		9804088623
16	Lila Gelal	Gauradaha-4	Maharaniyhoda Sana Kishan Agriculture Cooperatives	Member	
17	Mina Dhakal	Gauradaha-4	Maharaniyhoda Sana Kishan Agriculture Cooperatives	Chairman	9842686533
18	Dharma Prasad Ghimire	Gauradaha-4		Local Farmer	9842666441
19	Bishal Thapa	Gauriganj-6		Local Farmer	9810002150
20	Chandra Poudel	Gauriganj-6		Local Farmer	9803638019
21	Bhanubhakta Ghimire	Gauradaha-1			9842685835
22	Santa Kumar Marapache Kiranti	Gauradaha-5	Baluwathan Pragati Agriculture Cooperatives		9842100561
23	Dharmaraj Basnet	Gauradaha-5	User Committee	Chairman	9842630082
24	Chhali Maya Nepali	Gauradaha-5	Gauradaha Municipality-5	Ward Member	9815931972
25	Kapilmani Kafle	Gauradaha-5	Gauradaha Municipality-5	Ward Member	9842761703
26	Jagannath Khanal	Gauradaha-5	Gauradaha Municipality-5	Ward Chairman	9852033148
27	Mina Niraula	Gauradaha-5	Gauradaha Municipality-5	Office Helper	9816997105
28	Khemnath Sangraula	Gauradaha-5	Gauradaha Municipality-5	Ward Secretary	
29	Sharmila Chaudhary	Gauradaha-5		Local Farmer	9816996310
30	Sharmila Banskota	Gauradaha-5		Local Farmer	9814933012
31	Pramila Chaudhary	Gauradaha-5		Local Farmer	9818281627

### Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Madan Prasad Adhikari	1				1				
2	Bhim Bahadur Subedi	1				1				
3	Mohan Kumar Rai	1		1						
4	Bhola Rai	1		1						



S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
5	Pitambar Poudel	1				1				
6	Ambika Devi Adhikari		1			1				
7	Ramchandra Bastola	1				1				
8	Shanta Poudel		1			1				
9	Prakash Khadka	1					1			
10	Dagari Bahadur Katuwal	1					1			
11	Toyanath Prasai	1				1				
12	Devimaya Acharya		1			1				
13	Homa Katuwal		1				1			
14	Muna Shrestha		1	1						
15	Bhima Shrestha		1	1						
16	Lila Gelal		1				1			
17	Mina Dhakal		1			1				
18	Dharma Prasad Ghimire	1				1				
19	Bishal Thapa	1					1			
20	Chandra Poudel	1				1				
21	Bhanubhakta Ghimire	1				1				
22	Santa Kumar Marapache Kiranti	1		1						
23	Dharmaraj Basnet	1					1			
24	Chhali Maya Nepali		1			1				
25	Kapilmani Kafle	1				1				
26	Jagannath Khanal	1				1				
27	Mina Niraula		1			1				
28	Khemnath Sangraula	1				1				
29	Sharmila Chaudhary		1	1						
30	Sharmila Banskota		1			1				
31	Pramila Chaudhary		1	1						
<b>Total</b>		<b>18</b>	<b>13</b>	<b>7</b>	<b>1</b>	<b>17</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>0</b>

### C. Problem and Solution Analysis Workshop (Downstream)

<b>Name of River System</b>	Ratuwa	
<b>Section</b>	Downstream	
<b>Date of Workshop</b>	June 21 - 22, 2022	
<b>Venue</b>	Bishwonath Temple Hall	
<b>Location</b>	Sijuwa, Ratuwamai-7, Morang	
<b>Participants' Information</b>	<b>Total Participants</b>	<b>26</b>
	<b>Male Participants</b>	<b>22</b>
	<b>Female Participants</b>	<b>4</b>
	<b>Total No. of Dalits</b>	<b>2</b>
	<b>Total No. of Ips</b>	<b>8</b>

<b>S. N.</b>	<b>Name of Participants</b>	<b>Address</b>	<b>Institution</b>	<b>Designation</b>	<b>Contact No.</b>
1	Prem Bahadur Poudel	Urlabari-9		Local Farmer	9819335832
2	Minmani Karki	Urlabari-9	Dhurvatarra Farmers Group	Chairman	9819325315
3	Kagendra Nath Dhungana	Urlabari-9		Local Farmer	9804912877
4	Biren Subba	Ratuwamai-10		Local Farmer	9803423337
5	Rajan Prasad Ghimire	Urlabari-9, Gaighat	Maharajsthan Farmers Group	Member	9827355551
6	Khagendra Poudel	Urlabari-9		Local Farmer	9803683718
7	Ramesh Kumar Singh Gangain	Ratuwamai-3		Local Farmer	9804014216
8	Pujan Kumar Tajpuriya	Ratuwamai-3		Local Farmer	9816060630
9	Krishna Lal Tajpuriya	Ratuwamai-3		Local Farmer	9867082039
10	Ranjit Prasad Singh	Ratuwamai-4, Sighadi			9817319881
11	Menuka Gautam	Ratuwamai-8		Local Farmer	9819017386
12	Prabha Basnet	Ratuwamai-8		Local Farmer	9812373719
13	Kedar Pokharel	Ratuwamai-10	Madangram Farmers Group	Chairman	9812379799
14	Yuvaraj Pandey	Ratuwamai-8		Local Farmer	9820376960
15	Narpati Subedi	Ratuwamai-8		Local Farmer	9800959163
16	Jhanak Prasad Kandel	Ratuwamai-8	Shantinagar Farmers Group	Secretary	9806090470

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
17	Sumitra Devi Sardar	Ratuwamai-4	Ratuwamai Municipality-4	Dalit Woman Ward Member	
18	Dilip Kumar Gangain	Ratuwamai-4		Local Farmer	9807071941
19	Bisheshwor Prasad Singh	Ratuwamai-4		Local Farmer	9823252752
20	Bikram Kumar Singh	Ratuwamai-4		Local Farmer	9807080755
21	Sunita Sardar	Ratuwamai-4		Local Farmer	9810526723
22	Bishnu Kumar Gautam	Ratuwamai-10		Local Farmer	9805343094
23	Kamal Khadka	Ratuwamai-10		Local Farmer	9804022455
24	Uddhav Karki	Ratuwamai-10		Local Farmer	9845497907
25	Bhul Bahadur Karki	Ratuwamai-10	Ratuwamai Municipality-10	Ward Chairman	9852029995
26	Chintamani Trital	Ratuwamai-8		Local Farmer	9840270849

### Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Prem Bahadur Poudel									
2	Minmani Karki									
3	Kagendra Nath Dhungana									
4	Biren Subba									
5	Rajan Prasad Ghimire									
6	Khagendra Poudel									
7	Ramesh Kumar Singh Gangain									
8	Pujan Kumar Tajpuriya									
9	Krishna Lal Tajpuriya									
10	Ranjit Prasad Singh									
11	Menuka Gautam									
12	Prabha Basnet									
13	Kedar Pokharel									

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
14	Yuvaraj Pandey	1				1				
15	Narpati Subedi	1				1				
16	Jhanak Prasad Kandel	1				1				
17	Sumitra Devi Sardar		1		1					
18	Dilip Kumar Gangain	1		1						
19	Bisheshwor Prasad Singh	1		1						
20	Bikram Kumar Singh	1		1						
21	Sunita Sardar		1		1					
22	Bishnu Kumar Gautam	1				1				
23	Kamal Khadka	1					1			
24	Uddhav Karki	1					1			
25	Bhul Bahadur Karki	1					1			
26	Chintamani Trital	1								
<b>Total</b>		<b>22</b>	<b>4</b>	<b>8</b>	<b>2</b>	<b>10</b>	<b>5</b>	<b>0</b>	<b>0</b>	<b>0</b>

#### D. Expert Planning Workshop

##### DI: Workshop for Jhapa and Ilam district

<b>River Systems</b>	Kankai, Biring, Mechi and Ratuwa (areas of Ratuwa situated at Jhapa and Ilam district)
<b>Date of Workshop</b>	August 16 - 17, 2022
<b>Venue</b>	CP Hotel
<b>Location</b>	Birtamod, Jhapa

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
1	Dan Bahadur Shrestha	DFO, Ilam	Divisional Forest Officer	9852685616	<a href="mailto:db.shrestha.db@gmail.com">db.shrestha.db@gmail.com</a>
2	Umesh Budhathoki	BRCRN PPMU, Itahari	Assistant Soil Conservation Officer	9857085564	<a href="mailto:umesh.budhathoki@gmail.com">umesh.budhathoki@gmail.com</a>

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
3	Ek Raj Dahal	SDFO, Damak	Assistant Forest Officer	9852678858	<a href="mailto:ekraj.ek67@gmail.com">ekraj.ek67@gmail.com</a>
4	Dipak Sen Bhandari	SDFO, Jalthal	Forest Ranger	9842639419	<a href="mailto:d98426@gmail.com">d98426@gmail.com</a>
5	Raju Khadka	SDFO, Surunga	Forest Officer	9842698708	<a href="mailto:khadaraju2014@gmail.com">khadaraju2014@gmail.com</a>
6	Rajan Rai	SDFO, Dhaijan	Assistant Forest Officer	9845287154	<a href="mailto:rairajan5068@gmail.com">rairajan5068@gmail.com</a>
7	Jeewan Prasad Pathak	DFO, Jhapa	Acting DFO	9842673044	<a href="mailto:jiwanpathak123@gmail.com">jiwanpathak123@gmail.com</a>
8	Ganesh Siwakoti	AKC, Jhapa	Agricultural Extension Officer	9851192963	<a href="mailto:ganshsiwakoti5@gmail.com">ganshsiwakoti5@gmail.com</a>
9	Ganesh Kumar Rai	AKC, Ilam	Agriculture Officer	9842070614	<a href="mailto:raiganesh2076@gmail.com">raiganesh2076@gmail.com</a>
10	Tekendra Bista	SDFO, Mai	Forester	9852685602	<a href="mailto:tekendrabista21@gmail.com">tekendrabista21@gmail.com</a>
11	Hom Chandra Gautam	SDFO, Rong	Forester	9852680952	<a href="mailto:homchandra@gmail.com">homchandra@gmail.com</a>
12	Tika Pradhan	SDFO, Mangsebung	Forester	9804957695	<a href="mailto:tikapradhan867@gmail.com">tikapradhan867@gmail.com</a>
13	Tribhuvan Shah	SDFO, Chulachuli	Assistant Forest Officer	9852685610	<a href="mailto:tribhuwanshah826@gmail.com">tribhuwanshah826@gmail.com</a>
14	Sarda Prasai Parajuli	Himawanti Nepal Gauradaha-6	Treasurer	9842084841	
15	Sangita Budhathoki	FAO-TA KTM	Gender Specialist	9851060958	<a href="mailto:sangita.budhathoki@fao.org">sangita.budhathoki@fao.org</a>
16	Sushil Bhandari	BRCRN PPMU, Itahari	Coordinator	9852074805	<a href="mailto:sbhandari7@gmail.com">sbhandari7@gmail.com</a>
17	Ramesh Siwakoti	Province Forest Directorate	Forest Ranger	9862675334	<a href="mailto:romnath101@gmail.com">romnath101@gmail.com</a>

## D2: Workshop for Morang district

<b>River Systems</b>	Lohandra, Bakraha, Ratuwa and Budhi (areas of Ratuwa and Budhi situated at Morang district)
<b>Date of Workshop</b>	August 14 - 15, 2022
<b>Venue</b>	Dreamland Fun Park
<b>Location</b>	Belbari, Morang

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
1	Anirudra Kumar Shah	DFO, Morang	Divisional Forest Officer	9852026614	<a href="mailto:anirudrasah26@gmail.com">anirudrasah26@gmail.com</a>
2	Tarni Prasad Chaudhari	SDFO, Mangalbare	Assistant Forest Officer	9852032623	
3	Dipesh Kumar Mishra	SDFO, Belbari	Assistant Forest Officer	9842937089	<a href="mailto:diruba@gmail.com">diruba@gmail.com</a>
4	Rajendra Kumar Ghimire	DFO, Morang	Forest Ranger	9842046940	<a href="mailto:ghimirerajendra705@gmail.com">ghimirerajendra705@gmail.com</a>
5	Dharmendra Kumar Singh	AKC, Morang	Agriculture Officer	9842105698	<a href="mailto:dharmendrakumarsinghramesh@gmail.com">dharmendrakumarsinghramesh@gmail.com</a>
6	Sanjay Khadka	Food Technology and Quality Control Office, Biratnagar	Food Research Officer	9856000670	<a href="mailto:khadkasonj@gmail.com">khadkasonj@gmail.com</a>
7	Amrit Bilas Pant	SDFO, Latijhoda	Forest officer	9852070240	<a href="mailto:amritpanta5860@gmail.com">amritpanta5860@gmail.com</a>
8	Umesh Budhathoki	BRCRN PPMU, Itahari	Assistant Soil Conservation Officer	9857085564	<a href="mailto:umesh.budhathoki@gmail.com">umesh.budhathoki@gmail.com</a>
9	Kedar Prasad Adhikari	SDFO, Kerabari	Forest Ranger	9842133609	<a href="mailto:adhikarikeshab56@gmail.com">adhikarikeshab56@gmail.com</a>
10	Dilip Limbu	SDFO, Kerabari	Forest Guard	9808289279	<a href="mailto:dilipthegim@gmail.com">dilipthegim@gmail.com</a>
11	Dlip Prasad Gupta	Province Forest Directorate, Dharan	Assistant Forest Officer	9842552666	<a href="mailto:pradesh1forest@gmail.com">pradesh1forest@gmail.com</a>
12	Sushil Bhandari	BRCRN PPMU, Itahari	Project Coordinator	9852074805	<a href="mailto:sbhandari7@gmail.com">sbhandari7@gmail.com</a>
13	Abdul S. Ansari	FAO TA, KTM	FAO-TA	9802330560	<a href="mailto:abdul.ansari@fao.org">abdul.ansari@fao.org</a>
14	Minakshi Rokka Chhetri	FAO TA, KTM	FAO-TA	9841808331	<a href="mailto:minakshi.rokkachhetri@fao.org">minakshi.rokkachhetri@fao.org</a>
15	Dipesh Khadka	FSc-PU-Itahari	FSc-PU	9866834033	<a href="mailto:zindatiger99@gmail.com">zindatiger99@gmail.com</a>

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
16	Khadga Bd. Tamang	PCTMCD, Salakpur, Morang	Assistant Soil Conservation Officer	9852051053	<a href="mailto:kbtamang2@gmail.com">kbtamang2@gmail.com</a>
17	Sarda Parajuli	Himawanti Nepal Gauradaha-6 Jhapa	Treasurer	9842084841	

### Annex-3: Activities, Location and Budget Plan

Note: The location coordinates of planned activity sites listed in table below are the result of participatory mapping exercise conducted with local stakeholders who demarcated the intervention location in the map with google image in background. Some of the locations (approximately 30% of the sites) are verified in the field for their accuracy and validity. However, due to time and resource constraint for field verification, all identified location coordinates are not verified in field. Hence, location coordinates mentioned in CERP activity sites need further field verification before the implementation. Locations are subjected to change as per the field findings and verification result. Intervention site coordinate mentioned in this CERP Annexes should be taken only as initial guidance to start the field process and, if they are found inappropriate during the field verification, the technical team from PPMU can conduct location changes with proper documentation of field condition.

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Identification and operationalization of FFS								A1.1	
FFS at Sinphere Krishak samuha	No	1	700,000	700,000	Sinphere	87.72359	26.78073	A1.1.1	Mangsebung RM-4
FFS for Bukuwa CF	No	1	700,000	700,000	Phokharitol	87.70991	26.72443	A1.1.2	Chulachuli RM-5
FFS at Apexya Krishi Samuh	No	1	700,000	700,000	Mahadeva Chaukighat	87.66122	26.43985	A1.1.3	Ratuwamai M-3
FFS at Madagram Krishak Samuh	No	1	700,000	700,000	Satmedi	87.63841	26.552	A1.1.4	Ratuwamai M-10
FFS at Hamro saja Krishak Samuh	No	1	700,000	700,000	Birbalchwok	87.66222	26.49892	A1.1.5	Gauradhaha M-6
FFS at Ambari (Riverbed Agroforestry)	No	1	700,000	700,000	Ambari	87.65122	26.62393	A1.1.6	Uralabari M-8



Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Capacity-building in the use of weather information and its application in agricultural practices	No	3	100,000	300,000					
Implement climate resilient agriculture practices	ha	306.51	2,000	613,013.01	Mangsebung RM-3	87.71791	26.8229	A1.2.1	Mangsebung RM-3
	ha	184.28	2,000	368,564.65	Mangsebung RM-6	87.69389	26.83209	A1.2.2	Mangsebung RM-6
	ha	732.57	2,000	1,465,136.39	Chulachuli RM-3	87.75497	26.70944	A1.2.3	Chulachuli RM-3
	ha	496.78	2,000	993,560.12	Chulachuli RM-5	87.70848	26.72655	A1.2.4	Chulachuli RM-5
	ha	87.47	2,000	174,934.53	Miklajung RM-8	87.68323	26.74925	A1.2.5	Miklajung RM-8
	ha	781.76	2,000	1,563,520.01	Damak M-2	87.69259	26.69745	A1.2.6	Damak M-2
	ha	794.29	2,000	1,588,573.16	Uralabari M-9	87.63723	26.59553	A1.2.7	Uralabari M-9
	ha	1,120.18	2,000	2,240,366.50	Ratuwamai M-3	87.65903	26.43204	A1.2.8	Ratuwamai M-3
	ha	482.00	2,000	963,992.29	Ratuwamai M-7	87.64417	26.48713	A1.2.9	Ratuwamai M-7
	ha	1,947.31	2,000	3,894,621.14	Gauradhaha M-6	87.66433	26.50169	A1.2.10	Gauradhaha M-6
	ha	2,048.87	2,000	4,097,744.32	Gauradhaha M-5	87.66449	26.56351	A1.2.11	Gauradhaha M-5
	Event	1	450,000	450,000	Lamitar	87.72817	26.8142	A1.3.1	Mangsebung RM-3

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Train and support farmers to adopt and apply climate-resilient land use practices	Event	1	450,000	450,000	Suparibote	87.76919	26.72908	A1.3.2	Chulachuli RM-3
	Event	1	450,000	450,000	Shikharkateri	87.6945	26.74616	A1.3.3	Chulachuli RM-5
	Event	1	450,000	450,000	Gairigaun	87.68474	26.75647	A1.3.4	Miklajung RM-8
	Event	1	450,000	450,000	Baluwathan (Baluwathan Krishak Samuh)	87.64801	26.57654	A1.3.5	Gauradhaha M-5
	Event	1	450,000	450,000	Sakuna	87.75475	26.70719	A1.3.6	Chulachuli RM-3
	Event	1	450,000	450,000	Marchhadangi	87.67252	26.41958	A1.3.7	Ratuwamai M-3
	Event	1	450,000	450,000	Maharajsthan	87.63444	26.57866	A1.3.8	Uralabari M-9
	Event	1	450,000	450,000	Beldangi	87.69614	26.70791	A1.3.9	Damak M-2
	Event	1	450,000	450,000	Kusunde	87.69291	26.81895	A1.3.10	Mangsebung RM-6
	Event	1	450,000	450,000	Nayagaun-Magakhadigaun	87.65335	26.51942	A1.3.11	Gauradhaha M-6
Event	1	450,000	450,000	Sijuwa	87.64361	26.49253	A1.3.12	Ratuwamai M-7	
Promote agroforestry with multiyear cropping/horticulture/on-farm conservation	ha	10	6,000	60,000	Simbale	87.78472	26.72155	A2.1.1	Chulachuli RM-2
	ha	25	6,000	150,000	Sarkitar	87.75859	26.72498	A2.1.2	Chulachuli RM-3

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	ha	120	6,000	720,000	Makadhuppa-Chukphedi-Nigure	87.67085	26.83002	A2.1.3	Chulachuli RM-6
	ha	90	6,000	540,000	Todke	87.69264	26.83838	A2.1.4	Mangsebung RM-6
	ha	35	6,000	210,000	Uttare-Kamitar	87.70996	26.83142	A2.1.5	Mangsebung RM-3
	ha	50	6,000	300,000	Mringepakha-Dumse	87.7242	26.82294	A2.1.6	Mangsebung RM-3
	ha	60	6,000	360,000	Bhalutar-Boksi Thumka	87.73706	26.81319	A2.1.7	Mangsebung RM-5
	ha	10	6,000	60,000	Majhuwagaun	87.74069	26.80415	A2.1.8	Mangsebung RM-5
	ha	10	6,000	60,000	Titirbaote	87.72164	26.77513	A2.1.9	Mangsebung RM-4
	ha	125	6,000	750,000	Jhilke-Thulo muse-Sano muse-Kabhrangbote	87.75688	26.75	A2.1.10	Mangsebung RM-4
								A2.2	
Landslide treatment	No	1	3,500,000	3,500,000	Lamitar	87.72753	26.81921	A2.2.1	Mangsebung RM-3
	No	1	2,000,000	2,000,000	Kusunde	87.68931	26.81947	A2.2.2	Mangsebung RM-6
	No	1	2,000,000	2,000,000	Kusunde	87.69771	26.81827	A2.2.3	Mangsebung RM-6
	No	4	LS	3,000,000	Nigure	87.67631	26.82558	A2.3.1	Chulachuli RM-6

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Construction of check dams and bioengineering for gully/Debris torrent protection	No	3	LS	2,500,000	Perunge Upstream	87.69714	26.81234	A2.3.2	Mangsebung RM-4
	No	2	LS	2,000,000	Gharti Khola upstream	87.73369	26.81585	A2.3.3	Mangsebung RM-3&5
Construction of embankment & bio-engineering	m	113	30,000	3,390,000	Himalyan CF	87.71207	26.68365	A2.4.1	Damak M-1
	m	52	30,000	1,560,000	Sikre	87.69516	26.75786	A2.4.2	Chulachuli RM-6
	m	400	30,000	12,000,000	Ratuwa left bank	87.90873	26.48394	A2.4.3	Gauradaha M-5 & 6
Strengthening climate and disaster risk reduction mechanism in collaboration with local government	Municipality/Rural municipality	6	300,000	1,800,000				A2.5.1	
Training/capacity building on soil and watershed conservation using bio-engineering	Event	1	500,000	500,000				A2.5.2	
Climate resilient awareness campaign through Eco-clubs	School	10	50,000	500,000				A2.5.3	
Support review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	No	18	200,000	3,600,000	Starting from CBFMGs with higher willingness to participate and not having any technical and financial dispute			M3.1	
Training and capacity development for implementation of FOPs	No	18	250,000	4,500,000				M3.2	
Equipment support for implementation of FOPs	No	18	200,000	3,600,000				M3.3	

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Capacitate government staffs and CBOs on climate resilient forest management (ToF)	Event	4	300,000	1,200,000				M3.4	
Governance training to government staffs and CFUGs to enhance accountability and transparency	Event	10	240,000	2,400,000				M3.5	
Enrichment plantation	ha	2	50,000	100,000	Kanchanjunga CF	87.71582	26.74445	M4.1.1	Mangsebung RM-4
	ha	10	50,000	500,000	Ranidhara CF	87.68638	26.76259	M4.1.2	Chulachuli RM-6
	ha	9	50,000	450,000	Sukuna CF	87.75622	26.71533	M4.1.3	Chulachuli RM-3
Implement Assisted Natural Regeneration	ha	50	20,000	1,000,000	Darbare CF	87.71124	26.80499	M4.2.1	Mangsebung RM-4
	ha	100	20,000	2,000,000	Pangbuhang	87.68861	26.8062	M4.2.2	Mangsebung RM-4
	ha	150	20,000	3,000,000	Hanse Dumse	87.69134	26.7235	M4.2.3	Damak M-2 & 3
	ha	150	20,000	3,000,000	Sukuna CF	87.76804	26.72852	M4.2.4	Chulachuli RM-3
	ha	50	20,000	1,000,000	Bukuwa CF	87.72846	26.72802	M4.2.5	Chulachuli RM-3, 4 & 5
	ha	40.00	20,000	800,000.00	Devidhara CF	87.70201	26.75041	M4.2.6	Chulachuli RM-5
	ha	42.00	20,000	840,000.00	Kanchanjunga CF	87.70944	26.74629	M4.2.7	Mangsebung RM-4 & Chulachuli RM-5

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	ha	20.00	20,000	400,000.00	Baneli cf	87.73084	26.75908	M4.2.8	Mangsebung RM-4 Miklajung RM-7 Chulachuli RM-6
	ha	16.00	20,000	320,000.00	Tribeni cf	87.71474	26.79327	M4.2.9	
	ha	14.00	20,000	280,000.00	Mawa Nunsari cf	87.67147	26.73492	M4.2.10	
	ha	5.00	20,000	100,000.00	Ranidhara cf	87.69312	26.7594	M4.2.11	
Firefighter training and support fire fighting equipment to CFUGs	CFUG	10	300,000	3,000,000				M4.3.1	
Support firefighting equipment to security institution	Set	6	150,000	900,000				M4.3.2	
Training and equipment support for compost production from bushes and leaf litters	CFUG	5	150,000	750,000				M4.3.3	
Construction and improvement of fire lines	Km	4	300,000	1,200,000				M4.3.4	
Customize fire alert system in Community Based Forest Management	No	1	LS	300,000				M4.3.5	
Skill development trainings and equipment support	Household	250	25,000	6,250,000				M4.4	
Establish and support multi-purpose tree nursery (150,000 capacity)	No	1	1,000,000	1,000,000	Humse Dumse CF, Chulachuli sub division			M5.1.1	
Establish and support multi-purpose tree nursery (50,000 capacity)	No	1	500,000	500,000				M5.1.2	

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Production of saplings	No	200,000	40	8,000,000				M5.1.3	
Establish On-farm tree nursery	No	1	600,000	600,000	Gauradaha			M5.1.4	
Demonstration plantation	ha	15.28	500,000	7,639,265	Hanse dumse	87.69921	26.72232	M5.2.1	Damak M-2
	ha	15.78	500,000	7,892,058.50	Magarkhadigaun	87.64542	26.51101	M5.2.2	Gauradhaha M-6
Riparian/riverbank plantation	ha	17.02	600,000	10,213,273.20	Bukuwa CF	87.73326	26.71971	M5.3.1	Chulachuli RM-4
	ha	4.99	600,000	2,994,850.20	Sijuwa	87.64429	26.49947	M5.3.2	Ratuwamai M-7
	ha	4.97	600,000	2,979,256.80	Junnabari-Bhulkadubba	87.64223	26.5297	M5.3.3	Gauradhaha M-5 & 6
	ha	30	600,000	18,000,000	Teliyadangi	26.4901	28.91366	M5.3.4	Gauradhaha M-6
	ha	5	600,000	2,820,000	Kanchanjunga cf	87.70846	26.73828	M5.3.5	Chulachuli RM-5
	ha	3	600,000	1,860,000	Bukuwa cf	87.7089	26.73578	M5.3.6	Chulachuli RM-5
	ha	29	600,000	17,400,000	Chanju Khola	87.75659	26.69597	M5.3.7	Chulachuli RM-2
	ha	22	600,000	13,200,000	Chanju Khola (Right bank)	87.74863	26.69289	M5.3.8	Chulachuli RM-3
	ha	140	600,000	84,000,000	Ratuwa Khola (left)	87.67889	26.61636	M5.3.9	Kmal RM-7

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	ha	17	600,000	10,200,000	Bidhuwa Khola	87.71067	26.70205	M5.3.10	Chulachuli RM-5
Technical guidance and support to establish woodlots	ha	150	250,000	37,500,000	Others			M5.4	
Create informal learning and sharing platforms for grassroots-level women	Event	5	50,000	250,000					
Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership	Event	1	50,000	50,000					
Produce and publish best practices and learning in gendered governance	Event	1	50,000	50,000					
Conduct rapid assessment on women's contribution and involvement in SNRM	Event	1	100,000	100,000					
Provide gender mainstreaming trainings/ workshops to local government and CBOs	Event	1	100,000	100,000					
Conduct GESI focused social audits and public hearing	Event	2	150,000	300,000					
Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	Meeting	3	50,000	150,000					
Engage male involvement to advocate gender and women's issues and concern in campaign	Event	2	50,000	100,000					

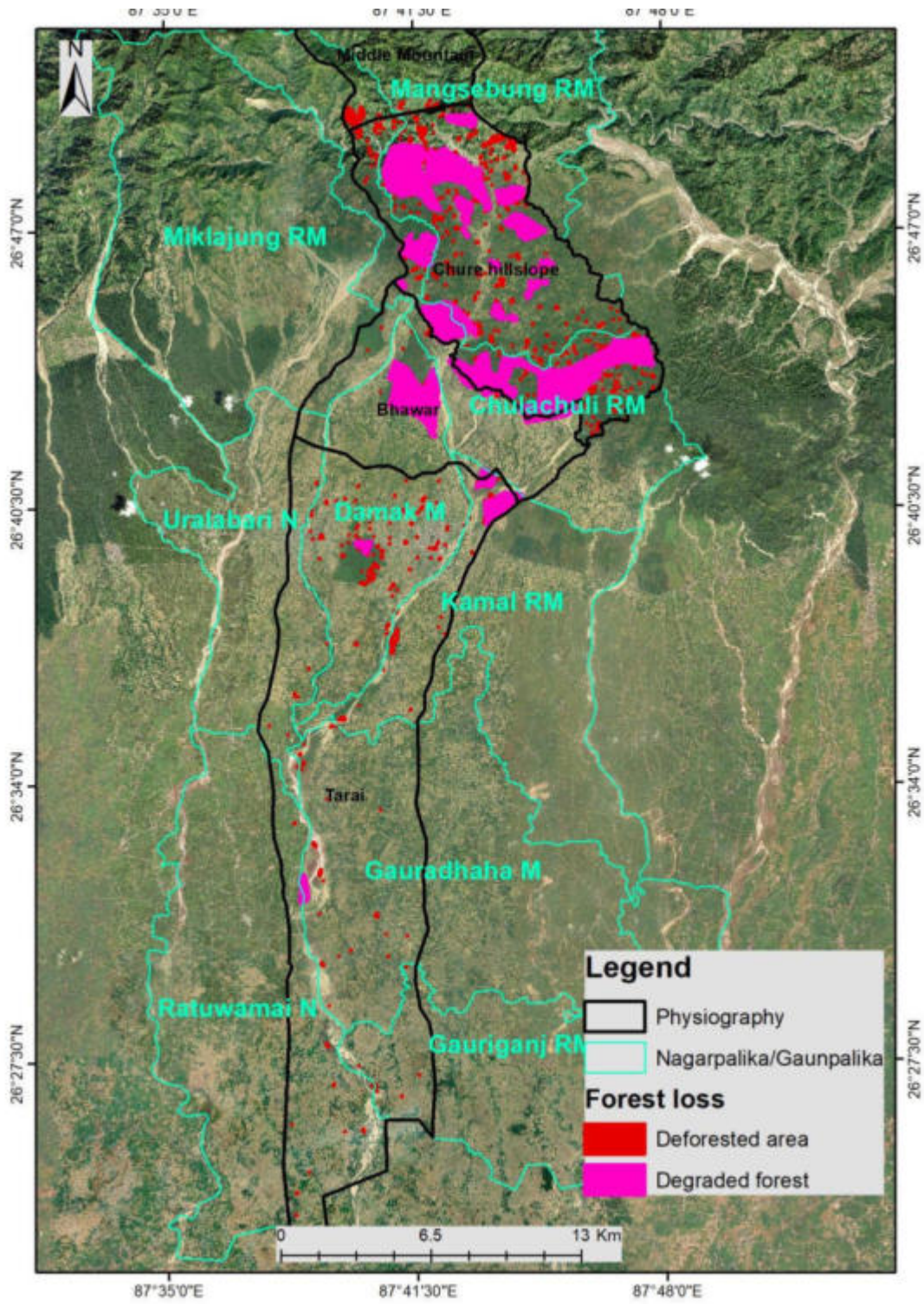


Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
<b>Total</b>				<b>335,212,729.81</b>					

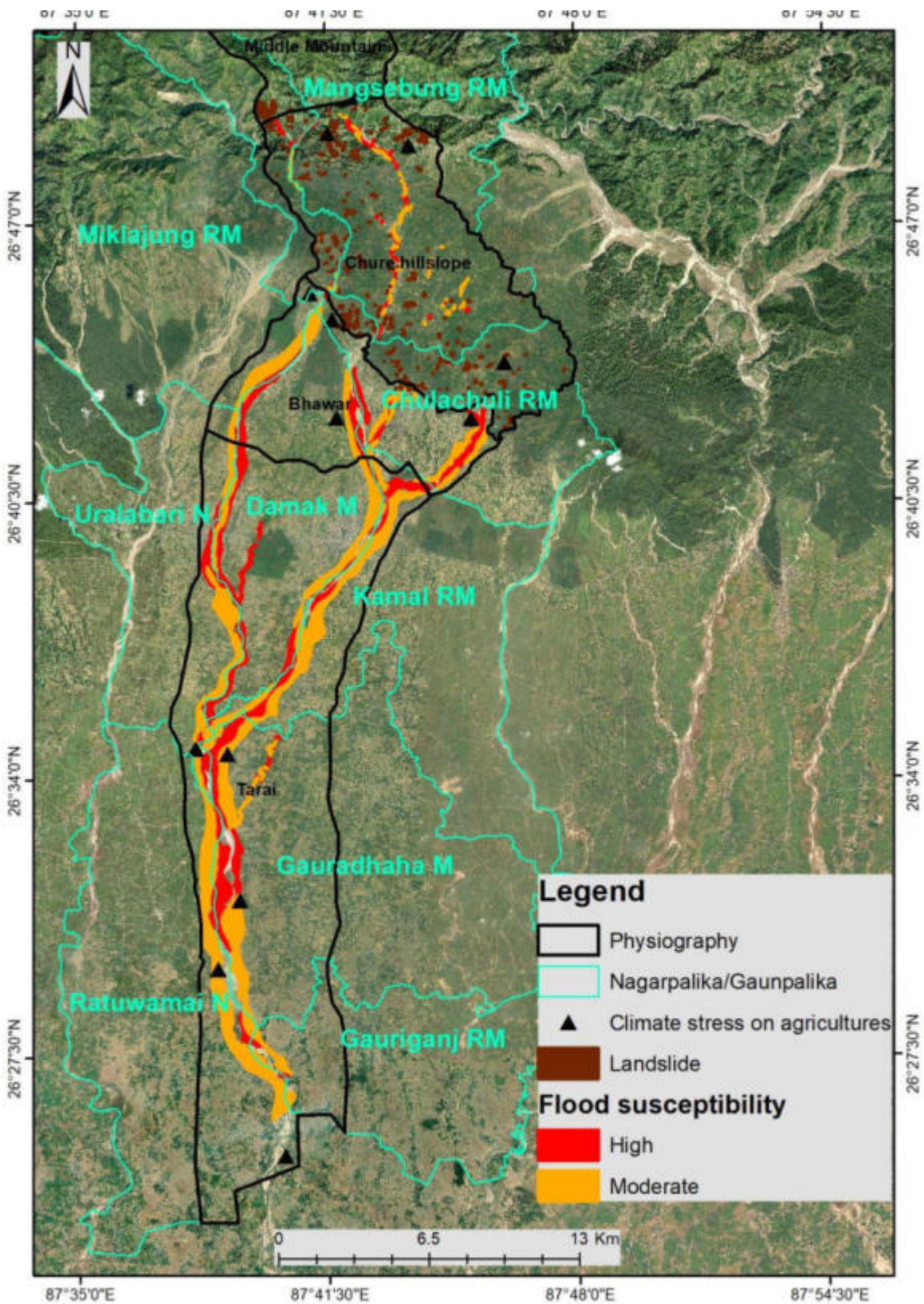
Note: Activity location and coordinates are subjected to change based on field condition before the implementation. BRCRN PPMU offices can make the necessary changes with proper documentation of field condition

## Annex-4: Maps

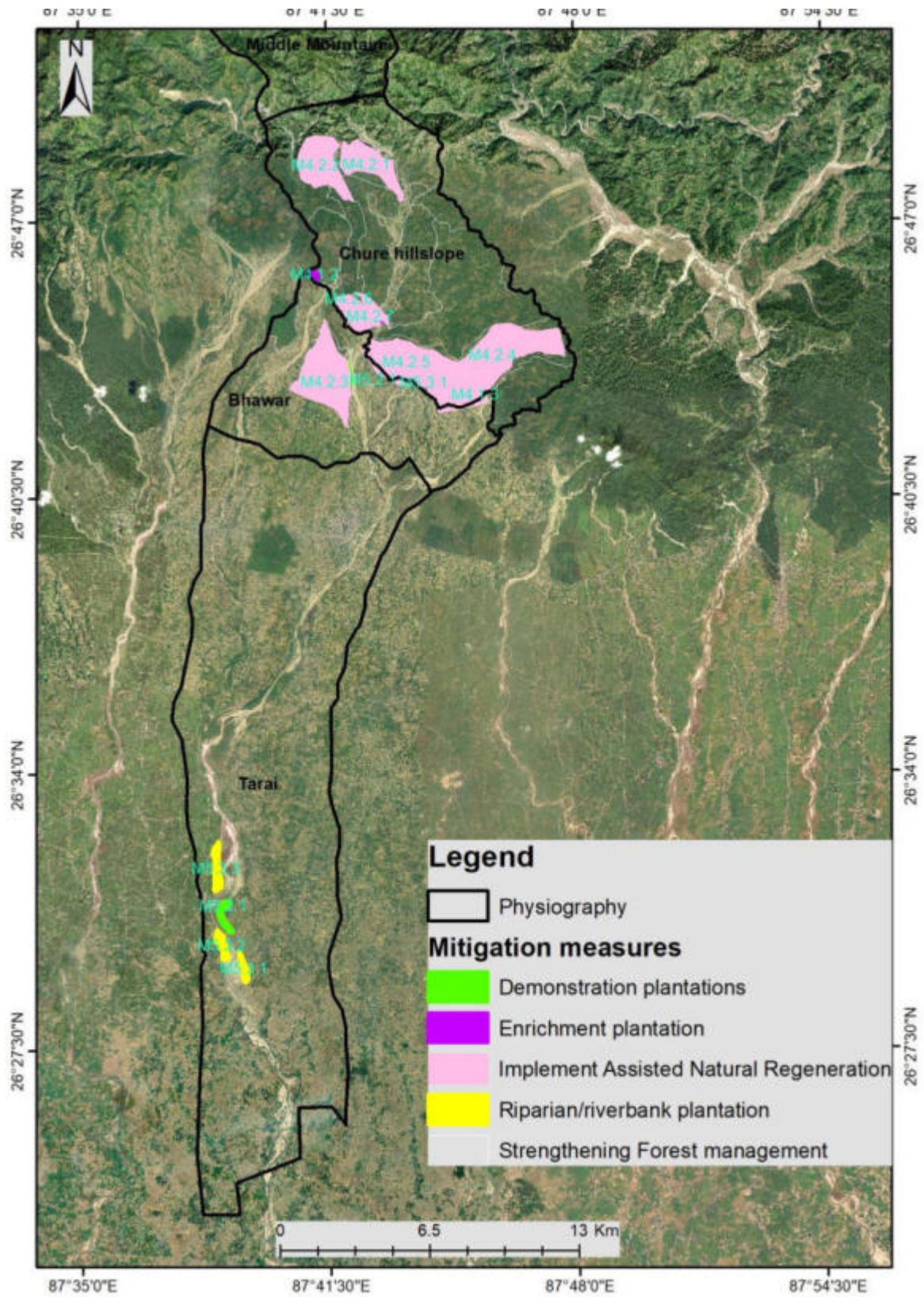
### Hotspots for Forest Loss (D&FD)



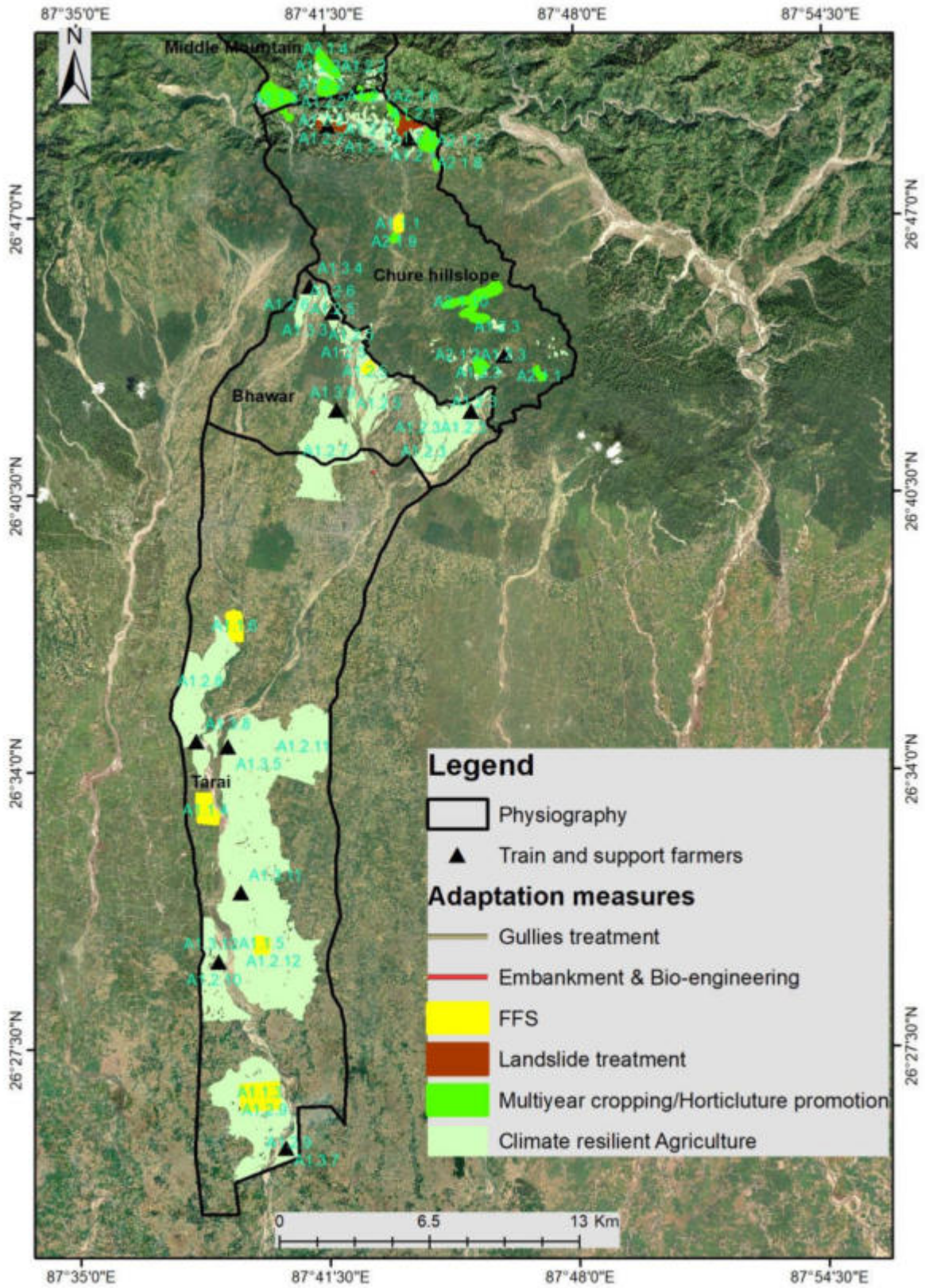
# Hotspots for Climate Adaptation



# Final Activity Map for Mitigation



# Final Activity Map for Adaptation



## Annex-5: Photographs

### A. Problem and Solution Analysis Workshop

#### A1: Upstream



#### A2: Midstream



**A3: Downstream**







**B. Expert Planning Workshop**

**BI: Workshop for Jhapa and Ilam district**





**B2: Workshop for Morang district**





### C. Hotspot Verification





#### D. Focus Group Discussion and KII



