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Ministry of Forests and Environment

GREEN CLIMATE FUND

Food and Agriculture Organization of the United Nations

Critical Ecosystem Restoration Plan (CERP)

of

Bakraha River System

Building A Resilient Churia Region in Nepal
(BRCRN)
Project Management Unit, Babarmahal, Kathmandu

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 ।

2080/2/24

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.

 As the CERP is public property, therefore, any plans or activities prepared under this report can be implemented by any organizations and institutions. The report attempts for higher precision, however, there may be areas for improvement. Intervention site locations and budget estimations mentioned in report are based on field consultation and observations. During the time of implementation, they are subjected to change based on the changes in field condition at the time of implementation. Considered as the lively planning instrument, the CERP has the window open for the revision along with its implementation at the river system.

Date: June 2023

GRID CONSULT (P) LTD.

APPROPRIATE TECHNOLOGY DEVELOPMENT AND RESEARCH

Reg. No.: 56920/065/066
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Date: 27th 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
Sincerely,
Angishor Shrestha
Director – Grid Consult (P) Ltd
On behalf of GRID Consult– ECN Consultancy – Sunakhari Research Consult JV

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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
DFPSC	:	District Forest Products Supply Committee
DHM	:	Department of Hydrology and Meteorology
DMG	:	Department of Mines and Geology
DoS	:	Department of Survey
DRR	:	Disaster Risk Reduction
DWIDP	:	Department of Water Induced Disaster Prevention
EIA	:	Environment Impact Assessment
FECOFUN	:	Federation of Community Forests Users Nepal
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
MoFESC	:	Ministry of Forests, Environment and Soil Conservation
PCTMCDB	:	President Chure Terai Madhesh Conservation Development Board
PCTMCMMP	:	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
SWMO	:	Soil and Watershed Management Office
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, BhavarandTerai. 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 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.

Bakraha river is originated at Mangmalung area (Dhankuta) from Mahabharat range, and passes through Chure-Bhavar and Terai. It extends over 87.528939° to 87.694380°E and 26.383895° to 26.833375°N. The river system faces rapid urbanization with the annual rate of 15.71% per year from 2000 to 2019. It appears that the total forest area increased by 438.4 ha at the annual rate of 0.24 % 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 forest fire, open/uncontrolled grazing, adopting inappropriate cropping systems, unsustainable/illegal harvesting of forest products, encroachment of forestlands, ineffective forest management practices and infrastructure development are major drivers of deforestation and forest degradation in Bakraha 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; soil quality degradation; and loss and damage of agricultural lands and crops.

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; interventions to regulate infrastructure development in forest area; interventions to regulate settlement expansion/land plotting in agricultural lands and others, 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.

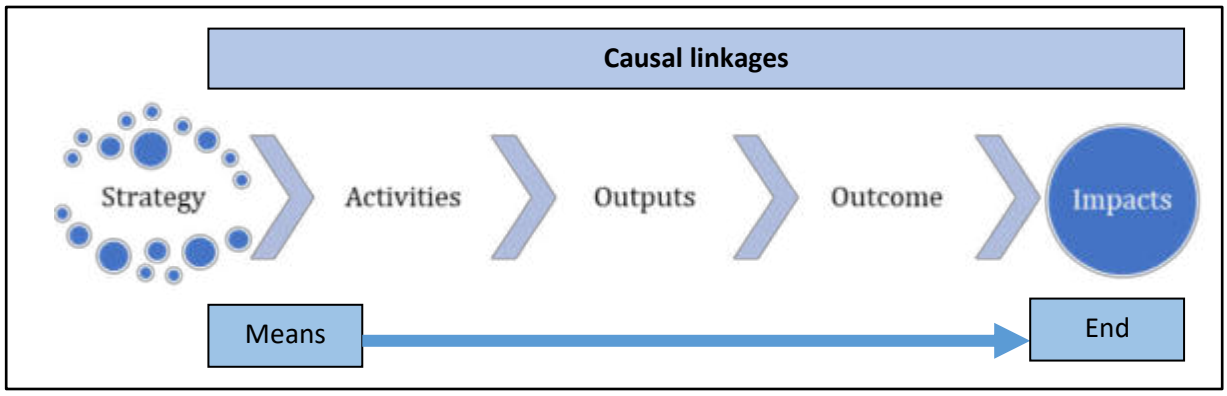
CHAPTER I : INTRODUCTION TO CRITICAL ECOSYSTEM RESTORATION PLAN

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 1, 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.

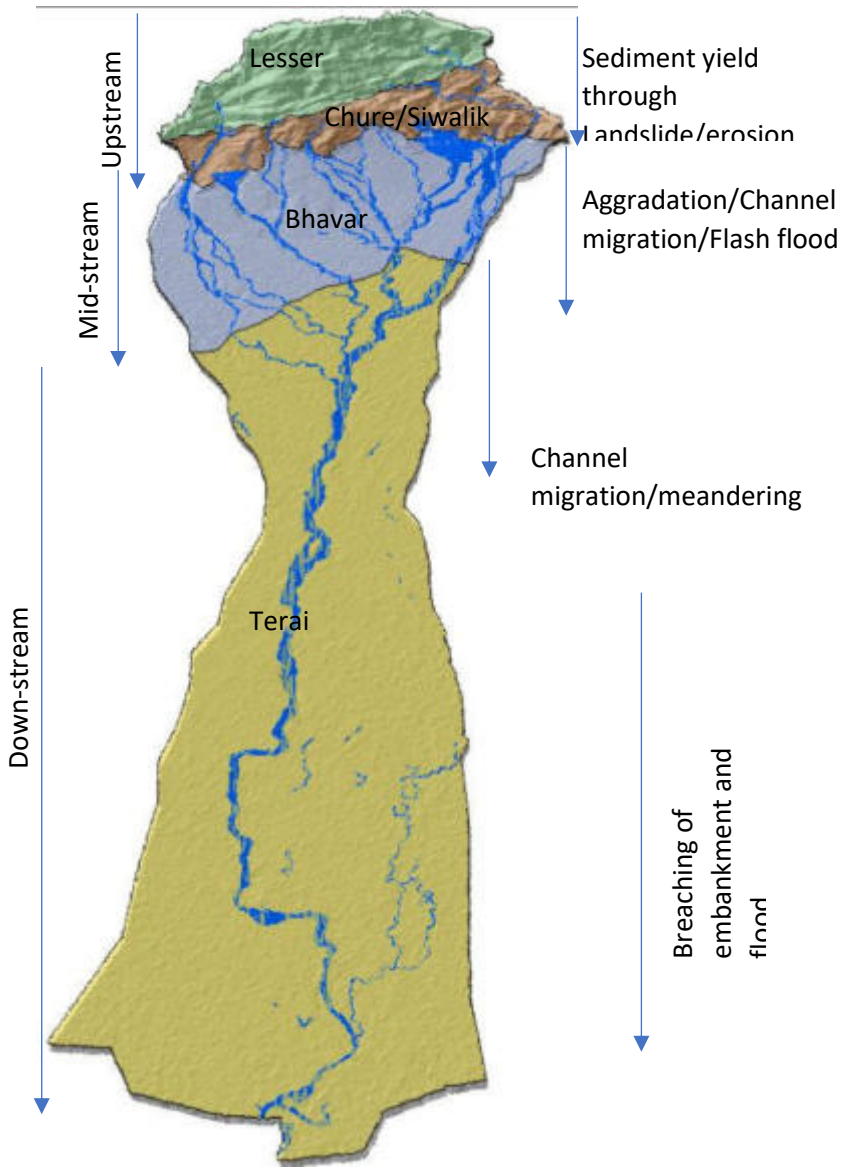


Figure 2: Upstream-midstream-downstream linkages in Bakraha river system

Bakraha 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.

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.

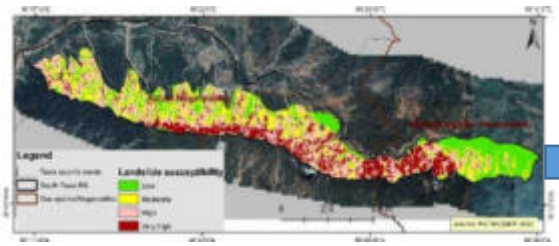
CERP is envisioned at a river system scale to foster upstream-midstream-downstream connectivity by analyzing complex inter-linkage of causes and effect dynamics of climate vulnerability over the specific geographic regions and interventions to help build the climate resilience with interlinked and cascading 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

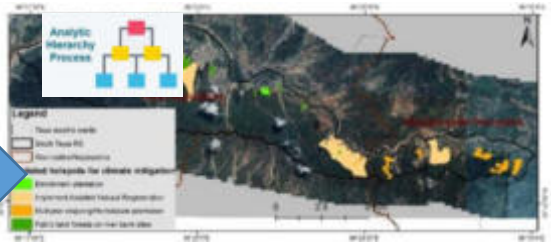
2.1 CERP Development Phase

Following nine steps were followed during the CERP development phases:

Step 1: Preparatory spatial analysis of land cover change, forest loss/gain, forest fires, slopes, landslide, flood, river geomorphology and settlement vulnerability



Step 2: Spatial Multi-criteria Analysis (MCA) to identify problem hotspots

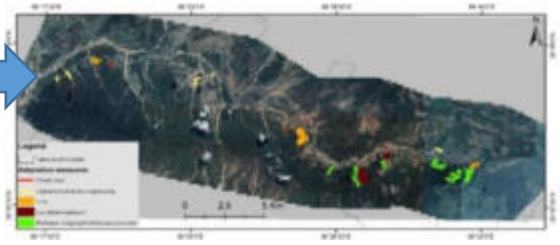


Step 3: Participatory spatial planning using hotspot map for prioritization of drivers, barriers, and identification of specific problem locations

Step 4: Formulation of problem and solution trees, identification, and mapping of solutions

Step 5: Field visits to verify locations of problem-solution

Step 6: Compilation of information and desk verification on problem-solution locations and interventions planned



Step 7: Expert planning workshop for finalization of IPacks and analysis of risks & benefits

Step 8: Finalizing monitoring mechanism and budgeting of interventions through expert consultation

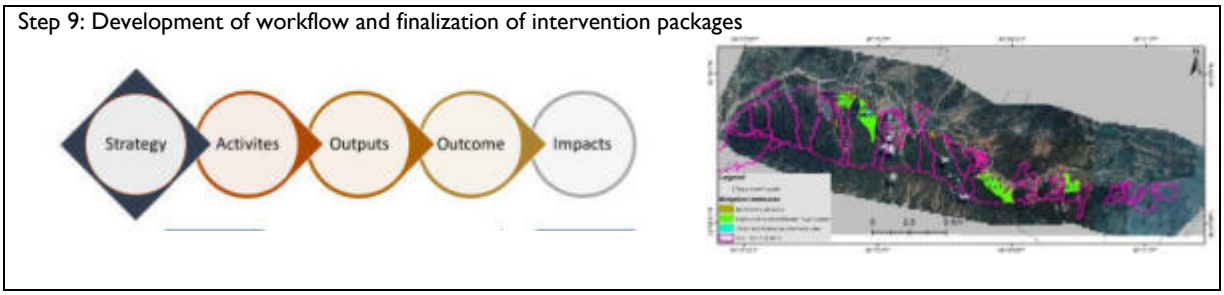


Figure 3: Steps of spatial analysis for CERP development

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 (https://firms.modaps.eosdis.nasa.gov)	- 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 indictors)	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:

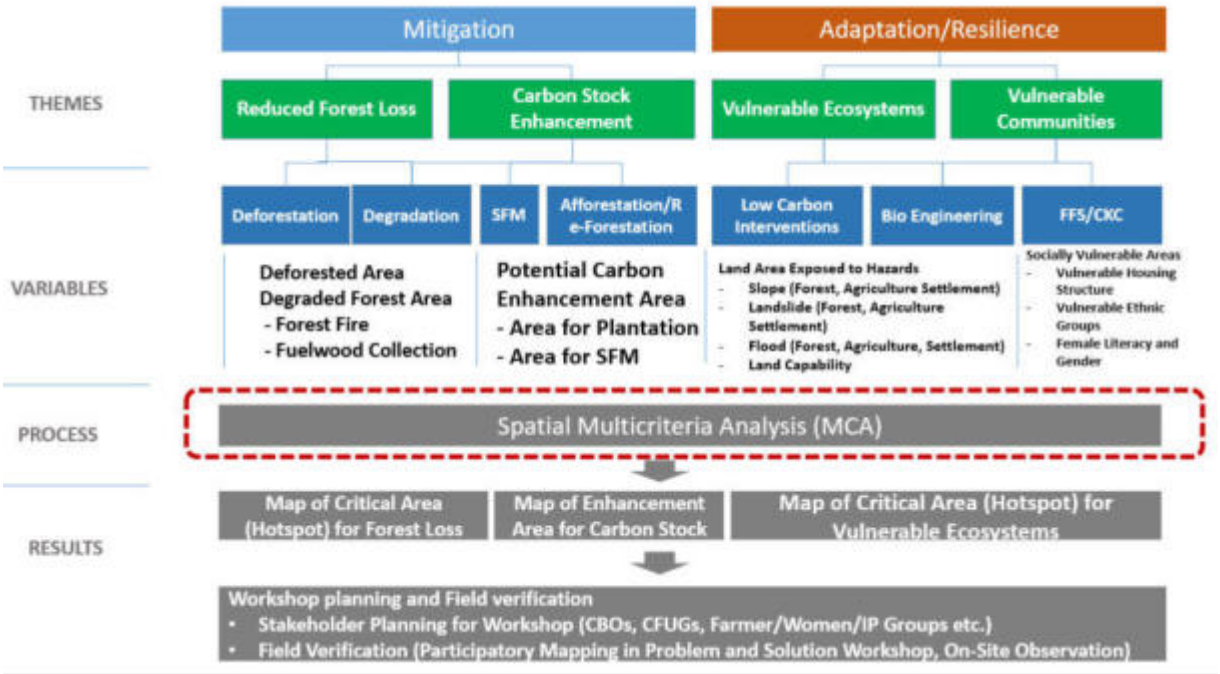


Figure 4: Multi-criteria analysis

2.3 Local Stakeholder Consultation

2.3.1 Selection of Participants

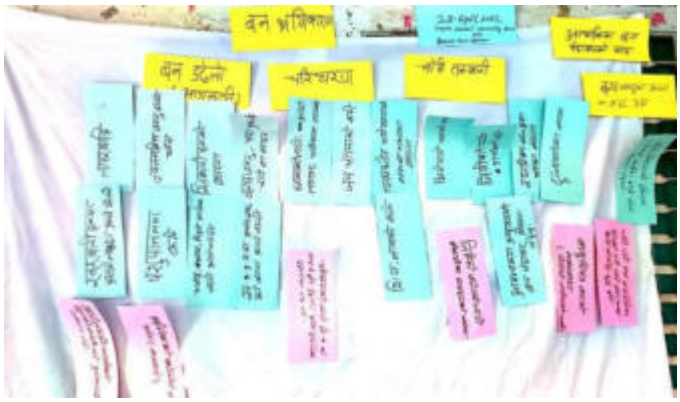
The selection process of participants for the two consecutive workshops i.e. Problem Analysis and Solution Analysis was vital for the validity and quality of CERP process. The selection process was carried out in collaboration with Division Forest Office (DFO) of Morang district. The selection process prioritized to include women and women lead organizations including Indigenous Peoples and their institutions at the river system level. The DFO 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 (P*alikas* 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, Collaborative Forest Management Group, Agriculture Cooperatives, Farmers Group, Sunwarshi Municipality office and other local Community Based Organizations (CBOs) while considering social inclusion i.e. representatives from women, poor, Indigenous Peoples (IPs) and Dalits.

2.3.2 Workshop

Workshops were conducted at three locations for Bakraha river system- upstream, midstream and downstream. The two-day workshop was organized at upstream section on 28 and 29 April 2022. The workshop venue was Mawa Noonsari CFUG office hall at Madhumalla, Miklajung-7, Morang. There were 35 participants in total. Among the participants, 16 were from IP groups and altogether 11 females and 24 males. The workshop for midstream section was organized on 19 and 20 January 2022. The workshop venue was office hall of Hariyali CFUG at Pathari Bazar, Pathari Sanischare-2, Morang. There were 25 participants in total. Among the participants, 12 were from IP groups and altogether 6 females and 19 males. The workshop for downstream section was organized on 17 and 18 June 2022. The workshop venue was municipal hall at Sunwarshi-9, Morang. There were 33 participants in total. Among the participants, 10 were from IP groups and altogether 11 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 first 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 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 input from participants of CCA groups and vice versa. This process provided ample space to refine the local issues on case to case basis mutually.

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. 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 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 workshop. Experts were invited in collaboration with BRCRN-PPMU and FAO-TA and Province ministries. All participants were informed though 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 Belbari of Morang district on 14 and 15 August 2022. The workshop was conducted for Lohandra, Bakraha, and areas of Ratuwa and Budhi river systems in Morang district. The workshop was intended to validate the preliminary CERPs prepared from local stakeholder consultations. In the workshop, BRCRN-PPMU first briefed about introduction of the BRCRN project and objectives of the study. This session also included the study process followed. In the workshop, detailed outcomes derived from problem analysis, solution analysis and hotspot verification were shared. Issues related to 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 BAKRAHA RIVER SYSTEM

3.1 Physiography, Land Cover and Hydrology

Bakraha river is originated in Mangmalung area (Dhankuta) from Mahabharat range, passes through Chure-Bhavar and Terai. However, Bakraha RS only contains Chure-Bhavar-Terai landscape, and its upper boundary was defined by the topographical break, just north to Main boundary thrust. The geographical coverage extended over 87.528939°to 87.694380°E and 26.383895° to 26.833375°N.

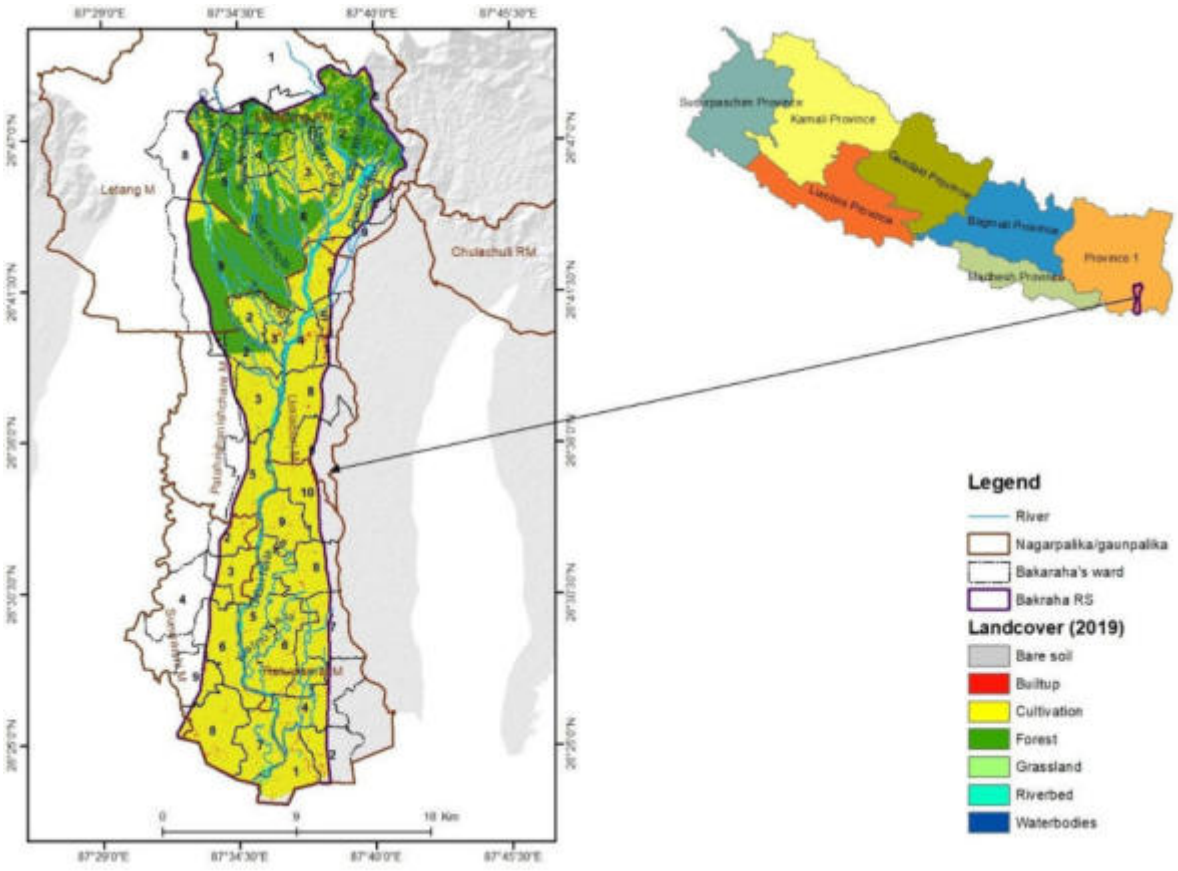


Figure 5: Location of Bakraha river system

The geology of Bakraha RS can be divided into lesser Himalaya group, Siwalik group (Lower and Middle Siwalik) and Terai-Quaternary group based on the rock types and their characteristics. The Main frontal thrust (MFT), Ambote thrust, Main Boundary Trust (MBT), Maikhola Thrust and Main Central Thrust (MCT) thrust together with several folds, faults and joints characterized the geomorphic process in RS.

Geologically, Bakraha RS is composed of Lesser Himalaya groups in the north and Lower Siwaliks (LS) and Middle Siwaliks (MS) in the Chure/Siwalik region and Terai Quaternary deposit to the South (DMG, 2007). The Lesser Himalayan rocks in the RS consist of the metamorphic rocks of Dubidanda Formation (DbD) and Kathmandu Crystalline (KC). Likewise, MS comprised of fine to very coarse-grained sand as well as pebbly sandstone, which alternate with mudstone (Ghimire, 2020). The Bhavar region is composed of alluvial deposit mainly boulder, pebble, cobble, and coarse- sand that derived from northern Siwalik and Mahabharat range. Sediment size become finer to the south and deposit in Terai region compose of sand, silt, mud and clay.

The Main frontal thrust (MFT), Ambote thrust, Main Boundary Trust (MBT), Mahabharat thrust (MT) and Main Central Thrust (MCT) thrust together with several folds, faults and joints characterization the geomorphic process in RS.

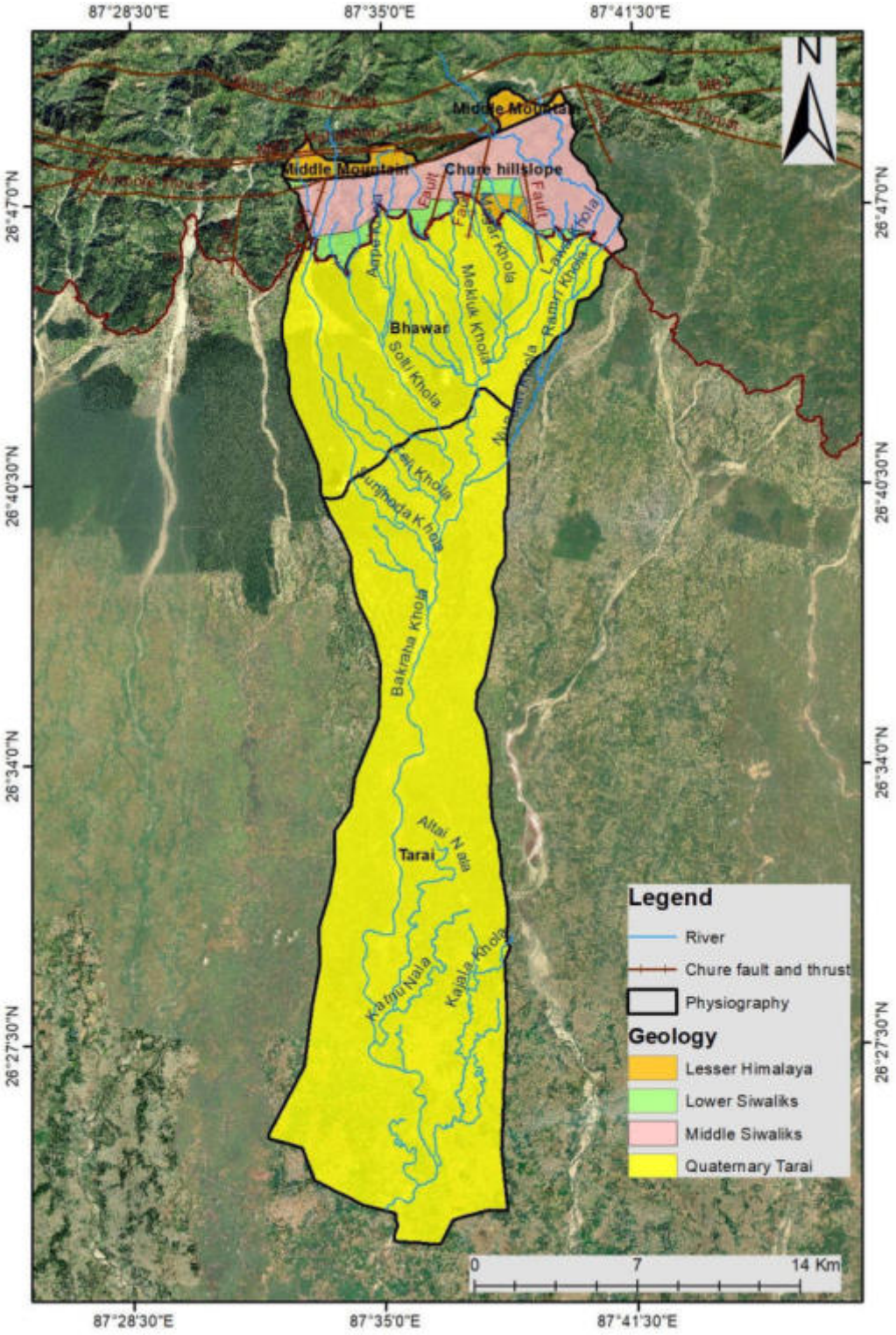


Figure 6: Geology of Bakraha river system

Over the last 19 years from 2000 to 2019, the forest[1] and built-up area were increased by 438.4 ha and 469.6 ha at the rate of 0.24 %/yr. and 15.71 %/yr. respectively

Table 2: Land cover change in Bakraha river system

Land cover	2000		2019		Change area (ha)	Rate of Change (%/yr)
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)		
Built-up	31.3	0.1	500.9	1.3	469.6	15.71
Cultivation	27605.5	70.1	26811.3	68.1	-794.2	-0.15
Forest	9393.9	23.8	9832.3	25.0	438.4	0.24
Grassland	632.3	1.6	566.0	1.4	-66.3	-0.58
Water bodies	295.7	0.8	237.6	0.6	-58.1	-1.14
Riverbed	1432.5	3.6	1443.1	3.7	10.6	0.04

Source: (ICIMOD & FRTC, 2021)

About 88.4% and 33.9% of total land of Chure hill and Bhavar is covered by the forest respectively. Forests in Bhavar region has been increased through planation in the river corridor and adaptation of agroforestry. Areca nut is favorable species among agroforestry. Meanwhile, rapid growth is observed in and around of Mangalbare and Urlabari bazar along the East-West highway.

[1] Land with tree crown cover of more that 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.

Figure 7: Evidence of increase in greenery in Bhavar region, Bakraha RS

The Hydest WEC-DHM method estimated that overall discharge at the driest month (March) is 4.39m^3/s and high discharge (81.9m^3/s) occurred on August.

Table 3: Average monthly discharges in Bakraha RS and its tributaries

Month	Long Term Average Discharge (m^3/s)
January	5.64
February	4.80
March	4.39
April	4.73
May	6.64
June	22.17
July	68.68
August	81.92
September	62.81
October	27.30
November	12.02
December	7.73

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 Bakraha RS

Station	Average long-term rainfall (mm)		
	Annual	Monsoon	Maximum 24 hours
Damak	2374.6	1912.4	330
Letang	2407.0	1915.5	249.2

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 increase by 0.83^{0}C and 1.197^{0}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 Bakraha RS

Temperature	District	^{0}C	Change (^{0}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
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

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 3.53% and 6.49% 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.

The Chure hill is naturally fragile due to its complex topographic setting and weak geology. Additionally, anthropogenic pressure such as cultivation in the marginal land (having slope greater than 30 degree) and haphazard construction of road have exaggerated the erosion and slope failure process. Both the settlements and cultivated patches are scattered in Chure hillslope. Some settlements in Chure hill like Simle, Kuwapani, Pangre, Bhalukhop and others are at risk of landslide, out of which Kuwapani requires relocation. More than 74.4 % of total land of Chure hill is covered by forest, accompany with 20.6% cultivated land. Despite of adaptation of multiyear farming such as Amriso (*Thysanolaena maxima*) and Banana have been grown in recent year, tillage farming in marginal slope of Chure hill is still in abundance.

Figure 8: Elevation profile of Bakraha RS, showing natural and social process

About 52.9 % Bhavar region is covered by forest area, whereas 42.1% of total land is under cultivation. Farmers are increasingly adopting commercial vegetable and cattle farming together with agroforestry. Despite of increase in forests in river corridor, channel migration is frequent due to the excessive aggradation of sediments derived from upstream. Moreover, unsystematic extraction of riverbed materials is also causing disturbance to the geomorphological process of the river, leading to bank erosion and channel shifting from one side to other.

In the Terai region, about 1.6% and 90.8% of the total land is occupied by built-up and cultivated land respectively. Farmers in Terai are yielding the major crops including rice, maize, wheat, sugarcane and lentils, however, there is decreasing trend in livestock holding and increase in pesticide use leading to unsustainable agriculture practices. Despite of DWIDP and other agencies have carried out a number of bank protection works and low-level flood embankments in Terai, breaching of those structures by flood are common, causing enormous losses and damages of agriculture land and properties. Such losses are likely to be increased in future due to climate change impact (ADB, 2016).

CHAPTER 4 : PROBLEM AND SOLUTION ANALYSIS

4.1 Problem Analysis

Theme 1: Climate Change Mitigation

4.1.1 Drivers and Underlying Causes of Deforestation and Forest Degradation

The major challenges of the forest sector identified at Bakraha 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	
Forest fire	Lack of awareness	
	Carelessness from herders and forest dwellers	Throwing of cigarette butts, careless handling of fires in forest areas etc.
	Intentional fire	Intentions of illegal poaching, improved forest products like forage & wild vegetables- Niguro; Conflict among CBFUGs
	Inadequate preparations for forest fire management	Insufficient fire line management and water storage, firefighting equipment and training, removal of dry biomass
Open and uncontrolled grazing	No specified grazing lands	
	Inadequate fodder production in private lands	Small landholdings
	Weak forest protection	Lack of fencing; poor enforcement of rules and regulations
Unsustainable/ illegal harvesting	Poverty and limited livelihood opportunities	Forest products being a source of income generation to poor/marginalized; Inadequate knowledge on sustainable forest management and long term benefits
	Demand-supply gap of forest products	
	Insufficient private land forests	Small landholdings for private land forest; Discouragement in private forests due to longer income return period and no legal provision in registration and use of forest products from private forests in unregistered lands

Drivers of D&FD	Underlying Causes	
Encroachment of forestland	Poverty and limited livelihood opportunities	
	Population growth	Settlement expansion; Agriculture land expansion
	Unmanaged settlers/settlements	Inadequate efforts of government in addressing land ownership issues
Ineffective forest management practices	Limited financial and technical capacity of CFUGs	Low income of CFUGs; Inadequate skill, equipment and technicians for forest management; FOPs without sensitivity analysis based on physiographic locations
	Barriers in forest enhancement	Problems associated with plantation & its protection- open grazing cutting of saplings by fodder & firewood collectors; Expansion of invasive species
	Weak governance	Declining accountability of CBFUGs; Deficiency in forest sector transparency; Weak coordination and cooperation among stakeholders; Inadequate efforts of government in addressing issues related to scientific forest management and collaborative forest management
Infrastructure development	Disproportionate population distribution	Construction of roads, playgrounds etc. to serve scattered settlements
	Socio-cultural practices	Construction of religious and cultural sites, concrete cemeteries and others; 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 forest fire, open/uncontrolled grazing, unsustainable/illegal harvesting of forest products, encroachment of forestlands and infrastructure development are the major drivers of deforestation and forest degradation

in Bakraha 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.

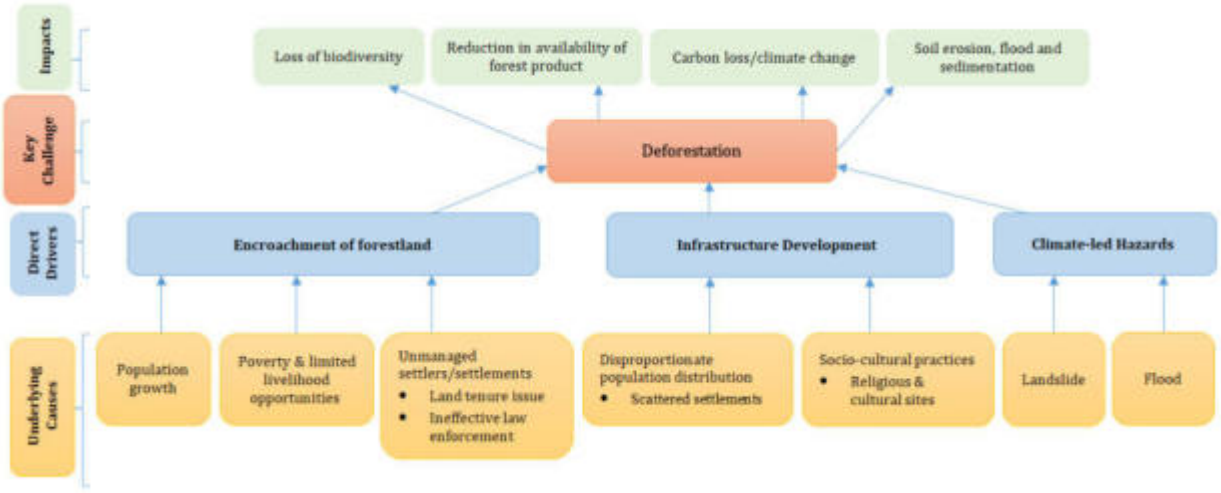


Figure 9: Problem tree for deforestation

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 9).

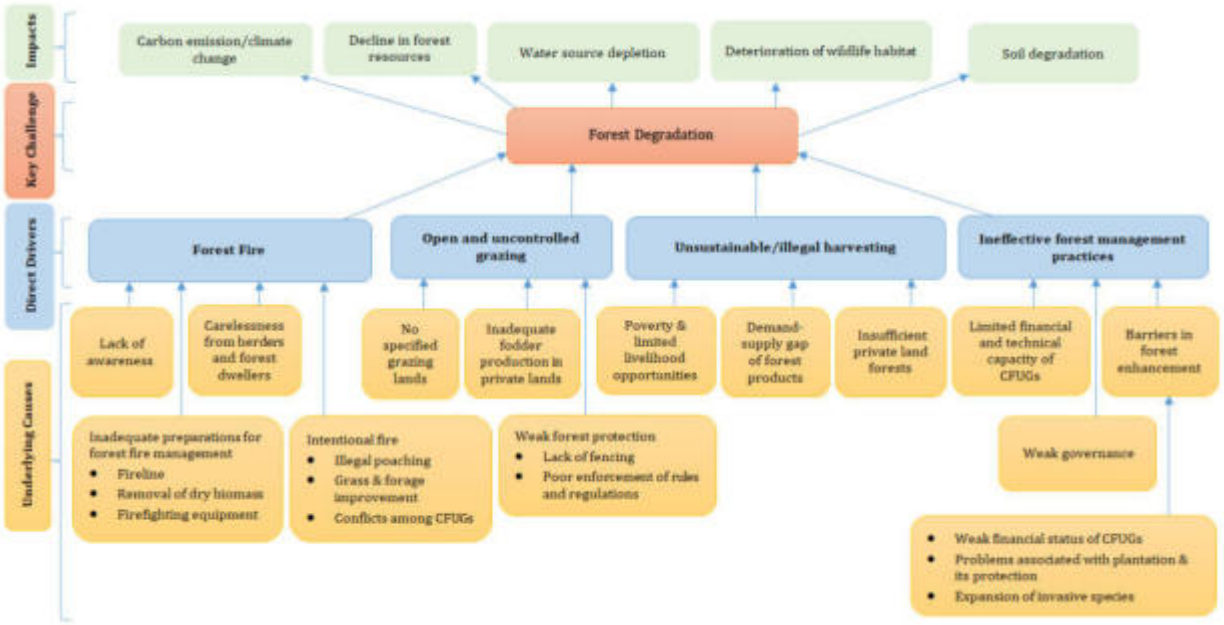


Figure 10: Problem tree for forest degradation

Forest degradation relates to loss of biomass (carbon) and reduction in the capacity of forests to produce ecosystem services. Forest fire is one of the 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, local communities for improved forest products like forage & wild vegetables-Niguro and due to conflicts among community forest user groups. 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. 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 sell, 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 lack of private land forests due to small landholdings. The income return period is longer for private land forests. The forest regulation also prohibits felling and sale of forest products from unregistered lands. It has demotivated local people for developing private land forest. Ineffective forest governance is among the underlying causes of unsustainable/illegal harvest of forest products. In recent years governments' weakness in addressing issues related to scientific forest management and collaborative forest management has triggered conflicts among CFUGs and government institutions.

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; inadequate inputs (irrigation, manure) and protection of plantation sites due to open grazing; cutting of saplings by fodder, firewood collectors; and expansion of invasive species like *Mikania micrantha* are major barriers of forest enhancement in the area (Figure 10).

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 community in Bakraha 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	
Climate Induced Disaster		
Flood	Heavy/erratic rainfall	High intensity rainfall and continuous rainfall for several days
	Upstream landslide and erosion	Fragile geological condition and slope terrain
	Unmanaged excavations of river bed materials	Lack of environment assessment; Higher demand of river bed materials due to urban growth
	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
	Forest degradation	Forest fire, open & uncontrolled grazing
	Heavy/erratic rainfall	High intensity rainfall and continuous rainfall for several days
	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
	Ineffective Disaster Risk Reduction (DRR) policy and planning	Low capacity of local governments in DRR planning and implementation; Less priority to

Drivers	Underlying Causes	
		disaster preparedness; lack of integrated planning for DRR
	Settlement expansion in vulnerable areas	Risk acceptance due to poverty and greed for financial gain; opportunity cost of land
Climate Stress on Agriculture Productivity		
Inadequate capacity and resources	Limited farm skill and technology use	Inadequate agriculture technicians at local level
	Low investment capacity of farmers	
	Lack of transparency in government support	Governments failure to identify and support real farmers (dominance of elites/paper farmers)
	Inadequate irrigation facilities	Declining water discharge in river/streams, drying up of water sources; Lack of conservation of water sources; Lowering groundwater table (12-15 feet in the past, 25 feet at present); Higher cost of irrigation while using diesel operated pump sets from deep boring, low electric voltage to operate electric pump sets (downstream)
	Limited human resources	Inadequate farm labors (youth migration for foreign employment) and skilled technicians
	Poor market access and infrastructures	Market dominated by intermediaries; higher cost of production; lack of storage & processing facilities
Pests and diseases	Decline in organic content of soil	Use of uncertified chemical fertilizers and pesticides
	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
	Monoculture farming practices	
Soil quality degradation	Low organic inputs	Insufficient compost manure due to declining livestock farming

Drivers	Underlying Causes	
	Use of uncertified chemical fertilizers and pesticides	Low yield without chemical fertilizers; Inadequate knowledge, skill and technology for compost and bio-pesticides production
Loss and damage of agricultural lands and crops	Climate-led hazards such as erosion and flood	
	Climate impacts	Crop damage and yield loss due to heavy rainfall, fog etc.
	Agriculture land fragmentation; land use conversion	Population growth and settlement expansion; Ineffective land use planning; Plotting to increase land price
	Crop-depredation by wildlife in the field	

❖ **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. 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, unmanaged riverbed material excavation and riverbed encroachment 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 without proper planning. Settlement expansion in vulnerable areas also makes it difficult in disaster risk management (Figure 11).

Climate stress on agriculture productivity is the other aspect of vulnerable communities. 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; soil quality degradation; and loss and damage of agricultural lands and crops (Figure 12).

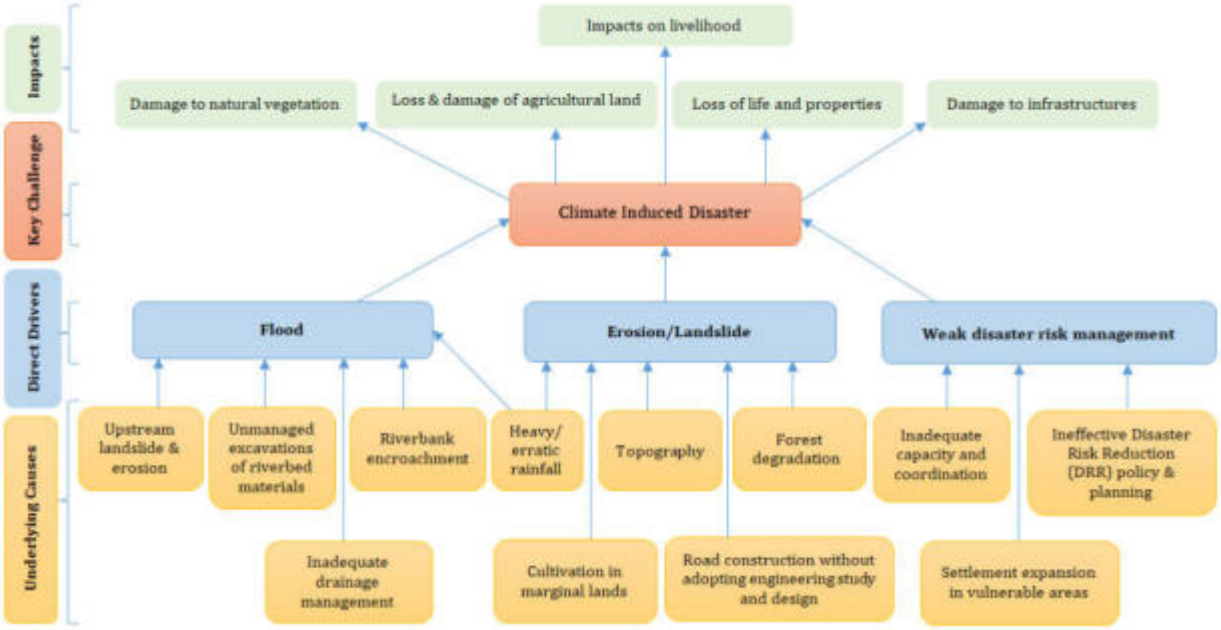


Figure 11: Problem tree for climate induced disaster

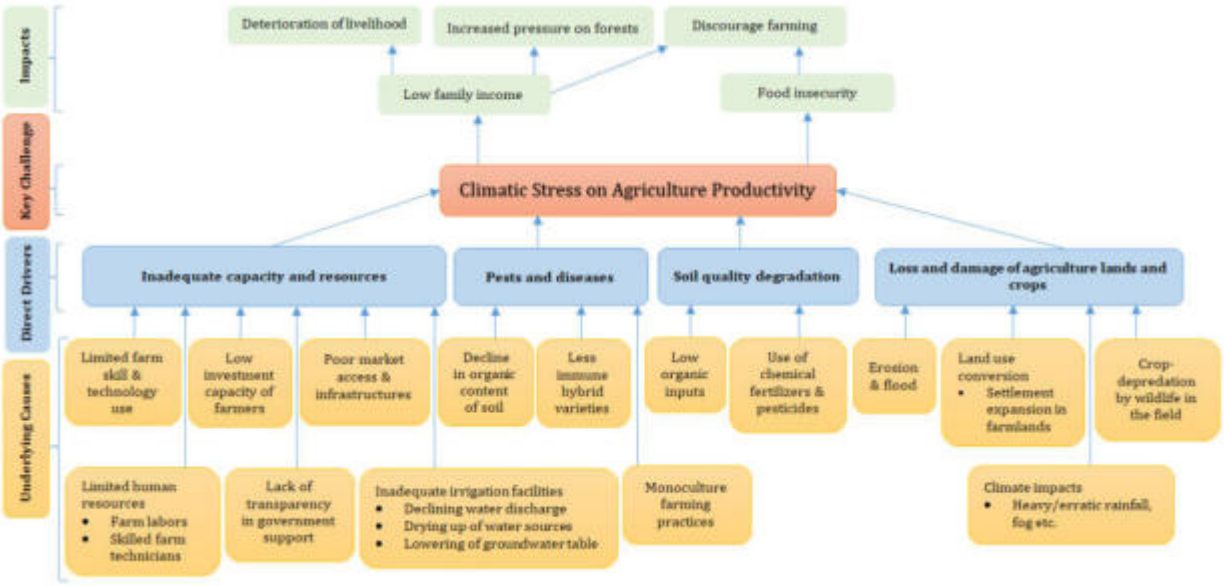


Figure 12: Problem tree for climate stress on agricultural productivity

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 drying up of water sources due to forest degradation and loss of moisture retaining species like Lampate– *Duabanga grandiflora*, Pani saj– *Terminalia myriocarpa;* declining water discharge in river/streams; lack of conservation of water sources; lowering of groundwater table (12-15 feet in the past & 25 feet at present); higher cost of irrigation while using diesel operated pump sets from deep boring; and low electric voltage to operate electric pump sets. Investment capacity of small farmers is low due to poor financial status. Government support is inadequate. There is deficiency

in transparency of government support to farmers due to elite capture. 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 and monoculture farming practices. Farmers use hybrid varieties due to seed unavailability and low production from native varieties. The major crop pests and diseases among others are Beruwa – Rice leaf folder – *Cnaphalocrocis medinalis* (rice); Phed katuwa –Cut worm – *Agrotis segetum* (Potato, maize); Fauji kira – Army worm – *Mythimna separata* (rice), Gawaro – Maize stem borer – *Chilo* partellus; Sete – *Albugo candida*; Daduwa (rice) – Balerial leaf blight – *Xanthomonas campestris* etc. Farmers lack technical skills on identification and treatment of pests and diseases. Land use conversion of farmlands for settlement purpose; loss and damage of farmlands due to erosion and flood; crop damage and loss due to climatic impacts like heavy rainfall, fog/smog etc.; and crop-depredation by wildlife in the fields are also among important problems in agriculture sector that needs to be addressed.

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	• Male- supremacy and dominance in decisions • Limited access of women to information and communication (especially climate change and SNRM-related information, facility, fund, notice, and subsidies) • Less consultation with women regarding agenda and time of meetings • Unavailability of disaggregated data • Lack of recognition of traditional knowledge of women in climate resilient land use practices (CRLUP)/SNRM • Articulation of CRLUP/SNRM /DRR as scientifically complex subjects • Limited knowledge on gender mainstreaming approach and value among officers/key people • Gendered power relations within households and in society and restricted mobility of women	• Hesitation to speak in meeting • Less knowledge on CFUG management • Less knowledge on climate change adaption • Insufficient women participation • Increased vulnerability of women towards environmental changes • Slower women leadership development in natural resource management (NRM), forest management and DRR • Low income of women

Drivers	Underlying Causes	
		• Less control of women over high value forest products

4.2 Solution Analysis

Theme 1: 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	
Forest fire	Sensitization/awareness	Sensitize communities on the impacts of forest fire on ecosystem functions/services and their restoration
	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
	Ensure easy accessibility of water during forest fires	Wetland conservation/management; Construction of water conservation/storage ponds
	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; Promote silage production
	Support fodder banks in private and public lands	Distribution of seeds/seedlings of fodder trees and nutrient grasses; Provide technical trainings
	Allocation and management of grazing land in specified area	Promote rotational grazing system to avoid overgrazing and degradation of single location

Drivers of D&FD	Activities against Drivers	
Unsustainable/illegal harvesting	Enhance income generation opportunities of poor/marginalized forest users	Skill development trainings and equipment support; Promote forest based enterprises
	Promote woodlots/commercial plantation in private lands	Seedling distribution and technical support for private land forests and agroforestry; Provide support for fencing; Sensitize local governments on private land forests
	Promote herbal farming and agroforestry	Promote multiyear high value species and horticulture- Bamboo, Tejpat etc.
	Improve legal supply system of timbers	
Encroachment of forestland	Resolving land ownership issues	Policy commitments/Policy interventions
	Forest boundary demarcation	Technical and financial support to DFOs/sub-DFOs
	Enhance income generation opportunities	Trainings and subsidies for entrepreneurship development to poor/marginalized households residing close to forests
Ineffective forest management practices	Implementation of sustainable forest management	Review/upgrade/renewal of forest operational plans (FOPs) of CFUGs; Sensitization/awareness programs on sustainable forest management; Training on silvicultural operations and equipment use
	Establish/upgrade nurseries	Demand based seedlings production- Avocado, Dragon fruit, Katahar (*Artocarpus heterophyllus*), Litchi (*Litchi chinensis*), Supari (Areca nuts), Raktachandan (*Pterocarpus santalinus*), Shrikhand (*Santalum album*), Rajbrikshya (*Cassia fistula*), Nariwal (Coconut), Rittha (*Sapindus mukorossi)*), Bel (*Aegle marmelos*), Harro (*Terminalia chebula*), Barro (*Terminalia bellirica*), Kurilo (*Asparagus racemosas*) etc.
	Implement forest enhancement activities	Enrichment plantation, assisted natural regeneration, riverbank plantation etc.; Control of invasive species

Drivers of D&FD	Activities against Drivers	
	Strengthen forest governance	Joint coordination meeting of government staffs and CFUGs to enhance accountability and transparency
Infrastructure development	Regulate infrastructure development within forest area	Promote environment friendly infrastructures; IEE/EIA & detail engineering study and design for infrastructure development
Climate-led hazards	Landslide treatment	
	Erosion/gulley control	
	Riverbank stabilization	
	Regulate excavation of riverbed materials	Coordination among local government, other associated government agencies and CBFUGs for riverbed excavation; Environment assessment (EIA/IEE) for riverbed excavation

❖ **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 intervention 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 training 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 13).

Degraded forests can be restored through addressing direct and underlying drivers of forest degradation, improving natural regeneration and plantations. Forest fire, one of the major drivers of forest degradation, 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 firelines reduces forest fire spread. In turn, the bushes and 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. 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, herbal farming and agroforestry. 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. The other solution can be management of grazing lands in certain areas of community forests or public lands. Rotational grazing can be effective, avoiding overgrazing in allocated grazing lands.

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 operational 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 14).

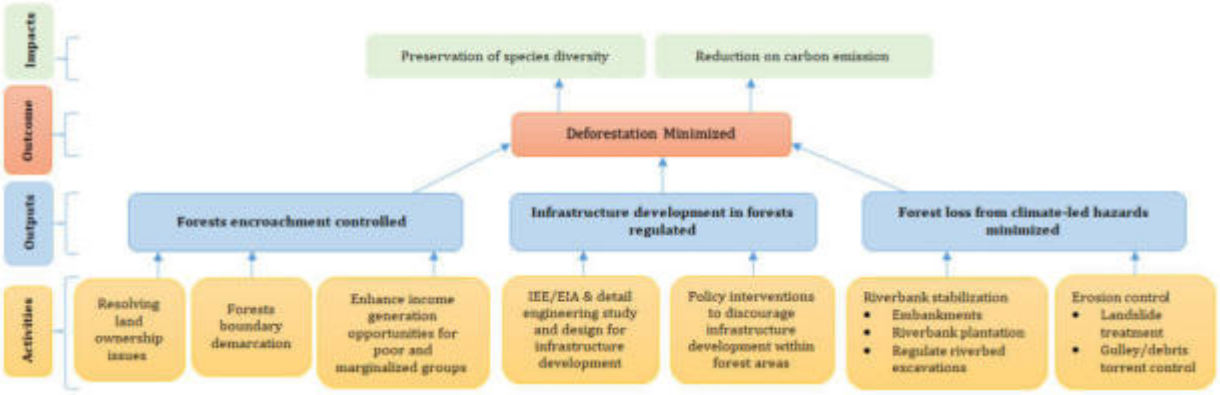


Figure 13: Solution tree for minimizing deforestation

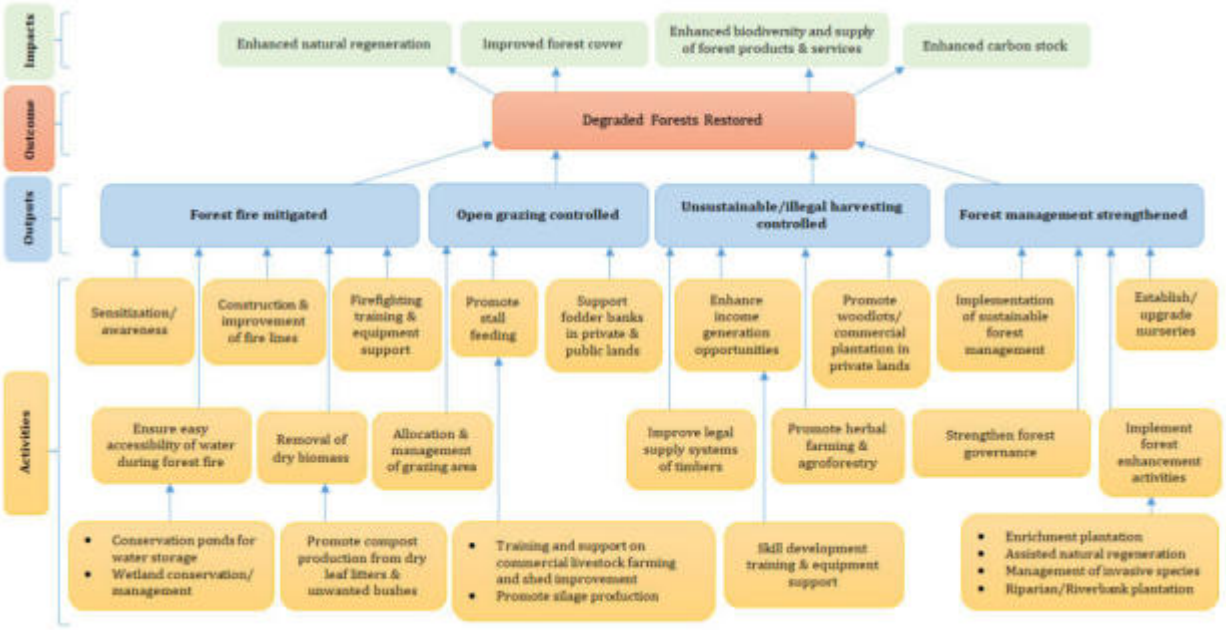


Figure 14: Solution tree for restoration of degraded forests

❖ 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. Security institutions in turn can also provide firefighting trainings.
- Construction and management of waterholes within the forest areas can decrease poaching incidents.
- 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.
- Plantation of small leaved species such as- Imili (*Tamarindus indica*), Bamboo, Bel (*Aegle mamelos*), Siris (*Albizia lebbeck*) among others can be done for Assisted Natural Regeneration in Chure.
- Public land plantation should include plantation along road and canal too.

- Seeding together with saplings can be effective for sustainable plantation. Multi-vitamin spray can be effective to enhance growth of saplings and reduce impacts of weeds.
- 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.
- 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.

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 11).

Table 11: Activities for enhancing adaptation/resilience building of ecosystem and community

Drivers	Activities Against Drivers	
Climate Induced Disaster		
Flood	Riverbank stabilization	Embankments and bioengineering
	Protective plantation along river corridors	Control open grazing in riverbanks
	Regulate riverbed excavation works	Coordination among local government, other associated government agencies and CFUGs; Environment assessment (EIA/IEE) for riverbed excavation
	Implement bylaws to control riverbank encroachment	
	Drainage management to minimize inundation	
Erosion/landslide	Landslide treatment	Crown protection, drain management, seed broadcasting, check dam etc.
	Construction of check dams and bioengineering for gully/debris torrent protection	
	Promote agroforestry on marginal land	Promote high value/multi-year species like Bans, Amrisho, Nigalo (*Drepanostachyum khasianum*), Salimo (khar); fodder species and grass
	Regulate infrastructure development in Chure hillslope	IEE/EIA & detail engineering study and design for infrastructure development

Drivers	Activities Against Drivers	
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
Climate Stress on Agriculture Productivity		
Inadequate capacity and resources	Establish Farmer Field Schools to capacitate farmers	Trainings on climate resilient farming and land use practices
	Wetland conservation and management	Live fencing, siltation prevention measures, plantations for wetland conservations; Management of water hyacinth (Jalkumbhi) in wetlands
	Promote alternative irrigation practices	Promote alternative irrigation practices like drip irrigation, sprinkle irrigation, rainwater harvesting etc.
	Promote agri-silvi-horticulture system	
	Incentives to promote commercial farming	Provide seed money, soft loans, subsidies in equipment, production based subsidies, and support shed improvement for commercial farming
Pests and diseases	Train farmers on identification and treatments of crop and livestock diseases	
	Promote poly-culture farming	Promote crop rotation or intercropping
	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
Soil quality degradation	Promote organic farming and Integrated Pest Management (IPM) through Farmers Field School (FFS)	Awareness programs and trainings on IPM and compost production; Promote livestock farming by supporting shed improvement and fodder banks; Support soil quality test

Drivers	Activities Against Drivers	
	Sensitization/awareness/ trainings on agriculture residue decomposition in farmlands	
Loss and damage of agricultural lands and crops	Implementation of erosion and flood mitigation measures	Embankments with bioengineering, riverbank plantation, check dams, plantation to enhance vegetative cover in erosion prone areas; Promote agroforestry in marginal lands
	Regulate settlement expansion/land plotting in agricultural lands	Policy interventions
	Plantation of fruit bearing tree species in forests	Plantation of Amala (*Phyllanthus emblica*), Jamun (*Syzygium cumini*), Bar (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Chiuri (*Diploknema butyracea*), Harro (*Terminalia chebula*), Barro (*Terminalia bellirica*) etc.

❖ **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 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 15).

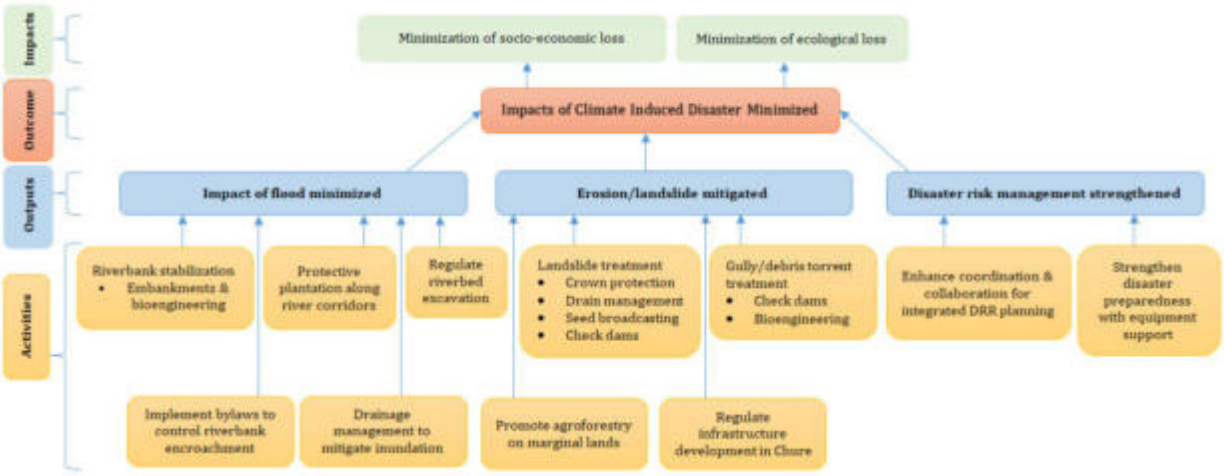


Figure 15: Solution tree for minimizing impact of climate-induced disasters

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. Promoting agri-silvi-horticulture can provide farmers with income generation opportunities. Alternative irrigation practices like rainwater harvesting, drip irrigation can be promoted along with conservation of water sources and wetlands to improve irrigation facilities. Wetland conservation and management requires live fencing, siltation prevention measures, plantations and management of water hyacinth (Jalkumbhi). 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. Promoting poly-culture farming; crop rotation or intercropping can also be helpful in reducing expansion of pests and diseases. One of the prominent issues in recent years is crop loss and damage by wild animals. The solution identified to cope with this issue is plantation of fruit bearing trees in forest area to enhance food source for wild animals and hence it may also minimize human-wildlife conflict on the longer terms since they get food right on the forest floor and will not go out of their habitats. The above mentioned activities are intended to capacitate farmers in climate resilient farming practices, minimizing agriculture yield loss and increasing productivity. Nevertheless, agriculture lands should be conserved through effective land use plan and climate resilient land use practices (Figure 16).

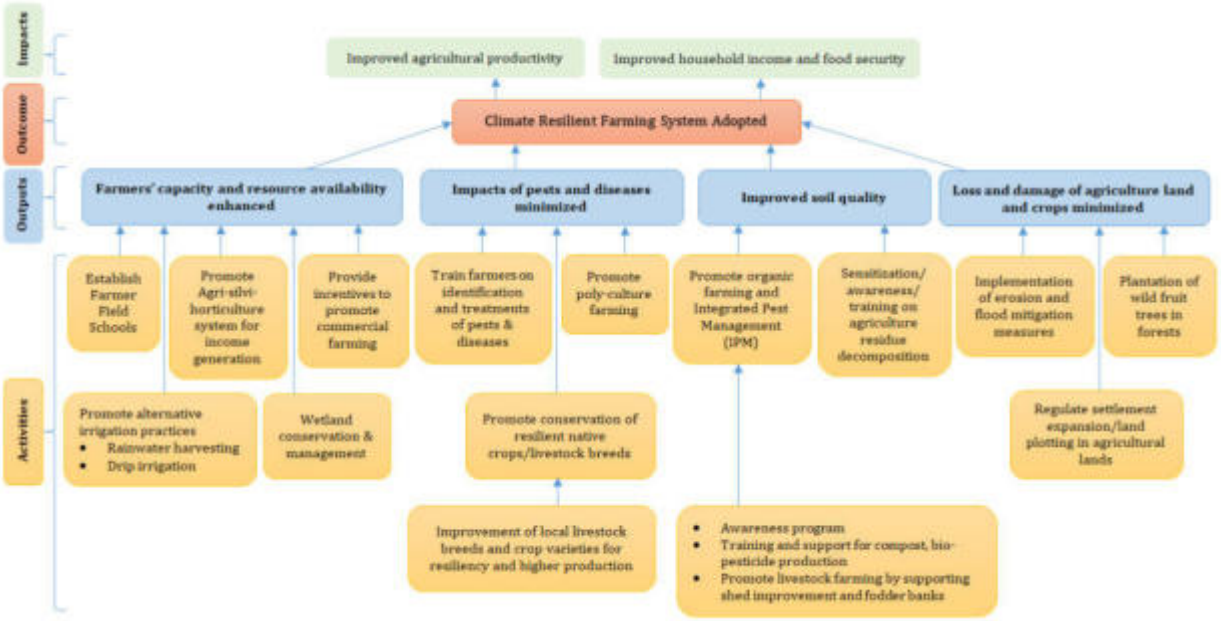


Figure 16: Solution tree for climate resilient farming practices

❖ 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, landslides/ sedimentation and flooding)
Agroforestry promotion in marginal/sloping lands	
Minimization of negative impact of Flood	
Strengthening disaster risk management and awareness creation on climate resilient NRM	
Establish and operationalize Farmers field schools (FFS)	Farmers adopted climate resilient farming practices
Conservation and management of water sources	
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.
- Establishment of agriculture based library at ward level can be effective for promotion of 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 CBFUGs 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

Key issues	Solution
	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-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	• 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 • Conduct rapid assessment on women's contribution and involvement in SNRM/ CRLUP and management • Provide gender mainstreaming trainings/ workshops to local government and CBOs and concerned stakeholders • Conduct GESI focused social audits and public hearing • 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. • Engage male involvement to advocate gender and women's issues and concern in advocacy and media campaign.	• Increase women's participation • Share information about the latest news, update, notice, fund, plans and budget • Time information about training and meetings • Promote and engage leadership • Include and integrate males in advocacy 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 **Error! R eference 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.

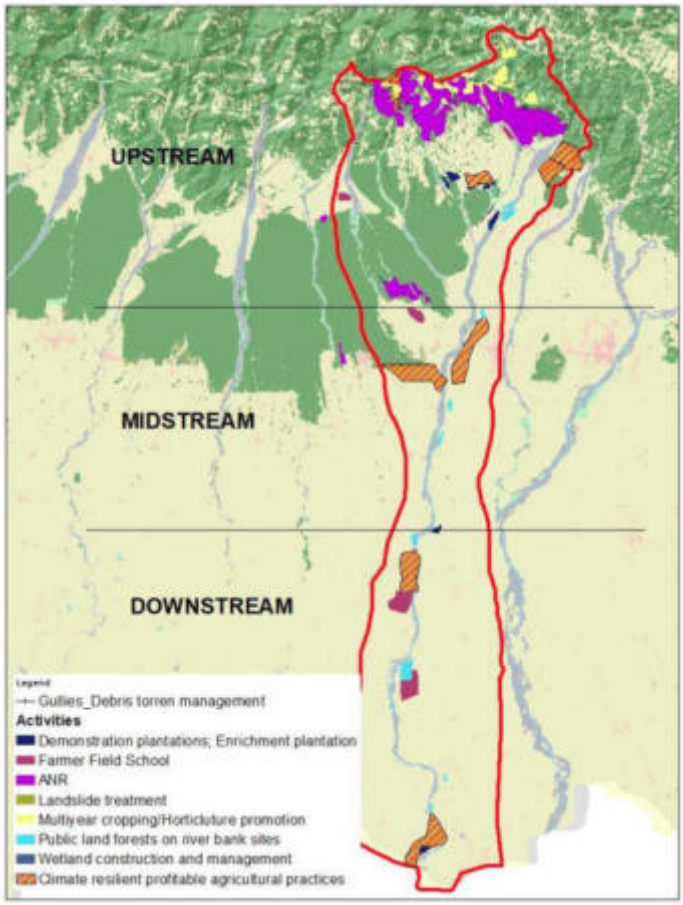
Table 16: Intervention packages for CERP

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	
	Water sources conserved	
	Flood mitigation	
	Disaster risk management strengthened	
IPack 3: Capacity enhancement for sustainable forest management	Forest management strengthened	Ineffective 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; interventions to regulate settlement expansion/land plotting in agricultural lands 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 linkage to foster integrated management approach. An activity mapped at river system scale demonstrates that those activities under IPack 2 (activities such as landslide/erosion control, water sources conservation, flood mitigation) and IPack 3, 4 (activities such as ANR, Fire control, capacity building SFM) focus on upstream regions that are expected to reduce sediment flow thus reducing flood and disaster on mid and downstream areas where IPack 1 and 5 are focused. In this sense, Ipack reflect connectivity and linkage of up, mid and downstream

areas. Ipack 6 being an advocacy-Gender governance package, focuses on all 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
IPack 1: Climate resilient agriculture and land use practices	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.	• To capacitate vulnerable farmers, women, Dalits to adopt climate resilient agriculture practices • To enhance agriculture yield	• Improving resilience of farmers to climate change, disasters, price volatility and other shocks • Increase agricultural productivity of Forest dependent and other smallholders (equal participation of men and women)	• Train farmers (prioritizing women) on climate resilient agriculture • Incentivize poor/marginalized farmers (skill development and equipment support) • Promotion of alternative irrigation practice, local livestock breed/crop varieties' improvement and cooperative farming to enhance yield • Promote organic farming with provision of compensating yield loss to reduce chemical inputs • Disease/pest control • Support agriculture commercialization
IPack 2: Improving/ maintaining river system landscape through soil and water conservation	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	• To mitigate disaster risks to reduce community and ecosystem vulnerability • To enhance restoration of ecosystem services • To enhance local knowledge, awareness and capacity on CRLUP and SNRM	• Increase non-carbon benefits of forest ecosystems • Minimizing erosion, landslide and floods through infrastructure development and also adopting indigenous knowledge, skills and customary practices • Promote changing annual crop into multiyear crop in Chure hill slopes • Implementation of projects in the collaboration with local government	• Incentivize multiyear cropping/ horticulture • Promotion of agroforestry in marginal lands • Promote water conservation ponds in Chure hills as well as lowlands • Promote fodder grass sloppy public lands • Project implementation in-line with priority of local government • Formation of school based eco-clubs • Training/capacity building on soil and watershed conservation using bio-engineering

Intervention Packages	IPacks description	Objectives	Strategies	Activities/Incentives for Participation and Changing Stakeholder Practices
	degradation. This IPack thus focuses on restoration and maintaining the degraded landscape and livelihood improvement of local communities.		• Awareness raising through schools, media and other relevant measures • Trainings for capacity enhancement in CRLUP and SNRM	
IPack 3: Capacity enhancement for sustainable forest management	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	• To improve forest quality through effective implementation of sustainable forest management • To improve forest governance	• Improve capacity, institutional performance and service delivery of the forestry sector institutions (including intra district/province level coordination) • Improving capacity of CFUGs as well as other stakeholders for sustainable forest management • Improve collaboration, cooperation and synergy among sectoral policies, sectors and actors • Enhance the role of private sector in forestry to promote forest-based enterprises for livelihood and economic development • Promote GESI and increase access of indigenous people in sustainable forest management	• Financial and equipment support to encourage CFUGs for climate resilient sustainable forest management • Enhance forest sector transparency thereby, enhancing accountability of forest users and also reducing illegal activities • Promote women and GESI in participation and benefit sharing • Policy intervention for resolution of land tenure issues • Promote forest-based entrepreneurship • Decentralization of district based timber supply system • Development of compensatory mechanism for accidents during legal forest management activities • Incentive to security forces for capturing loggers and loggings.

Intervention Packages	IPacks description	Objectives	Strategies	Activities/Incentives for Participation and Changing Stakeholder Practices
	government agencies and enrich forest resources.			
IPack 4: 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 thorough assisted natural regeneration.	• To enhance forest cover through enrichment plantation • To capacitate CFUGs in handling forest fire • To provide forest dependent people with alternative resource and income generation opportunities	• Reduce carbon emissions, enhance forest carbon stocks, and improve supply of forest products • Promote livelihood improvement programs for poor and marginalized forest dependent people	• Support for nursery establishment and enrichment plantation • Enhancing technical capacity of CFUGs in plantation and nurturing of seedlings • Strengthen forest firefighting • Provide skill development trainings to increase income source of poor/marginalized forest users
IPack 5: 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	• To enhance vegetation cover through public and private land plantation • To decrease pressure in natural forests	• Reduce carbon emissions, enhance forest carbon stocks, and improve supply of forest products • Promote private and public land forestry	• Support for nursery establishment with production of on-demand seedlings • Incentives for shed improvement and fodder banks to support commercial livestock • Community ownership for plantation in public lands • Campaign for encouraging plantation in private lands with provision of tree insurance and production based subsidies • Promotion through demonstration plantation

Intervention Packages	IPacks description	Objectives	Strategies	Activities/Incentives for Participation and Changing Stakeholder Practices
				• Promote 50% share of woodlots development in lands with women and indigenous ownership
IPack 6: Advocacy campaign: Gender-inclusive governance campaign	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.	• Increase women's leadership in NRM, CCA, and DRR • Building women's knowledge and skills in resource conservation and management Increase women's participation in decision-making forums • Increase common understanding towards gender equality and women empowerment in SNRM	• Build network among women and women-led organizations for an enabling environment • Engage male and government representatives in the campaign	• Consider women's convenience while setting meeting agenda and venue • Provide transportation costs for attending the trainings • Ensure that women are aware of meetings or activities in an appropriate way • Provide opportunity to participate in learning events /platforms for women leaders and women champions

5.3 Major Activities and Sub-Activities

Table 18: IPacks, major activities and sub-activities

Intervention Packages (IPacks)	Major Activities	Sub-activities
IPack 1: Climate resilient agriculture and land use practices	**Establish and operationalize Farmers field schools (FFS)**	Identification and operationalization of FFS
		Capacity-building in the use of weather information and its application in agricultural practices
	Implementation of climate-resilient land use practices	Implement climate resilient agriculture practices
		Train and support farmers to adopt and apply climate-resilient land use practices
IPack 2: Improving/maintaining river system landscape through soil and water conservation	**Agroforestry promotion**	Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation
	Controlling erosion/landslide and management of sedimentation	Landslide treatment
		Construction of check dams and bioengineering for gully/debris torrent protection
	Conservation and management of water sources	Wetland management
	Minimization of negative impact of Flood	Construction of embankments with bioengineering
	Strengthening disaster risk management and awareness creation on climate resilient NRM	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

Intervention Packages (IPacks)	Major Activities	Sub-activities
IPack 3: Capacity enhancement for sustainable forest management	**Strengthening forest management**	Support review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)
		Training and capacity development for implementation of FOPs
		Equipment support for implementation of FOPs
		Capacitate government staffs and CBOs on climate resilient forest management (ToF)
		Governance training to government staffs and CFUGs to enhance accountability and transparency
IPack 4: Restoration and rehabilitation of degraded forests	**Improvement of forest cover within national forest through enrichment plantation/ANR**	Enrichment plantation
		Implement Assisted Natural Regeneration
	Forest fire control	Firefighter training and support fire fighting equipment to CFUGs
		Support firefighting equipment to security institution
		Training and equipment support to promote compost production from bushes and leaf litters
		Construction and improvement of fire lines
		Customize fire alert system in Community Based Forest Management
	Income source of poor/marginalized forest users enhanced halting illegal harvesting	Skill development trainings and equipment support
	Restoration, enhancement and maintenance of forests and tree	Establish and support multi-purpose tree nurseries
		Production of saplings

Intervention Packages (IPacks)	Major Activities	Sub-activities
IPack 5: Restoration of river system landscape (within and outside national forest)	**cover in the river system landscape through Public and private forestry**	Establish On-farm tree nursery
		Demonstration plantation
		Riparian/riverbank plantation
		Technical guidance and support to establish woodlots
IPack 6: **Advocacy campaign: Gender-inclusive governance campaign**	**Increase access of women to SNRM and knowledge and information**	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
	Integrate gender and women's participation in local planning processes in SNRM	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
IPack 1: Climate resilient agriculture and land use practices					
Farmers capacitated in climate resilient agriculture	Identification and operationalization of FFS	• Exclusion of poor and marginalized farmers • Lower investment capacity of small farmers • Drop out of participants of FFS	• Build transparent selection criteria • Incentives for small farmers • Encourage and incentivize the participants	• Selection criteria to include poor and marginalized are in place • 100 % farmers attending FFS are incentivized to adopt climate resilient agriculture • At least 80% of FFS participants complete FFS package	• Selection criteria • Proportion of farmers incentivized • % of participants who complete FFS package
Improved climate-resilient land use practices	Train and support farmers to adopt and apply climate-resilient land use practices				
IPack 2: Improving/maintaining river system landscape through soil and water conservation					
Agroforestry promoted	Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	• Unwillingness due to higher opportunity cost of land	• Promotion of high value agroforestry • Incentivize socially and economically marginalized households	• Agroforestry in 430 ha land • Proportionate sharing of benefits among women, Dalit Janajati and marginalized groups	• Land area with agroforestry • % of women, Dalit Janajati and marginalized groups incentivized
Erosion/landslide controlled and sedimentation managed	Landslide treatment	• Local knowledge and practices missing in the stabilization measures • Influential decision in implementation	• Integrate local knowledge and practices • Risk prioritization prior to implementation in coordination with local government	• At least 3 landslides treated with integration of structural & bioengineering measures and risk prioritization • Local knowledge and practices integrated for the landslide treatment	• Number of landslides treated • Number of landslide treatment with local knowledge and practices
	Construction of check dams and bioengineering for	• Local knowledge and practices missing in the bioengineering for the protection	• Integrate local knowledge and practices with structural and non-structural (bioengineering) measures	• At least 11 gullies/debris torrent stabilized with integration of structural &	• Number of gullies stabilized with local knowledge and practices

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	gully/Debris torrent protection	• Influential decision in implementation	• Risk prioritization during mitigation	non-structural measures and risk prioritization	
Negative impact of flood minimized	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	• 254 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
IPack 3: Capacity enhancement for sustainable forest management					
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 45 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 45 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)	• Level of understanding on climate resilient forest management practices among the trainee and trainers	• Adoption of peer learning method	• At least 4 events of joint training (government staff and CBO representatives)	• Number of joint trainings
	Governance training to government staffs and CFUGs to enhance accountability and transparency	• Gaps in understanding of governance in forest management procedures between government authority & CFUGs	• Joint trainings/ roundtable discussion	• Bi-annual joint trainings for 5 years	• Number of joint training events organized
IPack 4: Restoration and rehabilitation of degraded forests					
Improved forest cover through enrichment plantation and ANR	Enrichment plantation/ANR	• Conflict on site and seedling species selection	• Prior consultation with CFUGs	• At least 1 consultation meeting with each CFUGs	• Number of prior consultations
Forest fire mitigated	Firefighter training and support firefighting equipment to CFUGs	• Lack of technical knowledge in handling of equipment	• Technical trainings on equipment handling	• At least 10 CFUGs are well equipped with trained firefighting groups	• Number of well-equipped CFUGs with trained firefighting groups
	Training and equipment support to promote compost production	• Elite capture • Cheaper alternatives to compost in the market	• Transparent selection to include most fire prone CFs • Awareness raising programs on the significance of composting conducted for CFUGs with opportunities to the market linkages	• At least 5 most fire prone CFs are included • At least 5 awareness raising events conducted covering 5 CFUGs	• Number of most fire prone CFs included • Number of awareness raising events

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	Construction and improvement of fire lines	• Selected sites might demand cutting of trees in significant number	• Selection of site with minimal tree removals • Improvement of fire lines will be prioritized	• At least 7 km of fire lines constructed/ improved	• Length of fire lines
Income source of poor/marginalized forest users enhanced	Skill development trainings and equipment support	• Low investment capacity of trainees on small and medium enterprise establishment	• Incentivize to develop small and medium enterprise (nursery, agroforestry)	• More than 50% trainees involved in income generation	• % of trainees involved in income generation
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	• Disparity in site and species selection	• Prior consensus with communities for site and species selection	• At least 2 consultation workshops organized	• Number of consultation workshops conducted to select site and species
	Establish On-farm tree nursery	• Disparity in site and species selection	• Prior consensus with communities for site and species selection	• At least 2 consultation workshops organized	• Number of consultation workshops conducted to select site and species
	Demonstration plantations	• Disparity in species selection	• Consensus among user members	• 85 ha of demonstration plantation with prior consent	• Area of demonstration plantation
	Riparian/riverbank plantation	• Conflict of land use change (eg. Current grazing sites)	• Community consultation before plantation site selection	• All the plantation sites are free from conflict	• Number of sites free of conflicts for riparian plantation
	Technical guidance and support to establish woodlots	• Unwillingness due to higher opportunity cost of land	• Distribution of high value and fast growing tree species • Provide financial support for field preparation, protection and management of woodlots	• 100% landowner who establish woodlots receives financial support	• % of landowner who establish woodlots receiving financial support
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	• Social norms and values restricting women to participate and give time for informal learning and sharing platforms	• Identification of social and structural barriers faced by women through sensitization measures	• At least one gender sensitization learning event per year	• Number of gender sensitization events conducted
	Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership	• Women lack access and resources about local level policies making them vulnerable	• Awareness and sharing of policies	• At least one event held on policy dissemination among women groups • At least 70% of target population participated	• Event/ activity report • Proportion of target population reached
	Produce and publish best practices and learning in gendered governance	• Lack of resources	• Ensure availability of resources	• Allocate budget for production and publication	• At least one report containing five best practices published and disseminated
Integrated gender and women's participation in local planning processes in SNRM	Conduct rapid assessment on women's contribution and involvement in SNRM	• Inadequate budget	• Explore budget availability	• Integrate subcomponents on ongoing studies	• Assessment reports
	Provide gender mainstreaming trainings/ workshops	• Gender is not a priority	• Raise awareness about long-term benefits after participating in gender workshops/ workshops	• Conduct in-person meetings with potential participants to understand their specific needs	• Number of trainings conducted

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	to local government and CBOs				
	Conduct GESI focused social audits and public hearing	• Lack of transparency • Inadequate budget • Exclusion of women and marginalized groups	• Increase practices for transparency through networking meetings, regular meetings • Policy guidance for ensuring inter-sectionality in social audits and public hearing • Adopt participatory tools for public hearing such as role-plays	• Regular meetings/ events conducted to increase transparency	• Number of social audit/ public hearings conducted • Percentage of women including Dalits and IPs participation • Number of issues raised on intersectional issues
	Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	• Inadequate interest and motivation of concerned institutions	• Raise awareness about long-term benefits of information dissemination	• Continuous follow-up meetings between institutions and women groups/ CBOs	• Number of events between institutions and women groups/ CBOs
	Engage male involvement to advocate gender and women's issues and concern in campaign	• Less priority	• Raise awareness about long-term benefits, social prestige	• Continuous follow-up meetings	• Frequency of male involvement in gender and women's issues and concerns

Table 20: Overall feasibility analysis of IPacks

Intervention Packages	Outputs	Implementation risks/obstacles L=3/M=2/H=1	Cost effectiveness of risk reduction measures H=3/M=2/L1	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
IPack 1: Climate resilient agriculture and land use practices	Farmers capacitated in climate resilient agriculture	3	3	2	3	2	13
	Improved climate-resilient land use practices	3	3	2	3	2	13
IPack 2: Improving/ maintaining river system landscape through soil and water conservation	Agroforestry promoted	3	3	2	3	2	13
	Erosion/landslide controlled and sedimentation managed	2	2	1	2	3	10
	Water sources conserved	2	2	1	2	2	9
	Negative impact of flood minimized	2	2	1	1	2	8
	Disaster risk management strengthened	2	3	3	3	2	13
IPack 3: Capacity enhancement for sustainable forest management	Forest management strengthened	2	3	2	2	3	12
IPack 4: Restoration and	Improved forest cover through enrichment plantation and ANR	2	3	1	3	2	11
	Forest fire mitigated	3	2	2	2	2	11

Intervention Packages	Outputs	Implementation risks/obstacles L=3/M=2/H=1	Cost effectiveness of risk reduction measures H=3/M=2/L1	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
rehabilitation of degraded forests	Income source of poor/marginalized forest users enhanced	2	3	2	1	3	13
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	3	3	2	2	3	13
IPack 6: 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
IPack 1: Climate resilient agriculture and land use practices					

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
Farmers capacitated in climate resilient agriculture	Identification and operationalization of FFS	• Participation from elite groups might be high	• Ensure participation of farmers including socially and economically marginalized group (IPs, women, Dalit etc.)	• At least 50% women, 13% Dalit and 31% Indigenous people are included in group at FFS	• % of women, Dalit and Indigenous people included in group at FFS
Improved climate-resilient land use practices	Train and support farmers to adopt and apply climate-resilient land use practices	• Lack of commitment by marginalized farmers	• Ensure participation of farmers including socially and economically marginalized group (IPs, women, Dalit etc.) • Incentives for small farmers	• 50% women, 13% Dalit and 31% Indigenous people are included • 100 % farmers involved are incentivized to adopt climate resilient agriculture	• % of women, Dalit and Indigenous people included • Proportion of marginalized farmers incentivized
IPack 2: Improving/maintaining river system landscape through soil and water conservation					
Agroforestry promoted	Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	• Human-wildlife conflicts due to improved habitat and connectivity	• Sensitization events for human-wildlife conflict	• At least 8 sensitization events (1 at each hotspot) on reducing human wildlife conflict; improving habitat and connectivity)	• Number of sensitization events conducted
Erosion/landslide controlled and sedimentation managed	Landslide treatment	• Durability of the structure due to fragile geology and climatic extremes	• Ensure technically sound structure following the design guideline	• Number of planned structures follow design guideline	• Number of structure following the guidelines
	Construction of check dams and bioengineering for gully/Debris torrent protection	• Durability of the structure due to fragile geology and climatic extremes • Occupational hazard for the construction workers	• Ensure technically sound structure following the design guideline • Provide awareness on the occupational hazards and the protective gear for the construction related works	• Design guideline followed • 100 % construction workers aware about the occupational hazards with the protective gear	• Number of structures following the guidelines • Proportion of the construction workers aware on the occupational hazards with the protective gear

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
Negative impact of flood minimized	Construction of embankment with bioengineering	• Improper design & implementation can lead to further degradation • Occupational health risks	• Ensure such infrastructure is planned in an integrated manner with involvement of DRR/ land use management/ engineers and/or watershed planning experts • Occupational Health and Safety training and equipment support	• 100% of planned structures follow design guideline • At least one OHS trainings for a site	• Proportion of structures following design guideline • Number of OHS trainings
IPack 3: Capacity enhancement for sustainable forest management					
Forest management strengthened	Review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	• Similar FOPs in varying topographical settings	• Incorporate sensitivity analysis including topography, geology & geomorphic process	• 100% updated FOPs are based on sensitivity analysis	• FOPs with sensitivity analysis
	Training and capacity development for implementation of FOPs	• Selection bias of participants can lead to lower level of outcome	• Establish transparent selection criteria	• 100% eligible and efficient personnel	• More than 90% achievement level in sustainable forest management
	Equipment support for implementation of FOPs	• Occupational health risks (injuries) due to inappropriate safety measures	• Training on OHS good practices, protocols and equipment to Trainers/ extension staff	• 15 trainings to CFUGs	• Number of person trained
IPack 4: Restoration and rehabilitation of degraded forests					
Improved forest cover through enrichment plantation and ANR	Enrichment plantation/ANR	• Introduction of nonnative species can pose a risk to the local biodiversity • Loss of species having current social use can worsen	• Promote tree species which are locally adapted/native • Provision of alternatives to affected marginal households	• 100 % of the species will be locally adapted/native species	• Proportion of local species in enrichment planation

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	• Firefighting without sufficient protective equipment or with inappropriate practices could lead to personal injuries • Possibility of exclusion of women	• Ensure trained groups are well aware of protective measures and procedures of fire controlling in the field through demonstration & examination • Promote inclusion/participation of women	• All members are trained • At least 20% participants are women	• Number of trained members on the use of firefighting equipment • Proportion of women participants
	Construction and improvement of fire lines	• Excessive construction of fire line can lead to habitat fragmentation and impact on habitat connectivity	• Use existing road/trail/river/stream as fire line	• 7 Km of fire line constructed/ improved	• Length of fire line constructed/ improve
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	• Land tenure issues on nursery site • Limited availability of quality seed of demanded species	• Consultation meetings • Demand analysis for choice of seedlings species	• At least 1 consultation meeting to screen and address the land tenure issues • At least 50% seedlings produced are of native species	• Number of nursery sites screened and land tenure issue addressed • Proportion of native species' seedlings produced
	Establish On-farm tree nursery	• Land tenure issues on nursery site • Limited availability of quality seed of demanded species	• Consultation meetings • Demand analysis for choice of seedlings species	• At least 1 consultation meeting to screen and address the land tenure issues • At least 50% seedlings produced are of native species	• Number of nursery sites screened and land tenure issue addressed • Proportion of native species' seedlings produced

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
	Demonstration plantations	• Introduction of nonnative species can pose a risk to the local biodiversity • Loss of current social use can worsen livelihood of marginal households	• Promote tree species which are already locally adapted • Provision of alternatives to affected marginal households	• At least 50% of enrichment plantation will use native species	• Proportion of native species in enrichment planation
	Riparian/riverbank plantation	• Land tenure issue • Introduction of nonnative species can pose a risk to the local biodiversity • Loss of current social use can worsen livelihood of marginal households • Loss and damage from flood	• Consultation meetings with local community and municipality • Promote tree species which are already locally adapted • Provision of alternatives to affected marginal households • Protective plantation with integration of structural measures and bioengineering techniques	• At least 1 consultation meeting to screen and address the land tenure issues • At least 50% of plantation will use native species	• Number of nursery sites with screened and addressed land tenure issue • Proportion of native species in planation
	Technical guidance and support to establish woodlots	• Conflicts with neighboring landowner • High value alternative crop can change woodlot practice	• Provide support to group of landowners rather than individual	• 90% landowners who received support will develop woodlots	• Area of woodlots established
IPack 6: Advocacy campaign: Gender-inclusive governance campaign					
Increased access of women to SNRM and knowledge and information	Create informal learning and sharing platforms for grassroots-level women	• Possibility of elite women capture • Possibility of the exclusion of Dalits and IPs women • Social norms and values restricting women to participate and give time for informal learning and sharing platforms	• Promote inclusion/participation of Dalits and IPs (Women) • Organize sensitization learning events to remove restrictions	• At least 20% participants are Dalits and IPs women • At least one gender sensitization learning event per year	• % of Dalits and IPs women • Number of gender sensitization learning events
	Conduct local level policy discourses to	• Change in gender roles not easily accepted posing threats to social norms and values	• Conduct GESI trainings and awareness campaigns and	• 50% men and women know about the GESI	• Province and local level policy reviewed

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	policy and integration strategies	
	Produce and publish best practices and learning in gendered governance	• Gendered governance restricting women to participate • Women participation in NRM sectors can pose threat to social change	• Document of good and best practices in gendered governance that has minimized social discrimination and women empowered reducing GBV as well	• Gendered governance best practices documented and learning shared for social change	• Best practices in gendered governance documented and published
Integrated gender and women's participation in local planning processes in SNRM	Conduct rapid assessment on women's contribution and involvement in SNRM	• Women not being empowered could hinder their participation • Leadership discrimination among women and elite captures	• Rapid assessment on women's contribution and involvement in NRM/CRLUP and management to be conducted and shared for minimizing social barriers	• % of women's contribution and involvement analyzed and further plans developed	• Rapid assessment conducted
	Provide gender mainstreaming trainings/ workshops to local government and CBOs	• GESI not prioritized	• Trainings to be provided to mainstream gender increasing the trend of preparing action plans as GESI priority	• % of understanding level and mainstreaming of GESI well adopted	• GESI mainstreaming training and workshops raised awareness
	Conduct GESI focused social audits and public hearing	• Inclusive transparency and practices limited and not prioritized	• Regularly conduct GESI focused audits and public hearing to increase transparency and good governance	• % of local institutions practice GESI focused social audits and public hearing for social and strong governance practice	• GESI focused social audit and public hearing conducted regularly
	Conduct advocacy campaign and promote awareness on gender	• Gender responsive awareness not shared or available as they are not prioritized	• Awareness promotion on gender responsive information and ensure to make available to all	• % of CBOs and women groups made aware on gender responsive	• Gender responsive information and availability access made easy

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
	responsive information, available provisions and resources among CBOs/ women groups			information and access to resources increased	
	Engage male involvement to advocate gender and women's issues and concern in campaign	• Men not interested for social change and not supportive too • Women participation not ensured in NRM/CRLUP and management	• Advocating GESI and women's issues among male and inform on transformative change and recognizing women's voice for change, reduce GBV	• % of male engagement in GESI and women's issues help change the social norms and values	• Male involvement increased in advocacy of GESI and women's issues and minimized social disparities

Table 22: Safeguard analysis (benefits)

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
IPack 1: Climate resilient agriculture and land use practices					
Farmers capacitated in climate resilient agriculture	Identification and operationalization of FFS	• Increased farm productivity	• Continuity of FFS for longer period (one crop cycle may not be sufficient) • Integration of FFS in municipal agriculture section2	• FFS operated for whole project period • All FFS will be integrated in respective municipal agriculture section	• Number of FFS operated for whole project period • Number of FFS owned and run by local government
Improved climate-resilient land use practices	Train farmers on climate-resilient land use practices	• Enhance soil organic carbon • Sustain farm productivity	• Provide financial, equipment and technological support to farmers adopting climate resilient land use practices3 • Promote climate resilient commercial farming in collaboration with local government4 • Promote organic farming and Integrated Pest Management system	• At least 50% farmers adopting climate resilient land use practices will be supported • Project will support at least one municipality for institutional procedures and marketing • At least 50% share of fertilizer and pesticides is organic	• Proportion of farmers supported • Number of municipality assisting institutional procedures and marketing • Decrease in use of chemical fertilizer and pesticides
IPack 2: Improving/maintaining river system landscape through soil and water conservation					
Agroforestry promoted	Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	• Erosion control • Enhance income generation opportunities • Decrease in forest dependency	• Prioritize cash crops, fast growing fodder trees and grasses	• At least 50% cash crops and fodder trees	• Proportion of cash crops and fodder trees in plantation

[2] Development of FFS as on-farm learning center in the long run (even after project completion)
[3] 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
[4] 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	• Reduce loss and damage • Reduce sedimentation	• Prioritize high value multipurpose plant species for bioengineering	• At least 50% use of high value multipurpose plant species for bioengineering	• Proportion use of high value multipurpose plant species for bioengineering
	Construction of check dams and bioengineering for gully/Debris torrent protection	• Reduce sedimentation in downstream • Reduce risks of flash floods and minimize settlement vulnerability	• Prioritize high value multipurpose plant species for bioengineering	• At least 50% use of high value multipurpose plant species for bioengineering	• Proportion use of high value multipurpose plant species for bioengineering
Negative impact of flood minimized	Construction of embankment with bioengineering	• Reduce riverbank erosion and loss and damage from flood	• Construction of sedimentation dams in midstream • Extraction and utilization of siltation through detail environmental assessment • Use of bamboo/other income generating plants for bioengineering	• At least 15 sedimentation dams • 100% embankments with plantation	• Number of sedimentation dams • Proportion of embankments with plantation
IPack 3: Capacity enhancement for sustainable forest management					
Forest management strengthened	Review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	• Support annual silvicultural operations for sustainable forest management	• Update FOPs with sensitivity analysis based on local scenario • Integrate forest based entrepreneurship development and income generation • Multi-stakeholder sharing for quality assurance of FOPs	• 100% CFUGs update FOPs with sensitivity analysis and integrating forest based entrepreneurship development	• Proportions of CFUGs with updated FOPs
	Training and capacity development for implementation of FOPs	• Enhance capacity of CFUGs on sustainable forest management	• Involve all CFUGs within River System in trainings	• 100% CFUGs participate in trainings	• Proportion of CFUGs participating in trainings
	Equipment support for implementation of FOPs	• Enhance capacity of CFUGs on	• Support all CFUGs within River System	• 100% CFUGs receive equipment support	• Proportion of CFUGs receiving equipment support

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
		sustainable forest management			
	Capacitate government staffs and CBOs on climate resilient forest management (ToF)	• Increase skilled manpower on climate resilient forest management	• Sensitize 100% users of community forest on climate resilient forest management	• At least 90% users will be aware of climate resilient forest management	• Proportion of users participating in sensitization program
	Governance training to government staffs and CFUGs to enhance accountability and transparency	• Good forest governance	• Public hearing • Make information available in DFO websites	• Bi-annual public hearing and update of website information	• Number of public hearings annually • Availability of information in websites
IPack 4: Restoration and rehabilitation of degraded forests					
Improved forest cover through enrichment plantation and ANR	Enrichment plantation/ANR	• Enhance forest quality and carbon stock	• Plantation of fast growing and locally adapted plant species • Promoting natural regeneration • Bio-fencing for protection	• At least 70% of fast growing and locally adapted/native plant species	• Proportion of fast growing and locally adapted/native plant species
Forest fire mitigated	Firefighter training and support firefighting equipment to CFUGs	• Enhance capacity on forest fire control	• Collaborate with security institutions and also provide equipment support	• At least 6 sets of firefighting equipment to security institutions	• Sets of firefighting equipment supported
	Training and equipment support to promote compost production	• Increase in soil organic content in farmlands	• Compensate litter collectors and provide subsidy to compost manure • Production based subsidy in organic farming	• At least 50% share of fertilizer is compost manure	• Number of households practicing composting
	Construction and improvement of fire lines	• Provides barrier to slow or stop the progress of wildfire	• Regular maintenance • Construct fire line as forest product collecting route	• Annual maintenance before fire season	• Number of fire line free of litters in dry season

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
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	• Enhance seedling availability for plantation	• Demand based seedling production (fruit, fodder etc.)	• Seedling production will meet 100% demand	• Proportion of seedlings used for plantation
	Establish On-farm tree nursery	• Enhance seedling availability for plantation	• Demand based seedling production (fruit, fodder etc.)	• Seedling production will meet 100% demand	• Proportion of seedlings used for plantation
	Demonstration plantation	• Increase biodiversity • Enhance carbon stock	• Ecotourism promotion and research center	• At least 1 demonstration plantation site used for ecotourism promotion and research center	• Number of demonstration plantation site used for ecotourism promotion and research center
	Riparian/riverbank plantation	• Increase biodiversity • Enhance carbon stock • Reduce riverbank erosion	• Plantation of fodder species, fruits, bamboo, Khayar (*Acacia catechu*), Sissoo (*Dalbergia sissoo*) and other high value species including grass • Ownership of plantation area to local community	• At least 50% fodder species	• Proportion of fodder species
	Technical guidance and support to establish woodlots	• Reduces forest dependency and hence forest degradation • Enhance carbon stock	• Facilitate woodland development in unregistered lands on collaboration with local government • Additional incentives to promote woodlots in adjacent private land along river banks	• At least 50% additional incentives for woodlot development in adjacent private land along river banks	• Number/area of woodlots in adjacent private land along river banks
IPack 6: Advocacy campaign: Gender-inclusive governance campaign					
Increased access of women to SNRM and	Create informal learning and sharing platforms for grassroots-level women	• Women empowered and their voices being respected	• Create and manage learning platform	• Five learning events	• Number of learning events

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
knowledge and information	Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership	• Women's participation, access, control and leadership developed and supported	• Interaction held between policy makers and targeted women	• One event	• Number of events
	Produce and publish best practices and learning in gendered governance	• Documentation and publication of gendered governance strengthened and institutionalized	• Sharing and publicity	• One best practice documented	• Number of best practices documented
Integrated gender and women's participation in local planning processes in SNRM	Conduct rapid assessment on women's contribution and involvement in SNRM	• Women's contribution and participation increased	• Gender data disseminated	• One Sharing event	• Number of sharing events
	Provide gender mainstreaming trainings/ workshops to local government and CBOs	• Women's capacity enhanced in GESI integration and local government and CBOs take the issues seriously	• Knowledge enhancement, accountability	• One training event for 20 government staffs	• Number of training events
	Conduct GESI focused social audits and public hearing	• Social transparency increased and regularly practiced	• Coverage of wider audience target group	• Two events	• Number of events
	Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and	• Gender responsive information making women and marginalized groups empowered	• Awareness raising sessions	• Three events	• Number of events

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
	resources among CBOs/ women groups				
	Engage male involvement to advocate gender and women's issues and concern in campaign	• Male roles changing and supportive for women empowerment	• Continues encouragement of male change agent to promote gender	• Two events	• Number of events

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)
IPack 1: Climate resilient agriculture and land use practices				
Identification and operationalization of FFS	No	5	700,000	3,500,000
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	6430.65	2,000	12,861,300.95
Train and support farmers to adopt and apply climate-resilient land use practices	Events	10	450,000	4,500,000
Total Budget for IPack 1 (NRs)				**21,161,300.95**
IPack 2: Improving/ maintaining river system landscape through soil and water conservation				
Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	ha	430	6,000	2,580,000
Landslide treatment	No	3		7,000,000
Construction of check dams and bio-fencing for gully/debris torrent protection	Gully/debris torrent	11		23,500,000
Wetland management	No	5		8,000,000
Construction of embankments with bioengineering	m	403.87	30,000	12,116,100

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
Total Budget for IPack 2 (NRs)				**55,996,100**
IPack 3: Capacity enhancement for sustainable forest management				
Support review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	No	45	200,000	9,000,000
Training and capacity development for implementation of FOPs	No	45	250,000	11,250,000
Equipment support for implementation of FOPs	No	45	200,000	9,000,000
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
Total Budget for IPack 3 (NRs)				**32,850,000**
IPack 4: Restoration and rehabilitation of degraded forests				
Enrichment plantation	ha	59.83	50,000	2,991,660.20
Implement Assisted Natural Regeneration	ha	536	20,000	10,720,000
Firefighter training and support firefighting equipment to CFUGs	CFUG	10	300,000	3,000,000

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
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	7	300,000	2,100,000
Customize fire alert system in Community Based Forest Management (CBFM)	No	1	LS	300,000
Skill development trainings and equipment support	Hh	200	25,000	5,000,000
Total Budget for IPack 4 (NRs)				**25,761,660.2**
IPack 5: Restoration of river system landscape (within and outside national forest)				
Establish and support multi-purpose tree nurseries (150,000 capacity)	No	1	1,000,000	1,000,000
Production of saplings	No	150,000	40	6,000,000
Establish On-farm tree nursery	No	1	600,000	600,000
Demonstration plantations	ha	85	500,000	42,505,728
Riparian/River bank plantation	ha	250.88	600,000	150,526,641
Technical guidance and support to establish woodlots	ha	100	250,000	25,000,000
Total Budget for IPack 5 (NRs)				**225,632,369**
IPack 6: Advocacy campaign: Gender-inclusive governance campaign				
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

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
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
Total Budget for IPack 6 (NRs)				**1,100,000**
Grand Total Budget (NRs)				**362,501,336.25**

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 BRCRN.

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	0	536 ha of natural forest restored through ANR and enrichment plantation	PMU and PPMUs reports Project report	This river system has 9490.8 ha of forest and 324.4 ha of other wooded land (baseline survey report 2022)
	xx ha of new plantation within national forests (enrichment and barren land plantation)	0	Area: 59.83 ha. Survival rate: 80%	PMU and PPMUs reports Project report	
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	6959 ha area managed by 45 community forestry user groups	PMU and PPMUs reports Project report	45 community forestry user groups manage 6959 ha of forest having 6699 ha (96.25%) of natural forest,236 ha (3.38%) plantation forest and 25 ha (0.36%) 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: 335.88 ha. Survival rate: 80% (Demonstration plantation: 85 ha and riverbank plantation: 250.88 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)	25% in comparison to before constructing structures	In-person assessments at lower gabions	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	6430.65 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.
Output 5: Integrated gender and equity issues in governance practices in NRM/	% of women in leadership positions of CBO's executive committee	Out of 659 leadership position in CFUGs, 270	At least 50% women in leadership position	DFO/PPMU/Group records	Proportional representation of all social groups ensured

Results	Indicator	Baseline	Target	Means of verification	Assumption
CRLUP and management		(41%) are women			
	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	45 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-1: Result Framework of Bakraha Critical Ecosystem Restoration Plan

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

Result Framework

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means of verification	Assumptions
Impacts					
GCF core indicator (Mitigation) *A4.0 Improved resilience of ecosystems and ecosystem services (proxy indicator 2 to 5)*	Tonnes of carbon dioxide equivalent (tCO_2eq) reduced or avoided. **Proxy indicator**: Area of (1) Deforestation rate: (2) Sustainable forest management area: (3) ANR area (4) Plantation area (5) Area of Climate Resilient Agriculture (CRA)	**Proxy indicators:** Deforestation rate: 0 Sustainable forest management area: 0 ha ANR: 0 ha Plantation area: 0 ha Climate Resilient Agriculture: 0 ha	**Proxy indicator**: Deforestation rate: 0 Sustainable forest management area: 6959 ha Plantation area: 335.88 ha ANR: 595.83 ha (ANR 536 ha and enrichment plantation 59.83 ha) Climate Resilient Agriculture: 6430.65 ha	PPMUs/PMU report GCF/BRCRN GHG mitigation calculation tool-based calculation sheet	This river system has 9490.8 ha of forest and 324.4 ha of other wooded land (baseline survey report 2022) CERP land use data shows changes in forest area between 2000 and 2019 is +438.4 ha. Hence, 0% deforestation rate. This river system has 9490.8 ha of forest and 324.4 ha of other wooded land (baseline survey report 2022)
GCF core indicator (Adaptation)	Total number of direct and indirect beneficiaries (gender disaggregated)		Direct: male: 51392 female: 51442	Periodic project reports	21212 HHs associated with CFUGs with 102843 population (51392 male and 51442 female)
Outcomes					

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means of verification	Assumptions
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_2 emission reductions		6430.65 ha ha of climate resilient agricultural practices implemented ha of forest ecosystems sustainably managed 536 ha community-managed natural forests restored through assisted regeneration 59,83 ha enrichment plantation in natural forest 335.8 ha of new planted forests established outside the forest	PMU/PPMUs reports Project reports	
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	Total population: 102843 Male: 51392 Female: 51442 females	Project report Workshop/training Attendance sheets and materials	All beneficiaries directly or indirectly made aware on it.
Outputs					
Output 1: Restored degraded forests area halting forest fire, illegal harvesting and grazing	Area (in ha.) of natural forest restored through ANR	0	536 ha of natural forest restored through ANR and enrichment plantation	PMU and PPMUs reports Project report	This river system has 9490.8 ha of forest and 324.4 ha of other wooded land (baseline survey report 2022)
	xx ha of new plantation within national forests (enrichment and barren land plantation)	0	Area: 59.83 ha. Survival rate: 80%	PMU and PPMUs reports Project report	

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means of verification	Assumptions
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	6959 ha area managed by 45 community forestry user groups	PMU and PPMUs reports Project report	45 community forestry user groups manage 6959 ha of forest having 6699 ha (96.25%) of natural forest,236 ha (3.38%) plantation forest and 25 ha (0.36%) 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: 335.88 ha. Survival rate: 80% (Demonstration plantation: 85 ha and riverbank plantation: 250.88 ha)	PMU and PPMUs reports Project report	Local government supported and owned public land and private forestry 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)	25% in comparison to before constructing structures	In-person assessments at lower gabions	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	6430.65 ha	FFS record PPPMUs Reports Project report	
	Proportion of farmers trained by the project who begin to apply climate-	0	At least 80% of the farmers involved in project trainings begun	PMU and PPMUs reports Project report	The final selection of practices to be promoted at each specific training site are

Expected Results	Objectively verifiable Indicator	Baseline	Target	Means of verification	Assumptions
	resilient land use practices on their fields in the relevant season following their respective trainings		to apply project-promoted climate-resilient land use practices in the season following their training		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.
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 659 leadership position in CFUGs, 270 (41%) 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	45 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
Output 1: Restored degraded forests area halting forest fire, illegal harvesting and grazing			
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 7 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 200 household beneficiaries
Output 2: Improved natural Forest management and increased forest area outside the forest			
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.	2.1.1Review/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 45 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 595.83 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	One multi-purpose nurseries established 85 ha of demonstration plantation established 250.88 ha of riparian/river bank plantation established 100 ha of woodlots established in private land
Output 3: Minimized impacts of climate induced disasters (erosion, landslides/sedimentation and flooding)			
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 11 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 Conservation and management of water sources	Management of existing wetlands that will enhance water availability and the at the same time supports groundwater recharge	3.3.1 Wetland management	5 wetlands managed
3.4 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	3.4.1 Strengthening climate and disaster risk reduction mechanism in collaboration with local government 3.4.2 Training/capacity building on soil and watershed conservation using bio-engineering 3.4.3 Climate resilient awareness campaign through Eco-clubs	5 days training for Government staffs/CBFMG/Farmer groups on soil and watershed conservation using bio-engineering

Activities	Description	Sub-activities	Remarks/Deliverables
	creation for climate resilient natural resource management		Student-run eco-clubs established
Output 4: Farmers adopted Climate resilient farming practices			
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	5 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 6430.65 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 430 ha marginal land
Output 5: Integrated gender and equity issues in governance practices in NRM/ CRLUP and management			
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 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	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	GESI integration ensured in in local planning processes for natural resource management and climate resilient land use practices

Activities	Description	Sub-activities	Remarks/Deliverables
	management and climate resilient land use practices	5.2.4 Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups 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)

Name of River System		Bakraha
Section		Upstream
Date of Workshop		April 28 - 29, 2022
Venue		Mawa Noonsari CFUG Office Hall
Location		Madhumalla, Miklajung-7, Morang
Participants' Information	**Total Participants**	**35**
	Male Participants	**24**
	Female Participants	**11**
	Total No. of Dalits	**0**
	Total No. of Ips	**16**

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
1	Krishna Kumar Chemjong	Madhumalla	Sub-Division Forest Office	Ranger	9844618845
2	Bikram Sharma	Miklajung-6			9811022341
3	Yubraj Gautam	Miklajung-6		Member	9814374113
4	Rai Bahadur Rai	Miklajung-6	Mayur CFUG	Forest Guard	9816334993
5	Lok Bahadur Shrestha	Miklajung-6	Mayur CFUG	Member	9817300716
6	Padam Prashad Bhattrai	Miklajung-4	Rankedada CFUG	Manager	9842078591
7	Min Prashad Tamang	Miklajung-6	Mayur CFUG	Vice-Chairman	9800904439
8	Dil Bahadur Tamang	Miklajung-6	Mayur CFUG	Forest Guard	9827380855
9	Dharma Bahadur Rai	Miklajung-2	Chulachuli CFUG	Chairman	9862960364
10	Tirth Bahadur Rai	Miklajung-2	Chulachuli CFUG	Secretary	9742305872
11	Rem Bahadur Rai	Miklajung-4	Rankedada CFUG	Member	
12	Manita Tamang	Miklajung-4	Koili CFUG	Secretary	9842199946
13	Binod Sigdel	Miklajung-3	Koili CFUG	Chairman	9842134580
14	Jagat Basnet	Miklajung-8	Shree Mawa Noonsari CFUG	Chairman	9842036700
15	Milan Gajamer	Miklajung-6	Namuna CFUG	Member	9814018738

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
16	Omnath Pyakurel	Miklajung-8	Shree Mawa Noonsari CFUG	User	9819378004
17	Yek Raj Rai	Millajung-4	Rankedada CFUG	Vice-Chairman	9819047347
18	Kamala Pandey	Miklajung-2	Chulachuli CFUG	Member	9814350592
19	Kamala Katuwal	Miklajung-2	Chulachuli CFUG	Member	9813566936
20	Ram Bahadur Budhathoki	Miklajung-9	Mikluk CFUG	Vice-Chairman	9813867101
21	Pabitra Pokharel	Miklajung-4	Rankedada CFUG	Vice-Chairman	9842197384
22	Sangita Khadka	Miklajung-6	Aapjhola Miklu CFUG	Member	9825365656
23	Bishnu Pandey	Miklajung-6	Aapjhola Miklu CFUG	Member	9815964783
24	Geet Devi Sambahamke	Miklajung-6	Aapjhola Miklu CFUG	Member	9804322557
25	Sujata Khatri	Miklajung-6	Aapjhola Miklu CFUG	Vice-Chairman	9804034642
26	Laxmi Prashad Ghimire	Miklajung-3		Member	9813328449
27	Thagendra Kumar Shrestha	Miklajung-3		Secretary	9852060340
28	Januka Nepal	Miklajung-7	Shree Mawa Noonsari CFUG	Member	9842125553
29	Satya Narayan Lama	Miklajung-6	Namuna CFUG	Member	9807061216
30	Shanta Lama	Miklajung-7	Shree Mawa Noonsari CFUG	Secretary	9816331811
31	Sunita Thaksu	Miklajung-7	Shree Mawa Noonsari CFUG	Vice-Chairman	
32	Chabi Raman Pokharel	Millajung-7, Madhumalla	Sub-Division Forest Office	Division Head	9842049458
33	Chandra Baniya	Miklajung-7	Shree Mawa Noonsari CFUG	Staff	9811061013
34	Tika Gurung	Miklajung-9	Shree Mawa Noonsari CFUG	User	9804006076
35	Gopal Karki	Miklajung-9	Shree Mawa Noonsari CFUG	Staff	

Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Krishna Kumar Chemjong	1		1						
2	Bikram Sharma	1				1				
3	Yubraj Gautam	1				1				

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
4	Rai Bahadur Rai	1		1						
5	Lok Bahadur Shrestha	1		1						
6	Padam Prashad Bhattrai	1				1				
7	Min Prashad Tamang	1		1						
8	Dil Bahadur Tamang	1		1						
9	Dharma Bahadur Rai	1		1						
10	Tirth Bahadur Rai	1		1						
11	Rem Bahadur Rai	1		1						
12	Manita Tamang		1	1						
13	Binod Sigdel	1				1				
14	Jagat Basnet	1					1			
15	Milan Gajamer	1				1				
16	Omnath Pyakurel	1				1				
17	Yek Raj Rai	1		1						
18	Kamala Pandey		1			1				
19	Kamala Katuwal		1				1			
20	Ram Bahadur Budhathoki	1					1			
21	Pabitra Pokharel		1			1				
22	Sangita Khadka		1				1			
23	Bishnu Pandey	1				1				
24	Geet Devi Sambahamke		1	1						
25	Sujata Khatri		1				1			
26	Laxmi Prashad Ghimire	1				1				
27	Thagendra Kumar Shrestha	1		1						
28	Januka Nepal		1			1				
29	Satya Narayan Lama	1		1						
30	Shanta Lama	1		1						
31	Sunita Thaksu		1	1						
32	Chabi Raman Pokharel	1				1				

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
33	Chandra Baniya		1				1			
34	Tika Gurung		1	1						
35	Gopal Karki	1					1			
Total		**24**	**11**	**16**	**0**	**12**	**7**	**0**	**0**	**0**

B. Problem and Solution Analysis Workshop (Midstream)

Name of River System		Bakraha
Section		Midstream
Date of Workshop		January 19 - 20, 2022
Venue		Hariyali CFUG Office Hall
Location		Pathari Bazar, Pathari Sanischare Municipality-2, Morang
Participants' Information	**Total Participants**	**25**
	Male Participants	**19**
	Female Participants	**6**
	Total No. of Dalits	**0**
	Total No. of Ips	**12**

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
1	Sujit Kumar Budhathoki	Letang Municipality-9	Sadabahar CFUG	Chairman	9807351966
2	Navaraj Mishra	Pathari Sanischare-1	Shree Shanti CFUG	Joint Secretary	9817376000
3	Hem Bhakta Gurung	Pathari Sanischare-1	Shree Shanti CFUG	Chairman	9807081922
4	Kabul Bahadur Magar	Pathari Sanischare-2	Hariyali CFUG	Chairman	9852034158
5	Bhim Shrestha	Urlabari Municipality-1	Manohar CFUG	Secretary	9817343848
6	Man Bahadur Pathak	Pathari Sanischare-2	Sundar CFUG	Chairman	9816386423
7	Yam Bahadur Limbu	Pathari Sanischare-1	Manakamana CFUG	Member	9807065348
8	Asit Kumar Tamang	Urlabari-1	Hariyali CFUG		9824320926
9	Naresh Mangranti	Letang-9	Shree Basanta Hariyali CFUG	Vice Chairman	9805336301
10	Punya Prasad Sapkota	Letang-9	Shree Basanta Hariyali CFUG	Treasurer	9804019888
11	Jit Bahadur Khadka	Urlabari-1	Hariyali CFUG	Secretary	9817384827
12	Asit Gole Tamang	Urlabari-1	Hariyali CFUG		9824320926
13	Sudeep Rai	Urlabari-2	Shree Srijan CFUG		9808186988
14	Krishna Prasad Acharya	Urlabari-1	Manohar CFUG		9852059791
15	Tekraj Dahal	Pathari Sanischare-6	Bishal CFUG		9813285209

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
16	Bharat Thapa	Miklajung Rural Municipality-6	Namuna Hariyali CFUG		9808065296
17	Samjhana Acharya	Urlabari-1	Janajyoti CFUG	Secretary	9819043074
18	Bishnu Maya Khakurel	Urlabari-1	Janajyoti CFUG	Treasurer	9811087952
19	Maina Devi Phuyal (Acharya)	Pathari Sanischare-10	Pashupati CFUG	Secretary	
20	Harika Tamang	Miklajung-5	Dhankheti CFUG	Secretary	9811012432
21	Nirmala Chauhan	Pathari Sanischare		Secretary	
22	Sumitra Thamden	Pathari Sanischare		Joint Secretary	
23	Usor Chauhan	Pathari Sanischare-10	Pashupati CFUG	Chairman	
24	Prem Bahadur Limbu	Letang-9, Barhagoth		Joint Secretary	
25	Bhawani Prasad Limbu	Letang-9, Barhagoth		Chairman	

Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Sujit Kumar Budhathoki	1					1			
2	Navaraj Mishra	1					1			
3	Hem Bhakta Gurung	1		1						
4	Kabul Bahadur Magar	1		1						
5	Bhim Shrestha	1		1						
6	Man Bahadur Pathak	1				1				
7	Yam Bahadur Limbu	1		1						
8	Asit Kumar Tamang	1		1						
9	Naresh Mangranti	1		1						
10	Punya Prasad Sapkota	1				1				
11	Jit Bahadur Khadka	1					1			
12	Asit Gole Tamang	1		1						
13	Sudeep Rai	1		1						
14	Krishna Prasad Acharya	1				1				

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
15	Tekraj Dahal	1				1				
16	Bharat Thapa	1					1			
17	Samjhana Acharya		1			1				
18	Bishnu Maya Khakurel		1			1				
19	Maina Devi Phuyal (Acharya)		1			1				
20	Harika Tamang		1	1						
21	Nirmala Chauhan		1				1			
22	Sumitra Thamden		1	1						
23	Usor Chauhan	1					1			
24	Prem Bahadur Limbu	1		1						
25	Bhawani Prasad Limbu	1		1						
Total		**19**	**6**	**12**	**0**	**7**	**6**	**0**	**0**	**0**

C. Problem and Solution Analysis Workshop (Downstream)

Name of River System		Bakraha
Section		Downstream
Date of Workshop		June 17 - 18, 2022
Venue		Sunwarshi Municipality Office Hall
Location		Sunwarshi-9, Morang
Participants' Information	**Total Participants**	**33**
	Male Participants	**22**
	Female Participants	**11**
	Total No. of Dalits	**6**
	Total No. of Ips	**10**

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
1	Kamala Devi Basnet	Ratuwamai-5			9810529404

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
2	Laxmi Neupane (BhatTerai)	Ratuwamai-5	Purbi Parewakhopi Farmers Goup	Vice Chairman	9800975489
3	Tikadevi Poudel	Ratuwamai-5	Ghopabad Farmers Goup	Member	
4	Bhim Maya Pokharel	Ratuwamai-5			
5	Mala Kumari Pandit	Sunwarshi-9	Sunwarshi Municipality-9	Ward Member	
6	Mansari Rajbanshi	Sunwarshi-3	Sunwarshi Municipality-3	Ward Member	9807059233
7	Govinda Rai	Ratuwamai-5	Manakamana Farmers Goup	Secretary	9810487994
8	Shanti Devi Rajbanshi	Ratuwamai-5	Manakamana Farmers Goup; Govindapur Maize Pocket Program	Chairman; Coordinator	9825343190
9	Hira Prasad Chapagain	Ratuwamai-5	Navadurga Farmers Goup; Govindapur Maize Pocket Program	Chairman; Secretary	9804377690
10	Govinda Prasad Neupane	Ratuwamai-5			9842152852
11	Binod Kumar Rajbanshi	Sunwarshi-2	Sunwarshi Municipality-2	Ward Chairman	9802064699
12	Govinda Prasad Rajbanshi	Sunwarshi-4			9842058709
13	Dilli Maya Mangrati	Sunwarshi-3	Sunwarshi Municipality-3	Dalit Woman Ward Member	9805354694
14	Champa Devi Majhi	Sunwarshi-7			
15	Sanjaya Kumar Singh	Sunwarshi-7	Sunwarshi Municipality-7	Ward Chairman	9842465863
16	Sukdev Kumar Singh	Sunwarshi-7			
17	Aakash Kumar Mandal	Sunwarshi-5			9811327474
18	Prem Kumar Das	Sunwarshi-5	Fish Farmers Group	Secretary	9813067010
19	Suryananda Shah	Sunwarshi-6	Sunwarshi Municipality-6	Ward Member	9800980468
20	Ram Kumar Rajbanshi	Sunwarshi-5	Takuwa Fruit Cooperatives	Treasurer	9845607790
21	Bishnu Prasad Kandel	Sunwarshi-6	Bhelahi Agriculture Cooperatives	Secretary	9817300152
22	Anil Kumar				
23	Nanda Kishor Das	Sunwarshi-5			9803495344
24	Subodh Kumar Das				9842089100
25	Shambhu Kumar Kewarat	Sunwarshi-6			9812359452
26	Ekabari Devi Pasman	Sunwarshi-9	Sunwarshi Municipality-9	Dalit Woman Ward Member	9829341266
27	Arun Kumar Pasman	Sunwarshi-9			9810438561
28	Shiva Dayal Sharma	Sunwarshi-9			9842249665

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
29	Hemanta Katuwal	Sunwarshi-3			9825349922
30	Satya Narayan Shah	Sunwarshi-8	Janachetana Farmers Goup	Chairman	9826335155
31	Devi Prasad Neupane	Ratuwamai-5	Purbi Parewakhopi Farmers Goup	Chairman	9862015066
32	Anita Thakur	Sunwarshi-7			9817308367
33	Jeetlal Shah	Sunwarshi-9			9811321567

Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Kamala Devi Basnet		1				1			
2	Laxmi Neupane (BhatTerai)		1			1				
3	Tikadevi Poudel		1			1				
4	Bhim Maya Pokharel		1			1				
5	Mala Kumari Pandit		1			1				
6	Mansari Rajbanshi		1	1						
7	Govinda Rai	1		1						
8	Shanti Devi Rajbanshi		1	1						
9	Hira Prasad Chapagain	1				1				
10	Govinda Prasad Neupane	1				1				
11	Binod Kumar Rajbanshi	1		1						
12	Govinda Prasad Rajbanshi	1		1						
13	Dilli Maya Mangrati		1	1						
14	Champa Devi Majhi		1	1						
15	Sanjaya Kumar Singh	1		1						
16	Sukdev Kumar Singh	1		1						
17	Aakash Kumar Mandal	1							1	
18	Prem Kumar Das	1			1					

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
19	Suryananda Shah	1							1	
20	Ram Kumar Rajbanshi	1		1						
21	Bishnu Prasad Kandel	1				1				
22	Anil Kumar	1							1	
23	Nanda Kishor Das	1			1					
24	Subodh Kumar Das	1			1					
25	Shambhu Kumar Kewarat	1							1	
26	Ekabari Devi Pasman		1		1					
27	Arun Kumar Pasman	1			1					
28	Shiva Dayal Sharma	1				1				
29	Hemanta Katuwal	1					1			
30	Satya Narayan Shah	1							1	
31	Devi Prasad Neupane	1				1				
32	Anita Thakur		1		1					
33	Jeetlal Shah	1							1	
Total		**22**	**11**	**10**	**6**	**9**	**2**	**0**	**6**	**0**

D. Expert Planning Workshop

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

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
1	Anirudra Kumar Shah	DFO, Morang	Divisional Forest Officer	9852026614	anirudrasah26@gmai.com
2	Tarni Prasad Chaudhari	SDFO, Mangalbare	Assistant Forest Officer	9852032623	

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
3	Dipesh Kumar Mishra	SDFO, Belbari	Assistant Forest Officer	9842937089	diruba@gmai.com
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12	Sushil Bhandari	BRCRN PPMU, Itahari	Project Coordinator	9852074805	sbhandari7@gmai.com
13	Abdul S. Ansari	FAO TA, KTM	FAO-TA	9802330560	abdul.ansari@fao.org
14	Minakshi Rokka Chhetri	FAO TA, KTM	FAO-TA	9841808331	minakshi.rokkachhetri@fao.org
15	Dipesh Khadka	FSc-PU-Itahari	FSc-PU	9866834033	zindatiger99@gmai.com
16	Khadga Bd. Tamang	PCTMCD, Salakpur, Morang	Assistant Soil Conservation Officer	9852051053	kbtamang2@gmai.com
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 for user of Chulachuli CF	No	1	700,000	700,000	Sakhare	87.641428	26.772963	A1.1.1	Miklajung RM-2
FFS at Chelibeti Sahakali Samuha	No	1	700,000	700,000	Jate	87.546889	26.740348	A1.1.2	Letang M-9
FFS at Babhanadop Krishi Sahakari Sanstha	No	1	700,000	700,000	Babhanadop	87.578185	26.530675	A1.1.3	Sunwarshi M-3
FFS at Kulanjhoda Krishak Samuha	No	1	700,000	700,000	Sirujher	87.587844	26.679368	A1.1.4	Uralabari M-2
FFS at Manakamana Krishak Samuha	No	1	700,000	700,000	Govindapur	87.582694	26.488154	A1.1.5	Ratuwamai M-5
Capacity-building in the use of weather information and	No	3	100,000	300,000				A1.1.6	

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
its application in agricultural practices									
Implement climate resilient agriculture practices	ha	258.12	2,000	516,243.63	Chulachuli RM-6	87.67169	26.781994	A1.2.1	Chulachuli RM-6
	ha	567.74	2,000	1,135,489.59	Miklajung RM-4	87.590735	26.779009	A1.2.2	Miklajung RM-4
	ha	1,152.49	2,000	2,304,971.84	Miklajung RM-6	87.626341	26.739899	A1.2.3	Miklajung RM-6
	ha	167.66	2,000	335,311.57	Miklajung RM-7	87.665515	26.74638	A1.2.4	Miklajung RM-7
	ha	292.22	2,000	584,446.35	Patahrishanish chare M-2	87.58729	26.65157	A1.2.5	Patahrishanishchare M-2
	ha	768.24	2,000	1,536,472.26	Uralabari M-1	87.625504	26.700435	A1.2.6	Uralabari M-1
	ha	663.36	2,000	1,326,714.13	Uralabari M-4	87.618542	26.662012	A1.2.7	Uralabari M-4
	ha	406.95	2,000	813,898.50	Uralabari M-9	87.620292	26.599004	A1.2.8	Uralabari M-9
	ha	805.77	2,000	1,611,541.83	Ratuwamai M-7	87.625031	26.485896	A1.2.9	Ratuwamai M-7
	ha	438.46	2,000	876,924.23	Sunwarshi M-2	87.574311	26.544316	A1.2.10	Sunwarshi M-2
	ha	909.64	2,000	1,819,287.02	Sunwarshi M-7	87.586691	26.416633	A1.2.11	Sunwarshi M-7
	Event	1	450,000	450,000	Mechedangi (Janajoti CF)	87.625971	26.670486	A1.3.1	Uralabari M-4

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	Toribari	87.671434	26.755239	A1.3.2	Miklajung RM-7
	Event	1	450,000	450,000	Nunsari Toribari	87.677159	26.759449	A1.3.3	Chulachuli RM-6
	Event	1	450,000	450,000	Devijung	87.573178	26.653008	A1.3.4	Patahrishanishchare M-2
	Event	1	450,000	450,000	Kaijale	87.61955	26.747085	A1.3.5	Miklajung RM-6
	Event	1	450,000	450,000	Karkuse	87.574996	26.792064	A1.3.6	Miklajung RM-4
	Event	1	450,000	450,000	Kalijhoda	87.603324	26.745873	A1.3.7	Miklajung RM-6
	Event	1	450,000	450,000	Khairbari	87.584357	26.550129	A1.3.8	Sunwarshi M-2
	Event	1	450,000	450,000	Bardanga Addatol	87.585425	26.40101	A1.3.9	Sunwarshi M-7
	Event	1	450,000	450,000	Chisapani	87.617991	26.702235	A1.3.10	Uralabari M-1
Promote agroforestry with multiyear cropping/horticluture/ on-farm conservation								A2.1	
	ha	45	6,000	270,000	Gurdum-Sajbote	87.641091	26.815116	A2.1.1	Miklajung RM-1
	ha	40	6,000	240,000	Chuli Pokhari	87.654887	26.790884	A2.1.2	Miklajung RM-2
	ha	75	6,000	450,000	Kuwapani	87.638067	26.801719	A2.1.3	Miklajung RM-2
	ha	40	6,000	240,000	Karkuse	87.574636	26.796846	A2.1.4	Miklajung RM-4

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	ha	60	6,000	360,000	Batase	87.594337	26.79666	A2.1.5	Miklajung RM-3
	ha	80	6,000	480,000	Barbote	87.604527	26.79554	A2.1.6	Miklajung RM-3
	ha	80	6,000	480,000	Yangsila	87.623637	26.796561	A2.1.7	Miklajung RM-2 & 3
	ha	10	6,000	60,000	Okhaldhunga	87.616876	26.803479	A2.1.8	Miklajung RM-2
Landslide treatment								A2.2	
	No	1	3,000,000	3,000,000	Yangsila	87.630418	26.792539	A2.2.1	Miklajung RM-2
	No	1	2,000,000	2,000,000	Solti Khola upstream	87.57546	26.789464	A2.2.2	Miklajung RM-4
	No	1	2,000,000	2,000,000	Maibash	87.566301	26.798431	A2.2.3	Miklajung RM-4
Construction of check dams and bio-engineering for gully/Debris torrent protection	No	3	LS	2,000,000	Gadame upstream	87.546931	26.795612	A2.3.1	Letang M-8
	No	3	LS	2,000,000	Gadame upstream	87.550286	26.79469	A2.3.2	Letang M-8
	No	2	LS	2,000,000	Todke	87.60547	26.783416	A2.3.3	Miklajung RM-4
	No	3	LS	2,000,000	Sindure	87.583197	26.788529	A2.3.4	Miklajung RM-3 & 4
	No	2	LS	2,000,000	Mekluk upstream	87.610575	26.793725	A2.3.5	Miklajung RM-3
	No	2	LS	2,000,000	Jalukeni	87.616461	26.790063	A2.3.6	Miklajung RM-3

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	No	3	LS	2,000,000	Simle	87.636346	26.788148	A2.3.7	Miklajung RM-2
	No	5	LS	3,000,000	Bhalukhop	87.556598	26.799487	A2.3.8	Letang M-8
	No	4	LS	2,500,000	Bataha Khola	87.618392	26.787707	A2.3.9	Miklajung RM-3
	No	2	LS	2,000,000	Gurdum	87.634466	26.818968	A2.3.10	Miklajung RM-1
	No	2	LS	2,000,000	Gurdum	87.637273	26.818876	A2.3.11	Miklajung RM-1
Wetland management	No	1	1,000,000	1,000,000	Koili CF	87.615763	26.741223	A2.4.1	Miklajung RM-6
	No	1	1,000,000	1,000,000	Namuna	87.602972	26.744583	A2.4.2	Miklajung RM-6
	No	1	2,000,000	2,000,000	Hariyali	87.577284	26.654537	A2.4.3	Patahrishanishchare M-2
	No	1	2,000,000	2,000,000	Hariyali	87.567352	26.674486	A2.4.4	Letang M-9
	No	1	2,000,000	2,000,000	Mahohar CF	87.614417	26.702694	A2.4.5	Uralabari M-1
Construction of embankment & Bio-engineering	m	76.71	30,000	2,301,366.36	Teli Khola	87.601596	26.672065	A2.5.1	Uralabari M-2
	m	40.95	30,000	1,228,553.37	Devijhoda Khola	87.598679	26.673418	A2.5.2	Uralabari M-2
	m	136.20	30,000	4,086,086.37	Sonapur	87.591316	26.392351	A2.5.3	Ratuwamai M-1

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	m	150	30,000	4,500,000	Nunsari nadi (Bakra Nadi)	087.67477	26.773663	A2.5.4	Miklajung Rural Municipility-2
Strengthening climate and disaster risk reduction mechanism in collaboration with local government	Municipality/Rural municipality	6	300,000	1,800,000				A2.6.1	
Training/capacity building on soil and watershed conservation using bio-engineering	Event	1	500,000	500,000				A2.6.2	
Climate resilient awareness campaign through Eco-clubs	School	10	50,000	500,000				A2.6.3	
Support review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	No	45	200,000	9,000,000	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	45	250,000	11,250,000				M3.2	
Equipment support for implementation of FOPs	No	45	200,000	9,000,000				M3.3	
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	

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Enrichment plantation	ha	6.96	50,000	348,107.80	Koili CF	87.621083	26.745266	M4.1.1	Miklajung RM-6
	ha	13.98	50,000	698,869.25	Aapjhola Miklu	87.62991	26.745926	M4.1.2	Miklajung RM-6
	ha	6.33	50,000	316,591.30	Miklung	87.628102	26.730532	M4.1.3	Miklajung RM-6
	ha	28.60	50,000	1,430,244.80	Koili CF	87.609312	26.750813	M4.1.4	Miklajung RM-6
	ha	3.96	50,000	197,847.05	Chulachuli	87.651153	26.786038	M4.1.5	Miklajung RM-2
Implement Assisted Natural Regeneration	ha	180	20,000	3,600,000	Rakedanda CF	87.588835	26.788704	M4.2.1	Miklajung RM-3, 4 & 5
	ha	30	20,000	600,000	Chulachuli CF	87.64516	26.782609	M4.2.2	Miklajung RM-3
	ha	140	20,000	2,800,000	Srijana CF	87.59018	26.690849	M4.2.3	Letang M-9 & Urlabari M-2
	ha	14	20,000	280,000	Sadabahar	87.534802	26.72942	M4.2.4	Letang M-9
	ha	20	20,000	400,000	Pasupati CF	87.545195	26.657857	M4.2.10	
	ha	100	20,000	2,000,000	Chulachuli cf	87.640092	26.786865	M4.2.5	Miklajung RM-2
	ha	10	20,000	200,000	Srijana cf	87.569894	26.698079	M4.2.6	Letang M-9
	ha	25	20,000	500,000	Basechauri xetra	87.568319	26.675815	M4.2.7	Letang M-9

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	ha	11	20,000	220,000	Hariyali cf	87.562904	26.664878	M4.2.8	Patahrishanichare M-1
	ha	6	20,000	120,000	Betini	87.611773	26.682452	M4.2.9	Letang M-9
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 to promote compost production from bushes and leaf litters	CFUG	5	150,000	750,000				M4.3.3	
Construction and improvement of fire lines	Km	7	300,000	2,100,000				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	Hh	200	25,000	5,000,000				M4.4	
Establish and support multi-purpose tree nurseries (150,000 capacity)	No	1	1,000,000	1,000,000	Mawa Nunsari CF,			M5.1.1	
Production of saplings	No	150,000	40	6,000,000				M5.1.2	
Establish On-farm tree nursery	No	1	600,000	600,000	Toribari			M5.1.3	

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
Demonstration plantations	ha	11	500,000	5,500,000	Namuna CF	87.605314	26.747895	M5.2.1	Miklajung RM-6
	ha	29	500,000	14,500,000	Beteni	87.63226	26.727772	M5.2.2	Miklajung RM-6
	ha	14	500,000	7,000,000	Srijana CF	87.574319	26.69334	M5.2.3	Letang M-9
	ha	15.59	500,000	7,793,363	Dharam Bhakari	87.59939	26.568055	M5.2.4	Ratuwamai M-9
	ha	15.42	500,000	7,712,365.50	Bardanga Addatol	87.590685	26.402713	M5.2.5	Sunwarshi M-7
Riparian/river bank plantation	ha	3.63	600,000	2,177,961.60	Aapjhola Miklu	87.633829	26.743194	M5.3.1	Miklajung RM-6
	ha	15.08	600,000	9,050,824.80	Kumidagi	87.642007	26.735862	M5.3.2	Miklajung RM-6
	ha	30.07	600,000	18,043,450.20	Kaseni	87.641122	26.730717	M5.3.3	Miklajung RM-6
	ha	11.83	600,000	7,097,947.80	Jhumraha	87.626316	26.679689	M5.3.4	Uralabari M-4 & 5
	ha	15.77	600,000	9,461,712.60	Rajghat	87.606859	26.632458	M5.3.5	Uralabari M-8
	ha	15.61	600,000	9,363,993.00	Baba Chaudharitha n	87.601556	26.614811	M5.3.6	Uralabari M-8
	ha	19.50	600,000	11,697,679.80	Jayanagar	87.586176	26.563208	M5.3.7	Patahrishanishchare M-5
	ha	70.33	600,000	42,199,988.40	Gobindapur	87.581576	26.494998	M5.3.8	Ratuwamai M-5

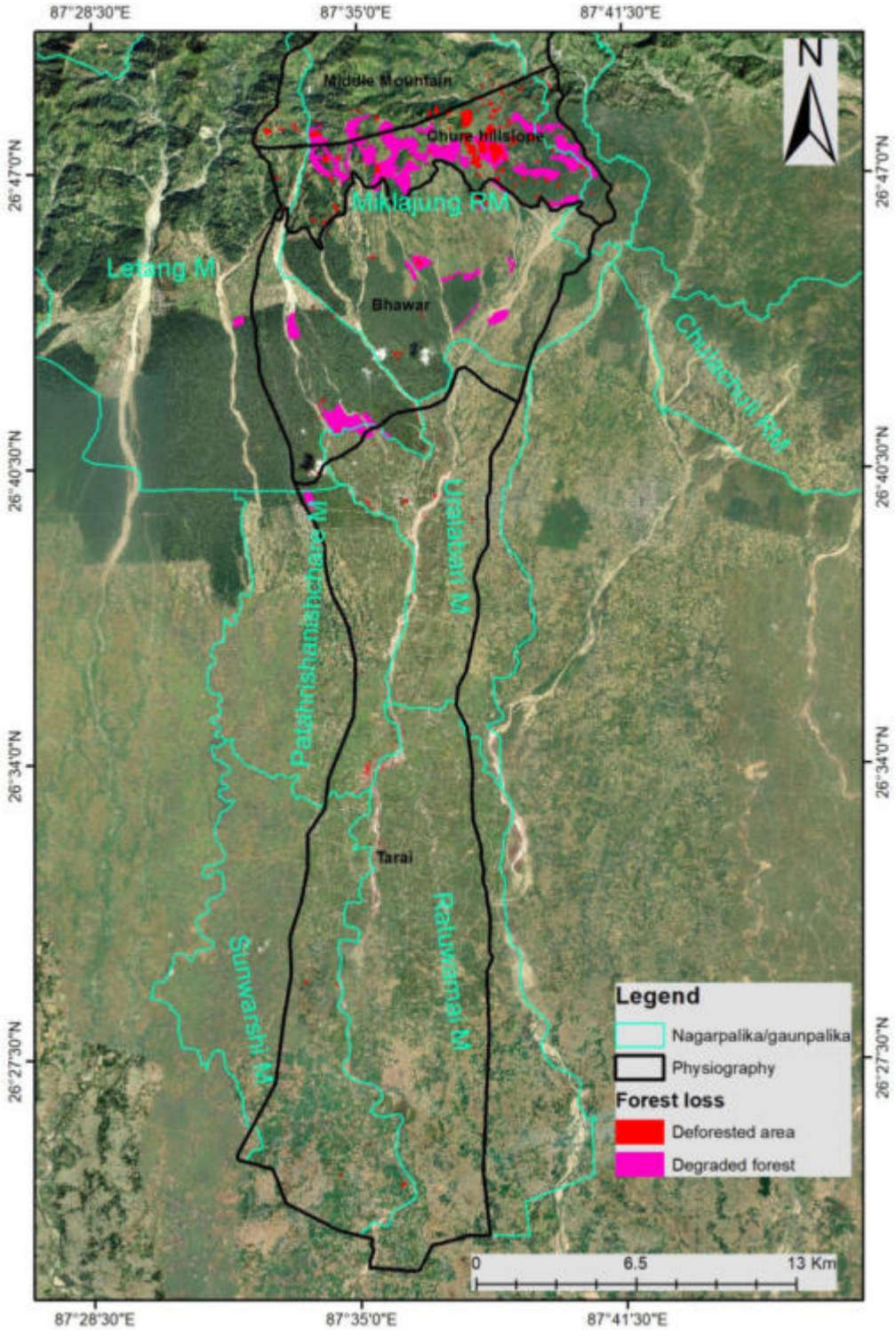
Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
	ha	2.93	600,000	1,758,708.60	Keraunja	87.57385	26.476127	M5.3.9	Sunwarshi M-6
	ha	7.46	600,000	4,475,185.20	Kathgada	87.603328	26.439408	M5.3.10	Ratuwamai M-4
	ha	6.67	600,000	3,999,189	Chaita	87.595048	26.42434	M5.3.11	Sunwarshi M-7
	ha	18.00	600,000	10,800,000	Bakraha-Teli confluence	87.61141	26.663352	M5.3.12	Urlabari M-4
	ha	24.00	600,000	14,400,000	Bakraha-Teli confluence	87.610153	26.656454	M5.3.13	Urlabari M-4
	ha	7.00	600,000	4,200,000	Lawa Khola	87.661832	26.764339	M5.3.14	Miklanjung RM-2
	ha	3.00	600,000	1,800,000	Nunsari cf	87.669736	26.767067	M5.3.15	Chulachuli RM-6
Technical guidance and support to establish woodlots	ha	100	250,000	25,000,000	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					

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)	Location	Lat.	Long.	Activity Code	Local Government
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					
Total				**362,501,336.25**					

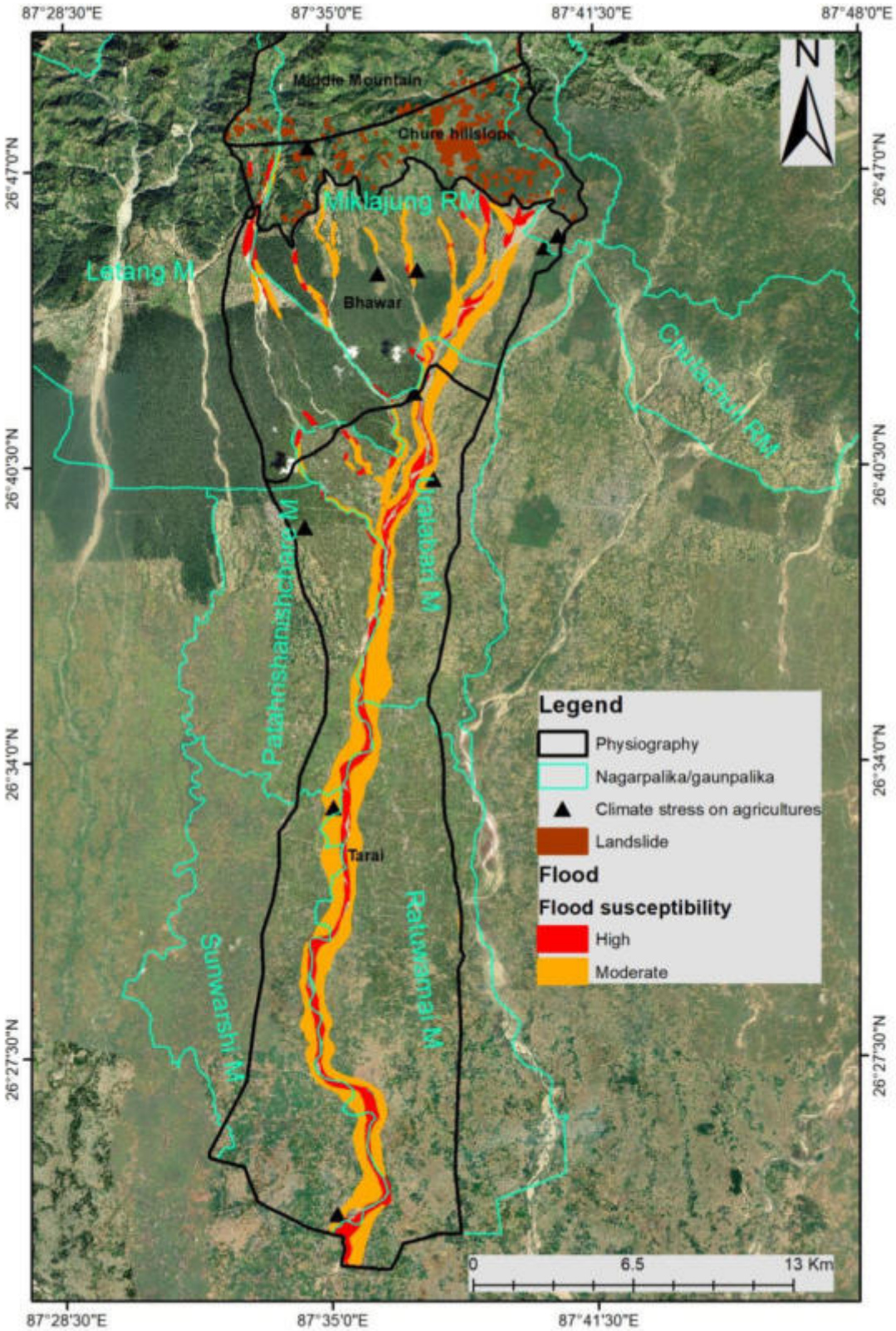
Note: Activity location and coordinates are subjected to change based on field condition before the implementation. BRCRN PPMU offices can make the necessary changes with proper documentation of field condition

Annex-4: Maps

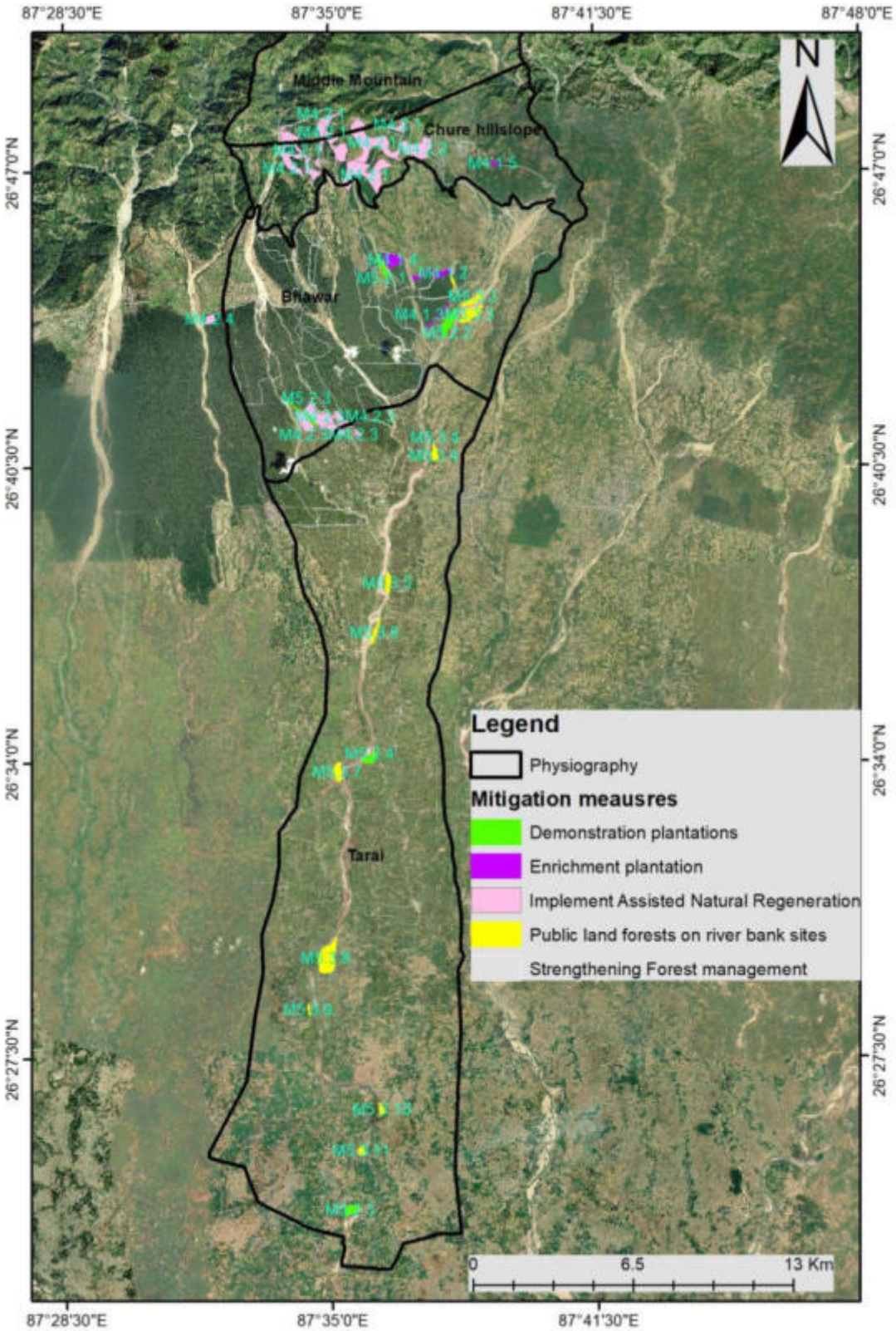
Hotspots for Forest Loss (D&FD)



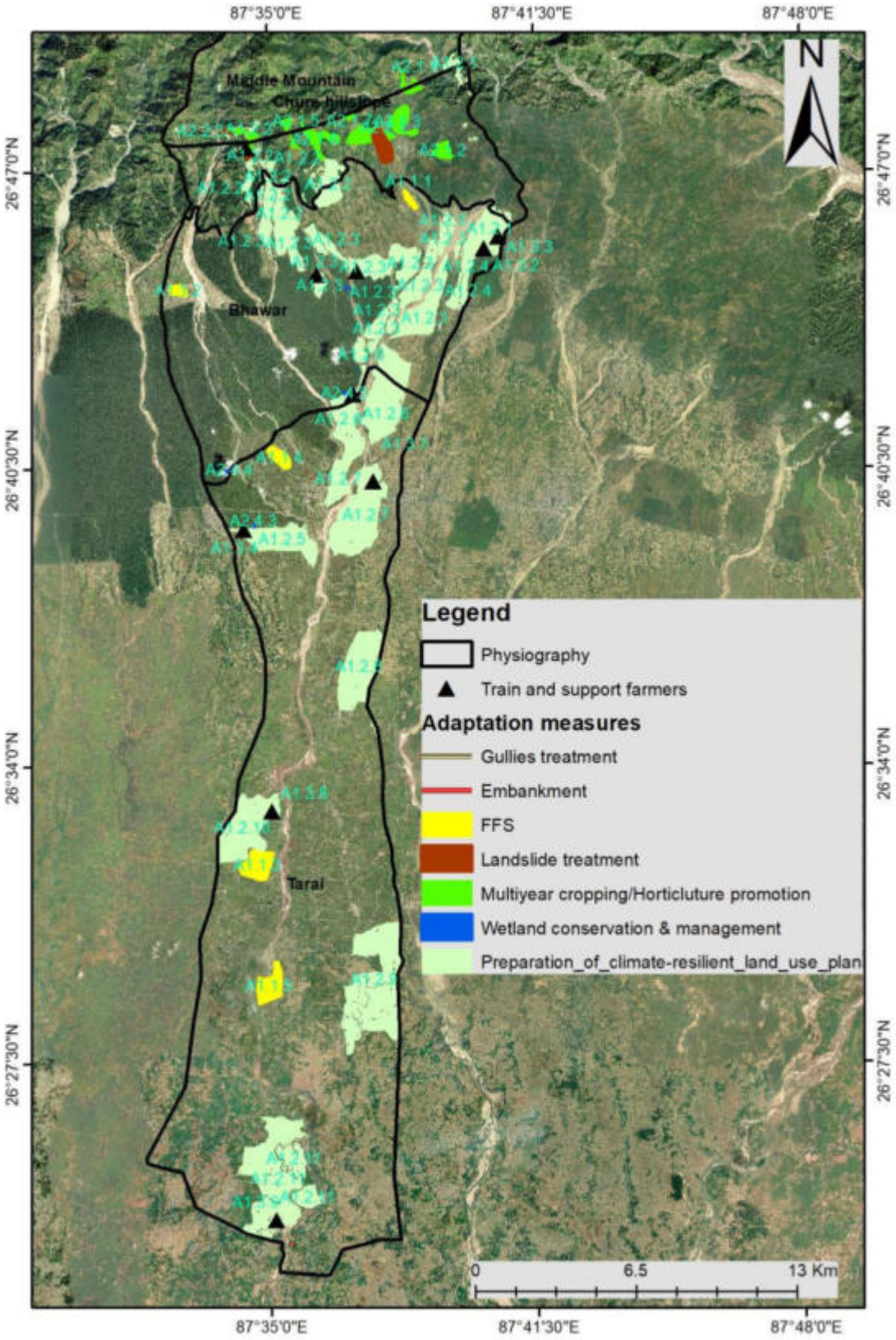
Hotspots for Climate Adaptation



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

C. Hotspot Verification

D. Focus Group Discussion and KII