Critical Ecosystem Restoration Plan (CERP)
of
Andheri-Baruwa-Dwar River System

Building a Resilient Churia Region in Nepal (BRCRN)

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 ।

२०८०।२।२६

National Project Director

GRID CONSULT (P) LTD.

APPROPRIATE TECHNOLOGY DEVELOPMENT AND RESEARCH

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
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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
DHM	:	Department of Hydrology and Meteorology
DoS	:	Department of Survey
DRR	:	Disaster Risk Reduction
EIA	:	Environment Impact Assessment
FFS	:	Farmer Field Schools
FGD	:	Focus Group Discussion
FOP	:	Forest Operational Plan
FPIC	:	Free, Prior and Informed Consent
GESI	:	Gender Equality and Social Inclusion
ha	:	hectare
ICIMOD	:	International Centre for Integrated Mountain Development
IEE	:	Initial Environmental Examination
IP	:	Indigenous People
IPacks	:	Intervention Packages
IPM	:	Integrated Pest Management
Km	:	Kilometer
LRP	:	Local Resource Person
m	:	meter
MCA	:	Multi Criteria Analysis
MoFE	:	Ministry of Forests and Environment
PCTMCDB	:	President Chure Terai Madhesh Conservation Development Board
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
TOF	:	Training of Facilitators
VDC	:	Village Development Committee

EXECUTIVE SUMMARY

The project entitled "Building a Resilient Churia Region in Nepal (BRCRN)" aims to promote widespread adoption of climate-resilient land use practices; confront the challenges of deforestation and forest degradation (D&FD); better maintain the forest ecosystem in the Chure hills; and build resilience to climate-induced hazards by linking the Chure hills, Bhavar and Terai. BRCRN has adopted the river system-based approach and follows boundaries earlier identified and delineated by President Chure Terai Madhesh Conservation and Management Master Plan 2017. The said master plan projected integrated conservation plan on the basis of river systems. The Critical Ecosystem Restoration Plan (CERP) is prepared to foster Climate Resilient Sustainable Natural Resource Management (CR-SNRM) in the river system so that this CERP will be launched to implement the concept of upstream-downstream linkage based on perspectives of the ecosystem services. The CERP process has followed participatory rural development planning approach including civil society organizations (CSOs), community-based organizations (CBOs), women lead organization, and groups, and government entities at different levels. It is based on 'Theory of change' approach integrating problem and solution tree analysis that explains how a given intervention, or set of interventions, is expected to lead to specific development change, drawing on a causal linkage based on available evidence. From problem and solution tree analysis the main problems along with their causes and effects are recorded, to come up with clear and manageable goals and the strategies to combat them. There are two main stages to this process: (1) the identification of negative aspects of existing situations (or key challenges) in the form of problem trees, and (2) the change of the problems into objectives leading to solution trees showing potential solutions or strategies that respond to the main drivers and underlying causes. In addition, the 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.

Adheri-Baruwa-Dwar river system (RS) is part of Triyuga watershed and constitute of south-facing hillslope with coverage of 60 % area of total watershed. It constitutes of lesser Himalaya in the north, Chure hill and Dun valley, and is extended over 86.559905° to 86.999013° E and 26.699891°to 26.916536°N. The river system faces urban expansion with the annual rate of 6.64% per year from 2000 to 2019. It appears that the total forest area decreased by 4.85 ha 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, unsustainable/illegal harvesting of forest products, open/uncontrolled grazing, adopting inappropriate cropping systems, encroachment of forestlands, ineffective forest management practices and infrastructure development are major drivers of deforestation and forest degradation in Adheri-Baruwa-Dwar 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. Erosion/landslide, flood 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; 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; and interventions to regulate infrastructure development in forest area, however does not suggest specific interventions as guided by CERP manual. Feasibility analysis is used to assess the strengths and weaknesses of the IPacks where risks and obstacles to implementation of each IPacks were assessed. Safeguard analysis is done to identify social and environmental risks or threats, as well as to identify where CERP interventions can contribute to significant social or environmental co-benefits. The

measures to mitigate risks and enhance benefits are also assessed. Budget plan and monitoring protocol for CERP are also prepared adopting several matrixes. However, geographic focus of activities is not considered as a primary criterion for activity grouping during IPack formulation.

The IPacks developed mainly focused on reducing deforestation and forest degradation; enhancing adaptation/resilience of vulnerable ecosystem and local communities; raising awareness and enhancing capacity of CBOs and government staffs; and integrating gender and social equity issues. The IPacks provide adaptation and mitigation activities for forest management and subsequent carbon enhancement; climate resilient agriculture and land use practices; and reducing ecosystem and community vulnerability to climate-induced disasters. Since the upstream is not protected, the people at the Dun valley 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), 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 the Dun valley. Riparian plantation is proposed 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 the valley. 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 enhancing tree cover in Dun valley will produce important climate change mitigation benefits while also preserving and enhancing vital ecosystem services that are essential to the resilience of communities throughout the river system.

CHAPTER 1 : 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 so that the ecosystem services perpetuated in the longer terms.

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, drought and flooding due to ongoing tectonic processes, fragile geological composition, and prolonged and intense rainfall during monsoon (Ghimire, 2011). A changing climate is further contributing to landslides, erosion, and flash floods in the hills. These processes in the hills have shaped the active geomorphological activities 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 jeopardizing the livelihoods of the inhabitants.

In these connections, Critical Ecosystem Restoration Plan (CERP) has been prepared to foster Climate Resilient Sustainable Natural Resource Management (CR-SNRM) at river system level. 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. This 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.
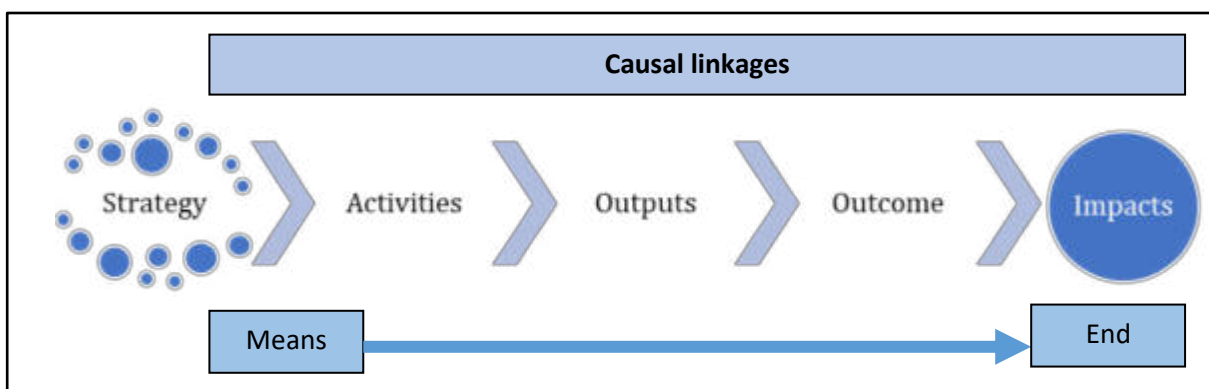
(Source: CERP manual, 2021)

Figure 1: Establishing casual linkages with theory of change analysis
Since 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, CERP has translated the field information into the desired activities, outputs, outputs, outcomes and impacts of the project and highlighted the current situations and dynamics including their incentives for change towards expected results.

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 management 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.
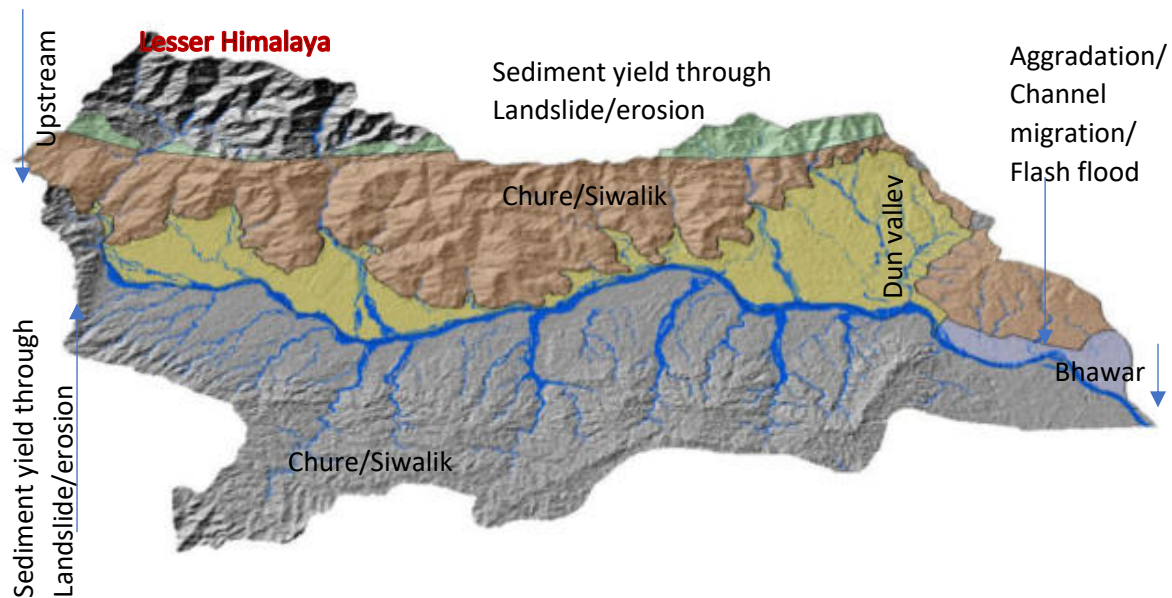
Figure 2: Upstream-downstream linkages in Adheri-Baruwa-Dwar river system

Sediment generates through erosion and slope failure process in the upstream cause aggradation in Dun region, which leads to bank scour/cut/erosion and then channel migration. Flowing downstream, channel becomes wider and channel migration is prominent in Triyuga river flood plain due to the loose and unconsolidated sediment in river bank.

1.3 Ecosystem Restoration

Ecosystem degradation is a negative trend in ecosystem condition, caused by direct or indirect human-induced processes including anthropogenic climate change perpetuated by anthropogenic factors, expressed as long-term reduction or loss of at least one of the following: biological productivity, ecological integrity, or value to humans in one way or the other.

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 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. Likewise, the site-specific information on land use and their changes is equally important. Hence, CERP processes have ensured rigorous field level discussions and consultations in each river system as well as exercised tools and techniques of land use and change dynamics to accommodate all the aspects of ecosystem restoration. The findings of the processes at multiple levels are then turned into the intervention packages of the CERP so that the specific ecosystems are restored.

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, leveraging the resources 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 cycle. The project achieves this through promotion 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 – integrated Sustainable Natural Resource Management in the Chure region.

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 can also inform country's overall Nationally Determined Contributions (NDC) reporting on land use change and greenhouse gas emissions at a national scale.

CERP is envisioned at a river system scale to foster upstream-midstream-downstream connectivity by analyzing complex inter-linkage of cause 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

Step 9: Development of workflow and finalization of intervention packages
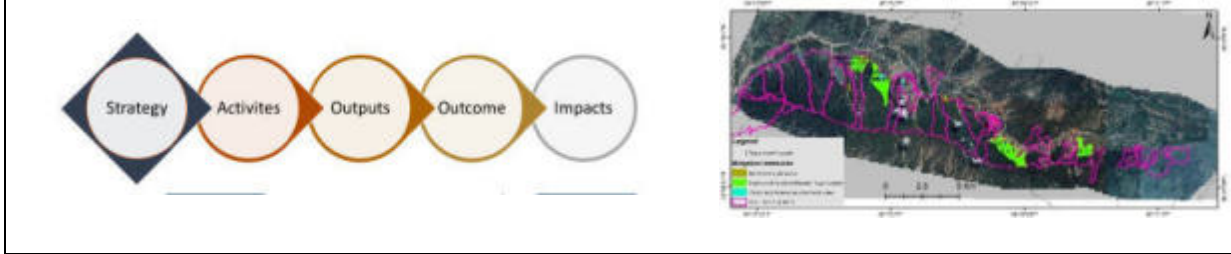
Figure 3: Steps of spatial analysis for CERP development

2.2 Spatial Planning as a Base for CERP

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

Table 1: Data types, acquisition and their processing methods

Themes	Parameters	Data types	Sources	Processing methods
Climate mitigation	Deforested area	Forest loss (2000-2020)	Global Forest Watch data.globalforestwatch.org	- Revised & update from temporal Google earth images
	Degraded forest	Open forest (Canopy <20%)	Sentinel image, 2021	- NDVI and supervised classification - Inputs, revised & update from temporal Google earth images
	Forest fire	Fire incident	NASA's Website (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			Spatial representation was created on then VDCs and transferred into river systems
	Ethnicity	Indices	CBS, 2011	
	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:
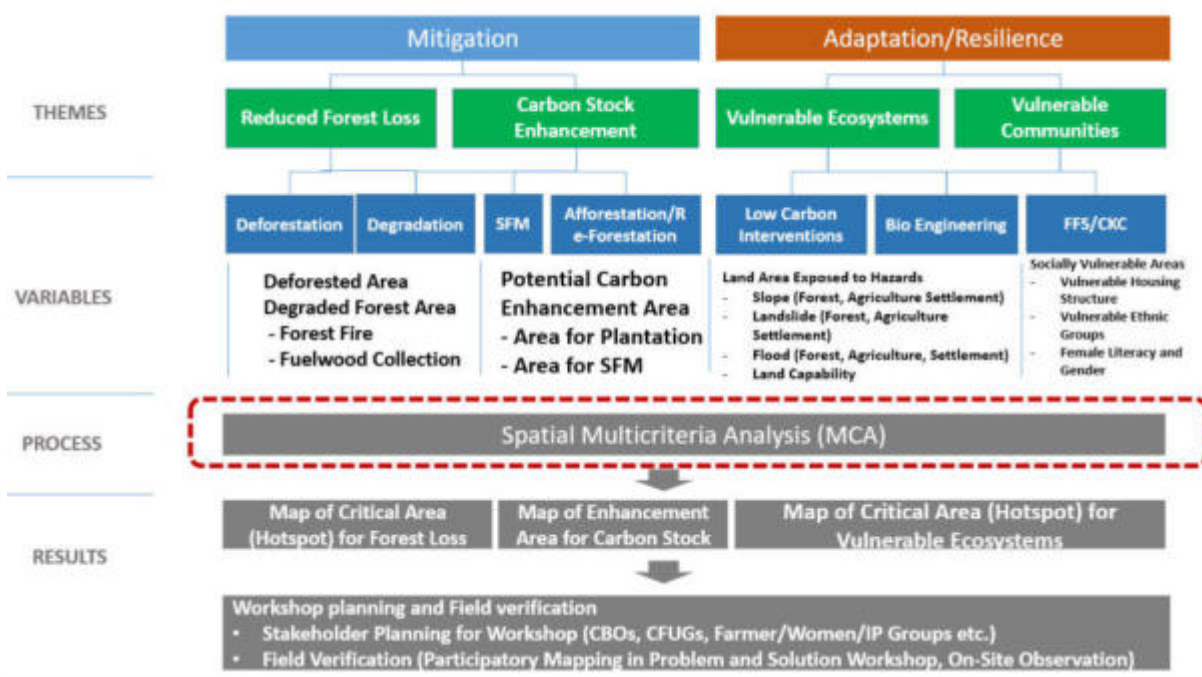
Figure 4: Multi-criteria analysis

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), Gaighat, Udayapur 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 and Community Forest User Groups while considering social inclusion i.e. representatives from women, poor, Indigenous Peoples (IPs) and Dalits.

2.3.2 Workshop

Workshops were conducted at two locations for Adheri-Baruwa-Dwar river system. The two-day workshop was organized at Beltar on 26 and 27 June 2022. The workshop venue was Basanta Panchami CFUG Office Hall at Beltar, Chaudandigadhi Municipality-7, Udayapur. There were 29 participants in total. Among the participants, 21 were from IP groups and altogether 15 females and 14 males. The other workshop was organized at Gaighat on 28 and 29 June 2022. The workshop venue was Division Forest Office Hall at Gaighat, Triyuga Municipality, Udayapur. There were 16 participants in total. Among the participants, 8 were from IP groups and altogether 5 females and 11 males (Annex 2).

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

A. Problem Analysis (Day One)

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

The participants were divided into two groups viz. 'Climate Change Mitigation (CCM)' and 'Climate Change Adaptation-(CCA). Each group nominated their spokespersons for the documentation of thematic issues and women were encouraged to be a spokesperson. Adding to this, CCM group was requested to discuss on the issues of deforestation, forests degradation and enhancement activities whereas CCA group was focused on the issues of agriculture and disaster. Both the groups were oriented on how problem and solution trees were to be formulated. They were asked to identify the key problem, direct and underlying causes of the problem and impacts of problem. The participants were also oriented about mapping 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 in walls of the workshop hall. Meta card with key problem/challenge was attached at the top. Following it, meta cards with direct drivers were attached and then meta cards with underlying causes at the bottom to prepare 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 (RS). These participatory discussions were instrumental to trace out the hotspots in terms of their severity, which would be basis for designing intervention packages for the BRCRN project with reference to climate change mitigation and climate change adaptation discussed in the problem analysis and solution analysis. The study team noted the name and physical location of the hotspots identified by the participants for field verification.

2.3.4 Field Visit and Focus Group Discussions (FGDs)

The study team went to field after the two-day workshops to verify identified hotspots. Maps and checklists were used for field verifications of hotspots. The study team had also conducted key informants interview to understand the depth of the problems in the respective hotspots. The study team discussed with local people on 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, Ministry of Forest Environment and Soil Conservation, Koshi Basin Management Center, President Chure Terai Madesh Conservation Development Board, Soil and Water Management Office, and Agriculture Development Center participated in the two-day workshops. Experts were invited in collaboration with BRCRN-PPMU and FAO-TA and Province ministries. All participants were informed 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 Gaighat of Udayapur district on 21st and 22nd of August 2022. The workshop was conducted for Tawa South, Adheri-Baruwa-Dwar, Gidari and Sunkoshi river systems of Udayapur 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 ADHERI-BARUWA-DWAR RIVER SYSTEM

3.1 Physiography, Land Cover and Hydrology

Adheri-Baruwa-Dwar river system (RS) is part of Triyuga watershed and constitute of south-facing hillslope with coverage of 60 % area of total watershed. It constitutes of lesser Himalaya in the north, Chure hill and Dun valley, and is extended over 86.559905° to 86.999013° E and 26.699891°to 26.916536°N.
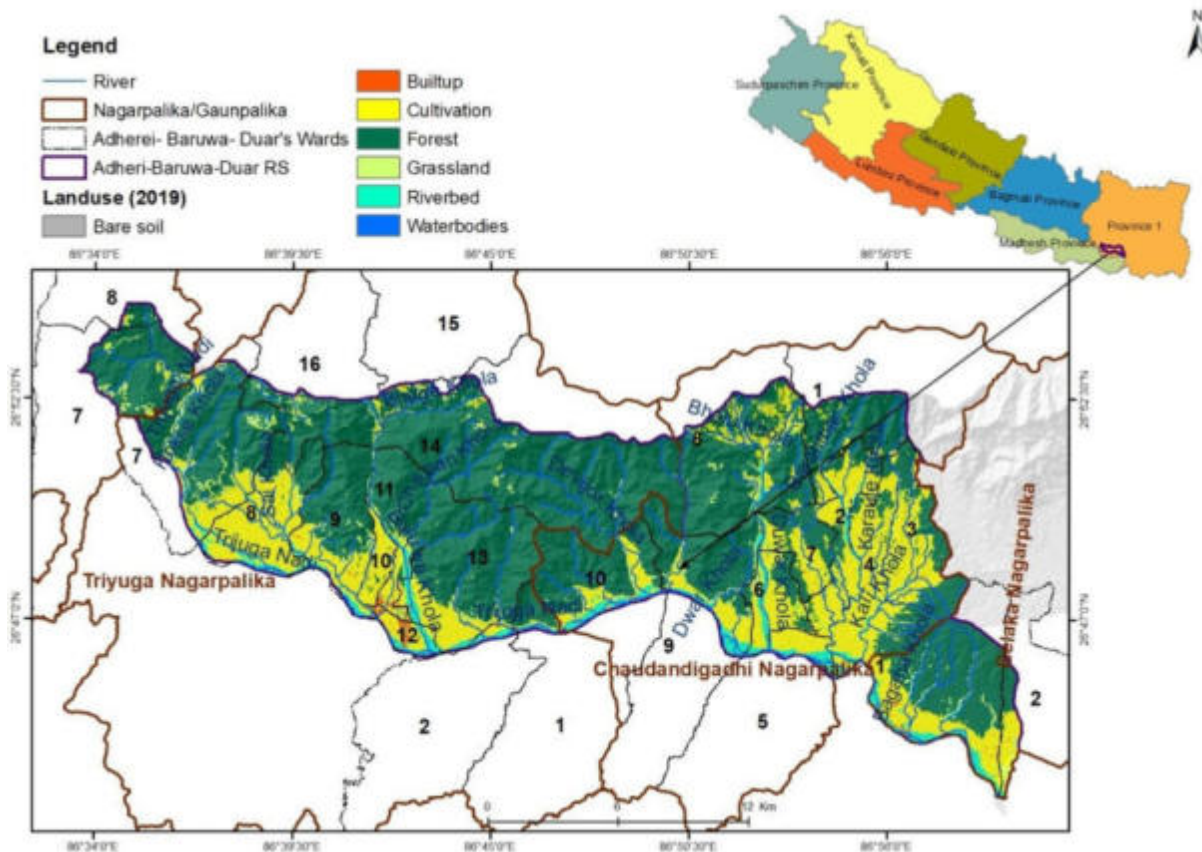
Figure 5: Location of Adheri-Baruwa-Dwar river system

The Siwalik Group of Trijuga Valley can be divided into Lower, Middle Upper Siwalik and Quaternary based on the rock types and their characteristics. The Kamal-Tawa thrust, Marin Khola thrust and Main boundary thrust together with several folds, faults and joints characterized the geomorphic process in RS. The Lower Siwalik in this valley consists of alternating beds of variegated mudstone, grey-greenish grey siltstone and very fine- to medium grained grey sandstone, whereas, Middle Siwalik are thick- to extremely thick-bedded, medium- to coarse- grained, grey, micaceous and cross-bedded sandstone with thin intercalations of black colored finely-laminated mudstone and grey colored siltstone (Acharya et al. 2020). Similarly, mud-dominated matrix-supported conglomerate as well as sand-dominated matrix and clast-supported conglomerate are the characteristics of Upper Siwalik.

Quaternary terraces is composing of alluvial fan, river terraces, and flood plain with coarse to fine sediments. This region is generally flat or rolling plains and characterized by areas of population concentration.
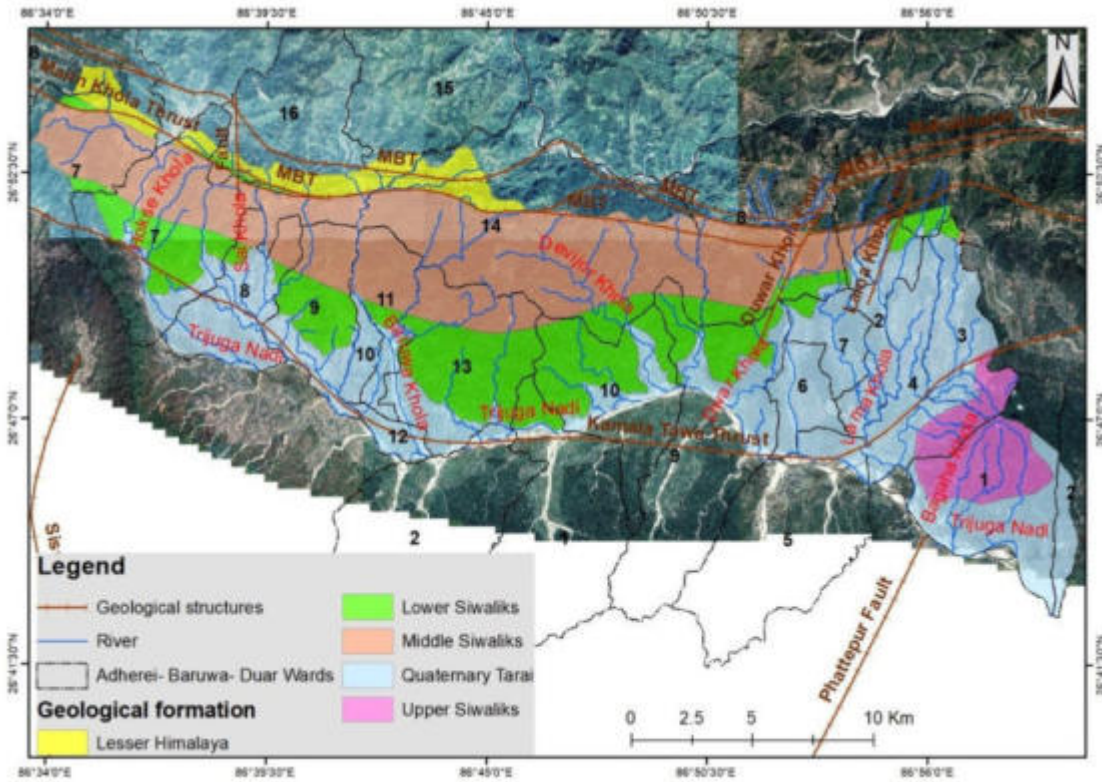
Figure 6: Geology of Adheri-Baruwa-Dwar river system

Forest[1] is the dominant land cover of RS, covering 64.9% of total area, followed by cultivated land (25.62%), riverbed (4.52%), grassland (4.09%) and so on (Table 2). Despite of reforestation in several areas during 2000 to 2019, net forest lost was 4.85 ha that can be attributed to the expansion of cultivation and settlements. Major patches of encroachment are seen in and around Adheri-Batase-Jamire, Nagrange, Dalepani and Masane area of Udayapurgadhi rural municipality; Kholetar, Jhora Khoriyatol, Ratmate-Anpsota and Tantaribote of Triyuga municipality; and Shikarpur, Waitung and Ficalchaudandi of Chaudandigadhi municipality.

Table 2: Land cover change in Adheri-Baruwa-Dwar river system

Land cover	2000		2019		Change area (ha)	Rate of Change (%/yr)
	Area (ha)	Percentage (%)	Area (ha)	Percentage (%)		
Built-up	45.80	0.11	155.36	0.39	109.56	6.64
Cultivation	10405.72	25.80	10332.33	25.62	-73.39	-0.04
Forest	26178.72	64.91	26173.87	64.90	-4.85	0.00
Grassland	1595.38	3.96	1649.39	4.09	54.01	0.18

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[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.

Water bodies	154.55	0.38	196.70	0.49	42.16	1.28
Riverbed	1950.44	4.84	1822.95	4.52	-127.48	-0.36

Source: (ICIMOD & FRTC, 2021)

RS is also facing urbanization with the built-up area expansion of 109.5 ha at the rate of 6.64 percent per year. Rapid growth is observed along the Madan-Bhandari highway, resulting in conversion of fertile land to built-up area. Likewise, fishery ponds are being increased due to the growing markets and continuous support from the government (DOA, 2018), subsequently water bodies has increased in the RS. In the meantime, riverbed has decreased due to the control in channel migration of Triyuga and its tributaries (Figure 7).
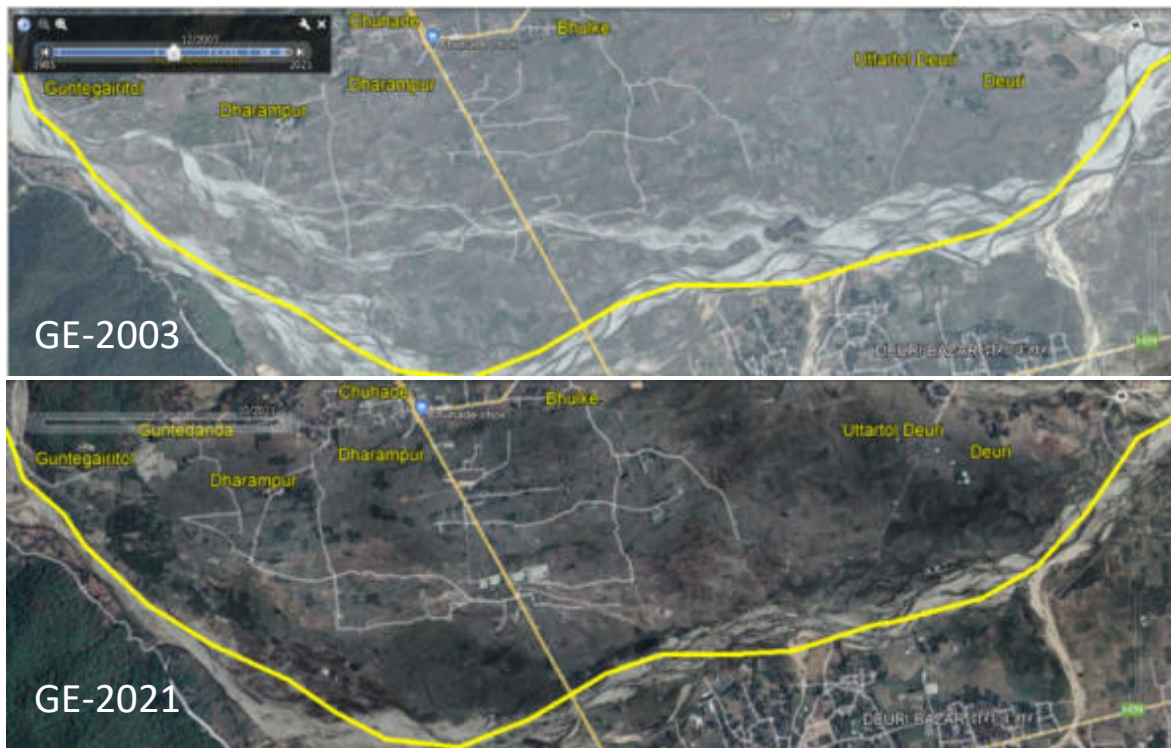
Figure 7: Channelization of Triyuga river through embankments

Triyuga and its tributaries which are originated in Mahabharat range are perennial streams. The Hydest WEC-DHM method estimated that overall discharge at the driest month (March) is 7.28m³/s and high discharge (136.2m³/s) occurred on August (Table 3). These rivers have formed a very fertile flood plain. However, active geomorphic processes such as channel migration, sedimentation and inundation frequently cause tremendous loss and damaged in the river system.

Table 3: Average monthly discharges in Triyuga and its tributaries

Month	Average Discharge (m³/s)
January	9.26
February	7.87
March	7.28
April	8.02

May	11.53
June	36.89
July	114.90
August	136.16
September	104.07
October	45.18
November	19.67
December	12.61

In the meantime, expansion of settlements in risk prone area especially in Gaighat and Beltar bazar area increase the flood risk.

Figure 8: Settlement expansion in flood prone area, Betar bazar

3.2 Climatic Conditions
The river system has tropical monsoon climate with average maximum temperature of 38° c and minimum temperature of 16° c. The average annual rainfall in this area is 1686.6 mm (Table 4).

Table 4: Rainfall distribution

Station	Average long-term rainfall (mm)		
	Annual	**Monsoon**	**Maximum 24 hours**
Phatepur	1695.7	1371.3	270
Udayapur Gadhi	1677.5	1335.6	204.7

Source: DHM, 2021

The rainfall pattern shows that about 80% of precipitation occurs during rainy season, 12% occurs before rainy season, 6% after rainy season and the remaining 2% in winter.

Moreover, Climate change scenarios analysis performed for National Adaptation Plan (NAP) process indicated that average annual mean temperature of Udayapur district is likely to rise, Representative Concentration Pathway (RCP) 4.5 projected that increased by 0.81^0C and 1.17^0C in 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). Rising temperature further will create the water stress during the dry months through decreasing the agricultural production and thereby increasing food insecurity. Increasing temperature is also likely to contribute for spread of the crop diseases, insects and pest, weeds and alien invasive (Pandey, 2012; Bhandari et al., 2019).

Table 5: Climate change scenario in Adheri-Baruwa-Dwar river system

	^0C	Change (^0C)			
Temperature	**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)
	19.9	0.81	1.17	1.02	1.72
	mm	**Change (%)**			
Precipitation	**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)
	1653	3.37	4.58	3.55	7.93

Source: (MoFE et al., 2019)

Similarly, average annual precipitation is likely to change in both the medium-term and long-term periods. It is likely to increase by 4.58% and 7.93% in the long period based on RCP 4.5 and RCP 8.5 respectively.

3.3 Socio-ecological Process
According to the participants of local stakeholder consultations, residents of the RS have generally migrated from adjoining districts and northern part of Udayapur and thus composition of the community is heterogeneous. The Janajati/ethnic (Danuwar, Chaudhary, Magar, Tamang, Rai Newar etc.) are the main indigenous groups in RS comprising more than 45% of the total households. The settlements are scattered; however, cluster settlements are being increasing because of emerging markets including Chuhade, Gaighat, Beltar, and others along the Madan Bhandari highway. Farmers grow and maintain different varieties and landraces of cereals, vegetables, fruits, fodder crops and livestock species and were found utilizing different species of plants and animals in farming and in sustaining their livelihoods (Bhandari 2012). Moreover, people are also adopting flood mitigation measures such as the construction of sand embankments, stonewalls, and bamboo fences, however, these preventive and adaptation measures are not enough to avoid loss and damage(Bauer 2013). Women were found to be vulnerable to climate change has been linked to their lack of empowerment in their communities. Girls tend to drop out of schools to support household chores. This leads to women's perceptions that they are unable to participate meaningfully in disaster management committees. Additionally, women are less mobile as they lack information and news. Furthermore, it is women who contribute most to agriculture, but only few women actually own the lands they work meaning their decision-making capacities are reduced.

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 Adheri-Baruwa-Dwar 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 among men and women for fire management	
	Carelessness from herders and forest dwellers	Throwing of cigarette butts etc.
	Intentional fire	Fire burnt for poaching; fire burnt for new grasses
	Inadequate preparations for forest fire management	Inadequate skilled human resources for firefighting; Inadequate firefighting equipment in CFUGs; Inadequate management of fire lines; Inadequate efforts in removal of dry biomass accumulated in forest floor
Unsustainable harvesting and illegal logging	Poverty and limited income generation opportunities	Forest products being a source of income generation to poor/marginalized
	Demand-supply gap of forest products	Population growth; Higher demand for timbers due to urban growth; Delay in silviculture operations, harvesting and utilization in CFs; Centralized timber distribution system from District Forest Products Supply Committee (DFPSC); Households with unregistered lands deprived of timbers distributed legally
	Insufficient private land forests	Insufficient fodder and firewood production in private lands due to small landholdings; Inadequate knowledge and technology among local people for species selection, plantation, nurturing and management of private land forest; No legal provision in registration and

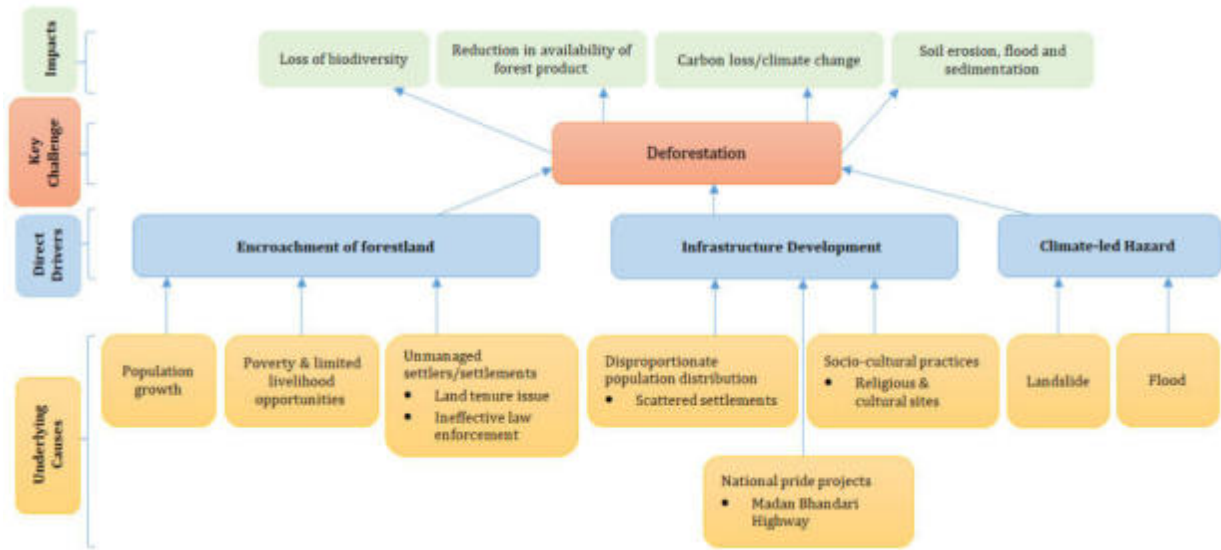| Drivers of D&FD	Underlying Causes	
		use of forest products from private forests in unregistered lands
	Women and marginalized groups not having adequate knowledge on sustainable forest management	Women and marginalized communities not part of the sustainable forest management practices and their voices not addressed
Open and uncontrolled grazing	Inadequate fodder production in private lands	Small landholdings
	Low investment capacity of farmers for stall feeding	
	Weak forest protection	Lack of fencing; poor enforcement of rules and regulations
Ineffective forest management practices	Limited capacity and resources of CFUGs	Low income of CFUGs; Inadequate skill, equipment and technicians for forest management in CFUGs
	Poor forest enhancement	Problems associated with plantation & its protection- inadequate irrigation, open grazing, riverbank cutting and cutting of saplings by fodder, firewood collectors
	Weak governance	Declining accountability of CFUGs; Deficiency in forest sector transparency; Weak coordination and cooperation among stakeholders; Lack of accountability of local government and forest users; Low engagement of women and marginalized groups in preparing sustainable forest operational plans of CFUGs
Encroachment of forestland	Population growth	Settlement expansion; Agriculture land expansion; Shifting cultivation (Khoriya Phadani)
	Poverty and limited livelihood opportunities	
	Unmanaged settlers/settlements	Land tenure issues; Ineffective law enforcement
Infrastructure development	Disproportionate population distribution	Construction of roads, playground etc. to serve scattered settlements

Drivers of D&FD	Underlying Causes	
	Socio-cultural practices	Construction of religious and cultural sites; Customary practices; local norms and values; relationship between different religious groups etc.
	National pride projects	Construction of Madan Bhandari highway
Climate-led hazards	Erosion/landslide	Forest degradation in Chure; Uncontrolled grazing in slope areas; 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, unsustainable/illegal harvesting of forest products, open/uncontrolled grazing, encroachment of forestlands and infrastructure development are the major drivers of deforestation and forest degradation in Adheri-Baruwa-Dwar 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.

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. Agricultural expansion can be further categorized into permanent conversion of forestland to farmland, and shifting cultivation. The underlying causes are population growth, limited livelihood options of households and unmanaged settlers (land tenure issues) near to 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, construction of national pride projects like Madan Bhandari highway, religious and cultural sites, and playgrounds 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 9: Problem tree for deforestation

Impacts: Loss of biodiversity · Reduction in availability of forest product · Carbon loss/climate change · Soil erosion, flood and sedimentation

Key Challenge: Deforestation

Direct Drivers: Encroachment of forestland · Infrastructure Development · Climate-led Hazard

Underlying Causes:
- Population growth
- Poverty & limited livelihood opportunities
- Unmanaged settlers/settlements
  - Land tenure issue
  - Ineffective law enforcement
- Disproportionate population distribution
  - Scattered settlements
- Socio-cultural practices
  - Religious & cultural sites
- Landslide
- Flood
- National pride projects
  - Madan Bhandari Highway

Figure 10: Problem tree for forest degradation

Impacts: Carbon emission/climate change · Decline in forest resources · Water source depletion · Deterioration of wildlife habitat · Soil degradation

Key Challenge: Forest Degradation

Direct Drivers: Forest Fire · Unsustainable and illegal harvesting · Open and uncontrolled grazing · Ineffective forest management practices

Underlying Causes:
- Lack of awareness
- Carelessness from herders and forest dwellers
- Poverty & limited income generation opportunities
- Demand-supply gap of forest products
- Insufficient private land forests
- Inadequate fodder production in private lands
- Weak forest protection
  - Lack of fencing
- Limited capacity and resources of CFUGs
- Poor forest enhancement
- Inadequate preparations for forest fire management
  - Fireline
  - Removal of dry biomass
  - Firefighting equipment
- Intentional fire
  - Illegal poaching
  - Grass improvement
- Women and marginalized groups not having adequate knowledge on sustainable forest management
- Low investment capacity of farmers for stall feeding
- Weak governance

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 and local communities for grass improvement. 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. 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 insufficient private land forests due to small landholdings. Households with unregistered lands are deprived of timbers and firewood distributed legally. The forest regulation also prohibits felling and sale of forest products from unregistered lands. It has demotivated local people for developing private land forest. 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 lack of specified grazing lands, inadequate fodder production in private lands and lower financial capacity to switch to stall feeding.

Ineffective forest management practice is also one of the drivers of forest degradation. It is mainly associated with institutional weakness caused by lower financial capacity and technical resources; poor forest enhancement; and ineffective forest governance due to deficiency in forest sector transparency, declining accountability, weak coordination and cooperation among forest stakeholders and users especially the women, poor and marginalized groups (Figure 10).

❖ **Key Observations**
  - The people residing nearby forest first encroach forestlands and then sell to in-migrants. Once the number of households increases, it becomes difficult to deal with the issue. Moreover, these encroached settlements have political protection as they are considered as vote banks.
  - Construction of Madan Bhandari highway has further enhanced forestland encroachment along the road.
  - An elite influence in CFUGs is one of the major causes of weak governance. Persons holding major posts in executive committees of CFUGs resign once they find better opportunities. The other reason is competitive feelings where one who does not get hold on major posts files complaints against others to hinder his/her work.
  - The major cause behind illegal logging is unemployment. The other cause is unregistered lands. The households with unregistered lands are deprived of timbers distributed from District Forest Products Supply Committee (DFPSC). It also creates difficulties in private land forests, as sell of forest products from unregistered lands is illegal.
  - At present, timbers are distributed from District Forest Products Supply Committee, which is also causing demand-supply gap. Distant users are unwilling to buy from DFPSC due to additional cost of transportation.
  - Women and marginalized communities not having access and control over resources.
  - Women are not able to ask for their equal rights to natural resources management. Women and marginalized groups not having adequate knowledge and awareness in policies and law for sustainable forest management.
  - Not having sufficient alternative energy programs. Traditional use of energy sources and inadequate alternative energy programs to reduce drudgery of women.

Theme 2: Climate Change Adaptation

4.1.2   Drivers and Underlying Causes of Vulnerable Ecosystem and Community
Climate induced disaster and climate impact on agriculture productivity are two key challenges representing vulnerable ecosystem and community in Adheri-Baruwa-Dwar River System. These two key issues have impacts on the ecosystem and livelihood generation 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		
Erosion/landslide	Topography	Fragile geological condition and slope terrain
	Forest degradation	Forest fire, unsustainable harvesting, open grazing etc.
	Heavy/erratic rainfall	High intensity rainfall and continuous rainfall for several days
	Road construction without adopting engineering study and design	Construction of roads to serve scattered settlements and market access for agriculture products; Use of heavy machineries in road construction
	Cultivation in slopy land	Limited productive lands for the community
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	Risk acceptance due to poverty, economic opportunity of land
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 disaster preparedness
Climate Stress on Agriculture Productivity		
Inadequate capacity and resources	Limited farm skill and technology use in climate resilient farming practices	Inadequate agriculture technicians at local level
	Low investment capacity of farmers	Difficulties in receiving loan due to unregistered lands
	Insufficient irrigation	Limited surface water sources; Drying up of water sources; Inadequate infrastructure and investment; Insufficient efforts to promote alternative irrigation technologies- rainwater

| Drivers	Underlying Causes	
		harvesting, deep boring, drip irrigation and others
	Inadequate support and promotions	Governments failure to identify and support real farmers (dominance of elites/paper farmers); Inadequate promotional activities in agriculture (incentives, subsidies, farm equipment support)
	Poor market access and infrastructures	Higher cost of production and low market price of sale of products; Market domination by intermediaries
Pests and diseases	Decline in organic content of soil	Use of chemical fertilizers and pesticides and low organic inputs
	Use of less immune hybrid varieties	Loss or limited availability of native varieties; Low production from local native seeds and livestock; Higher production from hybrid varieties but less immune to pests and diseases
	Inadequate knowledge and skill on pest and disease control	
Soil quality degradation	Low organic inputs	Insufficient compost manure due to declining livestock farming
	Use of chemical fertilizers and pesticides	Inadequate skill and technology for compost, bio-pesticides production
	Sedimentation in farmland	Sedimentation due to erosion and flood
Loss and damage of agricultural lands and crops	Climate-led hazards such as erosion, flood and heavy rainfall	
	Agriculture land fragmentation; land use conversion	Unplanned settlement expansion and infrastructure development; Plotting to increase land price; urban growth
	Crop depredation by wildlife in the field	

❖ **Problem Analysis**

Erosion/landslide, flood and weak disaster risk management are major drivers of climate induced disaster that enhances ecosystem and local community vulnerability. Landslide and flood have caused loss and damage of natural vegetation, agricultural land, and properties affecting local people's livelihood. 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 (Figure 11).
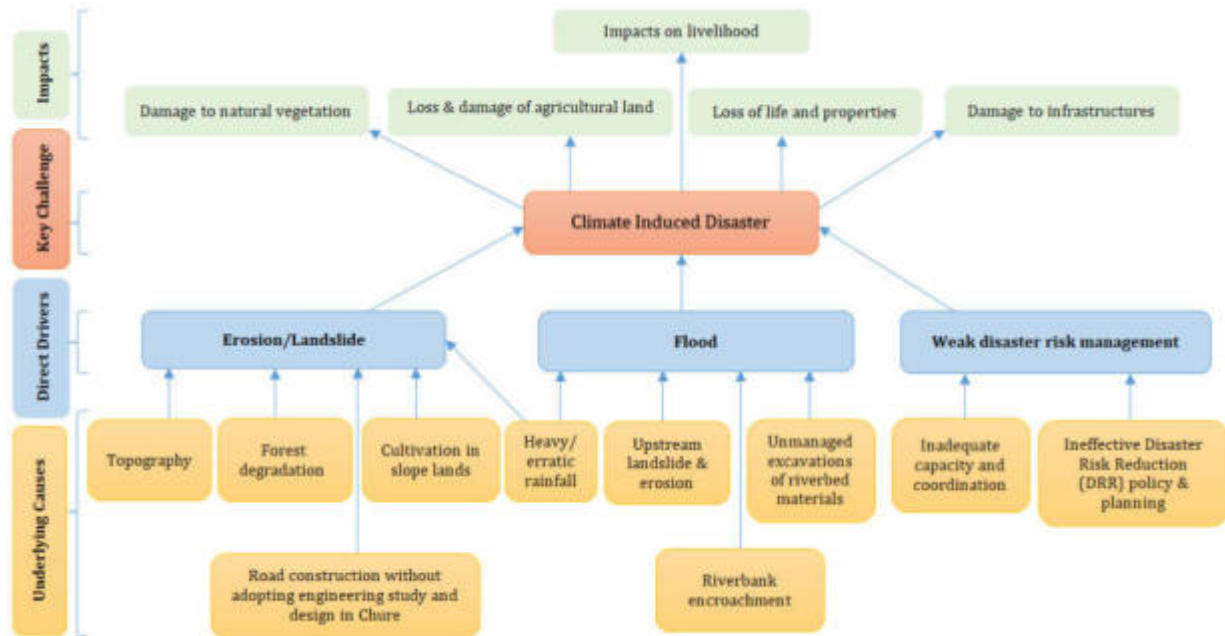
Figure 11: Problem tree for climate induced disaster

Climate stress on agriculture productivity is the other aspect of vulnerable local communities. It 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 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. Farmers both men and women 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. Investment capacity of small farmers is low due to poor financial status. Government support is inadequate. One of the major problems is unregistered lands that make difficult in receiving bank loans. 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, inadequate skilled agriculture technician 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 like Fauji kira – Army worm – *Mythimna separata* (maize), Khumle kira – White grub – *Phylophaga spp* (Ginger, turmeric), stem borer and others. Crop insects, pests and diseases are also increasing due to use of less immune hybrid varieties. 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, and crop depredation by wildlife in the fields are also among important problems in agriculture sector that needs to be addressed (Figure 12).
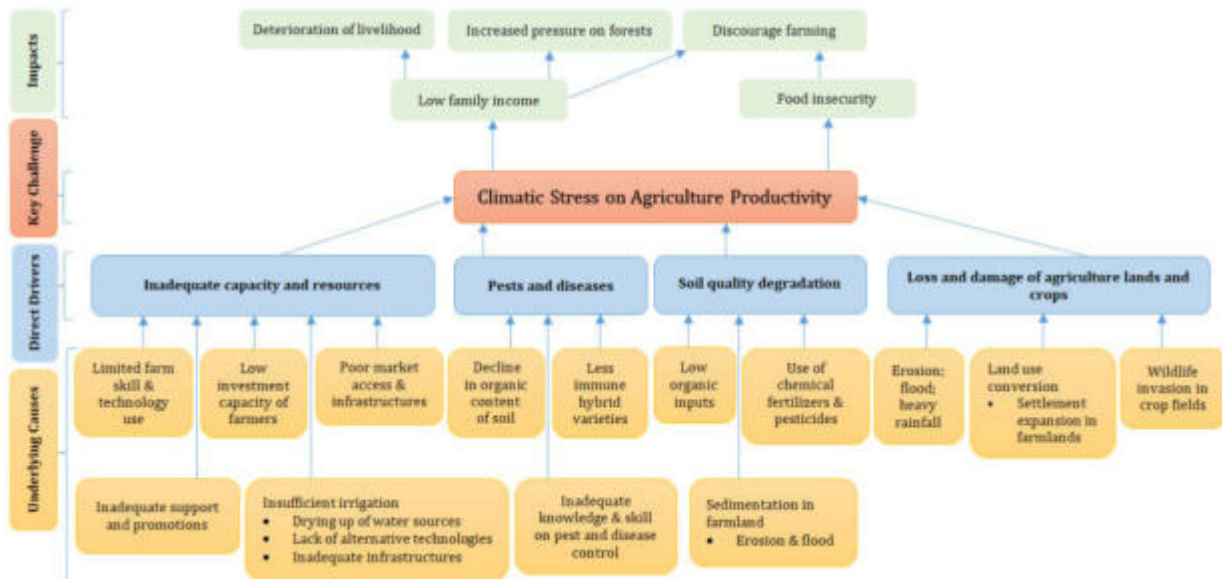
Figure 12: Problem tree for climate stress on agriculture

❖ **Key Observations**
- Security agencies mostly Armed Police Force is more involved in disaster management but they lack essential equipment.
- Unregistered lands make difficult for households to receive government incentives in farming.
- Though declared at policy level, provision of crop insurance is yet to be endorsed.
- Hybrid varieties are less pest resilient both in cultivation and storage.
- Farmers face unnecessary hurdles in registration of farmers group, acquisition of PAN number, approval for government incentives, auditing and renewals.
- Women, poor/marginalized and IPs are not getting sufficient access to information and financial and technical support.
- Inefficient access to irrigation facilities among women, Dalit and IPs
- Women and marginalized groups having less capacity in farming practices.

4.1.3 GESI Issues Observed in Problem Analysis

Women and marginalized groups risk serious injuries and deaths due to human wildlife conflict in the area near Koshi Tappu Wildlife Reserve. This is physically as well as mentally hard-hitting for women as they live in constant fear. Women additionally were found to be stressed as they are responsible for protecting the elderly and the children when their male counterparts are not present. Women and marginalized communities are being left behind when preparing management plans. Deforestation and flood hazards making women walk long distances to carry water and firewood. They also face food scarcity during the flood disasters.

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 • 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; promotion of alternative energy; 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 programs	Sensitize communities on the impacts of forest fire on ecosystem functions/services and their restoration; Employ forest guards in required number for enhancing patrolling activities to control illegal poaching; Enhance coordination among CFUGs

Drivers of D&FD	Activities against Drivers	
	Construction and improvement of fire lines	Capacity development and funding support for fire line construction
	Firefighter training and support firefighting equipment to CFUGs	Coordination and collaboration with DFOs/DRRMC and security forces
	Enhancing water availability during forest fire	Construction of conservation ponds for water storage
	Removal of dry biomass accumulated in forest floor	Promote compost production from dry leaf litters and unwanted bushes
Unsustainable harvesting and illegal logging	Enhance income generation opportunities of poor/marginalized forest users	Skill development trainings and equipment support (masonry, carpentry etc.); Support soft loans for entrepreneurship development
	Promote woodlots/commercial plantation in private lands	Seedling distribution and technical support for private land forests and agroforestry
	Promote agroforestry	Seedling distribution and technical support
	Promote alternative energy	Provide subsidies on alternative energy (induction stoves, Improved Cooking Stoves etc.)
	Improve legal supply system of timbers	Decentralize timber supply to sub-division forest offices; Policy interventions to facilitate timber distribution to households with unregistered lands
Open and uncontrolled grazing	Promote stall feeding	Training and support on commercial livestock farming and shed improvement
	Support fodder banks in private and public lands	Distribution of seeds/seedlings of fodder trees and nutrient grasses; technical trainings
	Allocation and management of grazing area in public lands and community forests	Provision of rotational grazing system to avoid overgrazing in single location
Ineffective forest management practices	Enhance income generation opportunities for CFUGs	Alternative income generation opportunities for CFUGs like Ecotourism promotion
	Implementation of sustainable forest management	Review/upgrade/renewal of forest operational plans (FOPs) of community forest user groups (CFUGs); Sensitization/awareness programs on

Drivers of D&FD	Activities against Drivers	
		sustainable forest management; Training on silviculture operations and equipment use
	Establish/upgrade nurseries	Demand based seedlings production with priority on native species
	Implement forest enhancement activities	Enrichment plantation, riverbank plantation, assisted natural regeneration etc.
	Strengthen forest governance	Joint coordination meeting of government staffs and CFUGs
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	Skill development trainings (production of soap, detergent powder, pickle, incense stick, dalmoth, tailoring, doll & toys making, sal leaf plates, bamboo baskets); Promote and support forest based entrepreneurship
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 works of riverbed materials	Coordination among local government, other associated government agencies and CFUGs to regulate excavation of riverbed materials; 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 environmentally friendly. Forest loss from natural hazards can be reduced through landslide treatment, gully/debris torrent control and riverbank stabilization (Figure 13).
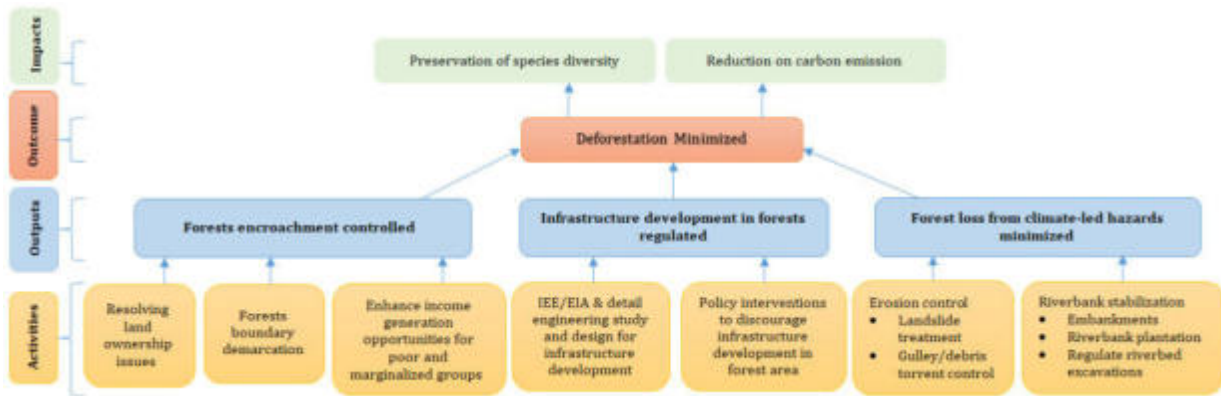
Figure 13: Solution tree for minimizing deforestation

Degraded forests can be restored through addressing the 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. In addition, collaboration with security agencies (Nepal Police, Armed Police Force) further enhances forest firefighting capacity. Periodic removal of dry biomass and construction of fire lines 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. Moreover, illegal poaching needs to be controlled by enhancing forest monitoring. 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. Promoting alternative energy, agroforestry and private forestry also reduces forest dependency. 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 single allocated grazing land.

Forest management can be improved through implementation of FOPs and strengthening of sustainable forest management practices, implementation of forest enhancement activities and strengthening of forest sector governance. All the CFUGs should have a 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 local species based on the demand of Indigenous People and local users that will encourage plantation. Moreover, government staffs and CFUGs' executive committee members should be sensitized and capacitated to strengthen forest sector governance (Figure 14).
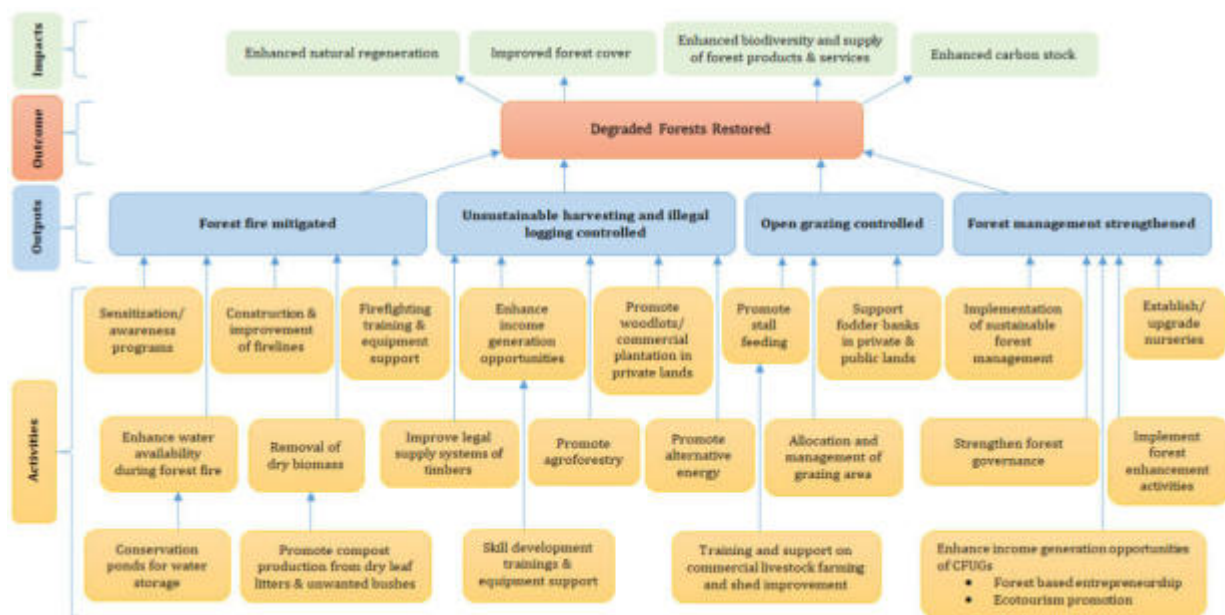
Figure 14: Solution tree for restoration of degraded forests

❖ **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	

❖ **Recommendation from Expert Planning Workshop**
- Provide subsidies in electricity to promote use of electrical stoves.
- Industrial development would be better for the employment generation. Skill development training should be focused on construction works that can guarantee employment opportunities and can be effective in replacing outside workers.
- Riverbank plantations can be effective to avoid riverbank encroachment. Plantation in adjoining land can be cost effective and sustainable than active flood plain.
- It would be effective to enhance cooperation and collaboration with security agency for forest fire management. They should be provided with essential equipment like fire extinguisher, fireproof jackets, water jet spray etc. Security agencies can also provide firefighting training.
- Timber distribution should be decentralized with provision of distribution from sub-division forest offices. It can be effective in reducing demand-supply gaps.
- Promote riverbank and public land plantation for ecotourism promotion and research purposes.
- Address gender inclusive governance which has been the weakness in addressing policy issues and practicing good governance.

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 these 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		
Erosion/landslide	Landslide treatment	Crown protection, drain management, seed broadcasting, check dam etc.
	Construction of check dams and bioengineering for gully/debris torrent treatment	
	Promote agroforestry on marginal land	Plantation of high value/multi-year species and grazing control in erosion prone areas; Conservation oriented agriculture in slopy lands
	Regulate infrastructure development in Chure hillslope	IEE/EIA & detail engineering study and design for road construction
Flood	Riverbank stabilization	Embankments and bioengineering
	Plantation of bamboo and other species along river corridors	
	Regulate riverbed excavation works	Coordination among local government, other associated government agencies and CFUGs; Environment assessment (EIA/IEE) for riverbed excavation
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	Preparation of Risk Sensitive Land Use Plan by local government and implementation
Climate Stress on Agriculture Productivity		
	Establish Farmer Field Schools (FFS) to capacitate farmers	

| Drivers	Activities Against Drivers	
Inadequate capacity and resources	Promote high value agroforestry	Training on horticulture: Aanp (*Mangifera indica*), Litchi (*Litchi chinensis*), Kera (*Musa paradisiaca)*, Katahar (*Artocarpus heterophyllus*), Kagati (*Citrus aurantifolia)*; Support ginger, turmeric farming and processing equipment
	Promote alternative irrigation practices	Training and support drip irrigation, rainwater harvesting, deep boring etc.
	Water source conservation	Maintain greenery around water sources/avoid concretization; Construction of check dams wherever required for water storage and source conservation
	Promote resilient crops for low soil moisture	
	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 pests and diseases	
	Promote conservation of resilient native crops and local livestock breeds	Training and support selection, grading and storage of seeds; Improvement of local livestock breeds and crop varieties for resiliency and higher production
Soil quality degradation	Promote organic farming and Integrated Pest Management (IPM) through FFS	Awareness programs and trainings on IPM and compost, bio-pesticides production; Equipment and technical support to produce compost manure; Promote livestock farming by supporting shed improvement and fodder banks; Support soil quality test
Loss and damage of agricultural lands and crops	Implementation of erosion and flood mitigation measures	Promote agroforestry in marginal lands; Construction of embankments with bioengineering for riverbank stabilization; Construction of check dams for gulley control; Plantation to enhance vegetative cover in erosion prone areas
	Regulate settlement expansion/land plotting in agricultural lands	Policy interventions

Drivers	Activities Against Drivers	
	Plantation of wild fruit species in forests	Plantation of Amala (*Phyllanthus emblica*), Jamun (*Syzygium cumini*), Bar (*Ficus benghalensis*), Peepal (*Ficus religiosa*), Chiuri (*Diploknema butyracea*)etc. in forest to enhance food source for wild animals

❖ **Solution Analysis**

The strategic actions proposed for disaster risk reduction are landslide treatment, erosion control, riverbank stabilization and strengthening disaster risk management. Landslide treatment can be done through crown protection, drain management, seed broadcasting etc. gullies/debris torrent can be treated by constructing check dams. To avoid erosion from human-induced causes like infrastructure development (road constructions) must be regulated. Promoting agroforestry, livestock management and conservation agriculture in slopy lands also help in reducing soil erosion. Plantation of high value species, multi-year plant species like bamboo, Amriso (*Thysanolaena maxima*), fruits not only reduces erosion but also provides the source of income. Riverbank stabilization requires construction of embankments. Bioengineering can be integrated for effectiveness along with structural measures. It also enhances vegetation cover. Riverbed material excavation must be regulated in coordination among local government, other associated government agencies and CFUGs to reduce flood risk. 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 (Figure 15).
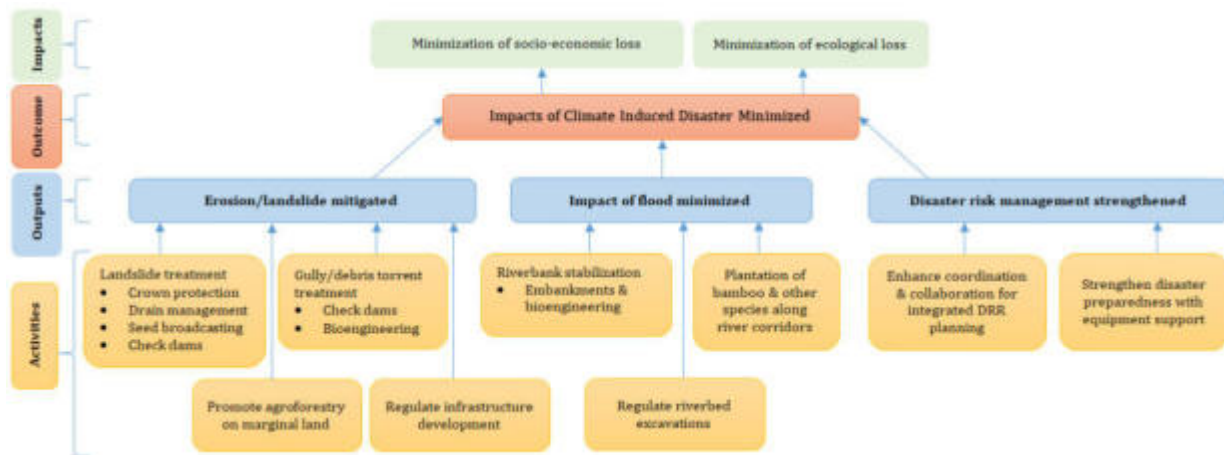
Figure 15: Solution tree for minimizing impacts of climate induced disaster
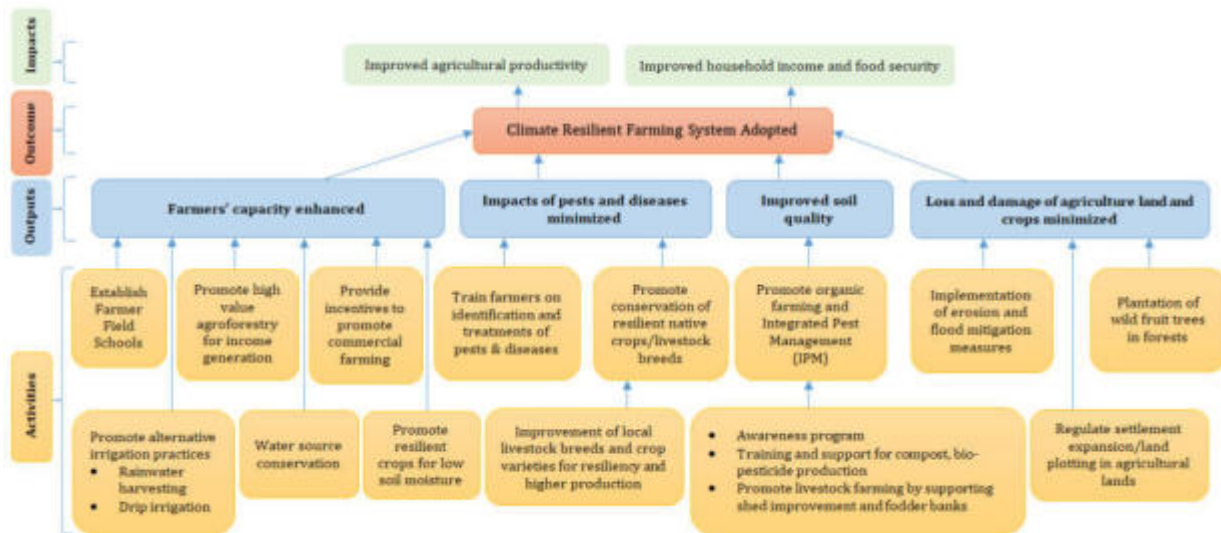
Figure 16: Solution tree for supporting climate resilient farming practices

One of the important aspects of enhancing adaptation/resilience building of ecosystem and local community would be climate resilient farming practices and enhancing agricultural productivity. Increase in agriculture productivity will improve livelihood of small farmers and at the same time, it will decrease forest dependency. To achieve this, foremost priority should be to enhance capacity of farmers. Farmer Field Schools can be the best solution where farmers will be trained on climate resilient farming practices and enhancing agriculture productivity. Training farmers alone would not be sufficient to encourage farmers. Providing seed money, soft loans, subsidies in equipment, production based subsidies, improving irrigation facilities and livestock shed improvement can encourage farmers to commercial farming. High value agroforestry can be promoted to enhance income generation opportunities of farmers. It can provide alternate income and livelihood for women, poor and marginalized. Alternative irrigation practices like rainwater harvesting, drip irrigation can be promoted along with conservation of water sources to improve irrigation facilities. Crops requiring low soil moisture can also be promoted to enhance climate resiliency in dry areas where water source are scarce. 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. 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 like Jamun (*Syzygium cumini*), Amala (*Phyllanthus emblica*), Harro (*Terminalia chebula*), Barro (*Terminalia bellirica*), Chiuri (*Diploknema butyracea*), Bar (*Ficus benghalensis*), Peepal (*Ficus religiosa*) 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).

❖ **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
Implementation of climate-resilient land use practices (pest and disease minimized, soil quality improved, irrigation facility enhanced)	

❖ **Recommendation from Expert Planning Workshop**

- Gullies/debris torrents are prioritized for treatment considering direct impacts on settlement and agriculture.
- Gulley treatment should be focused right from the upstream. Only downstream treatments will not be effective.
- Provide equipment support to security agencies for disaster management.
- Construct sediment trappers in river/torrents with higher sedimentation.
- More focus should be on groundwater recharge through construction of water storage dams, and conservation/recharge ponds.
- Concretization should be avoided in water source conservation. Rather focus should be on greenery improvement.
- Households with unregistered lands can receive government support for agriculture on recommendation from respective ward offices.

4.2.3 Gender Inclusive Action Plan and Process

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

Table 13: Gender issues and gender inclusive actions

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

Key issues	Solution
	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	• 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

Drivers	Activities Against Drivers	
	• 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.	• 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 Table 15.

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

Major activities	Output
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, Dalits, and forest-dependent marginalized communities.

b. Improve and synchronize CFUGs' operational plans in order to improve users' capabilities (women, 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 regions' women and agriculture activities for lowland regions' women
- Minimize women's workloads in the collection of fuelwood: a) by providing cost-effective equipment and techniques, especially in alternative energy uses for cooking); b) by providing fodder seeds and access to woodlots in public and private lands
- Reduce social barriers (social and economic insecurity and lowered education and understanding level) for Dalit, indigenous, 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 trainings 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; Loss and damage of agricultural lands and crops
	Improved climate-resilient land use practices	
IPack 2: Improving/maintaining river system landscape through soil and water conservation	Agroforestry promoted	Erosion/ landslide; Flood; Unsustainable and illegal harvesting; Loss and damage of agricultural lands and crops
	Erosion/landslide controlled and sedimentation managed	
	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	Forest fire; Unsustainable harvesting and illegal logging; Encroachment of forestland
	Forest fire mitigated	
	Income source of poor/marginalized forest users enhanced	
IPack 5: Restoration of river system landscape (within and outside national forest)	Forests and tree cover are restored, enhanced and maintained in the river system landscape	Unsustainable harvesting and illegal logging; Open and uncontrolled grazing; Erosion/ landslide; Flood
IPack 6: Advocacy campaign: Gender-inclusive governance campaign	Increased access of women to SNRM and knowledge and information	Lack of gender integration in SNRM, CCA, and DRR planning and implementation process
	Integrated gender and women's participation in local planning processes in SNRM	

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

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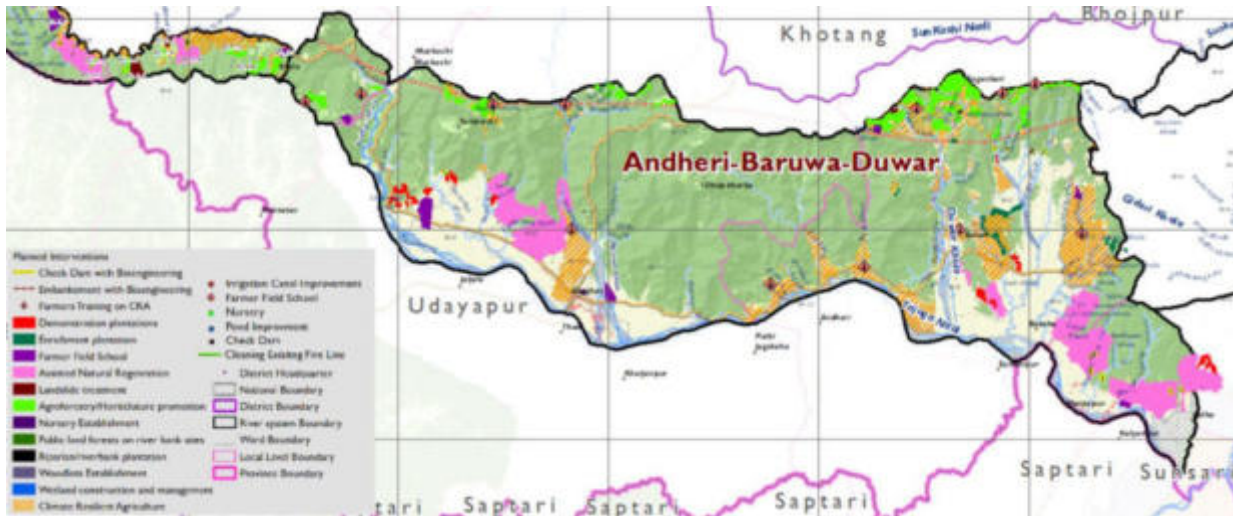
❖ **Strategies and Activities**

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

❖ **Summary of Feasibility Analysis**

Feasibility analysis was used to assess the strengths and weaknesses of the IPacks (Table 19), which can lead to desired results of the CERP. In the feasibility analysis, the risks and obstacles to implementation of each IPacks were assessed, and this provided the basis for assessing the overall feasibility of each IPack. Cost-effectiveness is also a vital criterion in feasibility analysis. The scores obtained through overall feasibility analysis at output levels indicate that all the IPs are reasonably feasible (Table 20). 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 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 • Awareness raising through schools, media and other relevant measures	• 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.		• 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 • 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	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
	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
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

Intervention Packages	Major Activities	Sub-activities
		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 firefighting 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
IPack 5: Restoration of river system landscape (within and outside national forest)	**Restoration, enhancement and maintenance of forests and tree cover in the river system landscape through Public and private forestry**	Establish and support multi-purpose tree nurseries
		Production of saplings
		Establish On-farm tree nursery
		Demonstration plantation
		Riparian/riverbank plantation

Intervention Packages	Major Activities	Sub-activities
		Technical guidance and support to establish woodlots
	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
IPack 6: Advocacy campaign: Gender-inclusive governance campaign	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 607 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

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	Construction of check dams and bioengineering for gully/Debris torrent protection	• Local knowledge and practices missing in the bioengineering for the protection • Influential decision in implementation	• Integrate local knowledge and practices with structural and non-structural (bioengineering) measures • Risk prioritization during mitigation	• At least 12 gullies/debris torrent stabilized with integration of structural & non-structural measures and risk prioritization	• Number of gullies stabilized with local knowledge and practices
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	• 190 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 95 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	• Build transparent selection criteria for CFUGs	• At least 50 % women, 13 % Dalit and 31 % indigenous peoples representatives	• Number of women, Dalits and indigenous

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
		participants from CFUGs)		trained in implementation of climate resilient FOPs	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 95 CFUGs receive equipment support with trained individuals	• Number of CFUGs receiving equipment and its handling support
	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 3 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 30 CFUGs are well equipped with trained firefighting groups	• Number of well-equipped CFUGs with trained firefighting groups

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	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 10 most fire prone CFs are included • At least 10 awareness raising events conducted covering 10 CFUGs	• Number of most fire prone CFs included • Number of awareness raising events
	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 5 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 3 consultation workshops organized	• Number of consultation workshops conducted to select site and species
	Establish On-farm nursery	• Disparity in site and species selection	• Prior consensus with communities for site and species selection	• At least 1 consultation workshops organized	• Number of consultation workshops conducted to select site and species
	Demonstration plantations	• Disparity in species selection	• Consensus among user members	• 139 ha of demonstration plantation with prior consent	• Area of demonstration plantation

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	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					
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 ensure gender responsiveness and women's participation, access, control and leadership	• Change in gender roles not easily accepted posing threats to social norms and values	• Conduct GESI trainings and awareness campaigns and policy reviews to strengthen the GESI initiatives	• 50% men and women know about the GESI policy and integration strategies	• Province and local level policy reviewed

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	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 responsive information, available provisions and resources among	• 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 information and access to resources increased	• Gender responsive information and availability access made easy

Outputs	Activities	Implementation Risk or Obstacle	Risk Reduction Measures	Risk Reduction Targets	Indicators
	CBOs/ women groups				
	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 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
	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	Improved forest cover through enrichment plantation and ANR	2	3	1	3	2	11

Intervention Packages	Outputs	Implementation risks/obstacles L=3/M=2/H=1	Cost effectiveness of risk reduction measures H=3/M=2/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
and rehabilitation of degraded forests	Forest fire mitigated	3	2	2	2	2	11
	Income source of poor/marginalized forest users enhanced	2	3	2	1	3	13
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					
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 16 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	• 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	• Design guideline followed • 100 % construction workers aware about	• Number of structures following the guidelines • Proportion of the construction

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
	gully/Debris torrent protection		the protective gear for the construction related works	the occupational hazards with the protective gear	workers aware on the occupational hazards with the protective gear
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	• 30 trainings to CFUGs	• Number of person trained
IPack 4: Restoration and rehabilitation of degraded forests					

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
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 livelihood of marginal households	• 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
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	• 5 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 3 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 nursery	• Land tenure issues on nursery site	• Consultation meetings	• At least 1 consultation meeting to screen and	• Number of nursery sites screened and

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
		• Limited availability of quality seed of demanded species	• Demand analysis for choice of seedlings species	address the land tenure issues • At least 50% seedlings produced are of native species	land tenure issue addressed • Proportion of native species' seedlings produced
	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					

Outputs	Activities	Social & Environmental risk	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	• 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 ensure gender responsiveness and women's participation, access, control and leadership	• Change in gender roles not easily accepted posing threats to social norms and values	• Conduct GESI trainings and awareness campaigns and policy reviews to strengthen the GESI initiatives	• 50% men and women know about the GESI policy and integration strategies	• Province and local level policy reviewed
	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	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

Outputs	Activities	Social & Environmental risk	Risk reduction measures	Risk reduction targets	Indicators
processes in SNRM	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 responsive information, available provisions and resources among CBOs/ women groups	• 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 information and access to resources increased	• Gender responsive information and availability access made easy
	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	• 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

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[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
	promotion/on-farm conservation				
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 10 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	• 100% CFUGs update FOPs with sensitivity analysis and integrating forest based entrepreneurship development	• Proportions of CFUGs with updated FOPs

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
			• Multi-stakeholder sharing for quality assurance of 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 sustainable forest management	• Support all CFUGs within River System	• 100% CFUGs receive equipment support	• Proportion of CFUGs receiving equipment support
	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

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
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 10 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
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 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	• At least 50% fodder species	• Proportion of fodder species

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
			other high value species including grass • Ownership of plantation area to local community		
	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 knowledge and information	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
	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	• Documentation and publication of gendered	• Sharing and publicity	• One best practice documented	• Number of best practices documented

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
	learning in gendered governance	governance strengthened and institutionalized			
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 resources among CBOs/ women groups	• Gender responsive information making women and marginalized groups empowered	• Awareness raising sessions	• Three events	• Number of events
	Engage male involvement to advocate gender and	• Male roles changing and supportive for women empowerment	• Continues encouragement of male change agent to promote gender	• Two events	• Number of events

Outputs	Activities	Benefits	Benefit enhancement measures	Benefit enhancement targets	Indicators
	women's issues and concern in campaign				

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	6	700,000	4,200,000
Capacity-building in the use of weather information and its application in agricultural practices	No	2	100,000	200,000
Implement climate resilient agriculture practices	ha	3,400.61	2,000	6,801,212.13
Train and support farmers to adopt and apply climate-resilient land use practices	Events	12	450,000	5,400,000
Total Budget for IPack 1 (NRs)				**16,601,212.13**
IPack 2: Improving/maintaining river system landscape through soil and water conservation				
Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation	ha	607	6,000	3,642,000
Landslide treatment	No	3		7,000,000
Construction of check dams and bioengineering for gully/Debris torrent protection	Gulley/Debris torrent	12	LS	24,000,000
Construction of embankment with bioengineering	m	190	30,000	5,700,000

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
Strengthening climate and disaster risk reduction mechanism in collaboration with local government	Municipality/ Rural municipality	2	300,000	600,000
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)				**41,942,000**
IPack 3: Capacity enhancement for sustainable forest management				
Review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	No	95	200,000	19,000,000
Training and capacity development for implementation of FOPs	No	95	250,000	23,750,000
Equipment support for implementation of FOPs	No	95	200,000	19,000,000
Capacitate government staffs and CBOs on climate resilient forest management (TOF)	Event	3	300,000	900,000
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)				**65,050,000**
IPack 4: Restoration and rehabilitation of degraded forests				
Enrichment plantation	ha	85	50,000	4,250,000
Implement Assisted Natural Regeneration	ha	546	20,000	11,280,000
Firefighter training and support firefighting equipment to CFUGs	CFUG	30	300,000	9,000,000

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
Support firefighting equipment to security institution (APF, Nepal Police, Nepal Army)	Sets	10	150,000	1,500,000
Training and equipment support to promote compost production from bushes and leaf litters	CFUG	10	150,000	1,500,000
Construction and improvement of fire lines	Km	5	300,000	1,500,000
Customize fire alert system in Community Based Forest Management (CBFM)	No	1	LS	300,000
Skill development trainings and equipment support	Household	200	25,000	5,000,000
Total Budget for IPack 4 (NRs)				**34,330,000**
IPack 5: Restoration of river system landscape (within and outside national forest)				
Establish and support multi-purpose tree nurseries	No	3		2,000,000
Production of saplings	No	250,000	40	10,000,000
Establish On-farm tree nursery	No	1	600,000	600,000
Demonstration plantation	ha	139	500,000	69,500,000
Riparian/Riverbank plantation	ha	290	600,000	174,120,000
Technical guidance and support to establish woodlots	ha	100	250,000	25,000,000
Total Budget for IPack 5 (NRs)				**281,220,000**
IPack 6: Advocacy campaign: Gender-inclusive governance campaign				
Create informal learning and sharing platforms for grassroots-level women	Event	5	50,000	250,000

Sub-activities	Unit	Quantity	Unit Cost	Budget (NPR)
Conduct local level policy discourses to ensure gender responsiveness and women's participation, access, control and leadership	Event	1	50,000	50,000
Produce and publish best practices and learning in gendered governance	Event	1	50,000	50,000
Conduct rapid assessment on women's contribution and involvement in SNRM	Event	1	100,000	100,000
Provide gender mainstreaming trainings/ workshops to local government and CBOs	Event	1	100,000	100,000
Conduct GESI focused social audits and public hearing	Event	2	150,000	300,000
Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	Meeting	3	50,000	150,000
Engage male involvement to advocate gender and women's issues and concern in campaign	Event	2	50,000	100,000
Total Budget for IPack 6 (NRs)				**1,100,000**
Grand Total Budget (NRs)				**440,243,212.13**

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	Means of verification	Baseline	Target	Assumption
Output 1: Restored degraded forests area halting forest fire, illegal harvesting and grazing	Area (in ha.) of natural forest restored through ANR	PMU and PPMU reports Project progress report	0	546 ha of natural forest restored through ANR and enrichment plantation	CBOs adopt climate resilient land use practices During baseline, deforested forest area is about 4.85 ha. between 200 and 2019; hence 0% deforestation rate
	Area (ha) of new plantation within national forests (enrichment and barren land plantation)	PMU and PPMU reports Project progress report	0	Area: 85 ha. Survival rate: 80%	Promotion of same species in enrichment plantation
Output 2: Improved natural Forest management and increased forest area outside the forest	Xx ha of forest area under xx no of forest user groups under implementation through updated forest management plan	PMU and PPMU reports Project progress report	0	32830 ha. area managed by 95 groups	Updated forest management plan adopt Climate change and sustainable natural resource management considerations Among 95 CFUGs, 87 are active and 7 are inactive (CBO profile report 2022)
	Area (ha) of new plantation outside forest area; and their survival rate (public land forestry and private forestry)	PMU and PPMU reports Project progress report	0	Area: 529 ha. Survival rate: 80%	Local government supported and owned public land and private forestry initiatives under their own jurisdiction

Results	Indicator	Means of verification	Baseline	Target	Assumption
Output 3: Minimized Impacts of climate induced disasters (erosion, landslides/ sedimentation and flooding)	Volume of sedimentation (Cubic meter of soil volume per unit area): NA	PMU and PPMU reports Project progress report	25% in comparison to before constructing structures	In-person assessments at lower gabions	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 system	FFS record PPMU Report	0 ha	3,400.61 ha	
	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	Assessment report		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	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/ CRLUP and management	% of women in leadership positions of CBO's executive committee	DFO/PPMU/Group records	Out of 1001leadership position in CFUGs, 467 (46.7%) are women	At least 50% women in leadership position	Proportional representation of all social groups ensured
	Access of women in Natural resources management, CRLUP, knowledge and information	Group record/PPMU records	0	At least 50% women participation in all events	Proportional representation of all social groups ensured

Results	Indicator	Means of verification	Baseline	Target	Assumption
	Integrate gender in local planning processes in NRM/ CRLUP and management	PPMU/DFO/Group records	0	95 Gender sensitive forest management operational plan of forestry user groups	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 Adheri-Baruwa-Dwar Critical Ecosystem Restoration Plan

Vision: Climate resilient and sustainably managed Natural Resources and local communities in Adheri-Baruwa-Dwar River system

Result Framework

Expected Results	Objectively verifiable Indicator	Means of verification	Baseline	Target	Assumptions
Impacts and Outcomes					
GCF core indicator (Mitigation) *GCF results M4; A4 and M9.*	Tonnes of carbon dioxide equivalent (tCO₂eq) 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) GCF indicators M4.1, A4.1 and M9.0 covered by proxi-indicator 2 to 5.	PPMUs/PMU report GCF/BRCRN GHG mitigation calculation tool-based calculation sheet	**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: 22830 ha Plantation area: 614 ha ANR: 466.2 ha Climate Resilient Agriculture: 3,400.61 ha	Total natural forest area in this river system is 27194.6 ha including 26728.4 ha forest and 466.2 ha other wooded land (Baseline survey report 2022) Out of 27194.6 ha, 95 forestry user groups are managing 22830 ha forest area (CBO profile report 2022) CERP land use data shows changes in forest area between 2000 and 2019 is -4.85 ha. Hence, 0% deforestation rate.
GCF core indicator (Adaptation)	Total number of direct and indirect beneficiaries (gender disaggregated)	PPMUs and PMU reports	Direct: Male: 0 Female: 0	Direct: Male: 48926 Female: 49,413	22865 households involved as members of 95 forestry user groups with 98339

Expected Results	Objectively verifiable Indicator	Means of verification	Baseline	Target	Assumptions
GCF result A8.0			Indirect: Male: Female: 0	Indirect: Male: Female:	population (CBO profile 2022) (GCF A8.0 indicator covered if considered direct beneficiaries only)
Outputs					
Output 1: Restored degraded forests area halting forest fire, illegal harvesting and grazing	Area (in ha.) of natural forest restored through ANR	PMU and PPMU reports Project progress report	0	546 ha of natural forest restored through ANR and enrichment plantation	CBOs adopt climate resilient land use practices During baseline, deforested forest area is about 4.85 ha. between 200 and 2019; hence 0% deforestation rate
	Area (ha) of new plantation within national forests (enrichment and barren land plantation)	PMU and PPMU reports Project progress report	0	Area: 85 ha. Survival rate: 80%	Promotion of same species in enrichment plantation
Output 2: Improved natural Forest management and increased forest area outside the forest	Xx ha of forest area under xx no of forest user groups under implementation through updated forest management plan	PMU and PPMU reports Project progress report	0	32830 ha. area managed by 95 groups	Updated forest management plan adopt Climate change and sustainable natural resource management considerations Among 95 CFUGs, 87 are active and 7 are inactive (CBO profile report 2022)
	Area (ha) of new plantation outside forest area; and their survival rate (public land forestry and private forestry)	PMU and PPMU reports Project progress report	0	Area: 529 ha. Survival rate: 80%	Local government supported and owned public land and private forestry initiatives under their own jurisdiction

Expected Results	Objectively verifiable Indicator	Means of verification	Baseline	Target	Assumptions
Output 3: Minimized Impacts of climate induced disasters (erosion, landslides/ sedimentation and flooding)	Volume of sedimentation (Cubic meter of soil volume per unit area): NA	PMU and PPMU reports Project progress report	25% in comparison to before constructing structures	In-person assessments at lower gabions	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 system	FFS record PPMU Report	0 ha	3,400.61 ha	
	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	Assessment report		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	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/ CRLUP and management	% of women in leadership positions of CBO's executive committee	DFO/PPMU/Group records	Out of 1001 leadership positions in 98 CFUGs, 467 (46.7%) are women	At least 50% women in leadership position	Proportional representation of all social groups ensured

Expected Results	Objectively verifiable Indicator	Means of verification	Baseline	Target	Assumptions
	Access of women in Natural resources management, CRLUP, knowledge and information	Group record/PPMU records	0	At least 50% women participation in all events	Proportional representation of all social groups ensured
	Integrate gender in local planning processes in NRM/ CRLUP and management	PPMU/DFO/Group records	0	95 Gender sensitive forest management operational plan of forestry user groups	Gender dimensions ensured in climate resilient plan including forest management operational plan of groups This river system has 95 CFUGs and 8 LHFGs.

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 30 CFUGs of most fire prone community forests supported with firefighting equipment About 5 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 95 forest operational plans developed and/or strengthened. Approximately 3 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 631 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	3 multi-purpose nurseries established 139 ha of demonstration plantation established 290 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 12 gully/debris torrents mostly in Churia hills
3.2 Minimization of negative impact of Flood	Construct local structures, as well as bioengineering that will reduce community vulnerability to flooding	3.2.1 Construction of embankments with bioengineering	Establish relevant structures and practices for riverbank stabilization
3.3 Strengthening disaster risk management and awareness creation on climate resilient NRM	Improving disaster risk management in collaboration with local government and capacity strengthening for disaster risk reduction, as well as awareness creation for climate resilient natural resource management	3.3.1 Strengthening climate and disaster risk reduction mechanism in collaboration with local government 3.3.2 Training/capacity building on soil and watershed conservation using bio-engineering 3.3.3 Climate resilient awareness campaign through Eco-clubs	5 days training for Government staffs/CBFMG/Farmer groups on soil and watershed conservation using bio-engineering Student-run eco-clubs established
Output 4: Farmers adopted Climate resilient farming practices			

Activities	Description	Sub-activities	Remarks/Deliverables
4.1 Establish and operationalize Farmers field schools (FFS)	Establish training sites on which farmers can be trained on climate resilient farming practices during and after the project.	4.1.1 Operationalize Farmer's Field Schools on adopting climate resilient land use practices 4.1.2 Capacity-building in the use of weather information and its application in agricultural practices	6 FFS established and operational
4.2 Implementation of climate-resilient land use practices (pest and disease minimized, soil quality improved, irrigation facility enhanced)	Support and strengthen farmers' capacities to adopt/apply climate-resilient farming practices in their own fields.	4.2.1 Implement climate resilient agriculture practices (including pest and disease control, soil quality improvement, irrigation facility enhancement) 4.2.2 Train and support farmers to adopt and apply climate-resilient land use practices	Climate-resilient land use practices adopted/applied in 3,400.61 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 607 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 management and climate resilient land use practices	5.2.1 Conduct rapid assessment on women's contribution and involvement in SNRM 5.2.2 Provide gender mainstreaming trainings/ workshops to local government and CBOs and concerned stakeholders 5.2.3 Conduct GESI focused social audits and public hearing 5.2.4 Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	GESI integration ensured in in local planning processes for natural resource management and climate resilient land use practices

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

Annex-2: List of Participants

A. Problem and Solution Analysis Workshop at Beltar

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
1	Chok Bahadur Tamang	Chaudandigadhi-8	Baghkhor Devithan CFUG	Chairman	9817731327
2	Gobinda Kumar Ojha	Chaudandigadhi-8	Salghari CFUG	Vice Chairman	9742847527
3	Mohan Kumar Karki	Chaudandigadhi-6	Anpkhahare CFUG	Member	9811710595
4	Bedana B.K.	Chaudandigadhi-6	Anpkhahare CFUG	Member	9811751035
5	Padam Bahadur Tamang	Chaudandigadhi-7	Basanta Panchami CFUG	Member	9811770838
6	Yambi Pulami Magar	Chaudandigadhi-8	Tinbhaiya CFUG	Member	9843946785
7	Dik Bahadur Rana Magar	Chaudandigadhi-8	Tinbhaiya CFUG	Secretary	
8	Narayan Thapa	Chaudandigadhi-1	Himchuli CFUG	Chairman	9862969692
9	Phulmaya Tamang	Chaudandigadhi-1	Lamakhola CFUG	Joint Secretary	9844436508
10	Janak Man Tamang	Chaudandigadhi-1	Lamakhola CFUG	Chairman	9864694196
11	Dipak Tamang	Chaudandigadhi-3	Deurali CFUG	Chairman	9818139005
12	Tara Devi Baral	Chaudandigadhi-8	Baghkhor Devithan CFUG	Treasurer	9816777070
13	Dambar Kumari Khadka (Parajuli)	Chaudandigadhi-7	Basanta Panchami CFUG	Member	9807072266
14	Gobinda Shrestha	Chaudandigadhi-3	Devikhola CFUG	Chairman	9814702255
15	Bal Kumari Rai	Chaudandigadhi-3	Devikhola CFUG	Member	9805913250
16	Saraswoti Rai	Chaudandigadhi-3	Deurali CFUG	Secretary	9819986346
17	Rewati Thapa Magar	Chaudandigadhi-3	Tinbhaiya CFUG	Treasurer	9861721719
18	Menuka Rai	Chaudandigadhi-3	Devikhola CFUG	Secretary	9862891722
19	Shanta Rai	Chaudandigadhi-1	Himchuli CFUG	Secretary	9843466026
20	Laxmi Rawat	Chaudandigadhi-8	Basanta Panchami CFUG	Member	
21	Susila Rai	Chaudandigadhi-1	Chandeshwori CFUG	Treasurer	9842955755
22	Chandra Bahadur Tamang	Chaudandigadhi-1	Chandeshwori CFUG	Chairman	9863875213
23	Sabita Tamang Magar	Chaudandigadhi-8	Sayapatri CFUG	Member	9742548602
24	Dipak Tamang	Chaudandigadhi-8	Sayapatri CFUG	Chairman	
25	Shailendra Jha	Chaudandigadhi-7	Beltar Sub-Division Forest Office	Forest Guard	9842851621

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
26	Ambika Rawat	Chaudandigadhi-7	Beltar Sub-Division Forest Office	Forest Guard	9829767487
27	Nirmal Rai	Chaudandigadhi-7	Basanta Panchami CFUG	Member	9823811153
28	Dil Kumari Rai	Chaudandigadhi-1	Chandeshwori CFUG	Member	
29	Man Bahadur Magar	Chaudandigadhi-8	Sayapatri CFUG	Member	

Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Chok Bahadur Tamang	1		1						
2	Gobinda Kumar Ojha	1				1				
3	Mohan Kumar Karki	1					1			
4	Bedana B.K.		1		1					
5	Padam Bahadur Tamang	1		1						
6	Yambi Pulami Magar		1	1						
7	Dik Bahadur Rana Magar	1		1						
8	Narayan Thapa	1		1						
9	Phulmaya Tamang		1	1						
10	Janak Man Tamang	1		1						
11	Dipak Tamang	1		1						
12	Tara Devi Baral		1				1			
13	Dambar Kumari Khadka (Parajuli)		1				1			
14	Gobinda Shrestha	1		1						
15	Bal Kumari Rai		1	1						
16	Saraswoti Rai		1	1						
17	Rewati Thapa Magar		1	1						
18	Menuka Rai		1	1						
19	Shanta Rai		1	1						

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
20	Laxmi Rawat		1				1			
21	Susila Rai		1	1						
22	Chandra Bahadur Tamang	1		1						
23	Sabita Tamang Magar		1	1						
24	Dipak Tamang	1		1						
25	Shailendra Jha	1							1	
26	Ambika Rawat		1				1			
27	Nirmal Rai	1		1						
28	Dil Kumari Rai		1	1						
29	Man Bahadur Magar	1		1						
Total		14	15	21	1	1	5	0	1	0

B. Problem and Solution Analysis Workshop at Gaighat

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
1	Tek Bahadur Basnet	Triyuga-7	Raktamala CFUG	Chairman	9812722414
2	Abhimanyu Khadka	Triyuga-10	Babari CFUG	Chairman	9808690202
3	Gita Danuwar	Triyuga-13	Bahedawa CFUG	Secretary	9862816514
4	Mina Kumari Parajuli	Triyuga-7	Raktamala CFUG	Secretary	
5	Radhika Niraula	Triyuga-7	Gunte Chuhade CFUG	Secretary	9819797818
6	Makar Bahadur Pulami	Udayapurgadhi Rural Municipality-7	Manakamana CFUG	Chairman	9826705843
7	Kumar Rana Magar	Udayapurgadhi Rural Municipality-7	Manakamana CFUG	Secretary	9808518727
8	Bhim Bahadur Basnet	Udayapurgadhi Rural Municipality-7	Bishwokanchan CFUG	Chairman	9814769669
9	Keshav Adhikari	Udayapurgadhi Rural Municipality-7	Bishwokanchan CFUG	Secretary	9823262258
10	Bir Bahadur Danuwar	Triyuga-7	Gunte Chuhade CFUG	Chairman	9747433915
11	Mira Rai	Triyuga-8	Panchakanya CFUG	Member	9818600815
12	Dhurva Kumar Basnet	Triyuga-9	Panchakanya CFUG	Member	9862913279
13	Ghaman Singh Magar	Triyuga-14	Saune CFUG	Treasurer	9825730720

S. N.	Name of Participants	Address	Institution	Designation	Contact No.
14	Rita Kumari Magar	Triyuga-14	Saune CFUG	Secretary	9741896103
15	Rajan Prasad BhatTerai	Triyuga-8	Bageshwori CFUG	Chairman	9842879696
16	Ram Kumar Chaudhary	Triyuga-13	Bahedawa CFUG	Chairman	9842917370

Disaggregated Participants Data

S. N.	Name of Participants	Gender		Ethnicity						
		Male	Female	Janajati	Dalit	Brahmin	Chhettri	Dasnami	Madhesi	Muslim
1	Tek Bahadur Basnet	1					1			
2	Abhimanyu Khadka	1					1			
3	Gita Danuwar		1	1						
4	Mina Kumari Parajuli		1			1				
5	Radhika Niraula		1			1				
6	Makar Bahadur Pulami	1		1						
7	Kumar Rana Magar	1		1						
8	Bhim Bahadur Basnet	1					1			
9	Keshav Adhikari	1				1				
10	Bir Bahadur Danuwar	1		1						
11	Mira Rai		1	1						
12	Dhurva Kumar Basnet	1					1			
13	Ghaman Singh Magar	1		1						
14	Rita Kumari Magar		1	1						
15	Rajan Prasad BhatTerai	1				1				
16	Ram Kumar Chaudhary	1		1						
Total		11	5	8	0	4	4	0	0	0

C. Expert Planning Workshop

River Systems	Tawa South, Adheri-Baruwa-Dwar, Gidari and Sunkoshi
Date of Workshop	August 21 - 22, 2022
Venue	Hotel Kohbar
Location	Gaighat, Udayapur

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
1	Ambika Pd. Poudel	DFO Gaighat, Udayapur	DFO	9852835134	ambikapoudel12@gmail.com
2	Raj Kumar Gupta	PCTMCD, Salakpur, Morang	Unit Head	9852077936	rajgupta2003@gmail.com
3	Umesh Budhathoki	PPMU, BRCRN	Assistant Soil Conservation Officer	9857085564	umesh.budhathoki@gmail.com
4	Dilip Prasad Gupta	Province Forest Directorate	Assistant Forest Officer	9842552666	pradeshforest@gmail.com
5	Kashi Narayan Chaudhari	DFO, Triveni	AFO	9864226567	kashichaudhari@gmail.com
6	Ram Singh Chaudhari	SDFO, Sunpur	Forest Guard	9842450556	
7	Binod Kumar Shah	SDFO, Tapeswari	AFO	9842050118	binodshah566@gmail.com
8	Bindeswar Shah	SDFO, Katari	Forest officer	9848117063	sahbindeswar21@gmail.com
9	Raj Kishor Mandal	MoFESC, Biratnagar	ASCO	9842635267	rkm2022@gmail.com
10	Ram Bhagat Yadav	SDFO, Swanku	AFO	9842825218	ramvagaty7@gmail.com
11	Dev Chandra Girte	SDFO, Nepaltar	AFO	9846055012	dev3760@gmail.com
12	Dharm Dev Thakur	SDFO, Rampur	AFO	9844671151	dharmadev35@gmail.com
13	Sanni Kumar Jha	SDFO, Mainamaini	AFO	9841249173	jha.sunnykumar1@gmail.com
14	Arvind Pandey	DFO, Udaypur, Triveni	AFO	9842096201	arvindpanday56568@gmail.com
15	Kamala Lpo	BMC, Koshi	ASCO	9846717055	kamala401@gmail.com
16	Kamala Shrestha	DFO, Gaighat	Forest Ranger	9842837606	
17	Ajay Chandra Subedi	SWMO, Okhaladhunga	ASCO	9855063076	ajay.subedi02@gmail.com
18	Ram Krishna Rajthala	BMC, Koshi	Senior Watershed Management Officer	9852835204	rkrajthala3a@gmail.com
19	Sushil Bhandari	PPMU, BRCRN-Itahari	Project Coordinator	9852074085	sbhandari7@gmail.com
20	Anu BC	AKC, Gaighat, Udaypur	Agriculture Officer	9842065006	sanub2004@gmail.com
21	Bijay Kumar Yadav	SDFO, Beltar	AFO	9849391436	bijay00yadav00@gmail.com
22	Raj Kumar Shrestha	DFO, Udaypur	AFO	9849148020	rajshrestha10@gmail.com
23	Narayan Shrestha	FAO-TA KTM	NIPS	9851040880	narayan.shrestha@fao.org

S. N.	Name of Participants	Institution	Designation	Contact No.	Email
24	Dron Kumari Rai	Triyuga-4 Udaypur	Hemwanti Nepal	9842869064	rai.drona123@gmail.com
25	Punya Prasad Paudel	DFO, Udaypur	Ranger	9852837222	punyapaudel28@gmail.com

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 (NRs)	Location	Lat.	Long.	Activity Code	Local Government
Identification and operationalization of FFS								A1.1	
FFS at Tinkune Krishi Samuha	No	1	700,000	700,000	Bharleni	86.9406	26.83	A1.1.1	Chaudandigadhi M-3
FFS for Bagkhor Devithan CF	No	1	700,000	700,000	Darula	86.8454	26.86	A1.1.2	Chaudandigadhi M-8
FFS for Bhalmanti CF	No	1	700,000	700,000	Bhalmanti	86.9609	26.74	A1.1.3	Belaka M-1
FFS at Atmanirbhar Krishi Samuha	No	1	700,000	700,000	Chuhade	86.6286	26.829	A1.1.4	Triyuga M-7& 8
FFS for Manakamana CF	No	1	700,000	700,000	Jarayotar/Ramite	86.5917	26.869	A1.1.5	Udayapurgadhi RM-7
FFS at Asari-Bhusune	No	1	700,000	700,000	Asari-Bhusune	86.7156	26.792	A1.1.6	Triyuga M-13
Capacity-building in the use of weather information and its	No	2	100,000	200,000				A1.1.7	

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
application in agricultural practices									
	ha	156.02	2,000	312,043	Chaudandigadhi M-1	86.9159	26.855	A1.2.1	Chaudandigadhi M-1
	ha	785.79	2,000	1,571,577	Chaudandigadhi M-3	86.9453	26.816	A1.2.2	Chaudandigadhi M-3
	ha	523.41	2,000	1,046,811	Chaudandigadhi M-7	86.8947	26.812	A1.2.3	Chaudandigadhi M-7
	ha	693.28	2,000	1,386,551	Chaudandigadhi M-8	86.869	26.857	A1.2.4	Chaudandigadhi M-8
Implement climate resilient agriculture practices	ha	396.92	2,000	793,832	Chaudandigadhi M-9	86.854	26.794	A1.2.5	Chaudandigadhi M-9
	ha	324.22	2,000	648,431	Chaudandigadhi M-10	86.8057	26.799	A1.2.6	Chaudandigadhi M-10
	ha	339.77	2,000	679,539	Triyuga M-10	86.6974	26.808	A1.2.7	Triyuga M-10
	ha	181.21	2,000	362,429	Triyuga M-16	86.6701	26.867	A1.2.8	Triyuga M-16
	Event	1	450,000	450,000	Gadanta (Himchuli CF)	86.9054	26.874	A1.3.1	Chaudandigadhi M-1
	Event	1	450,000	450,000	Balpipal gaun	86.9215	26.878	A1.3.2	Chaudandigadhi M-1
Train and support farmers to adopt and apply climate-resilient land use practices	Event	1	450,000	450,000	Khairahajhora	86.7928	26.795	A1.3.3	Chaudandigadhi M-10
	Event	1	450,000	450,000	Amsal	86.9422	26.813	A1.3.4	Chaudandigadhi M-3
	Event	1	450,000	450,000	Belatar (Awatarethan Mahila Krishi Samuha)	86.8839	26.816	A1.3.5	Chaudandigadhi M-7

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
	Event	1	450,000	450,000	Apraha-Dhaka	86.8646	26.868	A1.3.6	Chaudandigadhi M-8
	Event	1	450,000	450,000	Bhimatol/Khoriyatol	86.8375	26.801	A1.3.7	Chaudandigadhi M-9
	Event	1	450,000	450,000	Babari Karamganchi (Babri CF)	86.6979	26.82	A1.3.8	Triyuga M-10
	Event	1	450,000	450,000	Jantechaur	86.6962	26.873	A1.3.9	Triyuga M-16
	Event	1	450,000	450,000	Dhauri	86.6618	26.874	A1.3.10	Triyuga M-16
	Event	1	450,000	450,000	Batase (Panchakanya CF)	86.5721	26.877	A1.3.11	Udayapurgadhi RM-7
	Event	1	450,000	450,000	Adheri	86.5985	26.88	A1.3.12	Udayapurgadhi RM-7
Promote agroforestry with multiyear cropping/horticulture promotion/on-farm conservation								A2.1	
	ha	70	6,000	420,000	Darula-Masdanda	86.851	26.864	A2.1.1	Chaudandigadhi M-8
	ha	20	6,000	120,000	Kholetar	86.6427	26.878	A2.1.2	Triyuga M-16
	ha	35	6,000	210,000	Batase-Adheri-Nangrange	86.5777	26.878	A2.1.3	Udayapurgadhi RM-7
	ha	10	6,000	60,000	Masane	86.6067	26.882	A2.1.4	Udayapurgadhi RM-7
	ha	45	6,000	270,000	Dhauri	86.6572	26.873	A2.1.5	Triyuga M-16
	ha	40	6,000	240,000	Tantaribote	86.7196	26.878	A2.1.6	Triyuga M-14 & 15

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
	ha	10	6,000	60,000	Bardanda	86.7349	26.879	A2.1.7	Triyuga M-14
	ha	15	6,000	90,000	Kadame	86.7442	26.873	A2.1.8	Triyuga M-14
	ha	20	6,000	120,000	Bhalumara aahale CF	86.9345	26.877	A2.1.9	Chaudandigadhi M-1
	ha	22	6,000	132,000	Himchuli CF	86.9118	26.874	A2.1.10	Chaudandigadhi M-1
	ha	15	6,000	90,000	Himchuli CF	86.9027	26.857	A2.1.11	Chaudandigadhi M-1
	ha	30	6,000	180,000	Lamakhola CF	86.9158	26.863	A2.1.12	Chaudandigadhi M-1
	ha	135	6,000	810,000	Sugachari-Dharapani-Dahar-Lungitar	86.8864	26.876	A2.1.13	Chaudandigadhi M-8
	ha	75	6,000	450,000	Kadamtang-Kusumrang	86.8778	26.87	A2.1.14	Chaudandigadhi M-8
	ha	30	6,000	180,000	Pidibas	86.8755	26.861	A2.1.15	Chaudandigadhi M-8
	ha	35	6,000	210,000	Dhaka-Aprana	86.8625	26.873	A2.1.16	Chaudandigadhi M-8
								A2.2	
Landslide treatment	No	1	3,000,000	3,000,000	Masdanda	86.8539	26.868	A2.2.1	Chaudandigadhi M-8
	No	1	2,000,000	2,000,000	Chuniya chitra CF	86.9191	26.849	A2.2.2	Chaudandigadhi M-2
	No	1	2,000,000	2,000,000	Kusumrang	86.8851	26.867	A2.2.3	Chaudandigadhi M-8

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
Construction of check dams and bio-fencing for gully/Debris torrent protection	No	2	LS	2,000,000	Bagaha Khola (Aam CF)	86.9445	26.761	A2.3.1	Belaka M-1
	No	3	LS	2,000,000	Bagaha Khola (Aam CF)	86.9467	26.761	A2.3.2	Belaka M-1
	No	1	LS	2,000,000	Amarjoti CF	86.9886	26.745	A2.3.3	Belaka M-2
	No	3	LS	2,000,000	Belaka Janasakti CF	86.983	26.745	A2.3.4	Belaka M-1
	No	4	LS	2,000,000	Bagaha Khola	86.9504	26.752	A2.3.5	Belaka M-1
	No	4	LS	2,000,000	Bagaha Khola	86.9449	26.754	A2.3.6	Belaka M-1
	No	2	LS	2,000,000	Raktamala CF	86.6591	26.842	A2.3.7	Triyuga M-8
	No	1	LS	2,000,000	Bageswori khat CF	86.6376	26.846	A2.3.8	Triyuga M-7
	No	1	LS	2,000,000	Bageswori khat CF	86.6394	26.845	A2.3.9	Triyuga M-7
	No	2	LS	2,000,000	Madibas Khola	86.9014	26.851	A2.3.10	Chaudandigadhi M-1
	No	2	LS	2,000,000	Barahibar Khola	86.9072	26.85	A2.3.11	Chaudandigadhi M-1
	No	4	LS	2,000,000	Chuniya Khola	86.9251	26.849	A2.3.12	Chaudandigadhi M-2
Construction of embankment & Bio-engineering	m	90	30,000	2,700,000	Bhararjor Khola	86.7529	26.787	A2.4.1	Triyuga M-13
	m	100	30,000	3,000,000	Devijor Khola	86.8167	26.806	A2.4.2	Chaudandigadhi M-10

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
Strengthening climate and disaster risk reduction mechanism in collaboration with local government	Municipality/ Rural municipality	2	300,000	600,000				A2.5.1	Triyuga, Chaudandigadhi
Training/capacity building on soil and watershed conservation using bio-engineering	Event	1	500,000	500,000				A2.5.2	
Climate resilient awareness campaign through Eco-clubs	School	10	50,000	500,000				A2.5.3	
Support review/upgrade/renew of forest operational plans (FOPs) of community forest user groups (CFUGs)	No	95	200,000	19,000,000	Starting from Community Based Forest Management Groups (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	95	250,000	23,750,000				M3.2	
Equipment support for implementation of FOPs	No	95	200,000	19,000,000				M3.3	
Capacitate government staffs and CBOs on climate resilient forest management (Training of Facilitators- ToF)	Event	3	300,000	900,000				M3.4	
Governance training to government staffs and CFUGs to enhance accountability and transparency	Event	10	240,000	2,400,000				M3.5	
Enrichment plantation	ha	16	50,000	800,000	Deurali Basaha CF	86.9569	26.808	M4.1.1	Chaudandigadhi M-3 & Belaka M-5
	ha	27	50,000	1,350,000	Bhulke baithar CF	86.8999	26.813	M4.1.2	Chaudandigadhi M-7

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
	ha	35	50,000	1,750,000	Saguri gaubesi CF	86.9061	26.824	M4.1.3	Chaudandigadhi M-2 & 7
	ha	4	50,000	200,000	Salghari CF	86.8818	26.854	M4.1.4	Chaudandigadhi M-8
	ha	3	50,000	150,000	Basnta Panchami CF	86.8543	26.833	M4.1.5	Chaudandigadhi M-8
	ha	14	20,000	280,000	Sahikhola CF	86.6643	26.839	M4.2.1	Triyuga M-8 & 9
	ha	17	20,000	340,000	Babari CF	86.6944	26.83	M4.2.2	Triyuga M-9& 11
	ha	26	20,000	520,000	Panchakanya CF	86.6704	26.828	M4.2.3	Triyuga M-9
	ha	12	20,000	240,000	Sirjana CF	86.6816	26.814	M4.2.4	Triyuga M-9
	ha	19	20,000	380,000	Deurali TM	86.6764	26.818	M4.2.5	Triyuga M-9
Implement Assisted Natural Regeneration	ha	42	20,000	840,000	Ratmate CF	86.6882	26.818	M4.2.6	Triyuga M-9
	ha	11	20,000	700,000	Kalibhangeni CF	86.9415	26.783	M4.2.7	Chaudandigadhi M-4
	ha	35	20,000	960,000	Basahathan	86.9367	26.774	M4.2.8	Chaudandigadhi M-4
	ha	48	20,000	680,000	Aam CF	86.9467	26.761	M4.2.9	Belaka M-1
	ha	34	20,000	940,000	Bulbule bhamara CF	86.9607	26.746	M4.2.10	Belaka M-1
	ha	47	20,000	1,200,000	Amarjoti CF	86.9956	26.753	M4.2.11	Belaka M-2

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
	ha	60	20,000	300,000	Beleka Janasakti CF	86.9792	26.745	M4.2.12	Belaka M-1
	ha	15	20,000	580,000	Belaka Namuna CF	86.9384	26.767	M4.2.13	Belaka M-1
	ha	29	20,000	580,000	Katunje CF	86.8906	26.792	M4.2.14	Chaudandigadhi M-6
	ha	78	20,000	1,560,000	Jankalyan CF	86.8996	26.787	M4.2.15	Chaudandigadhi M-2
	ha	31	20,000	620,000	Thanpokhari cf	86.868	26.789	M5.4.16	
	ha	9	20,000	180,000	Raktamala devi cf	86.9129	26.823	M5.4.17	
	ha	11	20,000	220,000	Sunder Blt cf	86.9053	26.848	M5.4.18	
	ha	8	20,000	160,000	Bhim cf	86.8624	26.793	M5.4.19	Chaudandigadhi M-9
Firefighter training and support fire fighting equipment to CFUGs	CFUG	30	300,000	9,000,000				M4.3.1	
Support fire fighting equipment to security institution (APF, Nepal Police, Nepal Army)	Sets	10	150,000	1,500,000				M4.3.2	
Training and equipment support to compost production from bushes and leaf litters	CFUG	10	150,000	1,500,000				M4.3.2	
Construction and improvement of fire lines	Km	5	300,000	1,500,000				M4.3.3	
Customize fire alert system in Community Based Forest Management (CBFM)	No	1	LS	300,000					

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
Skill development trainings and equipment support	Household	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				M5.1.1	
Establish and support multi-purpose tree nurseries (50,000 capacity)	No	1	500,000	500,000				M5.1.2	
Establish and support multi-purpose tree nurseries (50,000 capacity)	No	1	500,000	500,000	Beltar, Gaighat & ….sub-division			M5.1.3	
	No	150,000	40	6,000,000				M5.1.4	
Production of saplings	No	50,000	40	2,000,000				M5.1.5	
	No	50,000	40	2,000,000				M5.1.6	
Establish On-farm tree nursery	No	1	600,000	600,000				M5.1.7	
	ha	4	500,000	2,000,000	Jankalyan CF	86.8991	26.785	M5.2.1	Chaudandigadhi M-2
	ha	15	500,000	7,500,000	Katunje CF	86.8933	26.788	M5.2.2	Chaudandigadhi M-2 & 6
Demonstration Plantation	ha	10	500,000	5,000,000	Raktamala devi CF	86.9108	26.801	M5.2.3	Chaudandigadhi M-2
	ha	1	500,000	500,000	Kauye Devi CF	86.9086	26.804	M5.2.4	Chaudandigadhi M-2
	ha	1	500,000	500,000	Sunder bit CF	86.9024	26.846	M5.2.5	Chaudandigadhi M-1 & 2

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
	ha	10	500,000	5,000,000	Sahikhola CF	86.6613	26.834	M5.2.6	Triyuga M-8
	ha	18	500,000	9,000,000	Bageshwori Khat CF	86.6411	26.843	M5.2.7	Triyuga M-7 & 8
	ha	8	500,000	4,000,000	Khatmandir CF	86.6296	26.838	M5.2.8	Triyuga M-7
	ha	30	500,000	15,000,000	Guntechuhade CF	86.6188	26.837	M5.2.9	Triyuga M-7
	ha	12	500,000	6,000,000	Guntechuhade CF	86.6142	26.833	M5.2.10	Triyuga M-7
	ha	30	500,000	15,000,000	Amarjoti CF	87.0005	26.757	M5.2.11	Belaka M-2
Riparian/River bank plantation	ha	12	600,000	7,200,000	Left bank of Triyuga (Triyuga-10)	86.6844	26.792	M5.3.1	Triyuga M-9
	ha	31	600,000	18,600,000	Khairahajhora	86.8006	26.788	M5.3.2	Chaudandigadhi M-10
	ha	4	600,000	2,400,000	Bulbhule Bhamara CF	86.9475	26.747	M5.3.3	Belaka M-1
	ha	7	600,000	4,200,000	Aam CF	86.945	26.748	M5.3.4	Belaka M-1
	ha	19	600,000	11,400,000	Devijor-Triyuga confluence	86.8228	26.795	M5.3.5	Chaudandigadhi M-10
	ha	10	600,000	6,000,000	Duwar (left)	86.8797	26.777	M5.3.6	Chaudandigadhi M-6
	ha	90	600,000	54,000,000	Triyuga-Lama confluence	86.9117	26.766	M5.3.7	Chaudandigadhi M-4 &5
	ha	13	600,000	7,800,000	Triuga-Bhararjor confluence	86.7575	26.779	M5.3.8	Triyuga M-2

Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
	ha	28	600,000	16,800,000	Baluwa (left)	86.7266	26.772	M5.3.9	Triyuga M-13
	ha	21	600,000	12,600,000	Baluwa (right)	86.7205	26.773	M5.3.10	Triyuga M-12
	ha	38	600,000	22,800,000	Trijuga Nadi	86.6156	26.815	M5.3.11	Triyuga M-7 & 8
	ha	1	600,000	600,000	Saraswati (left)	86.6616	26.809	M5.3.12	Triyuga M-9
	ha	1	600,000	840,000	Saraswati Khola	86.6522	26.818	M5.3.13	Triyuga M-8
	ha	4	600,000	2,100,000	Trijuga	86.7829	26.78	M5.3.14	Chaudandigadhi M-10
	ha	3	600,000	1,860,000	Devijor Khola (left)	86.8177	26.8	M5.3.15	Chaudandigadhi M-10
	ha	2	600,000	1,320,000	Devijor Khola (right)	86.8166	26.802	M5.3.16	Chaudandigadhi M-10
	ha	3	600,000	1,800,000	Dwar Khola	86.8528	26.789	M5.3.17	Chaudandigadhi M-9
	ha	3	600,000	1,800,000	Lama Khola	86.9185	26.791	M5.3.18	Chaudandigadhi M-4
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	Event	1	50,000	50,000					

| Sub-activities	Unit	Quantity	Unit Cost	Budget (NRs)	Location	Lat.	Long.	Activity Code	Local Government
participation, access, control and leadership									
Produce and publish best practices and learning in gendered governance	Event	1	50,000	50,000					
Conduct rapid assessment on women's contribution and involvement in SNRM	Event	1	100,000	100,000					
Provide gender mainstreaming trainings/ workshops to local government and CBOs	Event	1	100,000	100,000					
Conduct GESI focused social audits and public hearing	Event	2	150,000	300,000					
Conduct advocacy campaign and promote awareness on gender responsive information, available provisions and resources among CBOs/ women groups	Meeting	3	50,000	150,000					
Engage male involvement to advocate gender and women's issues and concern in campaign	Event	2	50,000	100,000					
Total				**440,243,212.13**					

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
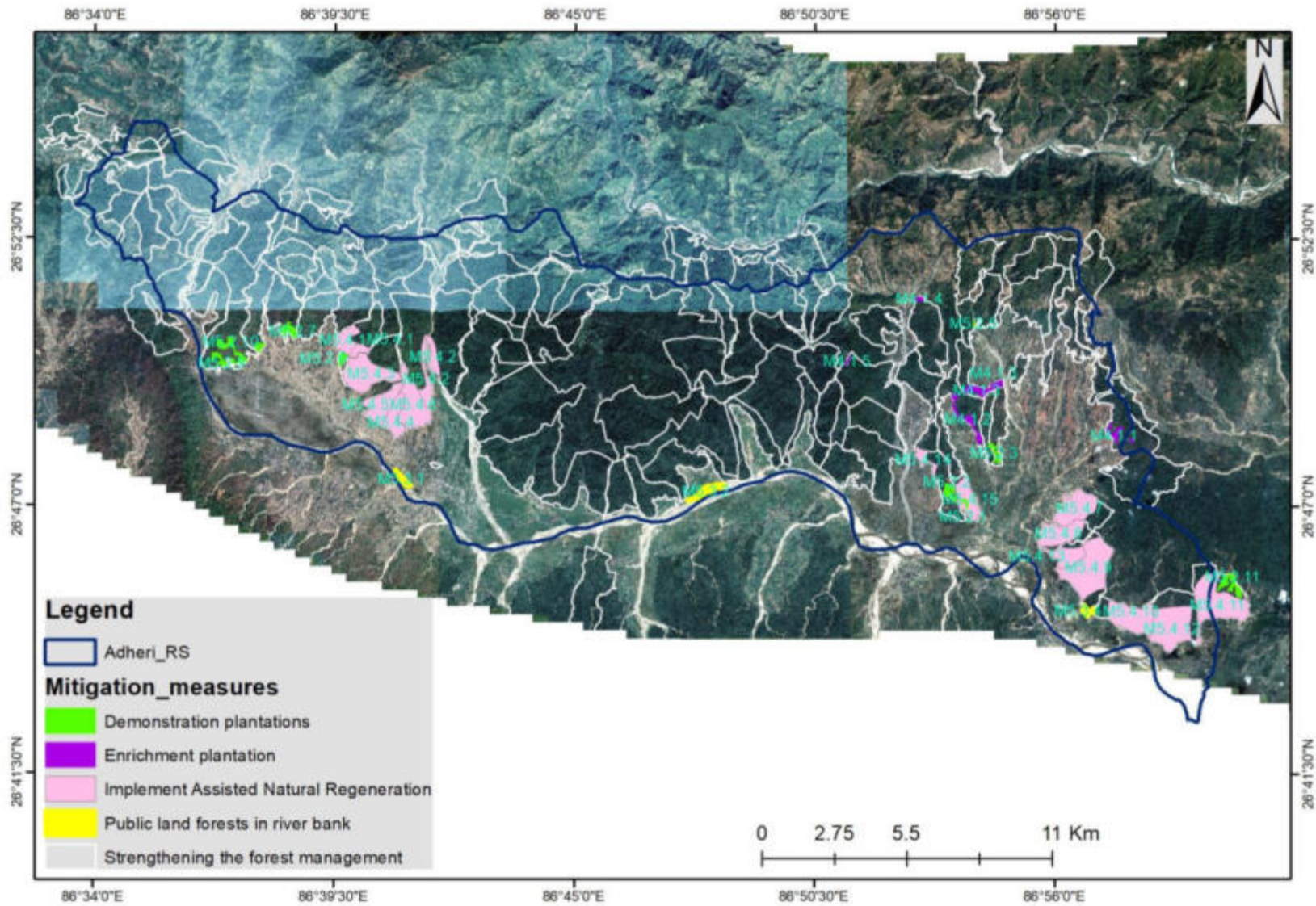
Annex-4: Maps

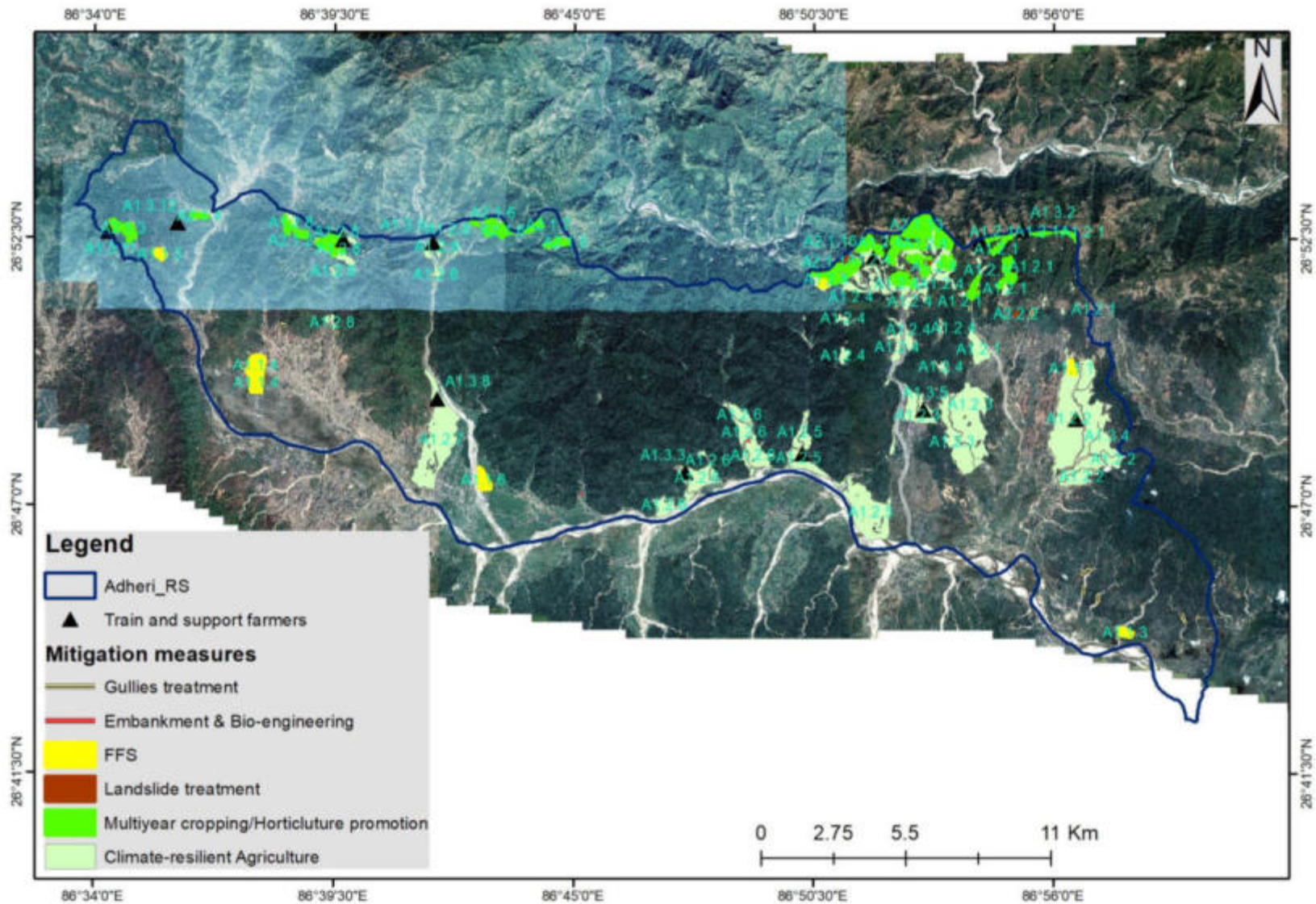**Hotspots for Forest Loss (D&FD)**
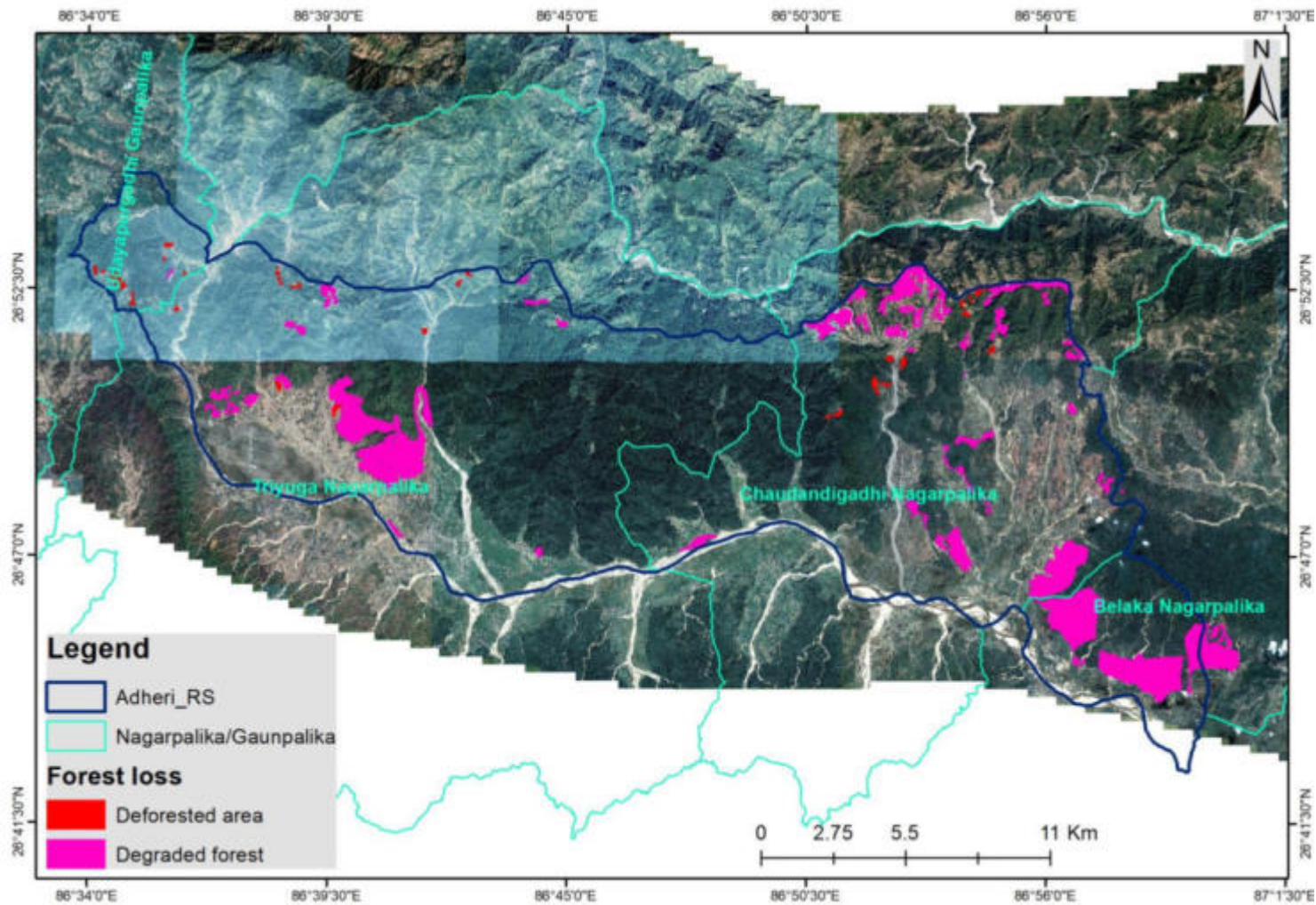
Hotspots for Climate Adaptation
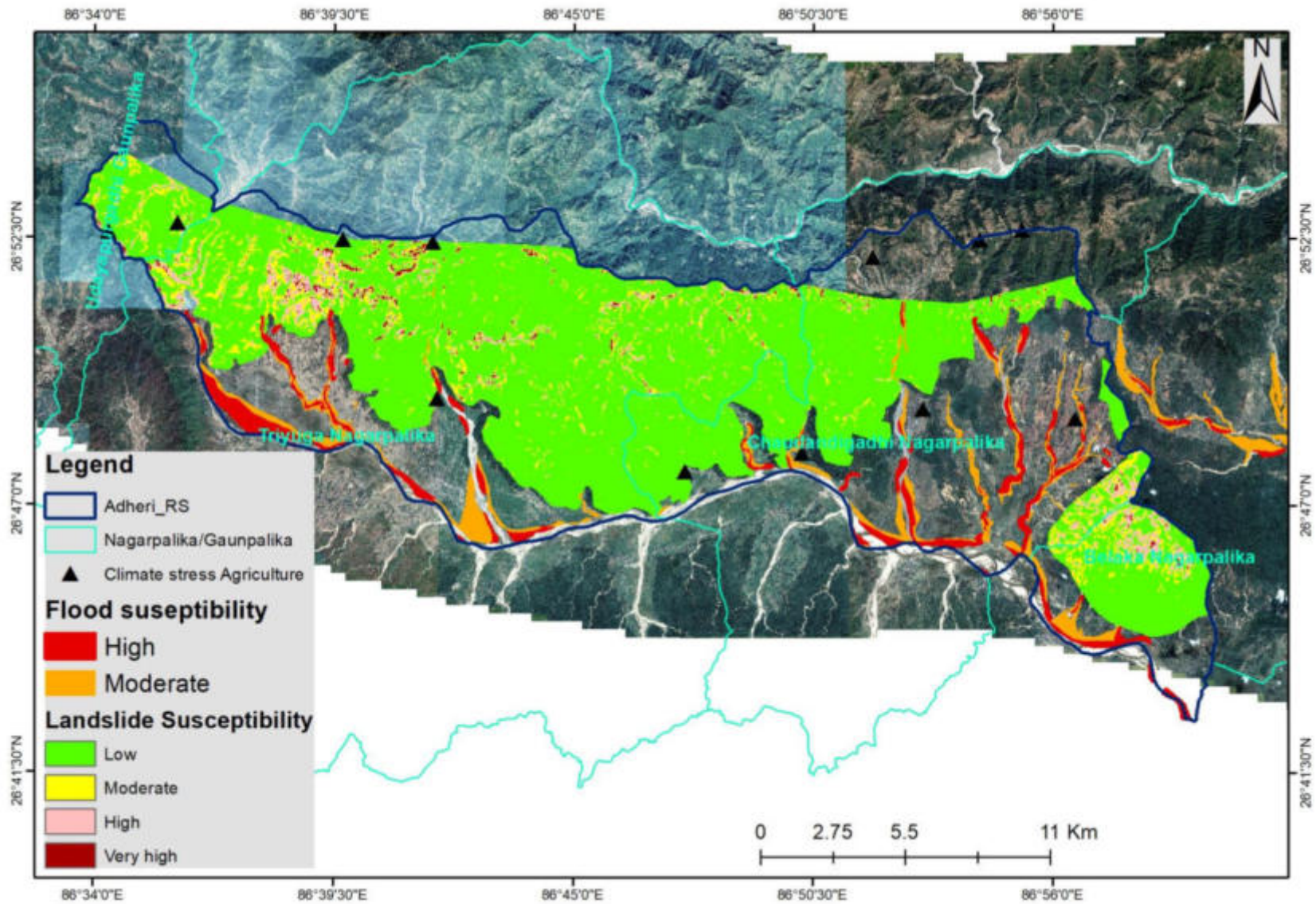
Final Activity Map for Mitigation

Final Activity Map for Adaptation

Annex-5: Photographs

A. Problem and Solution Analysis Workshop

Beltar

Gaighat

B. Expert Planning Workshop

C. Hotspot Verification