Government of Nepal

Ministry of Forests and Environment

Catalyzing Ecosystem Restoration for Climate Resilient Natural Capital & Rural Livelihoods in Degraded Forests and Rangelands of Nepal – EbA II

Baseline Assessment Report

April 2020

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FOREWORD

Ecosystem based Adaptation (EbA II) Project is a joint undertaking of the Government of Nepal/Ministry of Forests and Environment (MoFE), Global Environment Facility (GEF) and the United Nations Environment Programme (UNEP). MoFE is the Executing Agency and UNEP is the Implementing Agency, while Ministry of Agriculture and Livestock Development (MoALD) is the Collaborating Agency. Climate Change Management Division of the MoFE is responsible for the execution of the Project.

Climate change poses complex and unsurmountable challenges to nations and societies at large. The United Nations general assembly has declared 2021-2030 as the UN decade on ecosystem restoration. We all depend on healthy ecosystems for food and energy, water and biodiversity. Their continued degradation enhances the risk of severe ecological disasters. For Nepal, adapting to climate change is difficult owing to its diverse geographic terrain, where people practice agriculture and other natural resource-based livelihood that are sensitive to climatic conditions. Nature-based solutions have now become a preferred option to address the climate change risks and vulnerabilities. Nepal has already embarked on this direction and has implemented EbA project to address such contemporary issues.

The EbA Project aims to reduce the climate vulnerability of local communities in Nepal by enhancing the capacity of the Government and local communities to adapt to climate change by implementing EbA measures in degraded forests and rangelands in midhills and high mountain areas. The project document was designed in 2014 and therefore baseline information related to project beneficiaries, targets and its interventions were not available. Realizing this gap, MoFE commissioned Development Vision Nepal (DVN) to undertake the baseline assessment study.

I am very pleased to note that DVN has accomplished this important task and submitted the report. I am confident that the information generated will be helpful for the project to chart future course of actions and for measuring success at the end. At this stage, I would like to thank DVN and the entire team of consultants for their contribution and hard work despite the global pandemic of COVID -19.

I would like to thank Dr. Maheshwar Dhakal, Joint Secretary and National Project Director for the leadership and strategic guidance throughout the study. Likewise, I would like to thank Mr. Raju Sapkota, Under Secretary and National Project Coordinator for providing necessary support, coordination and guidance for making this work feasible. Also colleagues of CCMD also deserve special thanks for their support, constructive inputs and comments provided at various stages of the document. Similarly, I would also like to thank Mr. Top B Khatri, National Project Manager and the PMU team for the technical oversight, guidance and quality assurance of the product developed.

Finally, I would like to thank all the Municipal Leaders, Government Officials, Institutions, and individuals who provided necessary support and cooperation during the study.

Secretary

Bishwa Nath Oli, PhD

Secretary

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Ecosystem based Adaptation (EbA II) is a joint undertaking of the Government of Nepal (GoN), Ministry of Forests and Environment (MoFE), Global Environment Facility (GEF) and the United Nations Environment Programme (UNEP). The Project is financed through the Least Developed Countries Fund (LDCF). Ministry of Agriculture and Livestock Development (MoALD) is the collaborating Ministry. Climate Change Management Division (CCMD) of the MoFE is responsible for the execution of the Project.

The main goal and objective of the project is to reduce the climate vulnerability of local communities in Nepal and to enhance the capacity of the Government and local communities to adapt to climate change by implementing EbA in degraded forests and rangelands in mid-hills and high mountain areas.

EbA Project was formulated in 2014 and the project is under implementation with the conduction of inception workshop held in March 2019. As the project document was designed earlier, baseline information of the project was not generated. Realizing the gap, CCMD/MoFE commissioned Development Vision Nepal (DVN) a consulting company to undertake the baseline study. I am very happy to acknowledge that DVN has accomplished the study and submitted the report on time despite the global pandemic of COVID-19.

I would like to thank Mr. Raju Sapkota, Under Secretary, CCMD and National Project Coordinator, EBA II for the support, cooperation and guidance throughout the study period. Similarly, colleagues from CCMD/MoFE ; Mr. Yam Nath Pokharel, AFO, Mr. Ram Prasad Awasthi, Meteorologist, Mr. Hari Krishna Laudari, AFO, Ms. Srijana Shrestha, Under Secretary, Dr. Keshab Goutam, Under Secretary and Dr. Arun Prakash Bhatta, Under Secretary for their support, critical comments and inputs provided for enriching the document from the very beginning. Likewise, I would like to express my sincere thanks and appreciation to Mr. Rewati Prasad Sapkota, Undersecretary, Admin section/MoFE, Mr. Laxman Khanal, Undersecretary, Kumari Katuwal, Account officer, Finance section/MoFE and Mr. Man B. Basnet, Undersecretary, Legal section/MoFE for their support and cooperation extended during this study.

Likewise, I take this opportunity to thank Mr. Top B Khatri, National Project Manager, EbA II for providing necessary technical oversight, strategic guidance and quality assurance of the report. Similarly, PMU staff ; Mr. Shreedhar Adhikari, AFO, Mr. Dhiraj Gopal Jha, M&E Officer and District Project Coordinators, Mr. Binod Thapa, Dolakha and Mr. Digambar Singh Dahal, Salyan deserve special thanks for their support, coordination, inputs and feedbacks provided from the formative stage to the end of report preparation.

Finally, I would like to thank the Mayors, deputy Mayors, Chief and deputy Chief, Chief Administrative Officers, Divisional Forest Officers and their technical staff, ward Chairpersons and other Officials of the EbA working Municipalities and Rural Municipalities of Bhimeshwar, Jiri, Sanfebagar, Bangad-Kubhindey, Sailung, Gaurishankar, Kalinchowk, Mellekh, Ramaroshan, Kumakh and Divisional Forests of Accham, Dolakha and Salyan their help, support and cooperation extended during the study period.

Thank you
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& National Project Director, EbA II

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ADS	Agriculture Development Strategy
AKC	Agriculture Knowledge Centre
BCDS	Brahmin, Chhetri, Thakuri and Sanyasi (Ethnic groups)
CAO	Chief Administrative Officer
CLIPs	Community Livelihood Improvement Plans
DFOs	Division Forest Officer
DFSR	Department of Forest Research and Survey
DoFSC	Department of Forests and Soil Conservation
DVN	Development Vision Nepal
EbA	Ecosystem-based Adaptation
FECOFUN	Federation of Community Forest Users Nepal
FRTC	Forest Research and Training Centre
GESI	Gender Equality and Social Inclusion
GLOFs	Glacial Lake Outburst Floods
GoN	Government of Nepal
HVAP	High-Value Agriculture Project
IGAs	Income Generating Activities
IMCCCC	Inter-Ministerial Climate Change Coordination Committee
kg	Kilogram
LIP	Livelihood Improvement Plans
masl	Meters above mean sea level
MAPS	Medicinal and Aromatic Plants
MFAs	Micro Finance Agencies
MoALD	Ministry of Agriculture and Livestock Development
MoFAGA	Ministry of Federal Affairs and General Administration
MoFE	Ministry of Forests and Environment
MoFSC	Ministry of Forest and Soil Conservation
MoLMAC	Ministry of Land Management, Agriculture & Cooperative
mt	Metric ton
MSFP	Multi Stakeholder Forestry Programme
NGOs	Non-Governmental Organisations
NTFP	Non-timber Forest Product
PMAMP	Prime Minister Agriculture Modernization Project
PSC	Project Steering Committee
REDD+	Reducing Emissions from Deforestation and Forest Degradation
SDFO	Sub Division Forest Office
ToRs	Terms of References
VADEP	Value Chain Development Program
VHLSEC	Veterinary Hospital and Livestock Service Expert Center

EXECUTIVE SUMMARY

This document presents baseline status of the "Catalyzing Ecosystem Restoration for Climate Resilient Natural Capital & Rural Livelihoods in Degraded Forests and Rangelands of Nepal (EbA II)" project being implemented in ten Rural/Municipalities representing mid-hills and high-hills eco-systems of Nepal from March 2019. The Project districts are Achham, Salyan and Dolakha.

Three municipalities, namely Sanfebagar, Mellekh and Ramaroshan in Achham are rich in biodiversity and natural resources. The splendid natural attraction of these municipalities are further enriched by the presence of precious historical and religious sites. Various types of flora and fauna are available in the district due to varied climatic condition and topography. The district has a total of 98,640 ha forest area which is covered by different forest types namely; *Abiesspectabilis* & Abies*pindrow*, *Acacia catechu & Dalbergiasisso, Cedrusdeodara*, Lower Mixed Hardwood, *Pinus roxburghii, Pinus wallichiana*, *Quercus*, Sal *(Shorearobusta*), Tropical Mixed Hardwood and Upper Mixed Hardwood.

Salyan district has altogether 121,229 ha of forest area consisting of different forest types namely; Tropical Mixed Hardwood, *Shorea robusta, Pinus roxburghii*, Lower Mixed Hardwood, *Quercus*, Upper Mixed Hardwood, *Pinus wallichiana*, *Cedrusdeodara*, *Acacia catechu & Dalbergiasisso* and Picea*smithiana*. Similarly, different types of NTFPs such as *Acorus calamus, Aspararacemosus, Bergenia ciliate, Cinnamomumglaucescens, Cinnamomum Tamala, Dioscoreadeltoidei, Juglans regia, Lichens, Phyllanthus emblica, Piper lungum, Rubiamanjith, Sapindusmukorossi, Tionosporasinensis, Valerianajatamansii, Zanthoxylumarmatum* etc. are available and some of them have potentials for promotion in the community forests for long term employment and income generation.

Dolakha district contains three physiographic zones namely - Hill, Middle Mountain and High Mountain. Jiri Municipality and Gaurishankar Rural Municipality lie in Hill, Middle and High Mountain zones whereas the other three municipalities (Bhimeshwor M, Kalinchowk RM and Sailung RM) are in Hill and Middle Mountain zones. It has 97,068 ha of forest land which includes varieties of forest types. Flora and fauna of both Mid Hill and High Mountain zones are also found in the district. *Himalayacalamus asper, Nardostachys jatamansi, Swertia chirayita, Danphe panachea, Edgeworthia gardneri, Girardinia diversifolia, Allium Wallichii, Parmelia nilgherrensis, Zanthoxylum piperitum, Acorus calamus, Rheum australe, Dactylorhiza hatagirea, Gaultheria fragrantissima, Paris polyphylla, Rubia cardifolia, Asparagus Racemosus* etc. are some examples of different NTFPs that are available in the district.

According to DFRS/MoFSC data, the total forest area in the wards covered by the EbA-II Project in Achham district is estimated at 10,477.15 ha. Among the six project wards in Achham, the largest area under forest is found in ward number 5 of Ramaroshan Rural Municipality. Similarly, the EbA-II sites of Salyan and Dolakha districts have a total of 12704.01 ha and 12406.64 ha of forest area, respectively. Among the project wards in Salyan, ward number one of Bangad-Kupinde Municipality has the largest forest cover. In Dolakha district, ward 9 of Gaurisankar Rural Municipality has the largest area under forest.

Degradation of forest and rangelands were reported in all eighteen wards covered by the project. Degraded area was calculated using Landsat8 map extracted from USGS database.

Resulting figures show that degradation of forest ranged from seven to over nineteen percent of the total forest area among the eighteen project wards. Ward number eight of Gaurishankar Rural Municipality of Dolakha has the largest forest area and also the largest degraded area among the eighteen wards under EbA-II. Compared to forests, degradation was observed higher in rangelands. Ward number five of Ramaroshan Rural Municipality was found to have highest degradation of rangelands.

The EbA-II districts are ranked under different risk categories based on ecological vulnerability scores. With a score of 0.53, Achham district is ranked under high risk group followed by 0.47 score for Salyan under same category. With ecological vulnerability score of 0.33, Dolakha district is ranked under moderate risk group. However, located in the mountain region, Dolakha is ranked as vulnerable district to climate change on NAPA's "Climate Change Vulnerability Mapping for Nepal".

Drought, changing rainfall pattern, landslide, hailstone and temperature increase were major climate induced hazards reported in the project area. Such changes caused losses of agricultural land, losses/productivity decline of field crops and fruits, losses of livestock and disturbance in water supply systems. Farmers, especially small holder farmers, wage laborers and women were vulnerable to such hazards.

More than 99 percent of the sample households in the project wards reported to have access to agricultural land. The sample households, on an average, owned about 0.53 hectares (10.5 Ropani) land. Average land holding size ranged from 0.45 ha in Achham to 0.66 ha in Dolakha. By social groups, Adivasi/Janajati households owned highest amount of land averaging 0.66 ha followed by 0.55 ha for BCTS households. Dalits owned less than half of these figures accounting to only 0.25 ha per household.

Some 94 percent of the sample households cultivated at least one crop including, cereals, legumes, oil-seeds, cash crops, vegetables and fruits. Almost 80 percent of the total cropped area was occupied by cereal crops, about 10 percent by vegetables, about 8 percent by legumes and less than one percent by oil crops, cash crops and fruits. An average household produced 300 kg rice, 223 kg maize, 168 kg wheat, 65 kg millets and 11 kg barley. Total foodgrain production was 985 kg per household in Salyan, 793 kg in Achham and 520 kg in Dolakha district.

It was recorded that more than 95 percent of the sample households kept one or other animal. All households in Dolakha were raising livestock as compared to 95 percent in Salyan and 91 percent in Achham. The households, on an average, produced 114.6 kg of milk, 0.7 number of egg and 1.36 mt of Farm Yard Manure. The largest amount of milk, egg and FYM production was reported in Achham and lowest in Salyan.

The Livelihoods framework encompasses five capitals that are customarily used in the context of development projects representing human, natural, financial, physical and social aspects. Based on resource availability, different livelihood improvement plans are suggested for implementation under EbA-II. Broadly, the livelihood plans include three strategic areas of investment. These are: (i) **Forest and rangeland based measures** constituting activities that help the rural communities to improve their employment and income through the use of forest based products; **(ii) Land/livestock based measures** including support activities to the farming

families engaged in agriculture and livestock; and **(iii) Non land based measures** such as skill training in different vocational fields along with other supports which offer opportunities for self-employment and/or wage employment of the poor people.

Regarding the targeted activities of the EbA-II project, demand of the communities exceeded the targets set in the results framework. However, considering the limited time remaining for project implementation, it is suggested to stick on the targets given in the Project Document except that one nursery and one livelihood development plan be supported in each project municipalities against project target of 7 nurseries and 3 CLIPs in total. Construction of fire control lines along sensitive locations to save the forest from wild fire and construction of simple low-cost sheds at *Chauri Kharkas* for their caretakers are additional activities suggested by participants during FGDs.

CHAPTER I: BACKGROUND

General introduction of the project area, project targeted ouputs and objectives and scope of the baseline study are discussed in this chapter. It also includes a review of policies related to environment and its protection, natural resources management, climate change, agriculture, food security and disaster management.

1.1 Introduction

Nepal, a land locked country situated in the lap of Himalaya, covers an area of 147,181 km^2. Large part of the physical area comprises of hills and mountains. The elevation of Nepal ranges from ~60 meters above mean sea level (masl) in the south to 8,848 masl at the peak of Mount Everest, highest mountain in the earth. The country is broadly divided into three east to west running ecological belts: the Terai in the south, the mid-hills in the centre, and the high-hills (also referred as Himal) in the north. The *Terai* mainly consisting of flat land lies up to 800 m east to west. The mid-hills are in the range of 800 m and 1,800 m and comprise sloped lands with many small valleys. The high-hills, which lie above 1,800 m, are steep sloped snowy mountains with few valleys. These three ecological belts constitute 35, 42, and 23 percent, respectively, of Nepal's total geographical area. Forest occupies 44.74% (6.61 million ha) of the total area of the country, where Protected Areas (PAs) occupy 17.32% of forest area and 82.68% is under other forest management regimes (DFSR, 2015).

As of January 2020, the population of Nepal is estimated to be 30.06 million people. This is an increase of 1.18% compared to the population of 29.71 million a year before. Average annual growth rate of population is estimated at 1.1 percent. The sex ratio of the total population was 0.98 which is lower than global sex ratio[1]. Nepal's population density, calculated as permanently settled population divided by total area of the country, is 204.2 people per square kilometre. Approximately 74% of the population is dependent on agricultural activities including crop and livestock farming. A majority of the population predominantly live in poverty.

Approximately 66% of Nepal's population relies on subsistence agriculture for their livelihood[2]. Despite the large percentage of the population engaged in this sector, the food trade deficit is growing. Consequently, agriculture's contribution to the annual GDP has been decreasing over the last decade and currently contributes about 27% (Economic Survey 2075/76). The stagnant performance of this sector and an increasing population has resulted in decreasing food availability. Consequently, 42 of Nepal's 77 districts experience a food shortage for a few months per annum. This is exacerbated by a small holding size of agricultural land, which is less than 0.8 hectares (MOAC, 2010).

The geographic and ecological diversification of Nepal, makes it one of the most vulnerable countries in the world to climate induced disasters and is exposed to different hazards such as flood, landslides, glacial lake outburst floods (GLOFs), thunderstorms, cold wave, droughts and earthquakes. The country is also highly vulnerable to the negative impacts of climate

[1]https://countrymeters.info/en/Nepal#population_2019
[2]http://www.fao.org/nepal/fao-in-nepal/nepal-at-a-glance/en

change leading to consistent rising trends in annual mean temperature, extreme rainfall events, increasing frequency and intensity of floods, GLOFs and droughts. In view of the above, efforts must be made to explore options in which nature can provide solutions to our development challenges, enabling local communities and societies to adapt and cope with the effects of climate change on the long run.

Natural resources in forest and rangeland ecosystems support many local industries and micro-enterprises in Nepal through non-timber forest products (NTFPs), medicinal and aromatic plants (MAPs) and ecotourism. High population density and widespread poverty have accelerated pressure on the goods and services of forest and rangeland ecosystems. Important resources are being over-exploited through excessive stocking of livestock and increased harvesting of firewood, timber and other natural resources. This is evident in the expansion of intensive agriculture along previously forested hill slopes. These unsustainable land use practices result in increased soil erosion that results in (i) decrease in water quality through increased sedimentation; (ii) increased variability in water supply, and (iii) reduced soil fertility thereby adversely affecting agricultural productivity. As a result, ecosystem degradation is the most consistent threat to the local communities and the Nepalese economy.

The effects of climate change such as rising temperature, erratic and intense rainfall and increased frequency of extreme droughts, floods and avalanches have been reducing the adaptive capacity of forests and rangelands in the mid and high hills of Nepal, which naturally provide ecosystem goods and services to indigenous and local communities. As a result, climate change is adversely affecting the indigenous and local communities particularly children, elderly and women, who directly and/or indirectly depend on the ecosystem goods and services for their daily livelihoods. These problems are expected to increase in intensity and frequency under future climate change scenarios.

National, provincial and local government and local communities have limited technical and institutional capacity in planning, implementing and financing of the adaptations of these climate change and design action plans. To address these problems, the EbA II activities are initiated with the aim of increasing the capacity of national and local government institutions to adapt to the climate change by implementing ecosystem-based adaptation approaches in degraded forests and rangelands in mid-hill and mountain areas. The EbA II interventions are targeted to restore at least1,000 hectares (ha) of forest and 450 ha of rangelands in 18 Wards in 10 rural municipalities and municipalities of Achham (Sudurpashchim Province),) Salyan (Karnali Province) and Dolakha (BagmatiProvince) districts. This project is built on the good practices and lessons of the earlier interventions of EbA projects and consequently contributes to the long-term sustainability in the face of climate change.

The shifting weather patterns as a result of climate change, affecting rainfall and temperature, are likely to impact the ecosystem goods and services such as clean water and food on which people rely. In order to achieve the Sustainable Development Goals, reach global biodiversity targets and effectively address climate change, nature-based solutions should be treated as integral to adaptation strategies at global, national and local levels.

Catalyzing Ecosystem Restoration for Climate Resilient Natural Capital & Rural Livelihoods in degraded Forests and Rangelands of Nepal (EbA II) is a joint undertaking of the Government

of Nepal (GoN), Ministry of Forests and Environment (MoFE), Global Environment Facility (GEF) and the United Nations Environment (UNE).The project document has clearly defined its targets and indicators in its log frame/Results Resources Framework; and the purpose of this baseline assessment undertaking is to generate baseline information for each of the target spelled out in the project's document. The baseline indicators will be the guiding information to gauge project achievement and results at the end of the project. This will help devise appropriate tools for monitoring and evaluation of the project interventions. Furthermore, this baseline assessment provides required information comprising of socio-economic, demographic and natural resource base including ancillary information of the general and targeted beneficiaries of the project working Palikas. This information will guide the project to plan effectively and coherently in realizing the project objectives in a systematic way.

1.2 Purpose of the Report

The main purpose of this document is to establish the baseline information on the major indicators of the project. It is expected that baseline data and information about the project beneficiaries and other stakeholders collected through the survey approach will serve as guidelines for the efficient management and implementation of the projects and will provide basis for outcome and impact measurement.

1.3 An Overview of the Project

The “Catalyzing Ecosystem Restoration for Climate Resilient Natural Capital & Rural Livelihoods in degraded Forests and Rangelands of Nepal (EbA II)", aims to reduce the climate induced vulnerability of local communities in Nepal, and to increase the capacity of national and local government institutions to adapt to the climate change by implementing ecosystem-based adaptation (EbA) approaches in degraded forests and rangelands in mid-hill and high mountain areas of Achham, Salyan and Dolakha districts. The project is built on the good practices and lessons of the earlier baseline EbA projects and consequently contributes to the long-term sustainability of the projects in the face of climate change. The project has three components;

Component 1: Strengthen the national capacity to plan and implement EbA,
Component 2: Support a policy environment that promotes EbA across Nepal and
Component3: Demonstrate on the ground EbA interventions to restore degraded forests and rangelands.

1.3.1 Project's major outputs

There are total of ten outputs targeted across the three components of the project:

Output 1.1 Technical working groups on EbA established within IMCCCC (renamed as IMCCCC)

Output 1.2 Training provided for national, district and local stakeholders on identifying, prioritizing, implementing, monitoring and evaluating EbA interventions

Output 1.3 National campaigns implemented and district level collaboration facilitated on EbA approaches and benefits including lessons learned in component 3

Output 1.4 Primary, secondary and tertiary educational programs developed on EbA best practices

Output 2.1 Policy briefs developed and training provided on recommended revisions to policies, strategies and relevant sectoral budgets including for forestry, agriculture and water sector to promote EbA in forests and rangelands

Output 2.2 Frameworks that support up-scaling of EbA in forests and rangelands developed and presented to relevant national institutions

Output 3.1 Social, economic and biodiversity site-specific information produced to support identification, prioritization, implementation, monitoring and evaluation of EbA in forests and rangelands

Output 3.2 EbA demonstrations implemented to increase water infiltration and fodder production during drought conditions and intense rainfall events and integrated into operational management plans of user groups

Output 3.3 Adaptation techniques introduced to complement EbA through conservation of topsoil sand water in the face of droughts and increased rainfall intensity

Output 3.4 Community livelihood improvement plan (CLIPS) in line with the economic benefits from forests, rangeland and agro ecosystems and implemented with local communities

1.3.2 The Project Area

The project covers two distinct physiographic regions of Nepal: Mid-hills represented by Accham and Salyan and High-hills represented by Dolakha district. A total of 10 Municipalities/Rural Municipalities encompassing Sanfebagar, Ramaroshan and Mallekh in Accham; Bangad-Kupindeand and Kumakh in Salyan; and Gaurishankar, Bhimeswor, Kalinchowk, Shailung and Jiri in Dolakha fall within the project working sites (Table 1.1).

Table 1.1: Wards and Rural/Municipalities of the Project Working Sites

	District	Ward as per Project Document	Rural/ Municipality	Ward No.	No. of HH	Population	Female
Mid-hills	Achham	Babla	Sanfebagar M.	13	539	2,813	1,570
		Bhatakatiya	Ramaroshan RM	6	828	4,653	2,399
		Ramaroshan		5	1,031	5,989	3,047
		Rishidaha 1	Mallekh RM	1	449	2,478	1,275
		Rishidaha 2		2	381	2,082	1,068
		Sodasha		6	714	3934	2,079
		Sub-total			3942	21949	11438
	Salyan	Devasthal	BangadhKupinde Municipality	1	1,002	4,785	2,550
		Ghanjaripipal 6		6	554	3,126	1,608
		Ghanjaripipal 7		7	563	2,788	1,428
		Mulkhola 4		5	630	3,271	1,663
		Mulkhola 5		4	446	2,322	1,215
		Suikot 1 and 2	Kumakh RM	1	593	3037	1612
		Sub-total			3,788	19,329	10,076
High-hills	Dolakha	Khare	Gaurishankar RM	8	432	1,833	904
		LakuriDanda	Bhimeswor M.	9	924	3,713	1,979
		Lapilang 5	Kalinchowk RM	5	555	2,248	1,145
		Lapilang 6		6	651	2,694	1,414
		Magapauwa 4	Shailung RM	4	668	2,528	1,383
		Jiri 7	Jiri Municipality	5	493	1,876	992
		Sub-total			3723	14892	7817
Total of EbA II Project Area					11,453	56,170	29,331

Source: EbAII, Project Document: Nepal LDCF (GEF ID: 5203) and https://www.cbs.gov.np/district-profile

1.4 Baseline assessment

Climate Change Management Division, Ministry of Forests and Environment (MoFE) recruited Development Vision Nepal Pvt. Ltd (DVN), a national consulting company, to carry out the baseline survey at the beneficiary level of the project "Catalyzing Ecosystem Restoration for Climate Resilient Natural Capital and Rural Livelihoods in Degraded Forests and Rangelands of Nepal" (EbA II) being implemented in three districts of Nepal.

1.4.1 Baseline Study Sites

The baseline assessment covered the project working sites i.e. two distinct physiographic regions of Nepal: (i) mid-hills -Accham and Salyan and (ii) high mountain - Dolakha. Altogether, the assessment includes a total of 10 Municipalities/Rural Municipalities encompassing Sanfebagar, Ramaroshan and Mallekh in Accham; Bangad-Kupinde and Kumakh in Salyan; and Gaurishankar, Bhimeswor, Kalinchowk, Shailung and Jiri in Dolakha as mentioned in earlier section (Table 1.1).

1.4.2 Objective of the Baseline Study

The objective of the baseline assessment is to create baseline data of the current scenario of project working sites, generate data of its stakeholders and beneficiaries based on which the target of the project is to be measured. The assessment also revisited the Result framework of the project document and proposed revision of some of the indicators. The specific objectives included:

a. Identify and establish baseline information of project indicators as defined in Result framework for monitoring, evaluation and project performance
b. Revisit the Result framework including targets and indicators and propose revision, if deemed necessary.
c. Generate information on the demographic and socio-economic features of household beneficiaries (direct and indirect) disaggregated information (gender and class) of the working Rural/Municipalities.
d. Explore and identify the existing and potential opportunities in livelihood dimension towards improving the social, natural and financial capital of the targeted beneficiary households
e. Based on the Result Framework of the project document prepare baseline data in relation of target and MoV specified in the RF.

1.4.3 Scope of the Baseline Study

The scope of the baseline assessment focused inter alia on collecting data related to key performance indicators, which are set out in the results framework but not limited to the following:

a. Validate and configure the current working areas (formerly VDCs) as per the new federal structure. Identify the main project stakeholders, institutions, and beneficiaries (direct and indirect) of the working Rural/Municipalities;

b. Assess and document the socio-economic and demographic features of the project sites encompassing; coverage, households and population, household size and disaggregated information (gender and social class) of beneficiaries, occupation, income (annual income, source of income, land holding size, livestock, assets and so forth)
c. Assess the existing human, social, natural, physical and financial capital of the community institutions (at user group level) and recommend areas for capacity enhancement
d. Identify and map out the existing resource base including degraded forest and rangelands for EbA intervention and restoration. Based on a consultative process identify innovative on-farm and off-farm ground interventions in the areas of cash income, crops diversification, livestock management and food security to adapt and cope with the emerging climate induced risks.
e. Based on a participatory approach, identify and document existing and potential functional groups (forest, leasehold, NTFPs/MAPs, irrigation, livestock, rangeland, agro ecosystem, etc) and develop gender disaggregated information for conservation and livelihood interventions
f. Explore the perception and level of understanding of EbA measures and benefits by local stakeholders in Rural/Municipalities and district level
g. Explore and identify major forest/agro/rangeland based resources, its utilization and harvesting pattern (sites and product). Analyze the involvement of women, poor and marginalized communities in resource management and benefit sharing. Map them in a tabular form with seasonal calendar of harvest. Assess the vulnerability context of the targeted beneficiaries.
h. Document existing and potential micro-enterprises with focus on sustainable use of natural resources including NTFPs and MAPs.
i. Prioritize the most pragmatic, feasible and sustainable means of livelihood option to improve food security and cash income of the beneficiaries in the face of climate change. Identify and recommend income generating activities that have quick impact for the climate vulnerable communities.
j. Explore and identify possible opportunities for market linkages and value addition of the identified products.
k. Identify and map partners/I/NGOs, CBOs and their scope of work and coverage in project working areas to generate synergy in program implementation (coverage and intervention)
l. Prepare a resource map of the project working sites depicting province, district and, Rural /Municipalities.

1.5 Policy environment

National Environment Policy (NEP) 2019. Article 30 of the Constitution of the Federal Republic of Nepal has stipulated every citizen's fundamental rights to live in clean and healthy environment and has given the highest priority of the state in the protection and management of the environment. In agreement with this clause the government has endorsed the 'National Environment Policy-2019′ to control pollution, manage wastes and promote greenery so as to ensure citizens' right to live in a fair and healthy environment. The policy was framed to guide

the implementation of environment related laws and other thematic laws, realize international commitment and enable collaboration between all concerned government agencies and non-government organizations on environmental management actions.

The NEP has been organized around ten major policy objectives of the GoN that include: (i) lessen and prevent all types of pollutions including water, air, soil, sound, electromagnetic waves, chemical and radioactive, (ii) manage waste emanated from households, industries, service sectors, and other sources, (iii) develop/expand parks and greenery in urban areas, (iv) mainstream environmental issues in all dimensions of development initiatives, (v) ensure environmental justice for pollution victims, (vi) increase public participation in environment protection and sustainable management of natural resources, (vii) utilize natural and man-made resources to be fair to the present and future generations, (viii) research and capacity building on environment protection and management, (ix) use of land resources as per land-use plan, and (x) recycling and reuse of the available resources to the extent possible.

The policy for mainstreaming of environment include – internalization of environmental aspects in all stages of development programmes; lessening and mitigation of negative impacts and expansion of positive impacts of development programmes in environment and in society; identification and use of appropriate option for the implementation of programmes so as to ensure a balance between environment and development. To ensure sustainable development the policy envisages the development of environment-friendly infrastructure, conservation and sustainable management of sensitive areas, and sustainable and integrated management of natural resources and equitable distribution of benefits.

A national environment council has been established to make policy coordination of all types of environment related activities. All tiers of governments will require to formulate law and policy on environment. The policy has entrusted the federal government with the responsibility for looking after national-level policy, law and standards related works for environmental protection and management. The environment protection and management related programme and projects will be formulated and implemented in accordance with national and international standards.

National Forest Policy 2075. The vision of this policy is "Contribution to Nepal's economic, social and cultural prosperity through a well-managed forest and a balanced environment". The policy recognizes the lack of judicious use of available forest resources and biodiversity as the key threat. Effective coordination and cooperation among the three layers of government, the forest groups and the private sectors in forest, biodiversity, watershed management; and the conflict management arising between wildlife and biodiversity conservation, watershed management and social and economic development of the country are also considered as key challenges. In the context of such challenges, the aim of this policy is "production and value addition of forest-based products and services and equitable distribution of the benefits from sustainable and participatory management of the forest, protected areas, watershed, biodiversity and wildlife". The specific objectives are;

- Increase production, productivity and environmental services of forest resources
- Achieve self-sufficiency in forest products, and export promotion of value-added products

- Contribute to tourism by promoting improved systems of forest management, protected area management, and wetland management
- Conservation of forest resources, wildlife, and biodiversity; their restoration and sustainable use
- Conservation of forest area and their multidimensional use
- Develop forest sector as a source of earnings through the development and conservation of agroforestry
- Maintain the current area under forest and restoration of degraded forest
- Water and land resource conservation through integrated management of watersheds
- Contribute to Nepal's overall goal of carbon emission reduction
- Improve governance in forest sector and equitable distribution of benefits

It also details out specific policies and strategies on (i) ownership of the forest land, (ii) sustainable, participatory and sensible management of forest resources, (iii) green park development and contribution to national prosperity, (iv) biodiversity conservation, (v) watershed, environmental services and REED+, (vi) forest outside of national forests, (vii) research and capacity building, and (viii) social security, inclusiveness, and good governance.

The policy envisages the implementation of forest sector programs in coordination among the federal, provincial and local levels and in consultation and partnership with all concern stakeholders and the necessary acts, strategies, regulations, operational procedures, and guidelines are to be developed and implemented by the federal, provincial and local levels respectively.

National Climate Change Policy (NCCP) 2019. The government has endorsed National Climate Change Policy 2019 that aims at providing policy guidance to various levels and thematic areas towards developing a resilient society by reducing the risk of climate change impacts. The goal of NCCP is 'to contribute to socio-economic prosperity of the nation by building a climate resilient society. The objectives are to enhance climate change adaptation capacity of the persons, families, groups and communities vulnerable to, and at risk of , climate change; build resilience of ecosystems that are at risk of adverse impacts of climate change; promote green economy by adopting the concept of low carbon emission development; mobilize national and international financial resources for climate change mitigation and adaptation in just manner; conduct research, make effective technology development and information service delivery related to climate change; mainstream and integrate climate change issues into policies, strategies, plans and programs at all levels of State and sectoral areas; and mainstream gender equality and social inclusion into climate change mitigation and adaptation programs.

The National Climate Change Policy 2019 incorporates policies and strategies in the field of Agriculture and food security; forest, biodiversity and watershed conservation; water resource and energy; rural and urban habitants; industry, transport and physical infrastructure; tourism and natural and cultural heritage; health, drinking water and sanitation; disaster risk reduction and management; gender equality and social inclusion, livelihoods and good governance; awareness raising and capacity development; research, technology development and expansion; and climate finance management.

Agriculture and Food Security. The policy intents to improve food security, nutrition and livelihoods by adopting climate-friendly agriculture system. The strategies are to implement targeted (poor, marginalized, landless, indigenous people and vulnerable households, women and persons with disability) agriculture-based adaptation programs; promotion of technologies and crops suitable for stressed conditions such as dry and waterlogged; promotion of efficient irrigation technologies; crop diversification, protection of biodiversity and organic farming system; promotion of agroforestry in uncultivated agriculture land; documentation, promotion and expansion of climate-friendly agriculture system and innovative technologies including low carbon emission and energy efficient technologies; and provisioning of climate-induced disaster/risk insurance in agriculture and animal husbandry sector.

Forest, Biodiversity and Watershed Conservation. The policy is focused on developing climate resilient ecosystem for sustainable environmental services. The strategies aim to increase forest carbon sequestration by adopting sustainable forest management; development of agroforestry in sloppy lands and riverbeds; management of wetlands that are at risk of climate change; conservation of wildlife and plants of endangered species; mainstreaming climate change adaptation in integrated watershed management; and promotion of best practices in watershed and landscape management into adaptation program.

Water Resources and Energy. The policy emphasizes on the multiple use of water resources and production of low carbon energy. The strategies include promotion of technologies on storage and efficient use of water, rain water harvesting and groundwater recharge, production and use of renewable energy and use of energy efficient technologies.

Disaster Risk Reduction and Management. It envisages the development of disaster risk reduction and management system at the federal, provincial and local levels for prevention, reduction of climate-induced disasters by developing monitoring and forecasting and early warning system for disaster including flood, landslide, land erosion, drought, lightning, windstorm, heat wave, wild fire, epidemic and etc.

The policy emphasizes on good governance, gender equality and social inclusion in all aspects of program implementation; target households and communities that are at risk of adverse impacts of climate change and promotion of transparency; accountability and active participation of people in climate change adaptation and disaster risk reduction and management programs.

The **National Agriculture Policy 2004.** This policy aims to achieve high and sustainable economic growth by creating enabling environment for agriculture-led development, contributing to food security and poverty reduction. The policy envisages increased agriculture production and productivity, improved agriculture sector competitiveness in regional and world market, sustainable use of natural resources, and ensure bio-diversity.

For the purpose of contributing to the task of ensuring food security and poverty alleviation by achieving a high and sustainable economic growth a commercial and competitive farming

system, among others, the policy proposes Conservation, Promotion and Utilization of Natural Resources and the Environment. The strategies proposed are -

- Minimizing the negative impact of the use of agro chemicals on the condition of soil and reservoirs, and other environmental problems resulting there from;
- Encouraging the production, use and promotion of organic fertilizers;
- Establishment of gene banks and in situ conservation bio- diversity and development of participatory biodiversity parks;
- Promotion, conservation and utilization of bio-diversity; and development of agroforestry system in a way as to improve the conditions of degraded forests and natural reservoirs.
- Gradually developing conservation-oriented farming system by managing watersheds and controlling soil erosion;
- Checking the fragmentation of cultivable land and ensuring the scientific management (consolidation of plots) of land.

Rangeland Policy, 2068 (2012). Only 37% of the total 3.3-million-hectare pastureland is in use in Nepal. About 80% of these pasturelands are in high mountains and difficult to reach while productivity of the accessible pasturelands is very low. In order to manage these pasturelands scientifically, and support livelihoods of local people through conservation and use of these pastures, the government formulated Rangeland Policy, 2068.

The objectives of this policy are: a) to increase productivity of the rangelands, b) to promote rangeland related enterprises, and c) to maintain ecosystems with bio-diversity of rangelands through scientific and participatory management of resources. The major components of the policy are:

- Increment of pastureland productivity.
- Development and expansion of rangeland related enterprises, and
- Bio-diversity conservation and sustainable use of the pasturelands

The policy also proposes strategies and identifies interventions to be undertaken and institutions responsible.

Pasture Land Nationalization Act, 1974 with amendment 2010. The objective of this act is to nationalize the pasture land in order to maintain the convenience and economic interest of the general public. The act has provisions for local governments to manage and utilize pasture land. The act stipulates that the local government shall protect and govern the management of the pastureland and ensure in pursuant to this act and not to use, or cause to be used, for any other purpose except pasturing. This partly contradicts with the Acts and Regulations rolled for the protected areas, national parks and wildlife reserves. Therefore, delineation of the pasture land where farmers can invest and improve and those for conservation needs is extremely important. This provision under the Act is one of the greatest strengths to mobilize common property resources (CPR) for the development of livestock farming at individual/groups/ cooperative levels.

Environment Protection Act and Rules. The EPA and EPR are the main regulatory guidelines to undertake environmental assessment for any infrastructure development or resource management project. This act aims to take the economic development parallel with the environmental conservation so that the adverse impacts on human beings, flora and fauna and other natural as well as physical environment caused by the environmental degradation are minimized to the extent possible, thereby creating a clean and healthy environment. The Act gives legislative guidelines with regard to irrigation and water resources management activities; initial environmental examination or environmental impact assessment; control, mitigation, measures to control pollution; biodiversity and national heritage conservation; soil, water, noise and air pollution; solid waste management and transport; operation of environment protection fund; and other relevant aspects.

National Adaptation Program of Action. Nepal has developed National Adaptation Program of Action (NAPA) on climate change as a part of its commitment to the United Nations Framework Convention on Climate Change (UNFCCC). The framework of NAPA implementation stipulated by National Climate Change Policy requires 80 per cent of the funds of any adaptation program to flow directly to the community.

CHAPTER II: APPROACH AND METHODOLOGY

Details on approach taken to gather baseline information, sources of information, methodology used for sample size determination, survey tools, data collection techniques and related information are included in this chapter. Collection of baseline information was done using different secondary and primary sources. The primary data was collected using various tools such as household survey, stakeholder analysis, community consultation, key informant interviews, focus group discussions with concerned stakeholders, and competency analysis. For the purpose of household survey, a total of 404 households were interviewed across 18 wards of 4 Municipalities and 6 Rural Municipalities of Achham, Salyan and Dolakha districts using random selection method. The household survey employed Computer Assisted Personnel Interviewing (CAPI) technique.

2.1 Study Methodology

The study was based on both the primary and secondary sources of information. The assessment started with the detailed review of secondary information sources. The documents and reports provided by EbA II project office were reviewed and analysed. Besides these, the team of experts also reviewed other relevante secondary information at various levels.

The primary data was collected using various tools such as household survey, stakeholder analysis, community consultation, key informant interviews, focus group discussions with concerned stakeholders, and competency analysis (SWOT) based on PESTLE (political, economic, social, technological, legislative and environmental) approach.

The selection of indicators for collection of primary information was based on the result framework/outcome indicators of the project. The consultant also identified additional indicators that truly present the baseline status of the project area and facilitate outcome and impact review.

User's/Farmer's groups, cooperatives, entrepreneurs, non-government organizations and other relevant stakeholders were also the source of the primary information. The upcoming sections elaborate the quantitative and qualitative tools used for data collection.

2.1.1 Desk Study/Literature Review

The desk review was the main tool, which was used to dig out the secondary information from the documents. Review of government policy and program that are directly or indirectly related to Ecosystem-based Adaptation was also carried out. In addition, study team also reviewed the relevant legislative documents such as National adaptation plan, local adaptation plan of action, climate change related issues, periodic plans and policies. The project sites mentioned in the project document were names of previous local units (VDC /municipality) and villages. As the new local units are different from the previous ones, the local leaders were consulted to identify the new Rural/Municipality/ward number of those places mentioned in the project document. The new ward numbers and previous local unit/wards included in those new wards were further verified through Ministry of Federal Affairs and General Administration website. Both the new

Rural/Municipality/ward number formed by including the previous VCD/municipality and ward numbers mentioned in the project document is given in Table 2.1.

Table 2. 1: Verified List of Project Wards and Rural/Municipalities

District	Wards as per Project document	Present Local Units		Previous Local Units	
		Rural/ Municipality	Ward No.	VDC/Municipality	Ward No.
Achham	Babla	Sanfebagar Municipality	13	Babla	1 to 9
	Bhatakatiya	Ramaroshan RM	6	Bhatakatia	1 to 9
	Ramaroshan		5	Ramarosan	1 to 9
	Rishidaha 1	Mallekh RM	1	Risidaha	1,4,8 & 9
	Rishidaha 2		2	Risidaha	2,5 & 7
	Sodasha		6	Sodasa	1 to 9
Salyan	Devasthal	Bangad-Kupinde Municipality	1	Devasthal	1 to 9
	Ghanjaripipal 6		6	Ghanjaripipal	3,4,6 & 8
	Ghanjaripipal 7		7	Ghanjaripipal	1,2,5,7 & 9
	Mulkhola 4		4	Mulkhola	1, 2,3,5 & 6
	Mulkhola 5		5	Mulkhola	4,7,8 & 9
	Suikot 1 and 2	Kumakh RM	1	Suikot	1,2,3 & 9
Dolakha	Khare	Gaurishankar RM	8	Khare	1 to 9
	Lakuri Danda	Bhimeswor Municipality	9	Lakuridanda	1 to 8
	Lapilang 5	Kalinchowk RM	5	Lapilang	1 to 3
	Lapilang 6		6	Lapilang	5 to 9
	Magapauwa 4	Shailung RM	4	Magapauwa	2 to 9
	Jiri 7	Jiri Municipality	5	Jiri	7

Source: http://www.mofald.gov.np/en/nepal-nagarpalika-gaupalika-list and consultation with the authorities at ward level.

2.1.2 Household Survey

The Consultant's team collected quantitative data on household composition, land and water use, crop production, productivity and sales, livestock production and sales, availability and access to forest resources, physical facilities and services, adaptation to climate change, gender and so on in a fully disaggregated fashion through household survey.

2.1.3 Focus Group Discussion (FGD)

Focus Group Discussions were carried out with leaders of community organizations, political organizations and knowledegeable persons in the society. Active and meaningful participation of institutions and members, particularly members from small land holding and marginalized group was sought to get qualitative information for effective and efficient baseline data. Perception of people on the effect/impact of climate change on their livelihood, level of awareness on EbA approach and local adaptation techniques on climate change in the community was collected through FGD using the participatory methods and approaches. The FGD included around 6-10 persons with a mix of gender and social groups.

2.1.4 Key Informant Interviews (KIIs)

Interviews with knowledgeable persons on the EbA approaches of the project districts and municipalities were conducted. The interviews were conducted with persons such as leader farmer, community leaders, technicians, workers, district and local level stakeholders. Information collected through KII included general characteristics of the settlement, existing natural resources and their condition (good or degraded), climate change impacts (if any), prices of inputs and products, markets, road and other infrastructure in the area.

2.1.5 Direct Observations

Information on general characteristics of society, ecological situation, information on public infrastructure such as; road, markets, drinking water and irrigation systems, natural resources and their utilization was collected by concerned professionals through direct observation.

2.1.6 Strength, Weakness Opportunity and Threat (SWOT) Analysis

Success of a project depends on the strength and opportunity available and also weaknesses of the community and any external threats. Therefore, SWOT analysis was conducted with the help of community leaders.

2.2 Survey Tools

The survey methodology was developed based on the objective and scope of works as stipulated in the Terms of References (TOR), discussion and consultation with the different individuals and agencies, additional information collected and reviewed by the consulting firm and previous experience of the consulting firm to undertake similar assignments. Among the different tools proposed, the quantitative tool was used for the household survey. Participatory techniques were used for the qualitative data collection. In addition, direct observation of the ongoing initiatives was made by the team to understand existing socio-economic, resource conservation/use practices in the project area.

2.2.1 Household Survey Questionnaire

The team developed a structured HH survey questionnaire that included sections such as household identification, household size, children's education, employment, migrant labour and remittances, housing condition and physical assets, consumption, expenditure, natural calamities, access to finance, inclusion and financial literacy.

Sample Size Calculation. For the purpose of household survey, sample size was determined using a standard sampling procedure which clearly states the statistical significance level and maximum tolerable level of error. For this survey the consultant team used 95% statistical significance and maximum of 5% error. The required minimum sample size was determined using standard statistical formula

$$n = \frac{Z^2\, pqN}{e^2(N-1) + Z^2\, pq}$$

Where,

n	=	*required minimum sample size*
N	=	*population in the corresponding district*
Z	=	*standard distribution of reliability desired (Z-score corresponding to the degree of confidence at 1.96 corresponding to a confidence level of □ =95%)*
p	=	*probability of selecting an individual for perception survey (0.5)*
q	=	*probability of NOT selecting an individual for perception survey (q = 1-p = 0.5)*
e	=	*level of acceptable maximum error (0.05)*

The minimum required sample size was calculated by inserting the number of beneficiary households of the 10 municipalities (53,811 households) in the above formula (N) along with Z= 1.96, p=05, q= 0.5 and e=0.05, the resultant minimum sample derived was 382. In order to compensate the absence, refusal to respond or complete the interview, 5% increment was made to the sample size. Thus, the maximum targeted sample size was 402 (382+ 20).

Distribution of Sample Size across Survey Locations.

The proposed sample was proportionately distributed among the 18 wards of 10 Rural/Municipalitiesas presented in Table 2.2.

Table 2.2: Distribution of sample Among the Survey Locations

	District	Rural/ Municipality	Ward No.	Number of HH	Sample per ward HHs
Mid-hills	Achham	Sanfebagar Municipality	13	539	19
		Ramaroshan Rural Municipality (RM)	6	828	29
			5	1,031	36
		Mallekh RM	1	449	16
			2	381	13
			6	714	25
	Salyan	Bangad-Kupinde Municipality	1	1,002	35
			6	554	20
			7	563	20
			5	630	22
			4	446	16
		Kumakh RM	1	593	21
High-hills	Dolakha	Gaurishankar RM	8	432	15
		Bhimeswor Municipality	9	924	32
		Kalinchowk RM	5	555	19
			6	651	23
		Shailung RM	4	668	23
		Jiri Municipality	5	493	20
		Total	**18**	**11,453**	**404**

Selection of Households. The survey team used the household list provided by the respective wards. Sampling interval was calculated by dividing the total number of interviews required for that ward. Next, a random number within the range of 1 and sampling interval was generated, which was taken as the first sample. The successive samples were selected adding sampling interval again and again on it until reached the end of the list. Thus, the households were selected using systematic random sampling method.

Data Collection Technique. The household survey employed Computer Assisted Personnel Interviewing (CAPI) technique prepared for Kobo-Collect that runs in android operated tablets/mobile phones instead of traditional method of paper-based interview.

2.2.2 Checklists for Qualitative Data Collection

Qualitative data such as perception on climate change, common natural resources, expectations, opportunities, constraints, and some of the quantitative information such as whether there was some natural disaster in the area in the last ten years and damage made by such disasters were collected through focus group discussion where some 6 to 10 people participated per such discussion.

Key Informant Interviews (KII) were conducted to collect data on markets, prices, agricultural inputs, major commodities traded, wage rates, existing facilities including institutions and general farming systems prevailing in the area. Key informants that were interviewed included elected local representatives, leader farmers, entrepreneurs, agriculture and livestock technicians, forest officers, forest guards and social workers/motivators.

Competency analysis using Strength, Weakness, Opportunities and Threats (SWOT) approach was done with the help of knowledgeable persons in the villages. Major political, economic, social, technological, legislative and environmental (PESTLE) issues were discussed in detail. Collected information were verified using triangulation method.

All of the selected rural/municipality and ward offices were visited and necessary information collected including published documents, wherever available. The Agriculture Knowledge Centres (AKC), Veterinary Hospital and Livestock Service Expert Centres (VHLSEC), Division Forest Office (DFO), Sub Division Forest Office (SDFO), Prime Minister Agriculture Modernization Project (PMAMP) Offices in the project area, Small and Medium-sized Enterprises (SMEs) and local NGOs were visited to gather required information.

2.3 Survey Management

2.3.1 Recruitment of Field Supervisors and Field Enumerators

The consulting firm recruited qualified and experienced Supervisors and Enumerators. While recruiting supervisors and enumerators, the major criteria was their substantial experience in conducting similar surveys in the past.

2.3.2 Orientation Training to Field Enumerators/Supervisors

Consultant team organized a three full day in-house orientation for field surveyors and field supervisors. The training was divided in two parts. Part one covered the theoretical parts such as content of questionnaires, interviewing skills, recording answers correctly, and uploading the information while the other part focused on practical through real situation interview. This activity also served as pretesting of the questionnaire. Necessary adjustment was made in questionnaire based on experiences during pretesting.

2.3.3 Field Supervision

In general, all the team members were equally held responsible for the quality control of field survey work and data entry. But the primary responsibility of maintaining the quality lied to field supervisor. Supervisors checked the completed questionnaires on daily basis and adviced enumerators for corrections, if any. Besides checking completed questionnaires, a few spot verifications were done to assure the quality of collected data. Each survey site was visited by experts for the purpose of supervision and monitoring of field data collection.

2.3.4 Interview of Sample Households

For collection of household level data interview was conducted with the head of households as far as possible. In case the household head was not available for some reason, senior most person available in the household was interviewed.

The respondents providing household level information consisted of both males and females. Male respondents figured out slightly higher percentage (56.7%) in total. Among the respondents, Dalit female figured out highest (48.5% followed by BCTS (43.3%) in the second place and the lowest among Adibasi/Janajati (39.5%).

Table 2.3: Number and Percentage of Respondents by Gender

Categories	Male		Female		Total	
By District						
Achham	88	(63.8)	50	(36.2)	138	(100.0)
Salyan	65	(48.5)	69	(51.5)	134	(100.0)
Dolakha	76	(57.6)	56	(42.4)	132	(100.0)
Total/ Overall	229	(56.7)	175	(43.3)	404	(100.0)
By Caste/Ethnicity						
Dalit	34	(51.5)	32	(48.5)	66	(100.0)
Adibasi/Janajati	69	(60.5)	45	(39.5)	114	(100.0)
BCTS	126	(56.3)	98	(43.8)	224	(100.0)
Total/ Overall	229	(56.7)	175	(43.3)	404	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

CHAPTER III: AGRO-ECOLOGICAL FEATURES OF THE PROJECT AREA

The agro-ecological features discussed in this chapter include natural assets such as rivers, water bodies and watershed; forest and biodiversity; protected areas; geographic features; soil; and major land use and land cover in the EbA-II sites. The sites include the project assigned municipalities and rural municipalities (Sanfebagar, Ramaroshan and Mallekh in Achham, Gaurishankar, Bhimeswor, Kalinchowk, Shailung and Jiri in Dolakha, and Bangad-Kupinde and Kumakh in Salyan). Major issues in natural resource management and ecosystem based adaptation practices that need attention, are also discussed.

3.1 Introduction

The changing climate is no longer an intangible issue, and the realities of its impacts are being felt across the globe (Richard M et. al. 2013). Fragile ecosystems and biodiversity are increasingly impacted by climate change – of which Nepal is recognized as being the 13th most vulnerable country worldwide (USAID)[3]. Analysis of maximum surface temperature records from 49 stations in Nepal between 1971 and 1994 yielded a consistent increase after the mid-1970s, at a rate higher than the global average (Arun Shrestha et.al, 1999). Despite some evidence of change, IPCC's 2007 Fourth Assessment Report designated Nepal a "white spot" because of the limited scientific studies conducted in the region, especially linking climate change with impacts on ecosystems in Nepal (Shakya Mangalman et.al., 2009).

3.2 Ecosystem Based Adaptation (EbA)

Ecosystem-based Adaptation (EbA) fits in the use of biodiversity and ecosystem services into an overall strategy to help people adapt to the adverse impacts of climate change (A. Colls et.al., 2009). It also covers the field of sustainable management, conservation and restoration of ecosystems to provide services that help people adapt to both current climate variability, and climate change. The practice contributes to the strength to cope with changing climate and helps reducing vulnerability and increasing resilience to both climate and non-climate risks and provides multiple benefits to society and the environment. Many recent climate change adaptation practices have highlighted on the use of technologies and the design of climate resilient infrastructure. There is growing recognition of the role a healthy ecosystem can play in helping people adapt to climate change. Healthy ecosystems provide drinking water, habitat, shelter, food, raw materials, genetic materials, a barrier against disasters, natural resources, and many other ecosystem services on which people depend for their livelihoods. As natural buffers, ecosystems are often cheaper to maintain, and often more effective, than physical engineering structures, such as dykes or concrete walls. Ecosystem-based Adaptation, therefore, offers a means of adaptation that is readily available to the rural poor; it can be readily integrated into community-based adaptation and addresses many of the concerns and priorities identified by the most vulnerable countries and communities. Some of the successful EbA practices around word including Nepal are briefly presented in the following paragraphs. Lessons learned from those projects will be helpful in successfully implementing EbA II project.

[3] https://www.usaid.gov/nepal/environment-and-global-climate-change

3.2.1 EbA practices around the world

- *Integrated approach to Ecosystem-based Adaptation in high mountain ecosystems in the Colombian Andes*. Implementation of the Integrated National Adaptation Plan in Chingaza Massif has resulted in an integrated, ecosystem- based vision of the territory. This has improved governance of the region by incorporating Ecosystem-based Adaptation into regional planning processes, including municipal and watershed management plans. It has also contributed to the National Adaptation Policy which aims to integrate sectoral actions towards climate change adaptation and sustainable development. Currently, there are 27 restoring processes being implemented out of 200, which is the target objective, including upper watersheds, riversides and landslides areas. Native plants are selected with the local communities, who are also using climate information to develop early warning systems for fires, landslides and floods. Baseline data has been established for land cover and land use, water and carbon cycles, farming systems, and risk zoning.

- *Identifying opportunities for Ecosystem-based Adaptation in Eastern Africa*. It has improved the capacity for undertaking vulnerability assessments at local level and steps have been taken to develop Ecosystem-based Adaptation practices at community level, including re- vegetation and reforestation of dunes along the Mozambique coast, tree enrichment along flood-prone areas in Tanzania, and use the of non-timber forest products in Zambia.

- *Livelihood enhancement and diversification in Sri Lanka.* Application of the SLED tool has helped community members in Kudawa to realise the importance of diversifying their livelihood options, both to cope with current pressures and increase their capacity to adapt to future change. Based on the success of this pilot study, a new institution, The Marine and Coastal Resource Conservation Foundation (MCRCF) has been established to apply the SLED approach to other coastal villages in Sri Lanka. Livelihood enhancement and diversification, including into activities dependent on well-managed ecosystems, will help reduce coastal communities' dependency on vulnerable, climate-sensitive resources, relieving pressure on ecosystems and increasing resilience to climate change.

- *Integrated water resources management in Tanzania*. Stakeholders are gaining understanding of the social, economic and environmental trade-offs for different water allocations under different future scenarios, (e.g. maximizing hydropower, maximising water for agriculture use). The Pangani Basin Water Office is using this information for a new, and flexible, approach to informed decision-making. They are learning to allocate water within the limits of the river's flow, including to ecosystems in the basin that store water, regulate flows and support livelihoods.

- *Community-based fire management in Australia*. Since the project started, the incidence of destructive wildfires has been reduced. This has reduced the degradation of ecosystem services, and helped protect culturally-significant rock art sites. By limiting wildfires, the project is also reducing greenhouse gas emissions (an estimated 488,000 tonnes of CO2-

equivalent were abated during the first four years). It has generated economic benefits including increased *employment* and economic participation of aboriginal communities and the avoided costs of destructive wildfires and the associated loss of biomass and ecosystem services. Because fire management in Arnhem Land is based largely on Aboriginal practices, the project has also supported the transfer of indigenous knowledge between generations as elders work with young people.

- *Ecosystem-based Adaptation by small-holder farmers in Sweden.* A series of mild winters during the 1990s increased the intensity and severity of pest outbreaks, especially the fungal infestation of crops. This led to experimentation with both new and old crop varieties to test their pest resistance. Farmers found that the multiple-species cropping systems common in the past could produce a more reliable harvest during varying climatic conditions. Such ecosystem- based practices enable the small-holder Roslagen farmers to adapt to a dynamic environment. By diversifying and adjusting ecosystem management practices, farmers can increase their resilience to climate variability and change, while also enhancing local and regional biodiversity.

- *Ecosystem-based Adaptation (EbA) in Mountain Ecosystems of Nepal*. For the first time in Nepal, the Mountain EbA project was implemented from July 2012 to December 2014 in Panchase Mountain Region by the collective effort of International Union for Conservation of Nature (IUCN), United Nations Development Programme (UNDP) and United Nations Environment Programme (UNEP). The project was envisaged to strengthen the ecosystem resilience of the country and reduce vulnerability of local communities with particular emphasis on *mountain* ecosystems. Ministry of Forests and Soil Conservation (MoFSC) was the implementing agency at the National level while Ministry of Population and Environment (MoPE) played overall coordinating role. Besides, Nepal initiated various types of program and activities after initializing the NAPA in 2010. One of the major learnings from the implementation of the project is: social/human adaptation is best achieved by ensuring the continued provision of ecosystem services and enhancing human capacities to address the current challenges and future uncertainties, especially in the context of the mountains of Nepal where communities are still significantly dependent on natural resources for their basic livelihood.

3.2.2 Major Benefits of EbA

- Biodiversity Conservation

Protecting, restoring, and managing key ecosystems helps biodiversity and people to adjust to changing climatic conditions. Ecosystem-based Adaptation can safeguard and enhance protected areas and fragile ecosystems. It can also involve restoration of fragmented or degraded ecosystems, or simulation of missing ecosystem processes such as migration or pollination.

- Carbon Sequestration

Ecosystem-based Adaptation strategies can complement and enhance climate change mitigation. Sustainable management of forests can store and sequestrate carbon by improving overall forest health, and simultaneously sustain functioning ecosystems that provide food, fibre and water resources that people depend on. Conservation and, in some cases restoration, of peatlands can protect very significant carbon stores. Additional mitigation efforts can be

realized through land and water management practices that sustain essential natural resources while minimizing additional greenhouse gas emissions.

- Disaster Risk Reduction

Ecosystem-based Adaptation measures frequently complement disaster risk reduction objectives. Healthy ecosystems play an important role in protecting infrastructure and enhancing human security, acting as natural barriers and mitigating the impact of (and aiding recovery from) many extreme weathers events, such as coastal and inland flooding, droughts, extreme temperatures, fires, landslides, hurricanes and cyclones

- Livelihood Sustenance and Food Security

By protecting and restoring healthy ecosystems to be more resilient to climate change impacts, Ecosystem- based Adaptation strategies can help to ensure continued availability and access to essential natural resources so that communities can better cope with current climate variability and future climate change. In this context, Ecosystem-based Adaptation can directly meet the needs of Community Based Adaptation and poverty- reduction initiatives.

- Sustainable Water Management

Managing, restoring and protecting ecosystems can also contribute to sustainable water management by improving water quality, increasing groundwater recharge and reducing surface water run-off during storms. It is estimated that about one third of the world's largest cities obtain a significant proportion of their drinking water directly from forested protected areas (Source: IUCN).

3.3 Rational of the EbA approach

Nepal is one of the highly vulnerable countries to the adverse impacts of climate change, therefore adaptation to climate change must be the priority for the country to help poor communities to cope with, and adapt to the impacts of climate change (Practical Action Nepal, 2009). Impacts of climate change may affect the availability of natural resources which would create new challenges for women, disadvantaged and indigenous people. The management of water and energy for day to day activities would be more difficult during the dry season. These communities, particularly women, play an important role in the reduction of the vulnerability of climate change, often informally, through participating in disaster management and acting as agents of social change (UN-Habitat, 2015). Rural areas have experienced major impacts on water availability and supply, food security, infrastructure and agricultural incomes, including shifts in the production areas of food and non-food crops. Populations or communities that lacks access in resources could experience higher exposure to climate induced risk, particularly people living in the bottom of the pyramid. Majority of the deprived and indigenous community are most vulnerable because these communities are highly dependent on natural resources for securing their livelihoods.

Further, impacts on natural and human systems from global warming have already been observed. Many land and ocean ecosystems and some of the services they provide have already changed due to global warming. Populations at disproportionately higher risk of adverse consequences with global warming of 1.5°C and beyond include disadvantaged and vulnerable populations, some indigenous peoples, and local communities dependent on agriculture and other ecosystem based livelihoods (IPCC, 2018). Moreover, forests play crucial role and are integral part of the farming system in Nepal. They are the source of day to day needs of farmers

such as fodder for animal, firewood for energy, timber for building materials and part of agricultural implements (Mahat, 1987; Gilmour and Fisher, 1991 and Malla, 2000).

At present, a wide range of adaptation options are available to reduce the risks to natural and managed ecosystems like Ecosystem based Adaptation including ecosystem restoration, avoid deforestation/forest degradation, biodiversity management, sustainable aquaculture, and local knowledge and indigenous knowledge and the risks to health, livelihoods, food, water, and economic growth, especially in rural landscapes. As adaptation and mitigation options for tackling the climate change impacts are already in place, future climate-related risks would be reduced by the upscaling and acceleration of far-reaching, multilevel and cross-sectoral climate mitigation and by both incremental and transformational adaptation measures (IPCC, 2018).

The Government of Nepal initiated National Adaptation Programme of Action (NAPA) in 2010, Climate Policy and Local Adaptation Plan of Action (LAPA) in 2011 and also initiated the National Adaptation Plan (NAP) process in 2017. The LAPA intends to implement the priorities of NAPA more effectively through public and local participation and integrating adaptation into the sectoral plans and policies. The LAPA process demonstrated the possibilities of bottom-up, inclusive and local adaptation planning in Nepal. The Government of Nepal has initiated local adaptation planning processes to address local climatic issues, build resilience, enhance adaptive capacities at the local level and mainstreaming these plans into the development plans. Since, Framework for LAPA was designed to support decision-makers at local-to-national levels to: (i) identify the most climate vulnerable Rural/Municipalities, wards, and people and their adaptation needs, (ii) prioritize adaptation options with the participation of local people, (iii) prepare and integrate local adaptation plans for action at local level, (iv) identify appropriate service delivery agents and channels for funding to implement local adaptation plans for action, (v) assess the progress of LAPA to ensure effective planning and delivery; and (vi) provide cost-effective options for scaling out local-to-national adaptation planning.

Accordingly, Government of Nepal, Ministry of Forests and Environment (MoFE) has recently endorsed National Climate Change Policy (2019) with the aim to provide policy guidance to various levels towards developing a resilient society by reducing the risk of climate change impacts. Nepal started the formulation of its National Adaptation Plan (NAP), adhering to the Cancun Adaptation Framework and this process continued with the GCF-funded NAP Project (2018). Nepal's NAP process is expected to enhance the adaptive capacity and build resilience of climate vulnerable people and communities, geographical areas, physical infrastructure, and ecosystems. The Government of Nepal has recognized climate change adaptation as fundamental to safeguard climate vulnerable communities and ecosystems. The country has developed legal policy instruments, devised frameworks and strategies on planning and financing, and implemented a number of projects and program to enhance the resilience of people and their livelihoods. The guidelines for NAP process envisage to: (i) reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience; and (ii) facilitate the integration of climate change adaptation in a coherent manner into relevant new and existing policies, programs, and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate (NAP/MoPE, 2017).

3.4 Agro-ecological system in EbA

Despite the growing interest in Ecosystem-based Adaptation, there has been little discussion of how this approach could be used to help small holder farmers adapt to climate change, while ensuring the continued provision of ecosystem services on which farming depends. Changes in temperature, rainfall and the frequency or intensity of extreme weather events directly affect their crop and animal productivity as well as their household's food security, income and well-being. The International Union of Conservation of Nature (IUCN) emphasizes that ecosystem-based adaption (EbA) approaches are natural responses to environmental change (including climate change) since they have the capacity to increase resilience and reduce people's vulnerability levels. EbA includes a range of sustainable management strategies, conservation and restoration of ecosystems which take into account the multiple social, economic and cultural co-benefits for local communities to adapt to the adverse effects of climate change (Benjamin D. et.al., 2015).

The land management practices have a profound impact on natural resources such as water, soil, nutrients, plants and animals. Land use information can be used to develop solutions for natural resource management issues such as salinity and water quality. For instance, water bodies in a region that has been deforested or having erosion will have different water quality than those in areas that are forested. Forest gardening, a plant- based food production system is believed to be the oldest form of land use in the world. Farming in local ecosystems gives it an extra edge and a good vantage point for the future, for example, improving soil and plant quality through available biomass and biodiversity, rather than adding different chemical aids in the soil for the betterment of the production.

3.4.1 Agro-ecological principles

a) **Enhance the recycling of biomass, with a view to optimizing organic matter decomposition and nutrient cycling over time:**
   By imitating natural ecosystems, agro-ecological practices support biological processes that drive the recycling of nutrients, biomass and water within production systems, thereby increasing resources efficiency and minimizing waste and pollution. Recycling delivers multiple benefits by closing nutrient cycles and reducing waste that translates into lower dependency on external resources.
b) **Strengthen the "immune system" of agricultural systems through enhancement of functional biodiversity –natural enemies, antagonists, etc. by creating appropriate habitats:**
   Agro-ecological systems improve the use of natural resources, especially those that are abundant and free, such as solar radiation, atmospheric carbon and nitrogen. By enhancing biological processes and recycling biomass, nutrients and water, producers are able to use fewer external resources, reducing costs and the negative environmental impacts of their use; thus, strengthening the 'immune system' of agricultural systems.
c) **Diversify species and genetic resources in the agro-ecosystem over time and space at the field and landscape level:**
   Diversification is key to agro-ecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources. Agro-ecological systems are

highly diverse. From a biological perspective, agro-ecological systems optimize the diversity of species and genetic resources in different ways. For example, agroforestry systems organize crops, shrubs, and trees of different heights and shapes at different levels or strata, increasing vertical diversity.

d) **Enhance biological interactions and synergies among the components of agrobiodiversity, thereby promoting key ecological processes and services:**
Building synergies enhances key functions across food systems, supporting production and multiple ecosystem services. Agro-ecology pays careful attention to the design of diversified systems that selectively combine annual and perennial crops, livestock and aquatic animals, trees, soils, water and other components on farms and agricultural landscapes to enhance synergies in the context of an increasingly changing climate. Building synergies in food systems delivers multiple benefits. By optimizing biological synergies, agro-ecological practices enhance ecological functions, leading to greater resource-use efficiency and resilience.

3.5 Study Districts and Municipalities

The project covers two distinct physiographic regions of Nepal; Mid hills - Achham and Salyan; and High Mountain - Dolakha. A total of 10 rural and urban municipalities encompassing (Sanfebagar, Ramaroshan and Mallekh in Achham, Gaurishankar, Bhimeswor, Kalinchowk, Shailung and Jiri in Dolakha, and Bangad-Kupindeand, Kumakh in Salyan) fall within the project working sites.

3.5.1 Achham

Achham covers an area of 1,692 square kilometres (653 sq mi) and located at Latitude: 280°46' North to 290°23' North and Longitude: 810°32 East to 810°35' East. It is one of the nine districts of the Sudur Paschim Province. Mangalsen is its district headquarters, and had a population of 257,477 in 2011. The lowest elevation point is 540m and the highest elevation point is 3,820m from mean sea level (msl). Elevation of Achham headquarter Mangalsen is 1362 m. Karnali, Budhiganga and Kailash are main rivers flowing through Achham. Subsistence agriculture farming together with small-scale livestock is the main source of livelihood of a majority of population encompassing about 61%. Due to low level of agricultural production, majority of households face acute food shortages for a longer period of the year (RAP# Connect, 2016)[4]. As a result of elevation differences, Achham has four different types of climate: tropical up to 1200m, subtropical from 1,200 - 2,100m, Temperate above 2,100-3300m and Alpine above 3300m. The monthly average temperature ranges form 4.9^{0}C in Januray to 30.2^{0}C in June. The annual rainfall is about 1225.9 mm[5].

3.5.1.1 EbA-II Municipalities

Three municipalities, namely Safebagar, Mellekh and Ramaroshan, have been covered by the baseline study (Fig.3.1) in Achham district. Sanfebagar municipality covers an area of 166.70 Sq. km. The municipality has 14 Wards. Mellekh Municipality covers an area of 134.78 sq.km and has 7 Wards namely Risidaha, Thati, Kuskot, vindhevasani, Shodasha, Nandegada and Hattikot. Ramaroshan covers an area of 173.33 sq.km and it is the largest municipality among

[4] http://archive.rapnepal.com/district/district-profile
[5] Village Profile, Achham

the three. These municipalities are rich in biodiversity and natural environment. Abundant natural resources and wilderness have further added the value of historical and religious importance of these municipalities.

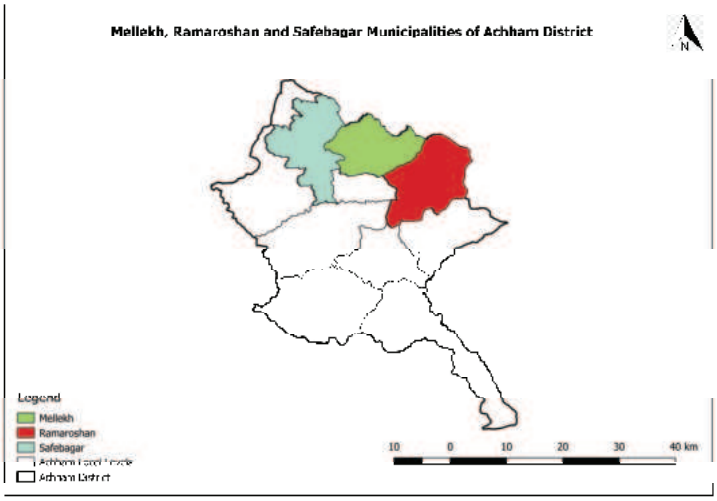


Figure 3. 1: Study municipalities in Achham district (Mellekh, Ramaroshan and Safebagar)

3.5.1.2 Physiographic Zones

The district lies in two physiographic zones namely: Hill and Middle Mountain. However, large portion of the land area of the district lies in Hills. In case of EbA II Project area, Safebagar, and Mellekh have large part in Hill and most part of the Ramaroshan municipality falls in the middle mountain (Figure 3.2). Physiographic zones play a significant role on land use patterns including vegetation, water resources and other agro-ecological set up of a particular location as it is governed by soil, geomorphology, altitude and climatic condition etc.

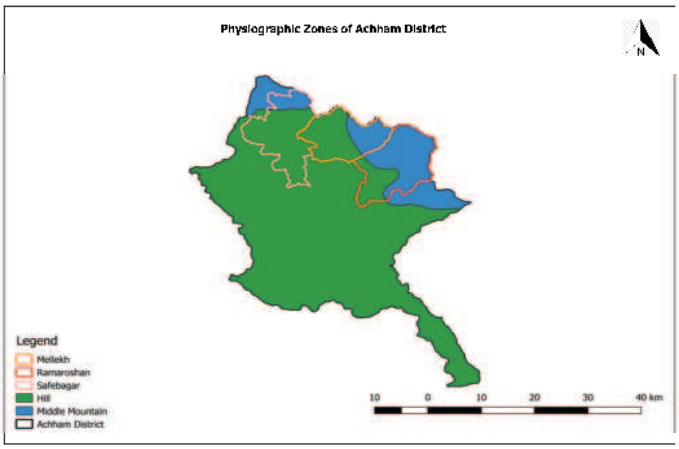


Figure 3. 2: Physiographic zones of Achham district

Achham district is rich in biodiversity. Various types of flora and fauna are found due to its diverse climate and topography. It covers a total land area of 98,640.25 ha and has different types of forest namely; *Abies spectabilis* &Abies *pindrow*, *Acacia catechu & Dalbergia sisso, Cedrus deodara*, Lower Mixed Hardwood, *Pinus roxburghii, Pinus wallichiana*, Quercus, Sal

(Shorea robusta), Tropical Mixed Hardwood and Upper Mixed Hardwood in its category (Source: FRA/MOFSC, 2015). The details on forest types of Achham is presented in figures 3.3.

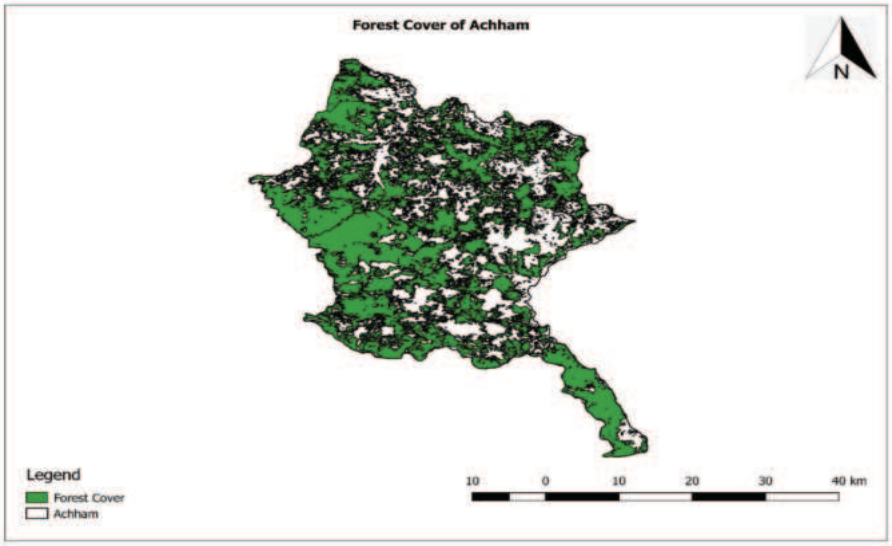


Figure 3. 3: Forest cover of Achham district.

Forests provide much needed products for the livelihoods of people. These include wide range of goods such as timber, fuel wood, fodder, saplings, ground grass etc which are of day to day needs for the people in rural area. In Achham district, some non-timber forest products (NTFPs) and medicinal and aromatic plants (MAPs) are produced either for local use or trade in limited amount. *Utis, Sallo, timur, lothsalla, satuwa, setochini, argeli, amriso, padamchal, sunakhari, sisno* etc were identified as common most NTFPs found in the community forests of Achham district. In fact, the role of community forests in the livelihood of rural people has always remained quite significant as these forests are the main sources that offer the much-needed products of basic needs for these people. Community forests, not only contribute to the healthy ecosystem of the rural area, but also provide a wide range of valuable products such as fuelwood, fodder, grass, timber, bamboo products as well as several NTFPs and MAPs on which the rural people are dependent either directly or indirectly. Specifically, the livelihoods of vulnerable rural people such as women, indigenous group and marginalized communities are inextricably linked with the community forests in which they are attached. Details about the supply of various forest products from community forests to the rural households are provided in Chapter IX. Similarly, the importance of community forests as source of NTFPs and MAPs and their potential role for employment and income generation are provided in Chapter XI.

3.5.1.3 Forest and Biodiversity of EbA-II Municipalities[6] of Achham district

The information on forest coverage and forest types are derived from secondary source (DFRS/MoFSC, 2015) and presented for EbA-II municipalities.

[6] The FRA/MOFSC, 2015 data have been used to interpret the forest and biodiversity of the study districts and municipalities.

a) Sanfebagar Municipality

Sanfebagar is a municipality in Achham District in Far Western Region of Nepal. The municipality was established in 2014 by merging two former Village Development Committees. It lies on the bank of Budhi Ganga River and is located about 25 km north of the district headquarters, Mangalsen.

i) Forest and biodiversity

Sanfebagar covers a total land area of 16,582 ha, out of which 9,151 ha (55.2%) area is covered by forest (DFRS, 2018). About 1102 ha land areas are covered by Community forests (Annex 3.2). Sal *(Shorea robusta*), Sissoo *(Dalbergiya sisso*), Sallo (*Pinus spp*.), Uttish *(Alnus nepalensis*), Panch Aule (*Dactylorhiza hatageria*), Timur (*Zanthoxylumarmatum*), Chiraito (*Swertia chirayita*), Padamchal (*Araheum austral*), Pakhanbed (*Bergenia purpurascens*), Satuwa (*Paris polyphylla*), Banjh (*Dendropbthoe falcata*), Quercus sp and Gunras (*Rhododendron spp*) etc are the main forest species and NTFPs. Similarly, Red Panda, Musk Deer, Himalayan Thar, Barking Deer, Leopard, Bear, Himalayan Ghoral, Wild Boar, Danphe, Munal, and Kalij etc are main mammalian spp found inside the forests[7].

According to FRA data, Sanfebagar municipality has eight different types of forests. Figure 3.4 presents forest types. These are Tropical Mixed Hardwood, Shorea robusta (Sal), Lower Mixed Hardwood, Upper Mixed Hardwood, *Pinus roxburghi* (Tingre salla), *Acacia catechu* and *Dalbergia sissoo* (Khair and sissoo forest), *Pinus walichiana and Quercus* (Gobre salla and khasru forest).

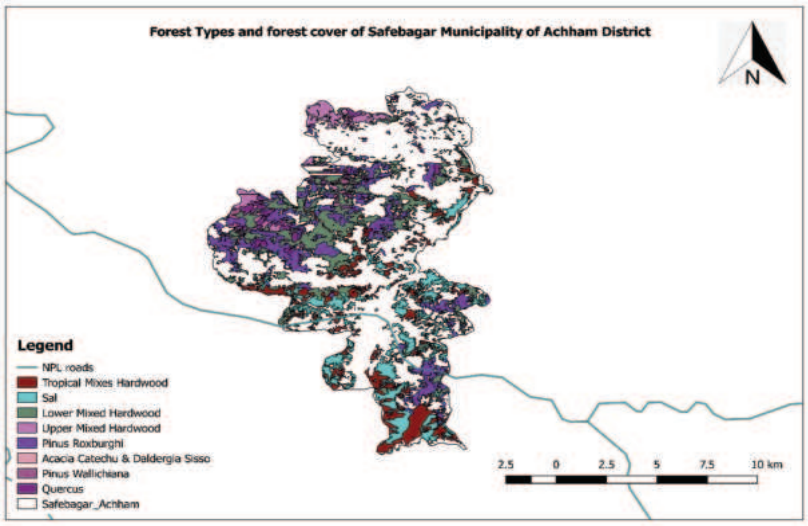


Figure 3. 4: Forest types and forest cover of Safebagar Municipality.

b) Mallekh Rural Municipality

Mallekh Rural Municipality is one of the three municipalities selected for the implementation of EbA-II. This municipality is rich in biodiversity and significant portion of the land is covered by forest.

[7] Source: Institutional Survey, 2074

i) Forest and Biodiversity

Mellekh has a total land area of 13,408 ha, out of which 8,242 ha (61.5%) is covered by forest[8]. Figure 3.5 shows that Mellekh rural municipality of Achham district have nine different types of forest namely: Tropical mixed Forest, Sal Forest, Lower Mixed Hardwood, Upper Mixed Hardwood, *Pinus Roxburghi*, *Acacia Catechu and Daldergia Sisso, Pinus Wallichiana, Quercus and Cedrus Deodara.*

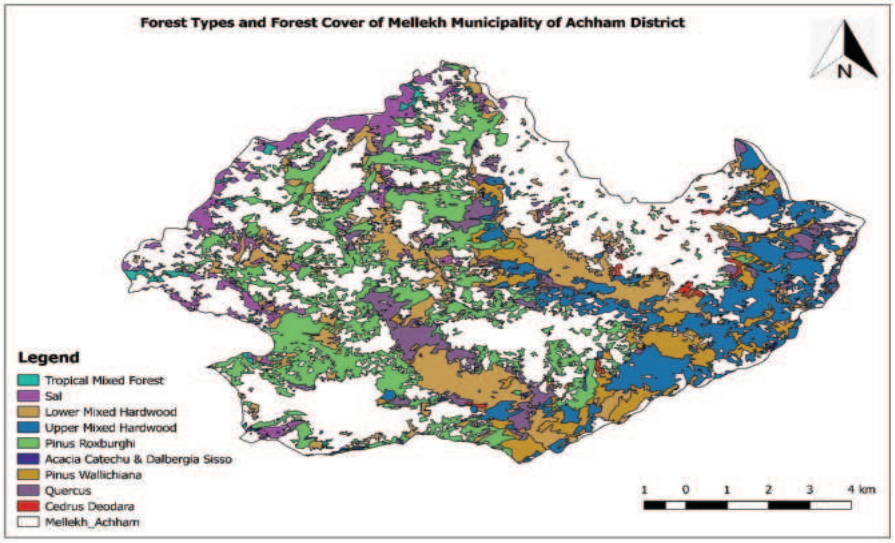


Figure 3. 5: Forest types and forest cover of Mellekh Rural Municipality.

c) Ramaroshan Rural Municipality

Ramaroshan is situated at an altitude of about 2500 m in Achham district of Seti Zone in Western Nepal. The municipality is amongst the three municipalities selected in Achham for the implementation of EbA-II. Located in the bank of Budhiganga River, the name of the municipality is derieved from the God Rama.

i) Forest and Biodiversity

Ramaroshan covers an area of 17,246 ha, out of this 12,075 ha (70%) is covered by forest. Figure 3.6 presents different types of forests in Ramaroshan rural municipality. There are a total of ten different types of forests and these are namely: Tropical Mixed Hardwood, *Shorea robusta*, Lower Mixed Hardwood, Upper Mixed Hardwood, *Pinus roxburghi*, *Acacia catechu and Dalbergia sissoo, Pinus wallichiana, Quercus, Abies spectabilis and Abies pindrow and Cedrus deodara.*

[8]DFRS, 2018

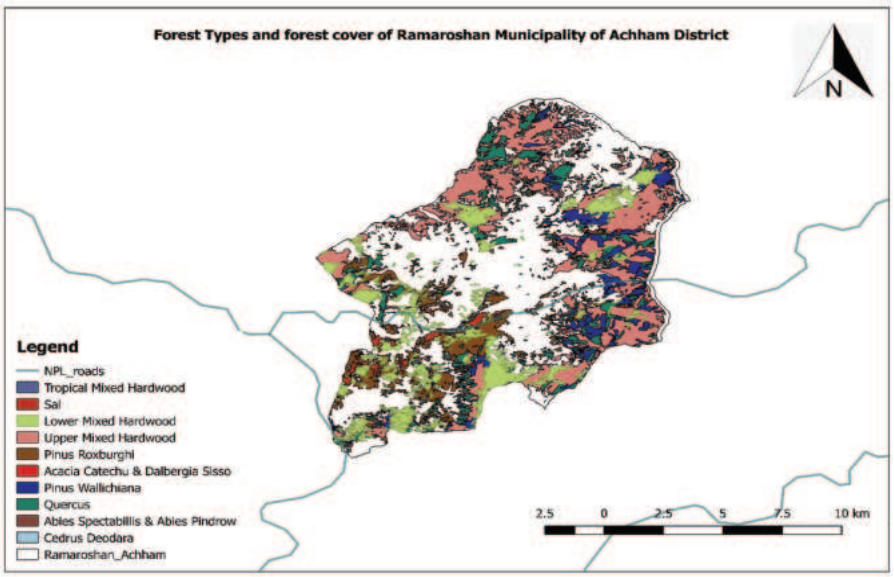


Figure 3. 6: Forest types and forest cover of Ramaroshan Rural Municipality

ii) Wetlands and Lakes

Field survey indicates that lakes in the Ramaroshan wetland sites are gradually shrinking due to siltation and invasive species. As the wetland is surrounded by forest, leaching of nutrients from forest occurs which causes eutrophication. It is necessary to regularly remove invasive species from the lakes and prevent the lake area from shrinking. It is also necessary to establish some filtration mechanisms so that the streams feeding the lakes do not cause soil erosion and excessive foliage and silt from forest areas surrounding the wetland. Check-dams between Batulla Daha and Lama Daha need to be repaired as they are eroded and afforestation around the lake area must be taken into consideration. Agricultural areas are located only in downstream site of the wetland. Dadari grassland area, which lies above the wetland needs to be managed to minimize and control soil erosion[9].

A view of Ramaroshan (*photo credit: By Redpandamoon - Own work, CC BY-SA 4.0*)

[9] Field Survey, 2020

3.5.1.4 Tourism and cultural heritage

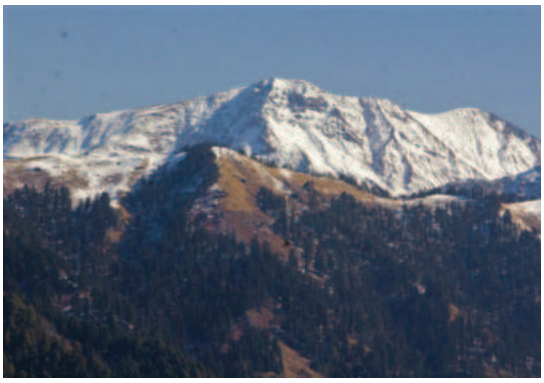
There are some promising tourist destinations that exist in Achham District including Khaptad National Park. In Sanfebagar, the touristic sites are Baidhyanath, Jalpadevi, Budhiganga River, Triveni, Kailash Khola as well as Tapadikunda, Kalikadevi temple, Babala etc. Baidhyanath is main touristic destination and is a famous religious site. Sangaradevi temple, having forest of Rhododendron spp adds further richness in the biodiversity. A total of 19 hotels and one homestay are operated in this municipality[10].

A view of Sanfebagar *(photo credit: Trilochan Thapa)*

Mellekh RM is famous for Mellekh bazar which is one of the beautiful markets of Achham district as is situated on the top of Mellekh hill and surrounded by beautiful green forest. Mellekh is one of the important business centres of the area. It is also serving Bajhang and Bajura districts. Previously, it was the main village centre for Nandegada, Kuskot, Sodasha, Nuwagau, Bindhyabasi VDCs. It has various historical and natural, scenic places for amazing experience of trekking and unique far western cultures[11].

With rich biodiversity full of wilderness and natural beatuties, Mellekh is also a site of tourists' attraction. It provides healthy ecosystems goods and services to local people, home to mountainous flora and fauna species, and a space for scientists for study and research. Mellekh remains intact with natural attraction that has not been disturbed by modern developments. The local goverment has proposed to extend its connectivity with other sites and develop required infrastructures for eco-tourism promotion. *Sodasa and Rishidaha* are some example of historical and religious touristic destinations in Mellekh RM.

A historical Bimkot darbar, Mellekh*credit: Mellekh RM webpage)*



A view of Mellekh snow hill with sparse vegetation *(credit: Mellekh RM webpage)*

[10]Source: Institutional Survey, 2074
[11]source: http://suggestnepal.com/listing/mellekh-bazar-achham/

A panoramic mountain view with dense forest *(credit: Mellekh RM webpage)*

A view of snow hill, Mellekh *(credit: Mellekh RM webpage)*

Ramaroshan rural municipality is also famous for its wilderness and scenic beauty as it is one of the 100 destinations selected by the government for tourism promotion and lies in the trekking route to Khaptad National Park. Bhatakatiya and Ramaroshan lakes are precious place for tourism which could be promoted as sustainable source of employment and income for the local communities (Please refer Chapter XI). Ramaroshan is an important wetland known as land of 12 lakes and 18 patch of meadows (grassland) with stiff rocky cliffs. Among the 18 patans, Kinemine patan is possibly the largest *patan* in Achham from where the Kailash river is flowing. This area lies in the highlands of the district and surrounded by forest and terraced hill slopes with lush green landscape in its surroundings. The area has rich biodiversity with different varieties of flora and fauna including Rhododendron, medicinal herbs as well as national bird Lophophorus, known as Danphe. The endangered mammalians in the area add precious value for tourist attraction[12].

3.5.1.5 Rangelands

FGDs with the beneficiaries indicated that rangelands were integral part of farming and livestock raising in the rural communities of Achham district. In EbA-II sites of Achham, households use the rangelands for grazing livestock, mainly sheep during monsoon when the households face shortage of crop residues namely straws, hay, maize or millet pillages. The EbA-II communities of Achham district suggested various sites where they considered necessary to restore the rangelands which have been degraded gradually over the years. The degradation of rangelands were caused largely due to uncontrolled grazing of livestock. The suggested rangelands for restoration were: Telegadha, Mastamandu, Syaule and Gumel in Ward-1 of Mallekh Municipality. In Ward-2, the sites suggested for rangeland improvements were Banpada, Thala, Naulaban, Khadindramul, Majaun, Rolta, Sirkitte etc. In Ramarosan also, some sites were named for restoring rangelands. These were Bagebachala and Netakot in Ward number-5 and Junna, Basanta and Sunni in Ward number-6. Similarly, in Sanfebagar Ward -13, the suggested sites for rangelands improvement were Jajar, Lambelo and Katrofalne saldado. In EbA-II sites of Achham, a total of 472 ha rangelands were demanded for restoration (Annex 13-2).

[12]https://en.wikipedia.org/wiki/RamaroshanSite, https://newbusinessage.com/Articles/view/9941

3.5.2 Salyan

One of the districts of the Karnali Province, Salyan covers an area of 1,462 km2 (564 sq mi) with a population 241,716 in 2011. It is located at 28°22'31N 82°9'42E at 1530 metres elevation (5020 feet). It is situated in an altitude ranging from 457 meters to 3049 meters from the sea level[13]. It comprises of hill slopes, forested lands of different types, small valleys, riverine, streams and rivers. The forest covers 960.3 km^2 out of the total land area of the district. From the climatic point of view, Salyan has a normal range of temperature depending upon the variations on the altitudes. It is located in the mid hill belt. The southern part of the district has tropical warm climate which successively keeps changing towards the northern parts. The southern valleys and flat lands along the river banks have tropical climate whereas sub-temperate climate dominates the mid hills and higher altitudinal areas. The average monthly temperature ranges from 2.2^0C (Mangsir/Poush) to 38.2^0C (Jestha). The average annual rainfall of the district was recorded at 1163.7ml[14]. Kapurkot is the place with maximum rainfall in the district. The warmest place of Salyan is Sallibazar, Devsthal.

Salyan district has 121229.3 ha of forest area. The forest cover of the district consists of different types of forest namely; Tropical Mixed Hardwood, Sal, *Pinus roxburghii*, Lower Mixed Hardwood, *Quercus*, Upper Mixed Hardwood, *Pinus wallichiana*, *Cedrus deodara*, *Acacia catechu& Dalbergia sisso* and Picea *smithiana* (FRA/MoFSC, 2015). Similarly, different types of NTFPs are also available in the district namely; *Acorus calamus, Aspara racemosus, Bergenia ciliate, Cinnamomum glaucescens, Cinnamomum Tamala, Dioscorea deltoidei, Juglans regia, Lichens, Phyllanthus emblica, Piper lungum, Rubia manjith, Sapindus mukorossi, Tionospora sinensis, Valeriana jatamansii, Zanthoxylum armatum* etc.

3.5.2.1 EbA-II Municipalities

In Salyan district, Bangad-Kupinde Municipality and Kumakh Rural Municipality have been included for EbA II implementation. Bangad-Kupinde covers an area of 338.19 sq.km and Kumakh has an area of 177.27 sq. km with 5 Wards namely; Kalagaun, Wadagaun, Jimali, Marmaparikada and Suikot.

Of total land area of 33678 ha, Bangad-Kupinde's forest cover is 22709 ha (67.4%). Likewise, Kumakh covers the total land area of 17658 ha, of which 10408 ha (58.9%) is covered by forest[15].The location of the study area and municipalities are presented in Salyan district map as below. (Figure 3.7).

[13] https://en.wikipedia.org/wiki/Dolakha_District#Geography_and_climate
[14] Salyan Mnicipality Profile, 2075
[15] DFRS, 2018

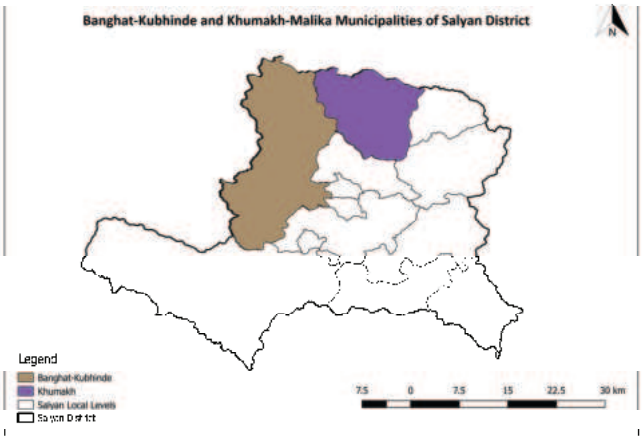


Figure 3. 7: Bangad-Kupinde and Kumakh municipalities of Salyan district

3.5.2.2 Physiographic Zones

Salyan district includes two physiographic zones namely - Siwalik and Hill. However, both EbA II municipalities (Bangad-Kupinde and Kumakh) are located in hill zone (Figure 3.8). Physiographic zones play a significant role on land use patterns including vegetation, water resources and other agro-ecological set up of the particular location as it is governed by soil, geomorphology, altitude and climatic condition etc.

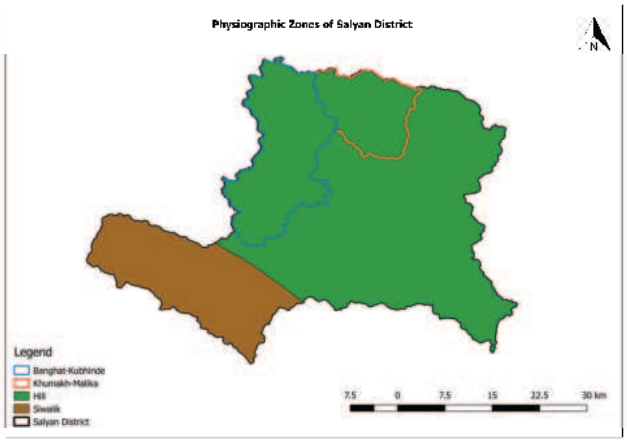


Figure 3. 8: Physiographic Zones of Salyan District.

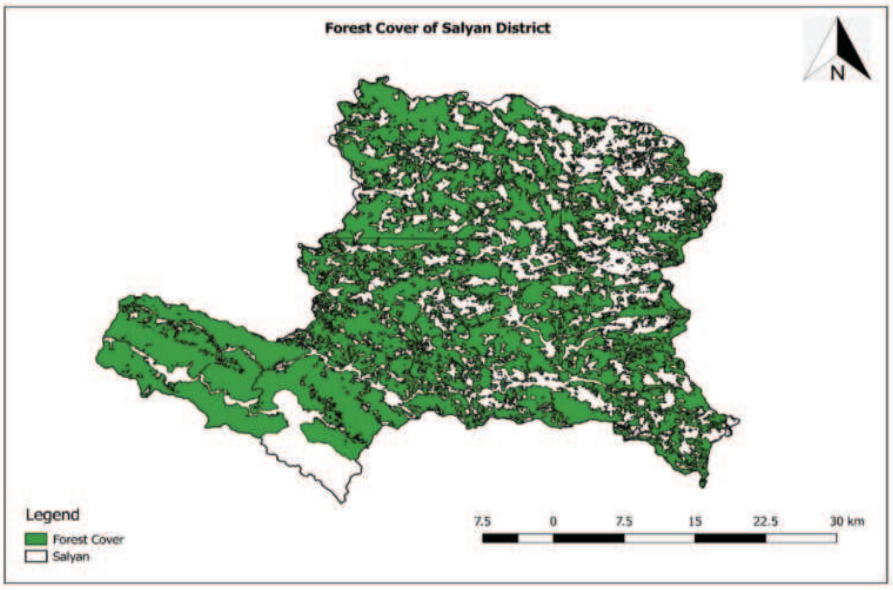


Figure 3. 9: Forest Cover of Salyan District.

3.5.2.3 Forest and Biodiversity of EbA-II Municipalities

Following sections deal with the forest situation of the Municipalities selected for EbA-II in Salyan District. These are discussed separately for each EbA II Municipalities.

FGDs with the communities in EbA-II sites of Salyan district revealed limited operations on forest products extraction/collection, processing and marketing. In Salyan, few CFUGs reported their involvement in the collection and sale of NTFPs. The beneficiaries, however, observed that restoration of forest/degraded lands and plantation of NTFPs and MAPs would contribute to enhance production of some NTFPs in EbA-II sites. *Timur*, *amala*, *tejpat*, *sisn*oo, *burjo* etc were identified as the potential NTFPs that could be promoted in the community forests of Salyan district from long term employment and income point of view (Please refer Chapter XI for details about community forests).

a) Bangad-Kupinde Municipality

Bangad-Kupinde Municipality is one of the two municipalites selected for EbA-II activities in Salyan District. The map depicts all types of forest cover ranging from tropical to high altitude forest species.

i) Forest and Biodiversity

The map elucidates that the Bangad-Kupinde Municipality of Salyan District has mainly six different types of forest namely; Tropical Mixed Hardwood, *Shorea robusta* (Sal), Lower Mixed Hardwood, Upper Mixed Hardwood, *Pinus roxburghi* (Rani salla) and *Quercus spp*.(Khasru).Further, *Pinus roxburghi* (Rani salla) is the main forest type followed by Lower Mixed Hardwood and Tropical Mixed Hardwood in the municipality.Remarkebly, Upper Mixed Hardwood type occupy the least are among others followed by*Quercus spp* and *Shorea robusta*.

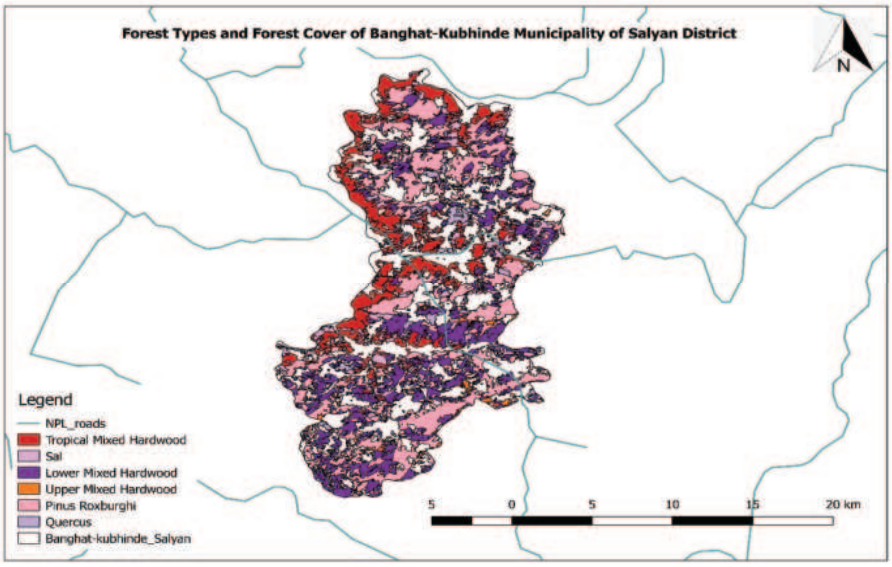


Figure 3. 10: Forest types and forest cover of Bangad-Kupinde Municipality.

ii) Wetlands and Lakes

Kupinde lake and other wetlands are gradually shrinking due to siltation and lack of proper forest management. There is high risk of sedimentation as the wetlands and lake is surrounded by four streams (Jyamire, Majh, Dulo and Kubhinde) which drain directly in the lake. As the lake is surrounded by forest, leaching of nutrients from forest is also a problem triggering eutrophication. Therefore, filtration mechanisms and check-dams need to be built so that the streams feeding the lake does not cause soil erosion and excessive foliage and silt from forest areas surrounding the lake is not deposited. Meanwhile, integrated watershed management together with plantation inside the degraded land and open space must be taken into consideration. Watersheds and forests located around the lake needs to be properly managed to minimize and control the sedimentation and soil erosion. Besides, waste needs to be taken away and managed properly[16]. Some of floral species found inside the forest are *Sal, Chiuri, Mahuwa, Salla, Tinu, Kaphal, and Chiniya.* Local people informed that the lake changes its color once a year.

[16] Based on KII, 2020

A view of Kubhinde lake from Bhangad – Kupinde Municipality of Salyan district

b) Kumakh Rural Municipality

Kumakh Rural Municipality is situated at an altitude of 450 to 2000 m from sea level. It lies at 28 ° 41 '03 North Latitude and is spread over 177 square kilometers. The municipality also includes several historical and religious sites such as holy temple of Salyan district, Sidddhababa temple and mysterious Siddha Cave.

i) Forest and biodiversity

There are seven different forest types in Kumakh Rural Municipality as presented in the map (Fig. 3.11). These seven different types of forest of Kumakh are: Tropical Mixed Hardwood, *Shorea robusta* (Sal), Lower Mixed Hardwood, Upper Mixed Hardwood, *Pinusroxburghi* (*Rani salla*), *Quercus spp.* (Khasru) and *Cedrus deodara* (Devdar). *Pinus*roxburghi (*Rani salla*) is clearly seen as dominant forest type in Kumakh, followed by Lower Mixed Hardwood, Tropical Mixed Hardwood and *Shorea robusta* (*Sal*). Interestingly, *Quercus*and *Cedrus deodara*forest types occupy the least in particular sites of Kumakh.

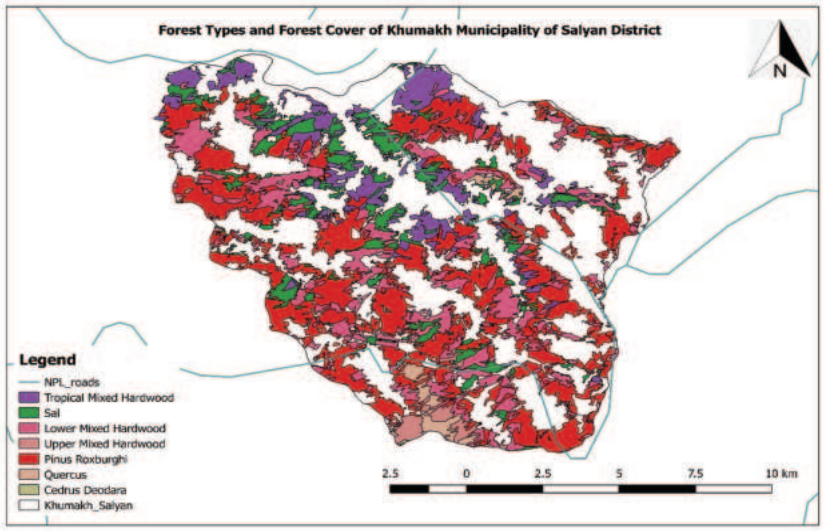


Figure 3. 11: Forest types and forest cover of Kumakh Rural Municipality.

3.5.2.4 Tourism and cultural heritage

There are a number of important places with cultural, historical and religious significance in Salyan district. The district holds a rich history from the ancient times and has various temples, heritage sites, lakes and ponds which are the main attractions for tourists. Some notable religious spots in the district are Khairawang Bhagwati, Chhayachhetra, Satidevi temple, Khalanga Ganesthan temple, Devsthal Krishna temple, Siddaratnanath temple, Kalika temple, Bhimsen temple, and Mokhlabaje cave. Besides, Falawang palace is historically important palace of Salyani King. Kubhinde and Kachhuwa lakes, and Kumakh and Jathak hills of the district are some of the scenic sites with rich biodiversity. These sites could be developed as tourism destination and could contribute to revenue generation and livelihoods. It is also a precious home for various wetland species as well.

Kubhinde Lake (Daha) is one of the greatest lakes in the district which is about 15 km west of Khalanga. The lake is gradually turning into a touristic destination of the area. The Lake makes for an awesome sight which is surrounded by rocky hills and forest in all sides. A temple

name Kailu Barahadev is located at the upper part of the lake where devotees come to pay respect. Around 2000 persons visit the lake each month. Kubhinde lake is like a tiny phewa lake of Pokhara where one can hire boat that costs Rs 500 to 1500. It takes nearly 45 to 60 minutes for boating the entire lake. Interactions with municipal stakeholders indicate that there are several picnic spots which can be developed as income generating activities for locals.

Kumakh hill is situated at an altitude of around 2520 m from mean sea level and is the highest hill in the District. Located at a distance of around eight hours' walk from Salyan's headquarters, Khalanga, Kumakh is regarded as an important place from religious and natural tourism perspective. At the top of hill, there is a temple named Sidda Mandir which is dedicated to God Shiva. Dozens of caves are located at different spots on the hill which are the attractions for tourists. Kumakh Hill represents a place of natural attraction and is surrounded by greenery. The natural beauties in the periphery further enhance its glory. Apart from this, about 15 district's landscape can be viewed from the top of Kumakh Hill. The impressive meadow on the Hill top is an ideal spot to view the breath-taking scenes of Sisne Himal, Dhaulagiri Himal, Chakhure Himal and many more Himalayan peaks in the north.

In addition to its beauties, many important herbal species and plants are found in the Kumakh Hill. The place is also a home for rare birds and several other wild animals are sighted in nearby hills of Kumakh. Given these potentialities, it is important to make joint efforts by concerned agencies that would contribute to planned conservation and management of Kumakh Hill[17].

A view of Kumakh hill, Kumakh Rural Municipality of Salyan (Photo credit: Dhurva Raj Oli)

3.5.2.5 Rangelands

Rangelands are important source of forage and grass for livestock for the rural communities. In Salyan, the rangelands are used for grazing livestock mainly cattles, goats and sheep. Households of higher altitudes depend mainly on rangelands where they take their livestock, mainly seep herds for grazing during summer. Beneficiaries of two Wards of Bangad-Kupinde Municipality demanded for rangeland improvement in different patches of community forests. In Ward number -5, the rangeland restorations were demanded in CFUGs viz Shreepani, Pipaldada, Chyandada, Sera, Kalikhet, Kolgade, Bhateni, Pakhapani, Garacha, Sansabarule. Similarly, various potential sites were identified for rangeland restoration in Bhirchuli

[17]The Rising Nepal, 15th Oct 2019

community forest of Ward -7 of Banagad Kupinde Municipality. In EbA-II sites of Salyan district, the communities suggested the restoration of 159 ha rangelands (Annex 13.2).

3.5.3 Dolakha

Dolakha District lies in Nepal's Middle Hills/Middle Mountains and is crossed north to south by the Tamakoshi River. The district headquarters is Charikot, an important market place, transportation hub and government center. The district covers an area of 2,191 km^2 and had a population of 186,557 in 2011. It is located at latitude 27°47′37.68″ North, longitude 86°11′03.48″ East and is situated in the height of 762 meters to 7183 meters from mean sea level (msl). Dolakha has seven different types of climate: Upper tropical up to 1,000 m, subtropical from 1,000 to 2,000 m, Temperate from 2,000 to 3000m and Sub-Alpine from 3000m to 4000m, Alpine from 4000m to 5000m and Nival above 5000m. The average annual rainfall is around 2353 mm[18]. The monthly average minimum temperature is 1.6^{0}C (January) and the mothly average maximum temperature is 24.2^{0}C (June).

3.5.3.1 EbA-II Municipalities

All five EbA-II municipalities of Dolakha District were covered by the baseline study. These were Bhimeshwor Municipality, Garushankhar Rural Munucipality, Jiri Municipality, Kalinchwok Rural Municipality and Sailung Rural Municipality. With an area of 132.50 sq.km (13250 ha), Bhimeshwor Municipality is divided in 7 Wards (Charikot, Mati, Dolkha, Makaibari, Boch and Lakuridada). Gaurishankhar Rural Municipality covers massive 681.4 sq.km land area (68140 ha), and is the biggest one among EbA-II municipalities. Jiri Municipality covers an area of 211.26 sq.km (21126 ha). Similarly, Kalinchwok Rural Municipality is holding an area of 132.48 sq.km (13248 ha) and is divided into 9 wards. Similarly, Sailung Rural Municipality covers an area of 128.65 sq.km (12865 ha). The EbA sites covered by the baseline study in Dolakha are presented in figure below.

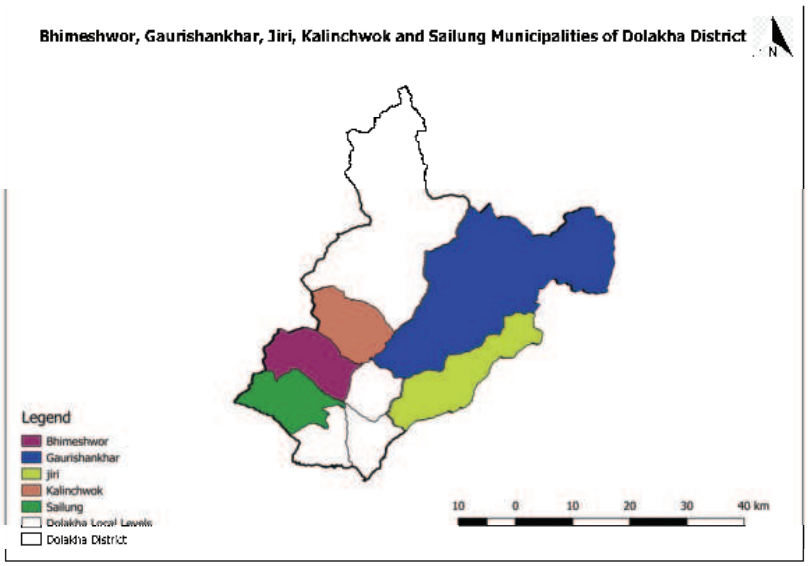


Figure 3. 12: Project sites in Dolakha (Bhimeshwor, Gaurishankhar, Jiri, Kalinchok and Sailung municipalities)

[18] dhm.gov.np

3.5.3.2 Physiographic Zones

Dolakha district contains three physiographic zones namely - Hill, Middle Mountain and High Mountain. Jiri Municipality and Gaurishankar Rural Municipality lie in Hill, Middle and High Mountain zones whereas the other three municipalities (Bhimeshwor M, Kalinchowk RM and Sailung RM) are in Hill and Middle Mountain zones.

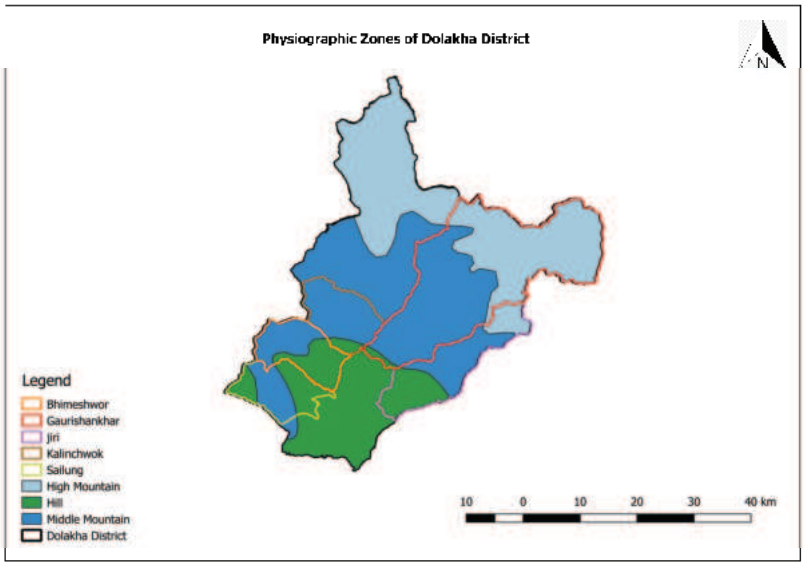


Figure 3. 13: Physiographic Zone of Dolakha District.

3.5.3.3 Forest and Biodiversity of EbA-II Municipalities

Following sections deal with the forest situation as well as land use and land cover of the Municipalities selected for EbA-II in Dolakha District. These are discussed separately for each EbA II Municipalities.

i) Forest and Biodiversity

Dolakha has 97,068.39 ha of forest land which includes varieties of forest types. The forest areas vary significantly with altitudinal ranges, climatic regions and geomorphology. Municipality wise, vegetation/forest types maps are generated based on data published by DFRS/MoFE in 2015 (for detail see the figures 3.14-18 representing each municipalitie's forest types).

Dolakha is a mountainous district with high altitude biodiversity. Therefore, flora and fauna of both Mid Hill and High Mountain zones can be found in the district. For example, *Bhojpatra* (*Betula utilis*), *Tasipatra, Thingure Salla, Dhupi* (*Cryptomeria japonica*), Khasru (*Quercus semecarpifolia*), *Phalat, Bashet, Laligurash* (*Rhododendron arboretum*), *Banjh* (*Quercus leucotricophora*), *Champ* (*Michelia champaca*), *Ageri, Lauth salla* (*Taxus wallichiana*), Uttis (*Alnus nepalensis*), *Saur, Pate Sallo, Gobre Sallo* (*Pinus wallichiana*), *Arkhulo, Kattus* (*Castanopsis indica*) are some of tree species found in Dolakha. Likewise, *Nigalo, Jatamsi, Bisphej. Chiraito, Bishjara, Lokta, Argeli, Allo, Van lasun, Jhyau, Sunakhari, Pakhandev, Thulo Okhati, Sughandhavala, Timur, Bojo, Dhasingre Padamchal, satuwa, argeli, paanch aule, Majhitho, Dhasingre, Kurilo* etc. are some examples of different types of

NTFPs found in the district. Besides, Pangolin, Clouded Leopard, Bear, Deer, Himalayan Ghoral, Red Panda, Wild Boar etc. are the faunal species found in Dolakha[19].

Field survey reveals that quite a large variety of trees and NTFPs are found in the forests of Dolakha District which are used as raw materials for selected rural micro enterprises. Trees such as *Uttis* and *Sallo* are widely used for timber purposes for the construction of buildings. *Argheli* and *Allo* are the most common non-timber forest products available in large amount in the community and private forests of the district. These products are used for making Nepali paper since long which are also a source of income to some rural households. Commercial use of these products is, however, limited to Jiri and its surrounding where the paper mills have been established since long. Other NTFPs such as *machino, lothsalla, siltimur/boketimur, padamchal, budiokto, jatamasi, sunakhari, banlasun* etc were also reported to have high medicinal value but their use has been constrained for different reasons such as lack of effiecient technologies, lack of secured markets and quality of the products. Focused Group Discussions (FGDs) in EbA-II settlements of Dolakha District clearly suggest immense potentialies of several NTFPs that could be utilized to enhace sutainable livelihoods of rural people in Jiri and other EbA-II municipalities of Dolakha (Please refer to Community Livelihood Improvement Plan in Chapter XI). Discussions with community forestry groups in many settlements also showed urgency to initiate scientific plantation and harvesting of NTFPs from ecological point of view.

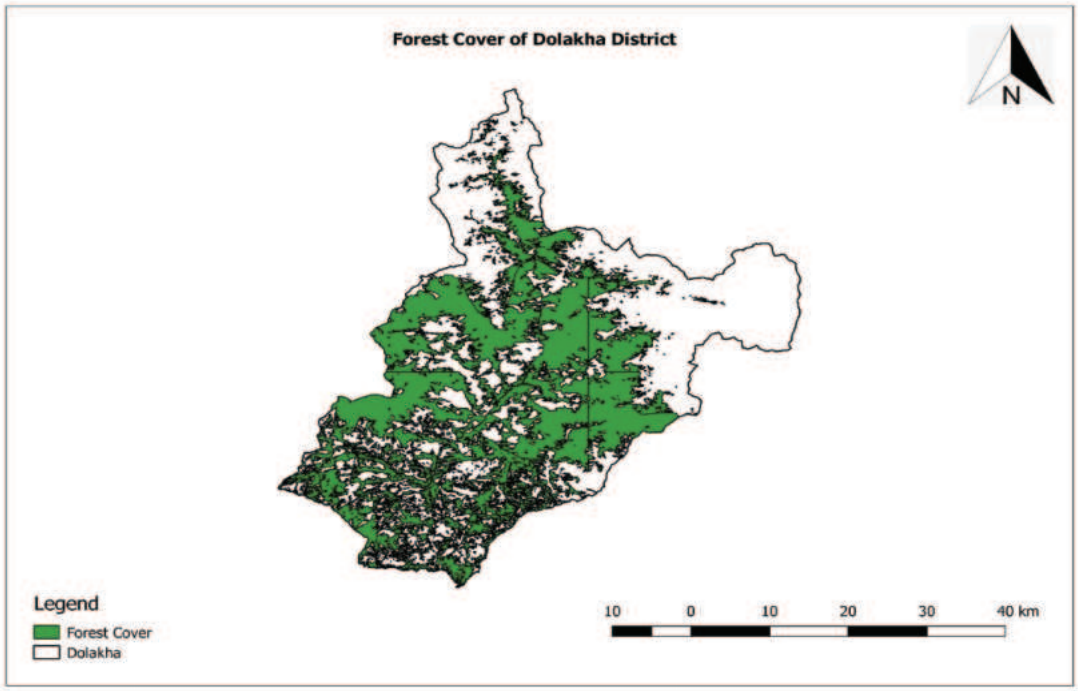


Figure 3. 14: Forest cover of Dolakha Distrct

[19]*Source: Institutional Survey, 2074*

a) Bhimeshwor Municipality

Bhimeshwor (formerly Charikot) is a municipality in noth-eastern Nepal and the district headquarter of Dolakha. It is one of the five municipalities proposed for the implementation of EbA-II. Bhimeshwor is traditionally popular for its rich biodiversity, culture, religion and recently as a touristic destination.

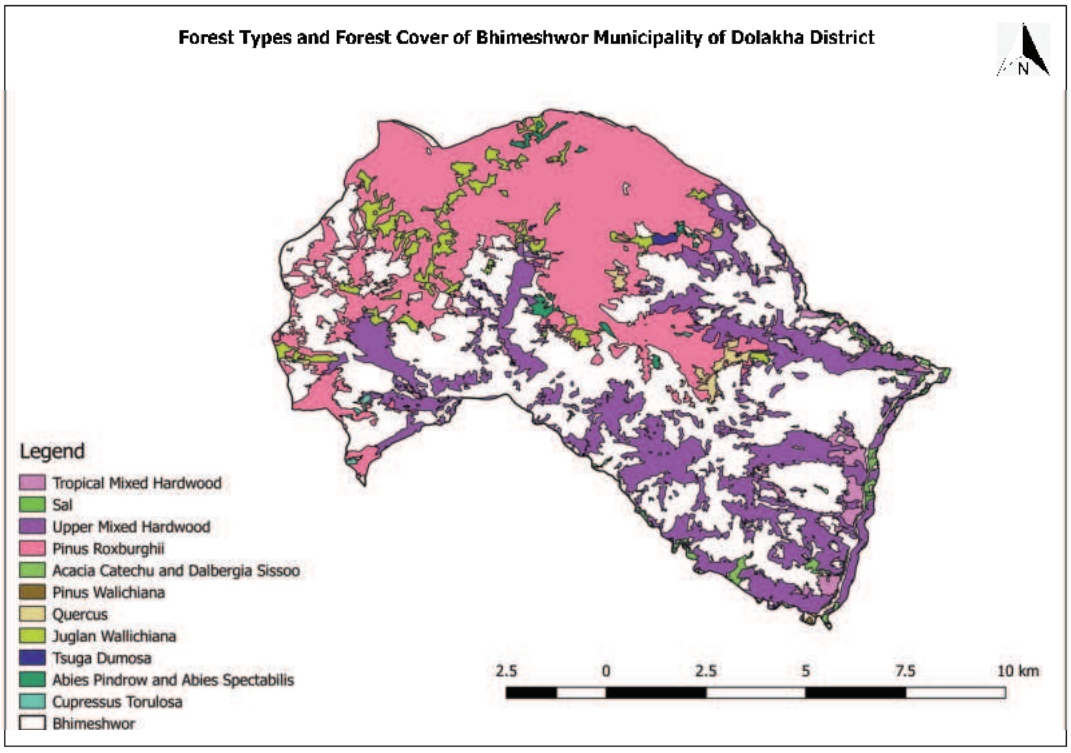


Figure 3. 15: Forest types map of Bhimeshor Municipality of Dolakha.

i) Forest and Biodiversity

Bhimeshwor's total land area is 13,194 ha, of which 7,718 ha (58.5%) is covered by forest (DFRS, 2018). The above map elucidates that Bhimeshwor municipality of Dolakha district has eleven different types of forest namely: Tropical Mixed Hardwood, Sorea robusta (Sal), Upper Mixed Hardwood, *Pinus roxburghii* (Rani salla), *Acacia catechu and Dalbergia sissoo* (Khair and Sissoo), *Pinus wallichiana* (Gobre salla), *Quercus*(Khasru), *Juglan wallichiana*, *Tsuga dumosa*, *Abies pindrow, Abies spectabilis and Cupressus torulosa*.Among these, the forests in the municipality is dominated by *Pinus roxburghii*type followed by Upper Mixed Hardwood and *Juglan wallichiana.*

b) Jiri Municipality

Jiri is a well-known municipality which is situated at north eastern part of Nepal. It lies at an elevation from 1649 m to 5341m above sea level and occupies 211.25 sq. km land area. The place is also known for its wonderful natural landscape and greenery which is also famous as a gateway for high altitude treks including Mount Everest. Jiri Municipality is traditionally a popular destination of Dolakha district and is one of the five Municipalities supported by EbA-II.

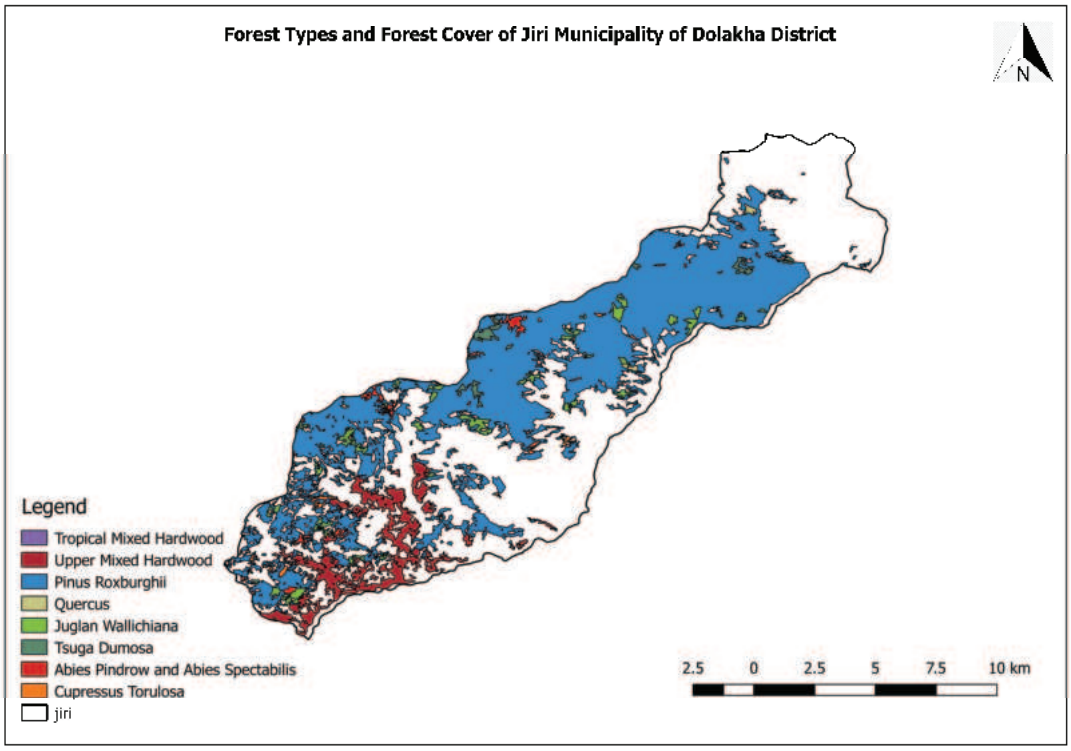


Figure 3. 16: Forest types map of Jiri Municipality of Dolakha.

i) Forest and Biodiversity

Jiri municipality covers a total land area of 21,028 ha, of which 12,125 ha (57.7%) area is covered by forest (DFRS, 2018). Jiri municipality includes eight different forest types namely: Tropical Mixed Hardwood, Upper Mixed Hardwood, *Pinus roxburghii* (*Rani salla*), *Quercus* (*Khasru*), *Juglan wallichiana*, *Tsuga dumosa*, *Abies pindrow, Abies spectabilis and Cupressus torulosa* (figure 3.15). Forest in the Jiri municipality is also dominated by *Pinus roxburghii*type followed by Upper Mixed Hardwood and *Juglan wallichiana*same as in Bhimeshor.Besides, Jiri Municipality is comparatively green due to wet weather and frequent rain. Community forests of Jiri have traditionally played important role not only for the livelihoods of rural communities but also a source of income generation. Number of forest based micro enterprises are under operation in Jiri which include mainly Nepali paper factories and sawmills which provide both employment and income to the people (Please refer Chapter IX for community forest and Chapter X for Livelihood).

c) Gaurisankhar Rural Municipality

Gaurishankar Rural Municipality is located in Dolakha district of Province-3. Gaurishankar Municipalty is divided into nine wards with Suri as its current official headquarter. It had a population of 17062 in 2011. It is named after Mount Gaurishankar, which also determines Nepal time (UTC +05:45), and is also home to Tsho Rolpa Lake, one of the biggest glacial lakes in Nepal.

i) Forest and Biodiversity

Gaurishankar municipality covers a total land area of 67,815 ha, of which 30,176 ha (44.5%) is covered by forest (DFRS, 2018), and includes ten different types of forest as shown in the map below (Fig. 3.17). These are - Tropical Mixed Hardwood, Upper Mixed Hardwood, *Pinus Roxburghii, Quercus, Juglan Wallichiana, Tsuga Dumosa, Cupressus torulosa, Cedrus eodara, Abies Pindrow and Abies Spectabilis and Acacia Catechu and Dalbergia Sissoo*.The forest dominancy is the same as earlier two municipalities, *Pinus roxburghii* followed by Upper Mixed Hardwood and *Juglan wallichiana.* The forest covers half of the municipal area. It might be due to high mountainous system covered by bushes, shrub or grass land and snow.

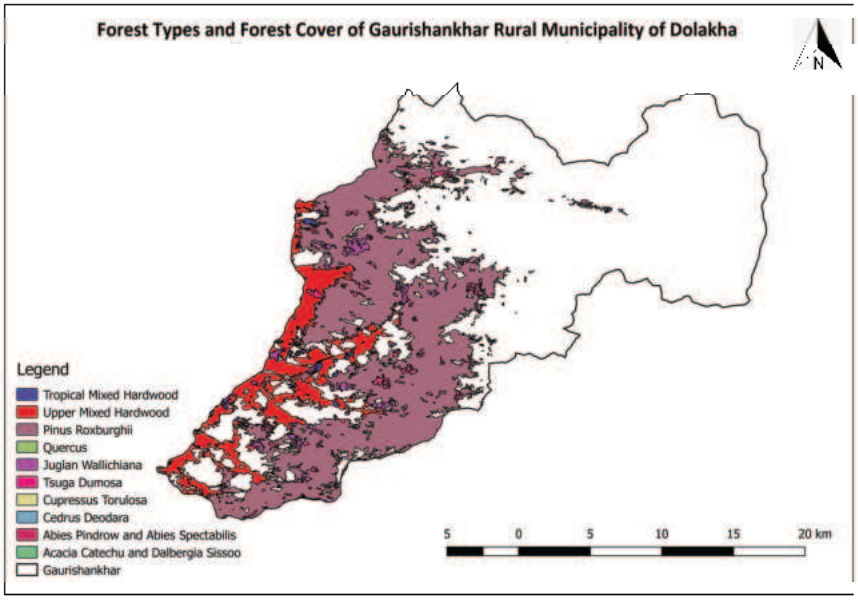


Figure 3. 17: Forest types map of Gaurishankar Rural Municipality of Dolakha.

d) Kalinchowk Rural Municipality

Kalinchok is a Rural Municipality of Dolakha district in Bagmati Province. Dolakha is also popular due to Kalinchowk Bhagawati Temple which lies in Kalinchowk Rural Municipality. It is situated in high mountains at an altitude of about 3842m and there are number of trekking routes for the piligrims and tourists to visit the temple and other touristic places.

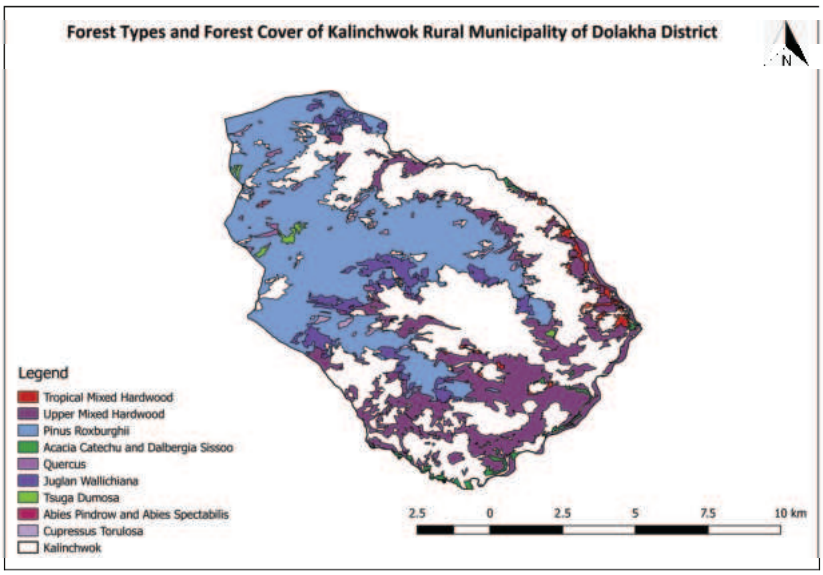


Figure 3. 18: Forest types map of Kalinchwok Rural Municipality of Dolakha.

i) Forest and Biodiversity

Kalinchok municipality covers a total land area of 13191 ha, of which 8031 ha (60.9%) area is covered by forest (DFRS, 2018). The municipality includes nine different types of forest as shown in the map above (Fig. 3.18). They are - tropical Mixed Hardwood, Upper Mixed Hardwood, *Pinus Roxburghii, Acacia Catechu and Dalbergia Sissoo, Quercus, Juglan Wallichiana, Tsuga Dumosa, Abies Pindrow and Abies Spectabilis, and Cupressus Torulosa*.

e) Sailung Rural Municipality

Shailung Rural Municipality is one of the five municipalities of Dolakha district planned for the implementation of EbA-II. The municipality is famous for number of mountain peaks like Gaurisankhar, Jugal and Ganesh Himal. The municipality is gaining importance as touristic destination because of high hills and peaks.

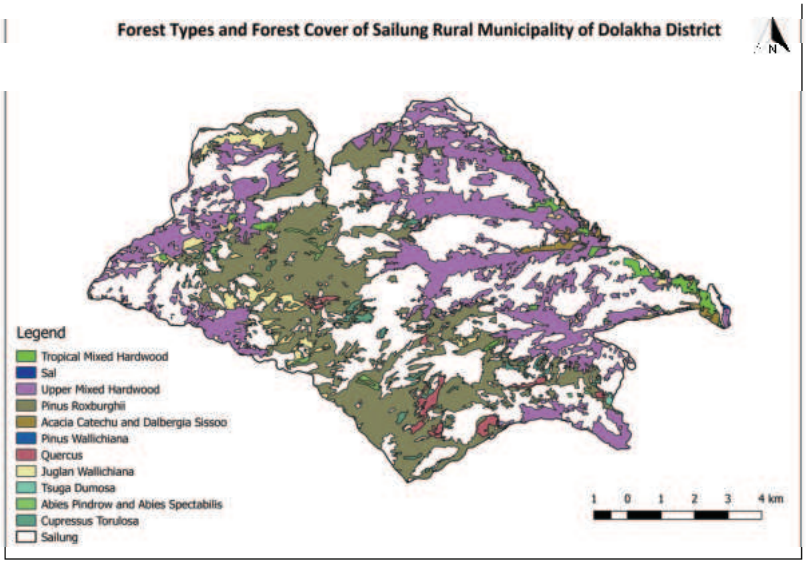


Figure 3. 19: Forest types map of Sailung Rural Municipality of Dolakha.

ii) Forest and Biodiversity

Salilung Rual Municipality covers a total land area of 12,811 ha, of which 6,974 ha (54.4%) area is covered by forest (DFRS, 2018). Sailing Rural Municipality includes eleven different types of forest. They are: Tropical Mixed Hardwood, *Shorea robusta* (Sal), Upper Mixed Hardwood, *Pinus roxburghii* (Rani salla), *Acacia catechu and Dalbergia sissoo* (Khair and sissoo), *Pinus wallichiana, Quercus, Juglan wallichiana, Tsuga dumosa, Abies pindrow and Abies spectabilis and Cupressus torulosa* as shown in the map above. Same as other municipalities, forest in Sailung is also dominated by *Pinus roxburghii* followed by Upper Mixed Hardwood and so on (Fig. 3.19).

3.5.3.4 Tourism and Cultural Heritage in Dolakha

Dolakha is increasingly developing as a popular touristic district for its natural beauty as well its religious and cultural attractions. The district headquarter, Charikot, is a hub for tourism centre from where most of the touristic sites in the districts are originated. All five EbA-II Municipalities namely Bhimeshwor, Jiri, Kalinchowk, Sailung and Gaurisankar are important destinations with diverse attractions for both domestic and international tourists.

Dolakha town, presently under Bhimeshwor Municipality, is an old trading centre and most famously known for the Bhimsen Temple which is dated back to the 7th century. It is believed that when the statue 'sweats', perspiring on the left side, bad omens are brought upon the people and the nation. Similarly, Jiri was set up as agricultural development centre by the Swiss Government Aid in 1938 and today is a popular destination for tourists. It is also popular as "Gateway to Mount Everest". Located at an elevation of 3,790 m, Kalinchowk Municipality is a famous pilgrimage site for Hindus who visit the famous Kalinchowk Bhagawati and pay homage. Kalinchowk is also famous for scenic beauty from where visitors can enjoy the splendid views of famous mountains such as Langtang Himal, Ganesh Himal, Dorje Lakpa, Jugal Himal, Gauri Shankar Himal etc. Likewise, Sailung and Gaursankar are famous sites for trekking and hiking.

Tourism in Dolakha plays significant role in the economic development directly contributing to poverty alleviation and livelihood improvement. According to the Mayor of Municipality Chief, Jiri has huge tourism potential and the Municipality is going to develop Jiri as Nepal's Switzerland. Key tourism attractions of Jiri (Ward 5) are Buddha park, Tony Hagen Ecological Park, Stone Park, Jireswor Mahadev temple etc. Apart from this, other attractions of Jiri are the culture, lifestyle and tradition of Jirel communities who are one of the fifteen disadvantaged indigenous communities living in the hills and mountain of Nepal. Similarly, Gaurisankar Rural Municipality, also the EbA-II site (Ward 8) and Sailung Municipality (Ward 4) also demonstrate high potentiality for commercial homestay. Given the opportunities of tourism development, the EbA-II sites of Jiri, Gaurisakar and Sailung Municipalities are proposed for commercial homestays. Please refer Community Livelihoods Improvement Plan (CLIP) for details.


i) Religious Sites

There are different religious sites like Dharma Dhoka, Mahadev Temple, Hanuman Dhoka, Jareshwor Mahadev, Gai Dhunga and Bag Dhunga in Shailung. These sites attract thousands of pilgrims during major festivals. Shailung is considered sacred by both Hindu and Buddhist followers.

3.5.3.5 Rangelands and Chauri Farming

Rangelands are traditionally an important source of forage production contributing directly to livestock raising and livelihood earnings of many rural communities. Rangelands comprise largely the grasslands, pasture and shrub lands and provide natural vegetation, forage, non-timber forest products and a variety of medicinal and aromatic products. The EbA-II municipalities of Dolakha district traditionally harbor important rangelands where local communities, especially the ethnic indigenous groups like Tamangs, Jirels, Gurungs etc. have been involved in Yak (*Chauri*) herding since generations. The Yak herding rangelands in EbA-II sites are located in higher altitudes ranging from about 2000 m to about 4000 m sea level. The herders change the herding sites based on the climatic variation and availability of grass. During summer, they move the herds upwards to the higher altitude area and during winter they come down to lower elevation.

Yak herding is an integral part of farming and source of income for many high altitude communities in Jiri, Gaurisankar, Kalinchowk and Sailung Municipalities. In Jiri - 5, *Chauri* farming was reported to be a traditional occupation but the number of farmers has decreased substantially in recent years. Locals informed that in Jiri-5, *Chauri* farming is limited to only one *Goth*[20] at present which consists of about 20-25 *Chauri*that owned by few families. In Gaurisankar rural municipality, a total of about 8 *Chaurigoths* were maintained in two EbA wards (5 and 6) that comprised of about 250 to 300 *Chauris.* Some important rangelands (*ChauriKharkas*) that are used for *chauri* farming/grazing in Gaurisankar municiplaity are Tutuwan, Ghydada and Kuri. It was also informed that sometimes farmers from Sindhupalchowk district also take their *Chauries* for grazing up to Kalinchowk of Dolakha when the numbers of *Chauris* reach as high as about 500. The surveyed communities of EbA-II sites in Dolakha strongly urged the need to restore and improve rangelands if *Chauri farming* is to be sustained for a longer term. Different rangelands (pasture lands and shrub lands) were

[20]*Goth*, literally known as cattle shed, is used for holding *Chauris. Goth* is also a unit to express the number of *Chauris* and one Goth is equal to about 20 to 25 *Chauris*.

suggested for restoration in most of the sites of EbA-II municipalities of Dolakha district. The identified sites for improvement were Deurali, Girpanidada, Patal and Mulkharka in Gaurisankhar Ward- 8. Other rangeland sites demanded for restoration were Panigahiro in Sailung Ward-4; Bhitari and Bhedikkhor in Bhimeshwor Ward-9 and Namathali (upper part) in Kalinchowk Ward-5. Altogether 72 ha rangelands were demanded for restoration in Dolakha district (Annex 13.2).

Although *Chauri* farming is a traditional activity among the high altitude communities of Dolakha, this has been gradually turning into a less attractive occupation in recent years. With the pace of modernization, the new generations have shown more detachment with *Chauri* farming. Besides, climate change has also resulted in a negative impact on traditional livestock farming practices as the rising temperatures have impacted the rangelands adversely. Some of the issues inhibiting *Chauri* farming were: i) degraded pasture lands and loss of native/ indigenous grass species preferred by *Chauris* ii) lack of breeding facility and lack of improved male Yaks to maintain the quality of *Chauris* iii) reduced attractions on *Chauri* farming due to factors such as hardship, low social status and low income iv) increasing control imposed by community forest user groups for *Chauri* grazing in rangelands v) growing conflict between Yak herders and community forestry groups vii) lack of fair price and market for *Chauri* products viz Cheese, *Churpi, ghee*, and viii) lack of supports (policy, technical and financial) to promote *Chauri* farming.

Based on field findings, some interventions are considered utterly important to conserve and promote rangelands and *Chauri* farming under EbA-II. These include primarily the technical and financial supports for different activities. The recommended areas of supports are: i) improvement of grasses of native species, including grass plantation, ii) construction of *goths* (cattle sheds) in rangelands, both for herders and *Chauris* iii) research for commercialization of *Chauri* farming iv) support for modern technologies for *Chauri* milk processing, and v) linkage development with external market.

3.6 Protected and Conservation Area

The newly designeated Gaurishankar Conservation Area lies in 850 47.4'and 860 34.8' East longitude and 270 34.2'and 280 10' North Latitude) which was gazetted in July 19, 2010. The area falls under Sacred Himalayan landscape and extends in three districts namely: Sindhupalchowk, Dolakha and Ramechap covering an area of about 2179 km^2. The conservation area borders with Tibet in the north. Besides, a huge part of its area (almost 1350.6 km^2) falls within Dolakha district and more preciecly in Gaurishankar and Kalinchowk Rural Municipalities.

It lies between the Langtang National Park in the west and the Sagarmatha National Park in the east and thus act as biological corridor for large home range high altitude's fauna. GCA harbors rich floral and faunal diversity along with cultural significance. Diversified vegetation composition viz. subtropical forest (Pine forest, SchimaCastonopsis forest etc.) to alpine shrub land are also be found across varied physiography and climatic conditions. In addition, agricultural lands, human settlements, cliffs and aquatic habitats are also present. This conservation area serves as refuge for more than 34 mammalians species including globally

concerned species like Red Panda, Snow Leopard along with other bird, herpeto-fauna and fishes[21].

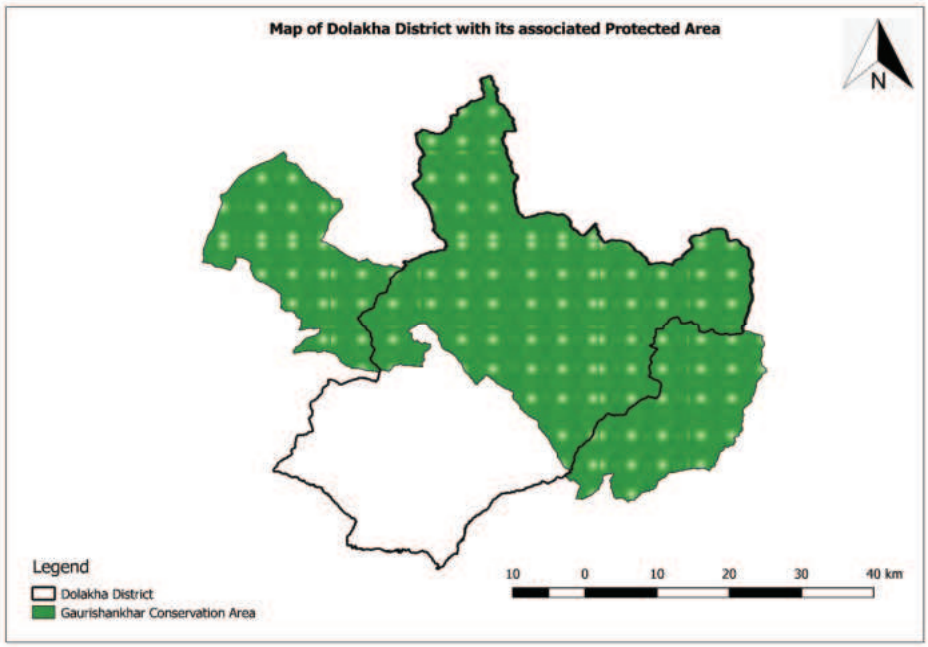


Figure 3. 20: Protected area in Dolakha district

3.7 Rivers, Water Sources and Watersheds

Agro-ecological practices play vital role in adapting to changing climate especially in climate change vulnerable areas like mid-hill region of Nepal. Approaches like conserving traditional farming techniques, use of indigenous knowledge, promoting local crops farming in addition to adoption of modern technology and practices need to be developed to uplift the economy of the project area. Relying only on rain water resources will not be sustainable. Continuously changing climatic condition of the area have been fast altering the rainfall pattern over the years. The development endeavours of those areas should be considered taking into account the advantages of abubdant fresh water from the rivers that could be utilized or the development of irrigation facilities.

While talking about the water resources in EbA-II sites, there are four main connecting rivers namely; Karnali River, Seti Nadi, Jaide Khola, Thuli Gad and Lohare Khola which passes through Achham district. Besides, the district consists of two precious watersheds, namely Seti and Karnali watersheds. Apart from this, about 75 traditional water mills (Pani ghatta) and 9 improved ghatta are located in Sanfebagar Municipality alone. Also, 1 traditional water mill, 4 diesel mill and 9 electric mills are also operating inside the municipality. Maximum no. of these Ghattas (traditional mills) are established in ward no. 11 and 12. Public taps and ground water or well are the main sources of drinking water (Institutional Survey, 2074). Similarly, 4 drinking water, 2 irrigation, 375 household's kitchen garden management, 95 improved stove, and 10 improved water mills programs were implemented in Ramarosan rural municipality in the fiscal year 2018/2019 where about 6000 hh were directly or indirectly benefited.

[21] NTNC, 2009

Diverse topographic conditions of the Salyan district results in varied water resource system comprising of small to large rivers, lakes and wetlands. Sharada is the major and highly important river in the district, whereas Bheri and Babai rivers are also the large rivers flowing through the Salyan district. Besides, Luham, Maskhola, Bangaad khola, Korwang khola, Darma khola, Maskhola, Marma Khola, Sangrahi khola, Mokhla khola etc are other rivers in the district. Similarly, the watershed areas in the district are Luham Khola watershed, Upper Sharada watershed, Bangaad watershed, Dhobate khola watershed, Korawang and Jhimpe khola sub watersheds. These watersheds have been identified from the district soil and watershed conservation office. Jathak, Kumakh, Nigalchula are the major lakes in the district. In addition, Kubhinde daha(lake) and kachhuwa daha (lake) are other important wetlands of Salyan.Likewise, agriculture is the main occupation of the district, about 93.2% of the total people are involved in agriculture. According to the land use data of the district, about 45,567 ha is cultivable, out of which 38,896 ha is cultivated land in the district. Another data from the DDC of Salyan shows that out of the total agriculture land, 83% is non-irrigated, 6% is partially irrigated and the rest 11% is irrigated throughout the year. The irrigation system is still traditional type using local canals and major water sourcesare Sharada and its tributary rivers[22].

Among the three districts, Dolakha is comparatively better in water resources. The river system of the district is enriched through nine major rivers namely; Khimti Khola, Tamakoshi Nadi, Chandrawati Khola, Sagu khola, Khare Khola, Chauri Khola, Sunkoshi Khola, Lapche Khola and Rolwalin Khola. Also, Dolakha district belongs to different watershed area namely; Bhotekoshi, Dudhkoshi, Likhu, Sunkoshi and Tamakoshi as well.

3.8 Soil Information (soil types and PH value) of the Study Area

Soil pH influences nutrient uptake and tree growth and effects on soil nutrient availability. The availability of many plant nutrients in the soil changes as a result of reactions in the soil, which are largely controlled by soil pH. Trees may or may not be able to use nutrients because of these reactions. Soils with a pH value of 6.0-7.0 typically have high concentrations of available nutrients (Williston and LaFayette 1978). However, the majority of commercially cultivated tree species can live long in a broad range of soil pH values due to an availability of the proper balance of essential nutrients. Extremes in soil pH (<4.5 and >8.5) can make some nutrients toxic and others required nutrients make unavailable to plants species. At low pH levels (<4.5) aluminum, iron, and manganese are available for plant uptake. While at high pH (>7.5), calcium and potassium are more than they require. In these situations, many plants will take up too much of these nutrients only, while absorbing insufficient amounts of the others which they really need for their healthy growth (Londo et al., 2006).

Regarding soil information of study area, soil data were downloaded from SOTER Nepal website to present the existing soil types and pH value. Data shows that, Achham having pH value 4.5 up to 5.2 covers very small area of the district while area with pH value 5.2 to 5.9 is common. Similarly, study municipalities having land pH value between 5.2 up to 5.9 is appropriate for raising all kind of tree species and agricultural crops.

Salyan district consists of sandy soils, boulders and hard rocks and various kind of soil types including clay loam, loam, silt clay loam, silt loam and sandy loam. Sandy loam and fertile

[22]MSFP, 2013

soils are found in the lowlands and riverine flood plains. The lower valleys, basins and river banks contain grey sandy and fertile sandy productive soil whereas the hill slopes are naturally dominated by upland terraces with less productive red sticky soil types[23]. Furthermore, SOTER data shows that the soil pH value range between 4.5 to 6.5 range, though tiny area with low and high levels of pH value also seen which may not be favorable for tree health.

Likewise, same scenarios can be seen in Dolakha where pH value remains within 4.5 up to 7.0. For details see soil pH maps of the study districts-Achham, Salyan and Dolakha.

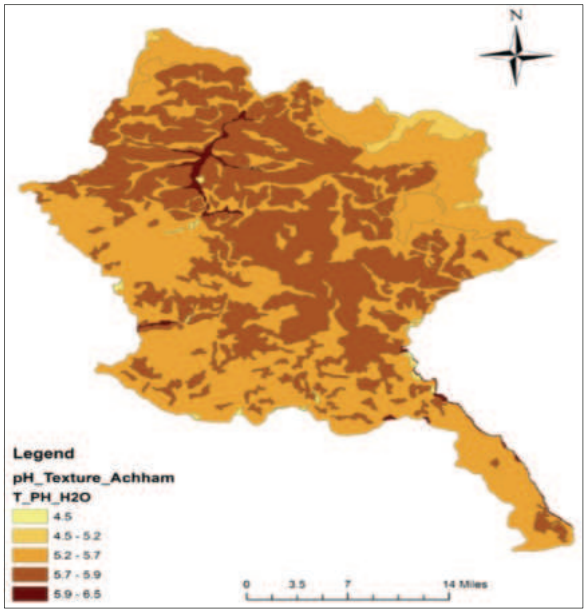


Figure 3. 21: Soil information of Achham district (*source: data obtained from SOTER Nepal*)

[23]MFSP, 2013

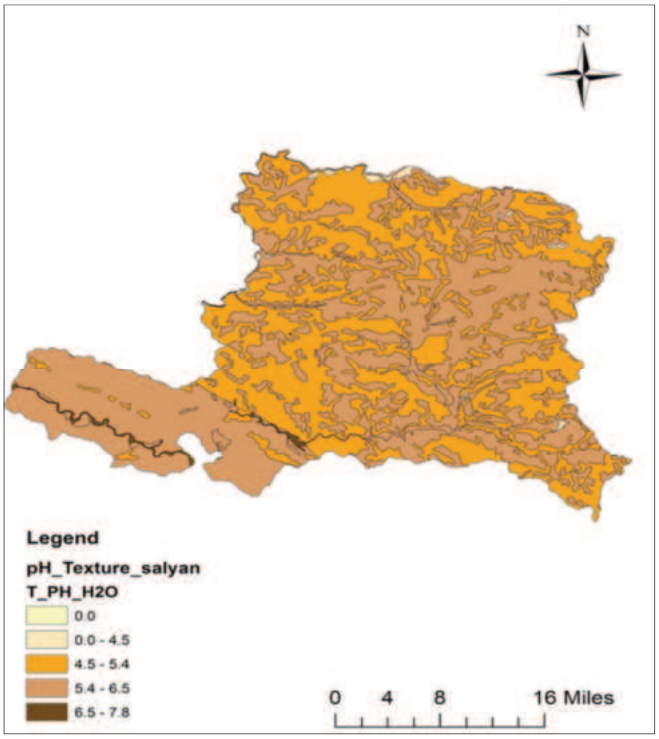


Figure 3. 22: Soil information of Salyan district (*source: data obtained from SOTER Nepal*)

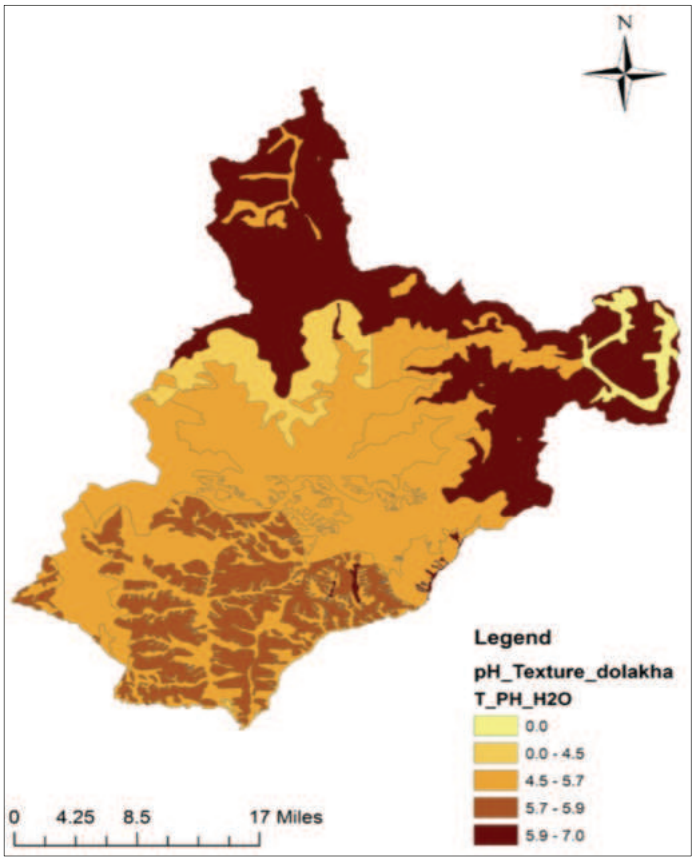


Figure 3. 23: Soil information of Dolakha district (*source: data obtained from SOTER Nepal*)

3.9 Digital Elevation Model (DEM)

A Digital Elevation Model (DEM) is a specialized database that represents the relief of a surface between points of known elevation. DEMs are used often in geographic information systems, and are the most common basis for digitally produced relief maps. For the purpose of baseline assessment of the specified study area DEM data are taken from Humanitarian Data Exchange official website[24]. Nepal digital model elevation with 90-meter resolution based on Shuttle Radar Topography Mission imagery were taken and processed in GIS to prepare the maps (Figure 3.24 to 3.26). which are presented in Annex 3.1.

3.10 Forest Cover Analysis

3.10.1 Forest and Non-Forest Area

The forest cover analysis (DFRS/MoFSC, 2015) indicates that Gaurishankar Rural Municipality of Dolakha has the highest forest coverage (26271.31 ha) followed by Bangad-Kupindeof Salyandistrict (22888.38 ha). The lowest forest coverage is in the Bhimeshwor and Sailung Municipalities of Dolakha district.

Table 3. 1: Forest Coverage of EbA-II Municipalities, DFRS/MoFSC, 2015

Districts	Municipality	Forest (ha)	Non-Forest (ha)	Other Wooded Land (ha)	Shrub (ha)	Total (ha)
Achham	Mellekh	7221.5	5028.5	1071.5	34.0	13355.6
	Ramaroshan	9116.8	5043.6	2943.3	1.7	17105.3
	Safebagar	8139.1	7427.7	927.5	64.4	16558.7
Dolakha	Bhimeshwor	4770.7	5414.1	46.0	0.0	10230.8
	Gaurishankhar	26271.3	37335.9	3648.6	55.9	67311.7
	Jiri	10541.8	8622.2	1275.5	0.0	20439.5
	Kalinchwok	7938.1	5163.6	147.0	0.0	13248.7
	Sailung	6981.4	5844.5	25.4	0.0	12851.3
Salyan	Bangad-Kupinde	22888.4	10587.8	272.4	0.0	33748.5
	Kumakh	10351.9	7225.0	57.4	9.8	17644.1

Source: DFRS/MoFSC, 2015

Gaurishankar Rural Municipality holds the larger area of Other Wooded Land (3648 ha) followed by Ramaroshan Municipality with 2943 ha. Interestingly, huge area of Non-Forest also falls under Gaurishankar Rural Municipality among others. Maps presenting the forest cover for all surveyed municipalities are presented in Annex 3.2 (Figure 3.29 – Figure 3.38).

[24]https://data.humdata.org/dataset/nepal-digital-model-elevation-dem

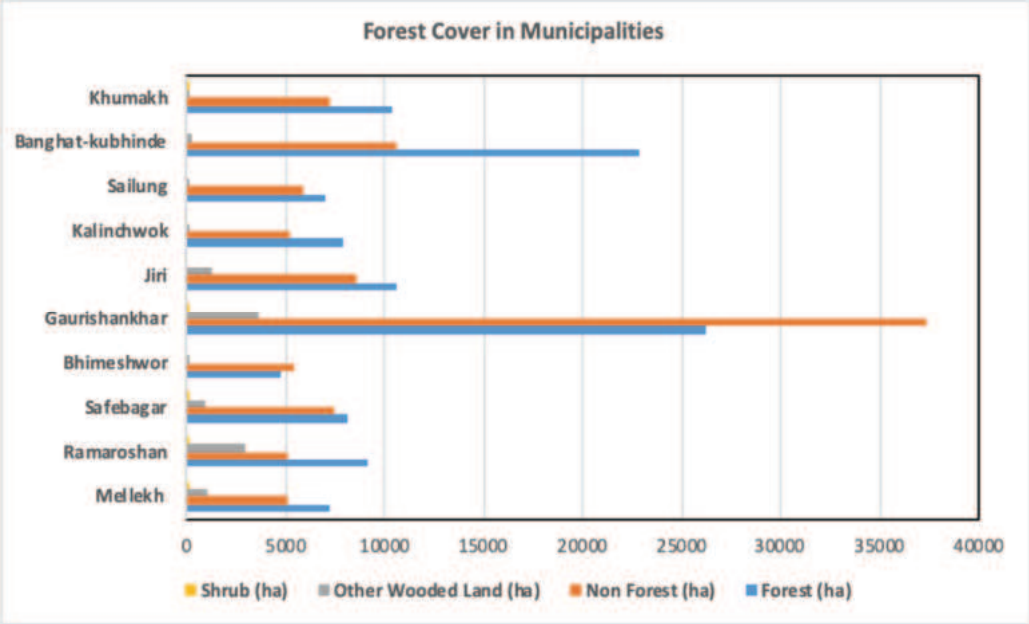


Figure 3. 24: Forest cover in municipalities

3.10.2 Forest Cover in EbA-II Wards

Forest is one of the important natural resources in the project area. Available data shows that 59 percent of the total area of 18 project wards is covered by forest, 8 percent by other woodland and remaining 33 percent is non-forest. Project wards in Salyan have larger forest area closely followed by Dolakha. District wise status of forest in project wards is elaborated in the following paragraphs.

i) Achham

The total forest area in EbA-II Project wards in Achham district is estimated at 10,477.15 ha. According to DFRS/MoFSC (2015) data, among the project wards, the largest area under forest is found in ward number 5 of Ramarosan rural municipality followed by ward number 5 of the same rural municipality and ward number 6 of Mellekh rural municipality. Sanfebagar municipality ward number 13 has the smallest forest cover with 607.87 ha in total. Similarly, largest area of other woodlands is also recorded in Mellekh as summarized in Table 3.2; Annex 3.2).

Table 3. 2: Forest cover in EbA II Project area of Achham district

District	Municipality	Ward No.	Forest (ha)	Non-Forest (ha)	Other-Wooded Land (ha)
Achham	Sanfebagar M	13	607.87	1205.25	241.10
	Ramaroshan RM	6	2573.48	1404.00	1312.49
		5	2921.86	1483.80	1393.30
	Mallekh RM	1	674.73	663.05	411.65
		2	1311.56	181.20	415.06
		6	2387.65	860.32	206.69
Total			**10477.15**	**5797.62**	**3980.29**

ii) Salyan

EbA II includes 5 wards of Bangad-Kupinde municipality and one ward of Kumakh rural municipality in Salyan district. According to DFRS/MoFSC data, total forest area in those EbA II project wards is 12704.01 ha. Among the project wards, ward number 1 of Bangad-Kupinde municipality has the highest forest cover (3345.83 ha), followed by ward number 7 of the same municipality (2288.49 ha) and ward number 1 of Kumakh rural municipality (2223.27 ha). Largest other wooded land is recorded in ward number 1 of Bangad-Kupinde (**Table 3.3; Annex 3.2**).

Table 3. 3: Forest cover in EbA II Project area of Salyan district

District	Municipality	Ward No.	Forest (ha)	Non-Forest (ha)	Other-Wooded Land (ha)
Salyan	Bangad-Kupinde M	1	3345.83	1498.34	114.92
		6	1730.3	827.66	0.51
		7	2288.49	1034.27	2.38
		4	1098.72	750.83	48.68
		5	2017.4	1316.94	26.12
	Kumakh RM	1	2223.27	1115.53	9.98
	Total		**12704.01**	**6543.57**	**202.59**

iii) Dolakha

In Dolakha district, Gaurisankar rural municipality ward number 8 has the largest forest cover with 7119.16 ha out of total forest area of 12406.64 ha in 6 wards of EbA-II project. Kalinchowk ward number 6 has a total of 2000.89 ha and Bhimeswor ward number 9 has 1815.06 ha. (Table 3.4; Annex 3.2).

Table 3. 4: Forest cover in EbA II Project area of Dolakha district

District	Municipality	Ward No.	Forest (ha)	Non-Forest (ha)	Other-Wooded Land (ha)
Dolakha	Gaurishankar RM	8	7119.16	4045.16	676.35
	Bhimeswor M	9	1815.06	1267.59	54.99
	Kalinchowk RM	5	329.6	615.74	70.58
		6	2000.89	719.72	40.1
	Shailung RM	4	779.86	732.52	1.26
	Jiri M	5	362.07	350.6	54.35
	Total		**12406.64**	**7731.33**	**897.63**

3.10.3 Status of the Forest and Rangelands

For careful planning of EbA activities in the grassroot levels it is important to know the current status of the natural resources. As no published data on the status of forest and rangelands was available, the following methods were used to estimate the degraded areas.

3.10.3.1 Method of calculation

Degraded forest area was calculated using Landsat 825 map extracted from USGS database26. In the beginning data for Achham, Salyan and Dolakha districts were downloaded from USGS website. The data was then processed in Arc GIS 10.8. First, all layers of data extracted from USGS database were combined and ward area was clipped using ward layer.

Once the ward image was clipped, it was compared with Google earth terrain image to develop various classification schemes. Once various schemes were created training samples were assigned in Arc GIS and various colors were assigned to forest area, agricultural area, grassland, shrub-land, wasteland, degraded forest, water body and snow covered lands. Degraded forest samples were taken from areas which had less than 20 percent crown cover. ICIMOD land use map of 2010 was also used as reference to observe where the degraded forests were located. All categories were fitted and signatures were created for each category. Supervised Maximum Likelihood classification27 was performed to generate image. This image was further verified with Google Earth Image and corrected to generate the final classified maps.

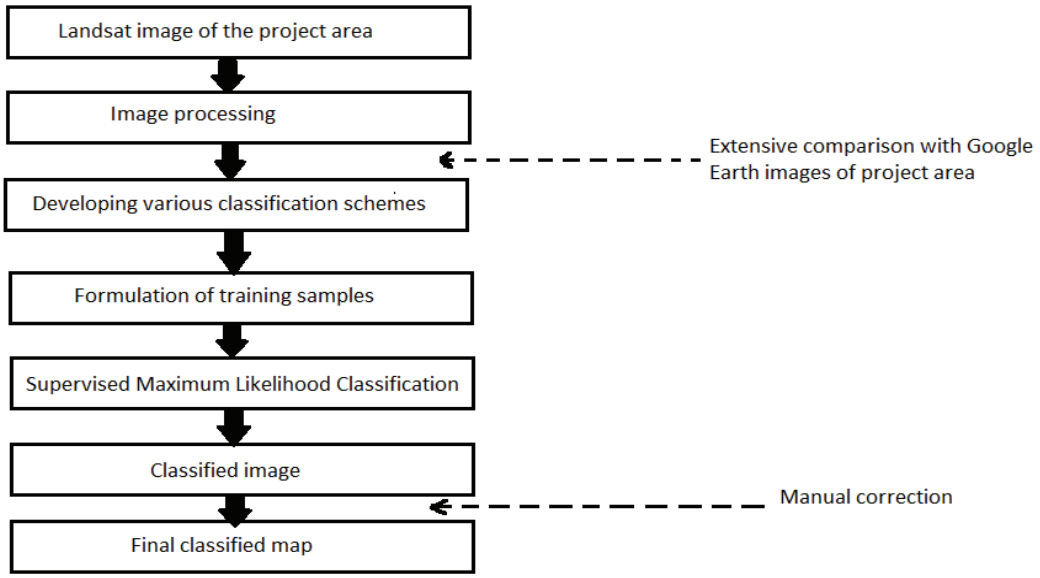


Figure 3. 25: Methodology used

To assess degraded grasslands, Google earth images were used as the grasslands were spread throughout the project area. In many cases these areas were small patches and degradation could not be detected in Arc GIS. Google Earth image observation was used to estimate degraded grasslands and measurements were done using polygon tool that measures size of

[25] *Landsat 8* which was formerly known as the Landsat Data Continuity Mission, is a satellite launched on February 11, 2013 from Vandenberg Air Force Base, California. The satellite carries the Operational Land Imager (OLI) and the Thermal Infrared Sensor (TIRS).

[26] USGS, 2020. *Earth Explorer home.* [Online] Available at: https://earthexplorer.usgs.gov/ [Accessed 14 July 2020].

[27] ESRI, 2016. *How Maximum Likelihood Classification Works.* [Online] Available at: https://desktop.arcgis.com/en/arcmap/10.3/tools/spatial-analyst-toolbox/how-maximum-likelihood-classification-works.htm [Accessed 14 July 2020].

selected area. Google earth images are widely used to estimate land use and land change[28].

Once maps were generated, areas were calculated by multiplying total pixel count with area of one pixel size (30 by 30 meters) for each category and were later standardized to hectares.

3.10.3.2 Degraded Area in EbA-II Project Wards

Degradation of forest and rangelands was recorded in all of the eighteen project wards, though the extent of degradation varied among those wards as presented in following paragraphs and tables. (Annex 3.3)

i) Achham

Among the six wards of three municipalities included in EbA-II project in Achham district, largest area of degraded forest (202.87 ha) and rangelands (63.46 ha) were reported in ward number six of Ramarosan municipality. While ward number one of Mellekh rural municipality had smallest area of degraded forest (87.08 ha), ward number 13 of Sanfebagar municipality had the smallest area of degraded rangeland (7.34 ha).

Table 3. 5: Degraded forest and Rangeland in EbA II Project area of Achham district

District	R/Municipality	Ward No.	Degraded forest (ha)	Degraded Grassland/ Rangeland (ha)
Achham	Mellekh	1	87.08	38.32
	Mellekh	2	114.02	45.67
	Mellekh	6	227.87	13.63
	Ramarosan	5	202.74	63.46
	Ramarosan	6	228.41	52.33
	Safebagar	13	122.22	7.34
	Total		982.34	220.75

Source: Refer to section 3.10.3.1

ii) Salyan

There was lower acreage of degraded forest and rangelands in Salya compared to Achham. Area of degraded forest ranged from about 104 hectares in ward number one of Bangad-kupinde municipality to about 156 hectares in ward number two of Kumakh rural municipality. Similarly, area of degraded rangelands ranged from about 6 hectares in ward number seven of Bangad-kupinde municipality to about 27 hectares in ward number four of Bangad-kupinde municipality.

Table 3. 6: Degraded forest and Rangeland in EbA II Project area of Salyan district

District	R/Municipality	Ward No.	Degraded forest (ha)	Degraded Grassland/ Rangeland (ha)
Salyan	Bangad-Kupinde	1	104.44	14.2
	Bangad-Kupinde	4	138.24	27.4
	Bangad-Kupinde	5	133.47	26.6
	Bangad-Kupinde	6	119.61	8.7

[28] Sidhu, N.,Pebesma, E. & Camara, G. (2018), Using Google Earth Engine to detect land cover change: Singapore as a use case, *European Journal of Remote Sensing,* 51 (1), 486-500.

	Bangad-Kupinde	7	175.41	6.4
	Kumakh	2	156.24	22.5
	Total		827.41	105.8

Source: Refer to section 3.10.3.1

iii) Dolakha

Among the wards covered by EbA-II project, largest area of degraded forest was found in Dolakha district (in absolute terms). Ward number eight of Gaurishankar rural municipality had the largest degraded forest area (438.3 ha) among all eighteen wards covered by the project. Ward number four of Sailung rural municipality had the smallest amount of degraded forest. Some degraded rangeland was found in all of the wards. Among them, largest area of degraded rangeland was in ward number nine of Bhimeshwor municipality.

Table 3. 7: Degraded forest and Rangeland in EbA II Project area of Dolakha district

District	R/Municipality	Ward No.	Degraded forest (ha)	Degraded Grassland/ Rangeland (ha)
Dolakha	Sailung	4	42.48	12.34
	Gaurisankar	8	438.3	14.23
	Bhimeshwor	9	286.8	35.66
	Kalinchok	5	79.47	12.32
	Kalinchok	6	208.98	15.83
	Jiri-	5	71.97	16.47
	Total		1128.0	106.85

Source: Refer to section 3.10.3.1

3.10.3.3 Limitations

It was more challenging to calculate degraded grassland/rangeland area due to size and spread. The Landsat image available was of 30 by 30 m2 resolutions hence it was problematic to estimate degraded grasslands/rangeland via Arc GIS. A more accurate Landsat image of 5 by 5 m2 resolution would be required to generate more accurate image, however, this was not used as these images do not have free public access.

In some places the color of degraded forest as seen on satellite map was similar at times with shrub-land. Similarly, the barren agricultural land at times were similar to grasslands, much of these were corrected after the classified images were generated. None the less the maps generated indicate where degradations are.

Among various measures used to verify maps, field verification has been most widely used. The maps generated for the project could not be verified in the field due to COVID-19 pandemic that restricted travels. Results from FGDs and group discussions have been compared to the results from the maps and differences are observed. One of the reasons for these differences could be not taking into account national forests during forest area calculation in the field. Also, the maps separate shrub-lands and wastelands, which could be calculated as forests as they lie within forest territory.

3.11 Community Forests in the EbA-II Wards

Forest covers and their status in the study wards were discussed with the participants of FGD and also local leaders during field visit. Though majority of the FUGs could provide total area of the forest under the group, there was no authentic data on degraded forest. Concerned Division Forest Offices and Sub-division Forest Ofices were contacted and verified the data on community forests in EbA-II wards. All of the project wards have community forest groups. Community forest areas in the project wards varied widely from 199 ha (in Bangad kupinde-1) to 1807 ha (in Gaurishankar-8). Ward wise area of community forests is given in Table 3.5 and details by individual community forest in Annex 3.3.

Table 3. 8: Community Forests in EbA-II Wards

District	Municipality-ward No.	CF Area	Municipality-ward No.	CF Area
Achham	Mellekh 1	697.7	Mellekh 2	510
	Ramarosan 5	1101	Mellekh 6	899.5
	Ramarosan 6	585.9	Safebagar 13	454.3
Salyan	Bangad-Kupinde 1	199	Bangad-Kupinde 4	947.6
	Bangad-Kupinde 5	730.1	Bangad-Kupinde 6	926.8
	Bangad-Kupinde 7	527.4		1041.2
Dolakha	Sailung 4	570.43	Gaurisankar 8	1807.5
	Kalinchok 5	365.45	Kalinchok 6	952.38
	Bhimeshwor 9	1465.11	Jiri-5	559.05

Source: Field Survey 2020.

3.12 Climate Change Induced Hazards

3.12.1 General

The impact of climate change is apparent in the rural lives, especially in developing countries like Nepal. Although climate change is a global phenomenon, its impacts are local and more severe among those who depend on the natural resources for their livelihoods. As the impacts are localized, we need to deal with them at the local level. It has been realized that local institutions have an important role to play in the planning and implementation of activities geared towards adaptation at the local level.

A study on climate change induced hazards and adaptation in agriculture in Koshi River Basin (KRB), including Dolakha, was done by Hussain et al. (2018). The study shows that climate change is severely impacting water resources, agriculture, food security, and local livelihoods. There is a significant temporal and spatial variability within the basin in precipitation, actual evapotranspiration, and water availability. Projections suggest that in general wet seasons are likely to become wetter and dry seasons drier, resulting in a decline in river discharge during winter-summer months. The study predicted that the changes in extremes will increase the difference between high and low-flow regimes, and the likelihood of both droughts and floods will increase.

There are thousands of subsistence and small farmers who face challenges in taking adequate adaptive action due to high costs, labor shortages resulting from outmigration, limited access

to technology and inputs, and lack of awareness. The report further elaborates that a quarter of small farmers in the basin face frequent labor shortages during the critical periods for agriculture due to out migration of household members and that close to 6% of cultivable land was left fallow or abandoned as a result, leading to low agricultural production (Hussain et al, 2018).

Often farm households' decisions on adaptation to climate change depend on a range of socioeconomic and physical factors. A study by Tiwari et al. (2014) in three different agro-climatic regions in Nepal indicated that factors such as resource availability, family labor availability, farm income, institutional activities, and involvement in community level organizations influenced farmers' decisions on taking adaptive actions. Provision of support services, such as credit, training, and extension also plays an important role in increasing the likelihood of adaptation by farmers (Mulatu 2013).

There is limited information available about vulnerability of the project districts. Located in the mountain region, Dolakha is ranked as vulnerable district to climate change on NAPA's "Climate Change Vulnerability Mapping for Nepal" (GoN/NAPA 2010). GLOF is the biggest threat to the people in Dolakha with very high vulnerability index. TshoRolpa Lake is among the 20 potentially dangerous glacial lakes in Nepal (Mool 2001). Beside GLOF, Dolakha is also highly vulnerable for drought and rainfall/temperature hazards. With ecological vulnerability score of 0.33, Dolakha district is ranked under moderate risk group (Ministry of Environment, 2010). Salyan, another project district, is also classified as vulnerable district to climate change. With ecological vulnerability score of 0.47, it is among the high-risk group of districts. Though Achham district as a whole is counted among the mid-hills district, about 10 percent of its geographical area is in high-hills. With ecological vulnerability score of 0.53, this district is ranked under high risk group. Vulnerability score of those districts at municipality and ward level is not available.

Participants in FGD meetings and local leaders were asked several questions related to climate change induced hazards, their impact on livelihoods and measures taken to cope with such hazards. The responses varied from temperature rise, uneven duration and quantity of rainfall, drought, landslide and wild fire. Municipality specific responses are described in the following paragraphs.

3.12.2 Dolakha

A total of six types of hazards were reported in Dolakha. Drought was reported in all of the selected rural/municipalities except Jiri and Rise in temperature in all except Gaurishankar. Similarly, uneven/unexpected precipitation patterns were reported in Kalinchok; forest fire in Sailung, Jiri and Gaurishankar; landslide in Kalinchok and Bhimeshwor; and flood in Kalinchok and Jiri. Major impact of those hazards included loss of land, loss of agricultural products, shortage of water (drinking, irrigation), increased burden in fetching water and fuelwood and poor health conditions. Mainly the farmers, women, children and wage laborers suffered due to such hazards.

3.12.3 Salyan

Prolonged drought, increased temperature and forest fire were the major hazards reported in Salyan district. All of the selected rural/municipalities reported frequent drought with

prolonged and severe one in 2074 BS. Increased temperature was reported in Bangad Kupinde municipality and forest fire was reported in both of the municipalities – Bangd Kupinde municipality and Kumakh rural municipality. Major impact of those hazards included loss of land, loss of agricultural products, shortage of water (drinking, irrigation), shortage of fuelwood and also injuries caused by forest fire. Farmers, especially small farmers, women, children and wage laborers suffered due to such hazards.

3.12.4 Achham

Eight types of hazards were reported in Achham. Occurrence of frequent drought was reported in all of the selected rural/municipalities in Achham. Flood was reported in Sanfebagar and Mellekh; extreme rain in Ramarosan, hailstone in Mellekh and Ramarosan; landslide in Mellekh; and soil erosion in Ramarosan rural municipality. Losses of agricultural land, losses/ productivity decline in field crops and fruits, losses of livestock and disturbance in water supply systems were some of the impact of those natural hazards. Farmers, especially small holder farmers, wage laborers and women were vulnerable to such hazards. A summary of some of the natural hazards reported by the concerned persons is given in Table 3.6 and details by ward presented in Annex 3.4.

Table 3. 9: Climate Induced Hazards Reported in the Project Area

	Drought	Uneven rain	Hailstone	Flood	Landslide	Soil erosion	Temperature increase	Forest fire	Pest problem
Dolakha District									
Gaurishankar RM-8	√	√		√					
Bhimeswor M-9	√				√		√		
Kalinchowk RM-5	√	√			√				
Kalinchowk RM-6	√			√	√				
Shailung RM-4	√				√		√		
Jiri M-5	√			√			√	√	
Salyan District									
BangadKupinde M-1	√								
BangadKupinde M-4	√							√	
BangadKupinde M-5	√						√	√	
BangadKupinde M-6	√								
BangadKupinde M-7	√								
Kumakh RM-1	√							√	
Achham District									
Sanfebagar M-13	√			√					
Ramaroshan RM-5	√		√		√	√			√
Ramaroshan RM-6	√	√	√						
Mallekh RM-1	√			√	√				
Mallekh RM-2	√			√				√	
Mallekh RM-6	√		√	√					

CHAPTER IV: GENERAL INFORMATION OF SAMPLE HOUSEHOLDS

This chapter describes general characteristics of the sample households. Average family size in the project area was 4.9 persons which is slightly higher than average family size in Nepal (4.6 persons). Sex ratio was 1.07 meaning that there were 107 males per 100 females. The ratio of older people was higher among Adibasi/Janjati indicating more longevity compared to other ethnic groups. The literacy rate of the project area was about 88 percent which is higher than national average of about 70 percent. Literacy rate was highest among the BCTS households and lowest among Dalit households. Almost 98 percentof the total children aged between 5 to 14 years were attending school.

4.1 Sample Households

A total of 404 households were surveyed in all three districts under EbA-II. The number of surveyed households varied slightly across the districts from 132 (32.7%) in Dolakha district to 134 in Salyan (33.2%) and 138 (34.2%) in Achham district. These districts have distinct caste and ethnic groups of people. In Achham and Salyan districts, Chhetries and Thakuris were the dominant caste groups which belong to BCTS (Brahmin, Chetri, Thakuri and Sanyasi) category whereas in Dolakha, the surveyed households were predominantly ethnic group (Adibasi/Janajti) as per the definition of National Federation for the Development of Indigenous Nationalities (NFDIN). The ethnic groups consisted of mainly Tamang, Newar, Jirel, Thami, Gurung etc as detailed in Table 4.1.

Table 4. 1: Number and Percentage of Sample Households by Project Districts

Categories	Achham	Salyan	Dolakha	Total
Dalit	23 (34.9)	43 (65.2)		66 (100.0)
Adibasi/Janajati			114 (100.0)	114 (100.0)
BCTS	115 (51.3)	91 (40.6)	18 (8.0)	224 (100.0)
Other				
Total/ Overall	138 (34.2)	134 (33.2)	132 (32.7)	404 (100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

Among the major social/ethnic groups, number of BCTS households was highest (55.5%) followed by Adibasi/Janajati (28.2%) and Dalit (16.3%). Compared to other two districts, Dalit households in Salyan, accounted for highest percentage (32.1%) in total sample. Among the sample households, indigenous people known as Adibasi/ Janajati were recorded only in Dolakha district.

Table 4. 2: Number and Percentage of Households by Social Groups

Categories	Dalit	Adibasi/ Janajati	BCTS	Total
By District				
Achham	23 (16.7)		115 (83.3)	138 (100.0)
Salyan	43 (32.1)		91 (67.9)	134 (100.0)
Dolakha		114 (86.4)	18 (13.6)	132 (100.0)
Total/ Overall	66 (16.3)	114 (28.2)	224 (55.5)	404 (100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

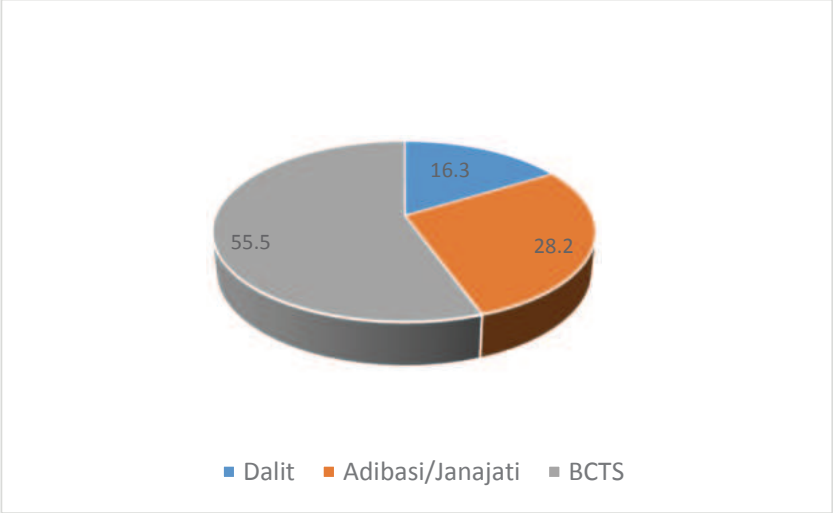


Figure 4. 1: Percentage of surveyed HHs by Caste/Ethnicity

4.2 Household Heads

The surveyed household heads constituted more than three fourth of males (78.2%) against only 20.8% females. These figures, however, varied marginally across the districts. Female headed households were highest in Salyan (29.9%) and lowest (14.4%) in Dolakha. Caste and ethnicity wise, female headed households were highest (25.8%) among Dalit closely followed by BCTS (23.7%) and the lowest (12.3%) among Adibasi/Janajati households.

Table 4. 3: Number and Percentage of Households by Gender of Household Head

Categories	Male Headed HHs		Female Headed HHs		Total	
By District						
Achham	113	(81.9)	25	(18.1)	138	(100.0)
Salyan	94	(70.2)	40	(29.9)	134	(100.0)
Dolakha	113	(85.6)	19	(14.4)	132	(100.0)
Total/ Overall	320	(79.2)	84	(20.8)	404	(100.0)
By Caste/Ethnicity						
Dalit	49	(74.2)	17	(25.8)	66	(100.0)
Adibasi/Janajati	100	(87.7)	14	(12.3)	114	(100.0)
BCTS	171	(76.3)	53	(23.7)	224	(100.0)
Total/ Overall	320	(79.2)	84	(20.8)	404	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

4.2.1 Age

The overall average age of the household heads was 49.4 years with some variation across the district and ethnicity. Of the total respondents, 24.5% were of over 60 years and 10.5% under 30 years of age. The average age of the household heads was highest (52.4 years) among Adibasi/Janajati group.

4.2.2 Occupation

The household heads were reported to have different types of occupations. Agriculture cum livestock was the main occupation for the highest percentage of household heads (55.9%). Another major occupation absorbing second largest group was off-farm wage (19.6%) which included mostly wage-earning works in non-agricultural sector comprising both skilled and non-skilled jobs. Other occupations that provided employment to smaller number of household heads were household chores (6.4%), service (5.7%), business/trade (3.7%), and foreign employment (2.5%). Among the caste and ethnic groups, the highest percentage of Adibasi/Janajati household heads was employed in agriculture/livestock (76.3%) followed by BCTS (53.1%) and lowest among Dalit group (30.3%). Gender wise, 29.8% female heads were occupied in household chores against 0.3% males.

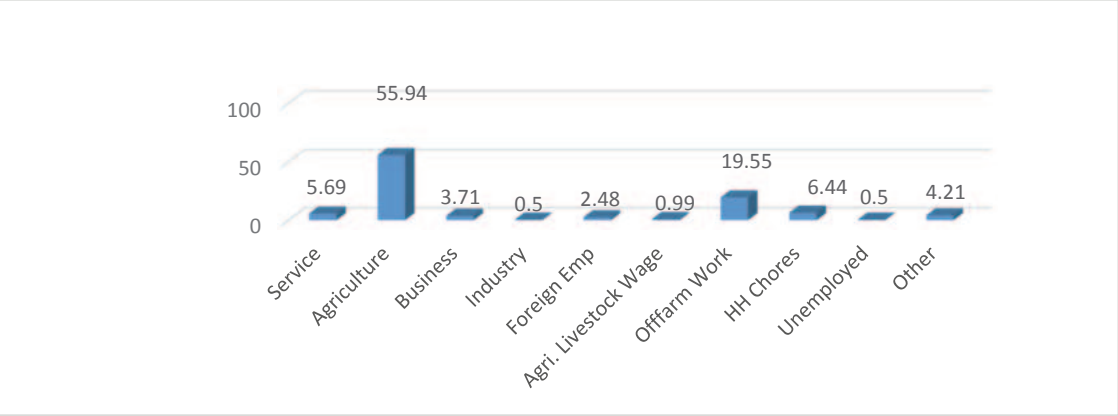


Figure 4. 2: Percentage of HH Heads Employed in Different Occupations

4.2.3 Literacy

Of the total household heads 17.6% were illiterate whereas remaining others were literate with varied level of educational attainment. A large percentage among literates, accounting 33.9%, had no formal education. Among the illiterate, Dalit household heads ranked on the top with 28.8% as compared to lower figure among Adibasi/Janajati (15.8%) and BCTS (15.2%). Similarly, female heads figured out more than double (33.3%) than males (13.4%) among the illiterates. District wise, illiterate figure was highest in Salyan (30.6%) and lowest in Achham (5.1%).

Table 4. 4: Distribution of Household Heads by Educational Status

Categories	Illiterate		Literate		Grade 1 - 5		Grade 6 - 7		Grade 8 - SEE		Higher Secondary Level		Graduate		Above Graduation	
By District																
Achham	7	(5.1)	58	(42.0)	32	(23.2)	5	(3.6)	26	(18.8)	7	(5.1)	2	(1.5)	66	(47.8)
Salyan	41	(30.6)	36	(26.9)	25	(18.7)	9	(6.7)	19	(14.2)	4	(3.0)			77	(57.5)
Dolakha	23	(17.4)	43	(32.6)	36	(27.3)	9	(6.8)	19	(14.4)	2	(1.5)			66	(50.0)
Total/ Overall	71	(17.6)	137	(33.9)	93	(23.0)	23	(5.7)	64	(15.8)	13	(3.2)	2	(0.5)	209	(51.7)
By Gender of Household Head																
Male	43	(13.4)	105	(32.8)	82	(25.6)	21	(6.6)	56	(17.5)	10	(3.1)	2	(0.6)	149	(46.6)
Female	28	(33.3)	32	(38.1)	11	(13.1)	2	(2.4)	8	(9.5)	3	(3.6)			60	(71.4)
By Caste/Ethnicity																

Categories	Illiterate		Literate		Grade 1 - 5		Grade 6 - 7		Grade 8 - SEE		Higher Secondary Level		Graduate		Above Graduation	
Dalit	19	(28.8)	17	(25.8)	18	(27.3)	4	(6.1)	5	(7.6)	2	(3.0)	1	(1.5)	36	(54.6)
Adibasi/Janajati	18	(15.8)	39	(34.2)	31	(27.2)	8	(7.0)	16	(14.0)	2	(1.8)			57	(50.0)
BCTS	34	(15.2)	81	(36.2)	44	(19.6)	11	(4.9)	43	(19.2)	9	(4.0)	1	(0.5)	116	(51.8)

Note: Figures in parenthesis indicate percentage./Source: Field Survey, 2020

4.3 Demographic Characteristics of Sample Population

4.3.1 Household Size

Overall household size averaged at 4.9 persons for all districts with highest in Achham (5.9) and lowest in Dolakha (3.8). Among the caste/ethnic groups, highest household size was noted for BCTS group (5.4) and lowest among Adibasi/Janajati (3.8). Similarly, male headed households had larger family size of 5.1 persons as compared to a family size of 4.5 persons among female headed households.

Table 4. 5: Distribution of Population in Project Area by Gender and Household Size

Categories	Population						Household Size		
	Male		Female		Total		Male	Female	Total
By District									
Achham	416	(50.7)	404	(49.3)	820	(100.0)	3.0	2.9	5.9
Salyan	354	(53.0)	314	(47.0)	668	(100.0)	2.6	2.3	5.0
Dolakha	260	(51.2)	248	(48.8)	508	(100.0)	2.0	1.9	3.8
Total/ Overall	1030	(51.6)	966	(48.4)	1996	(100.0)	2.5	2.4	4.9
By Gender of Household Head									
Male	856	(52.9)	761	(47.1)	1617	(100.0)	2.7	2.4	5.1
Female	174	(45.9)	205	(54.1)	379	(100.0)	2.1	2.4	4.5
By Caste/Ethnicity									
Dalit	190	(55.1)	155	(44.9)	345	(100.0)	2.9	2.3	5.2
Adibasi/Janajati	230	(53.0)	204	(47.0)	434	(100.0)	2.0	1.8	3.8
BCTS	610	(50.1)	607	(49.9)	1217	(100.0)	2.7	2.7	5.4

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

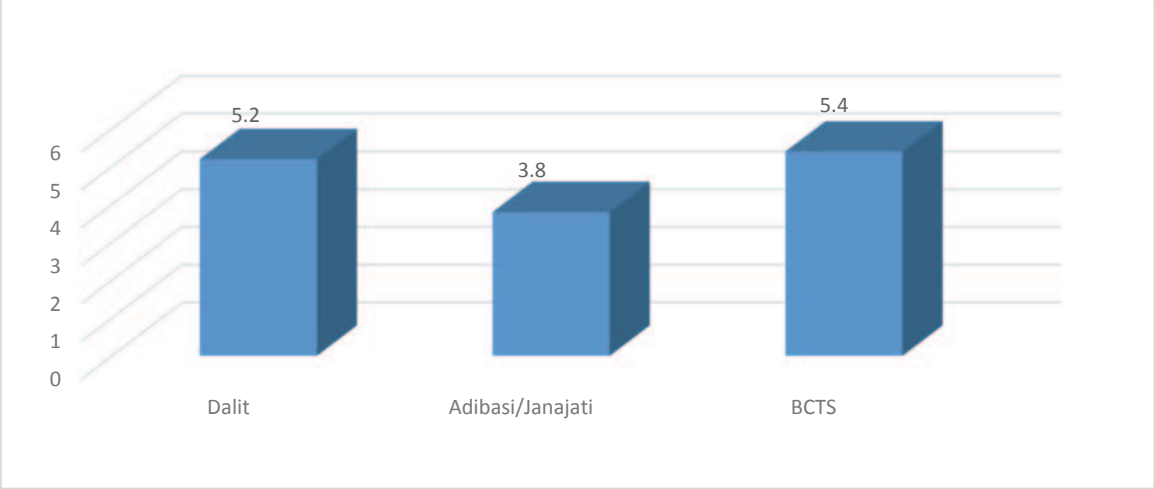


Figure 4. 3: HH Size of Surveyed Households by Caste/Ethnic Group

4.3.2 Age

The total population of sample households was 1996 with slightly higher percentage for male (51.6%). By age group, the highest percentage of population (51.9%) was in the group of 15 to 49 years. Child population, below 14 years of age, was also remarkably high at 30 percent. Population above 60 years of age accounted for 10.3 percent.

Table 4. 6: Distribution of Population by Age

Categories	<5 years		5-14 years		15-49 years		50-59 years		>60 years		Total	
By District												
Achham	80	(9.8)	216	(26.3)	411	(50.1)	54	(6.6)	59	(7.2)	820	(100.0)
Salyan	48	(7.2)	152	(22.8)	366	(54.8)	45	(6.7)	57	(8.5)	668	(100.0)
Dolakha	26	(5.1)	78	(15.4)	258	(50.8)	57	(11.2)	89	(17.5)	508	(100.0)
Total/ Overall	154	(7.7)	446	(22.3)	1035	(51.9)	156	(7.8)	205	(10.3)	1996	(100.0)
By Caste/Ethnicity												
Dalit	30	(8.7)	89	(25.8)	184	(53.3)	14	(4.1)	28	(8.1)	345	(100.0)
Adibasi/Janajati	25	(5.8)	71	(16.4)	214	(49.3)	51	(11.8)	73	(16.8)	434	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

Population pyramids presented below shows that less than one percent of population are 80 years and older. By ethnicity, the ratio of older people is higher among Adibasi/Janjati indicating more longevity compared to others.

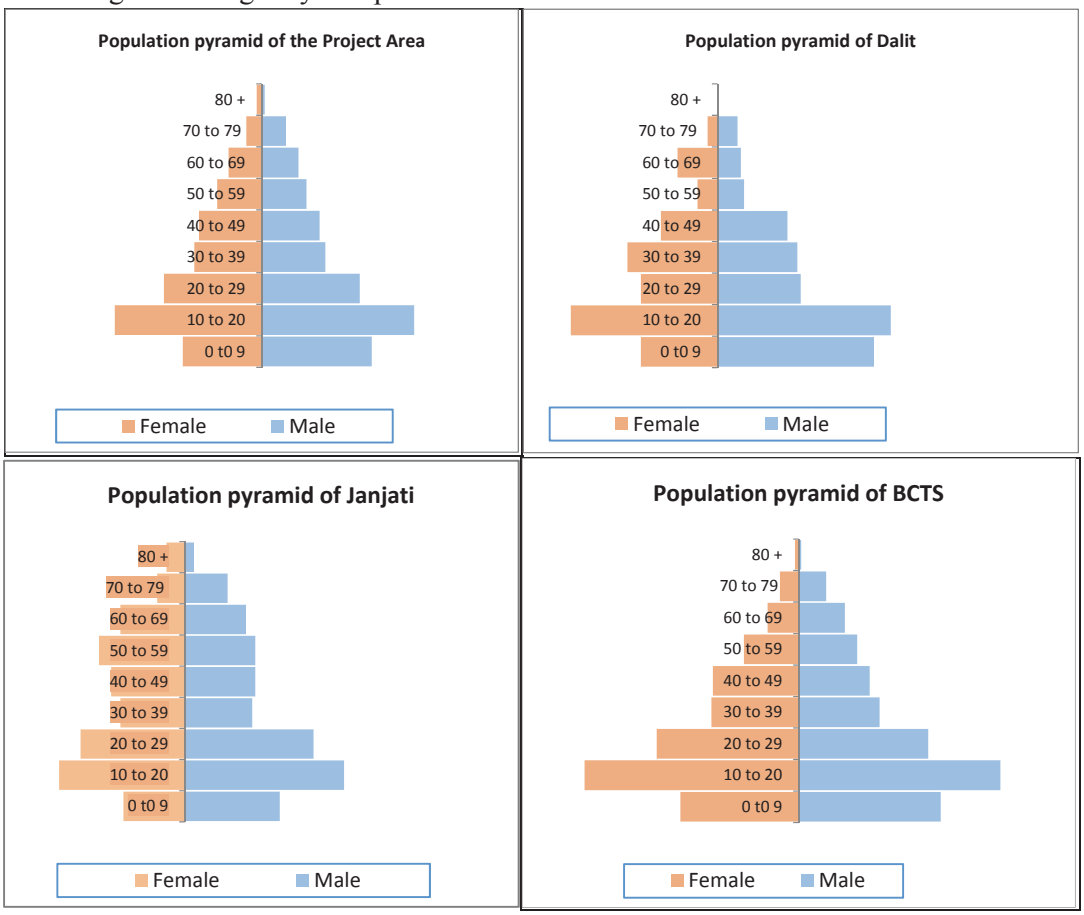


Figure 4. 4: Population Pyramids of Project Area

4.3.3 Migration

Of the total population reported in the household survey, 83.9 percent were at home during the time of survey. Among the family members who were out of their home, 8.6 percent were outside home within country whereas another 7.5 percent were outside Nepal. Across districts, Salyan had the highest percentage of people (21%) out of home as compared to 14.2 percent in Achham and 13 percent in Dolakha district. Interestingly, female headed households had higher percentage of family members who were out of home (15.8%) as compared to only about one third (5.6%) among male headed households revealing that the former group households depended more on income of family members working outside.

Table 4. 7: Distribution of Surveyed Population by Current Residential Status

Categories	At Home		Outside Home within Nepal		Outside Nepal		Total	
By District								
Achham	704	(85.9)	40	(4.9)	76	(9.3)	820	(100.0)
Salyan	528	(79.0)	82	(12.3)	58	(8.7)	668	(100.0)
Dolakha	442	(87.0)	50	(9.8)	16	(3.2)	508	(100.0)
Total/ Overall	1674	(83.9)	172	(8.6)	150	(7.5)	1996	(100.0)
By Gender of Household Head								
Male	1387	(85.8)	140	(8.7)	90	(5.6)	1617	(100.0)
Female	287	(75.7)	32	(8.4)	60	(15.8)	379	(100.0)
By Caste/Ethnicity								
Dalit	288	(83.5)	24	(7.0)	33	(9.6)	345	(100.0)
Adibasi/Janajati	385	(88.7)	36	(8.3)	13	(3.0)	434	(100.0)
BCTS	1001	(82.3)	112	(9.2)	104	(8.6)	1217	(100.0)

Note: Figures in parenthesis indicate percentage. / Source: Field Survey, 2020

4.3.4 Literacy and Education

Literacy status of the population has a different scenario than that of the household heads. The literate rate of the total population is higher (88.2%) than that of the household heads. Among the literate population, males account for a slightly higher figure (93.4%) as compared to females (82.7%). Among the caste/ethnic groups, the ratio of literate population differs marginally with 90.5 percent among BCTS group followed by 85.6 percent for Adibasi/Janajati and 83.2 percent for Dalit.

Table 4. 8: Distribution of Surveyed Population by Literacy Status

Categories	Illiterate						Literate					
	Male		Female		Total		Male		Female		Total	
By District												
Achham	9	(2.5)	25	(6.9)	34	(4.7)	347	(97.5)	336	(93.1)	683	(95.3)
Salyan	33	(10.4)	80	(27.5)	113	(18.6)	283	(89.6)	211	(72.5)	494	(81.4)
Dolakha	18	(7.4)	48	(20.5)	66	(13.8)	225	(92.6)	186	(79.5)	411	(86.2)
Total/ Overall	60	(6.6)	153	(17.3)	213	(11.8)	855	(93.4)	733	(82.7)	1588	(88.2)
By Gender of Household Head												
Male	53	(6.9)	120	(17.3)	173	(11.8)	715	(93.1)	574	(82.7)	1289	(88.2)
Female	7	(4.8)	33	(17.2)	40	(11.8)	140	(95.2)	159	(82.8)	299	(88.2)
By Caste/Ethnicity												
Dalit	16	(9.8)	35	(24.8)	51	(16.8)	147	(90.2)	106	(75.2)	253	(83.2)
Adibasi/Janajati	15	(7.0)	43	(22.5)	58	(14.4)	198	(93.0)	148	(77.5)	346	(85.6)
BCTS	29	(5.4)	75	(13.5)	104	(9.5)	510	(94.6)	479	(86.5)	989	(90.5)

Note: Figures in parenthesis indicate percentage. / Source: Field Survey, 2020

The survey captured the educational levels of the population above five years age which totaled to 1588 persons. Of the population above 5 years of age, the highest percentage (32.3%) had completed primary education (Grade 1 to 5) followed by 25.9 percent in the second largest group who attained Grade 8 to SEE level education. Similarly, 20.1 percent population had attained education above graduation level as compared to 13 percent who were just graduates. Among the graduates and above, the BCTS group accounted for highest figure (35.3%) which was slightly lower at 34.3 percent among Adibasi/Janajati and 24.2 percent among Dalit group.

Table 4. 9: Distribution of SamplePopulation Above 5 Years by Educational Status

Categories	Literate (No Formal Education)		Grade 1 - 5		Grade 6 - 7		Grade 8 - SEE		Higher Secondary Level		Graduate		Above Graduation		Total
By District															
Achham	158	(23.1	231	(33.8)	65	(9.5)	165	(24.2)	47	(6.9)	10	(1.5)	165	(24.2)	683
Salyan	65	(13.2	163	(33.0)	55	(11.1)	147	(29.8)	56	(11.3)	7	(1.4)	66	(13.4)	494
Dolakha	88	(21.4	119	(29.0)	57	(13.9)	99	(24.1)	44	(10.7)	4	(1.0)	88	(21.4)	411
Total/ Overall	311	(19.6	513	(32.3)	177	(11.2)	411	(25.9)	147	(9.3)	21	(1.3)	319	(20.1)	1588
By Caste/Ethnicity															
Dalit	41	(16.2	110	(43.5)	33	(13.0)	48	(19.0)	19	(7.5)	2	(0.8)	41	(16.2)	253
Adibasi/Janajati	77	(22.3	105	(30.4)	50	(14.5)	78	(22.5)	32	(9.3)	4	(1.2)	77	(22.3)	346
BCTS	193	(19.5	298	(30.1)	94	(9.5)	285	(28.8)	96	(9.7)	15	(1.5)	201	(20.3)	989

Note: Figures in parenthesis indicate percentage. / Source: Field Survey, 2020

4.3.5 School Going Population

Of the total children aged between 5 to 14 years, 447 children (97.8%) were attending school during the time of survey. The figures of school going children were between 97.6% in Achham and 98.1% in Salyan. The percentage of school going children was 96.6% among Dalits and 98.3 percent among BCTS households. The statistics clearly denotes that the children of school going age have access to schools among all districts and ethnic communities.

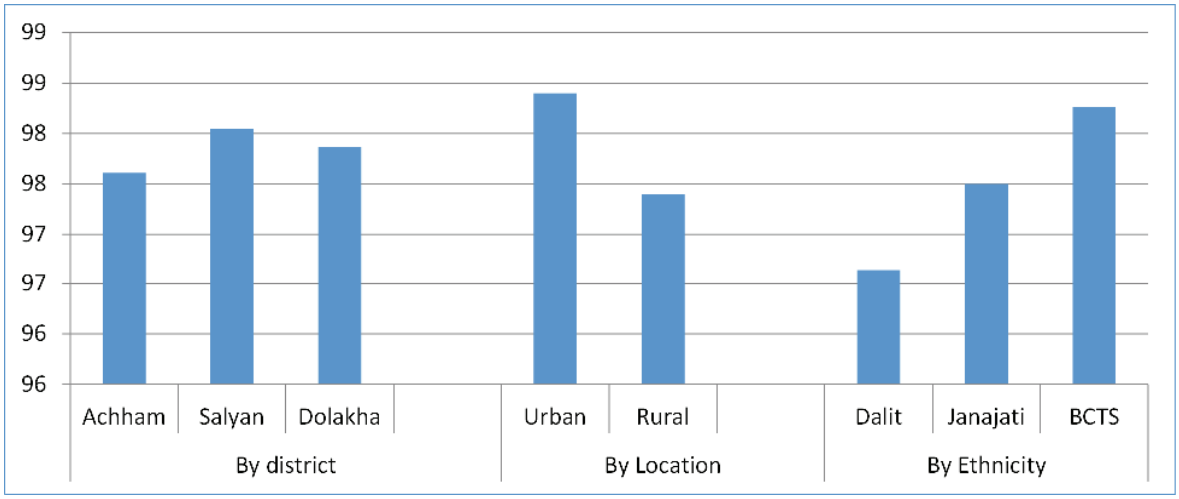


Figure 4. 5: Percentage of Children Attending School

4.3.6 Training Received

A total of 104 persons (7.7%) reported to have received one or other type of training. The training recipients were highest in Dolakha (17%) with much lower figure in Achham (4.3%) and Salyan (3.8%). Among caste/ethnic group, the training recipients were highest (16.7%) from Adibasi/Janajati group. Of the training recipients, 53 persons (51%) were provided training in general farming. Another 15.4 percent received training in different IGAs and 11.5 percent received training in construction work under earthquake housing project.

Table 4. 10: Number and Percentage of Population by Type of Training Received

	By District				By Caste/Ethnicity		
	Achham	Salyan	Dolakha	Total/ Overall	Dalit	Adibasi/Janajati	BCTS
General Farming (Agriculture/Livestock)	4	10	39	53	3	30	20
	(18.18)	(58.82)	(60.00)	(50.96)	(33.33)	(55.56)	(48.78)
Climate Smart Farming (Agriculture/Livestock)		4		4	2		2
		(23.53)		(3.85)	(22.22)		(4.88)
NTFP Cultivation/Production	1		2	3		2	1
	(4.55)		(3.08)	(2.88)		(3.70)	(2.44)
NTFP Processing/Marketing	1		2	3		1	2
	(4.55)		(3.08)	(2.88)		(1.85)	(4.88)
Earthquake Resistance Construction			12	12		9	3
			(18.46)	(11.54)		(16.67)	(7.32)
River Training		1		1			1
		(5.88)		(0.96)			(2.44)
Terrace Improvement	1			1			1
	(4.55)			(0.96)			(2.44)
IGA (Knitting/Weaving/Sewing)	7	2	7	16	1	6	9
	(31.82)	(11.76)	(10.77)	(15.38)	(11.11)	(11.11)	(21.95)
Others	8	2	12	22	4	10	8
	(36.36)	(11.76)	(18.46)	(21.15)	(44.44)	(18.52)	(19.51)
Reporting at Least One training	22	17	65	104	9	54	41
	(100)	(100)	(100)	(100)	(100)	(100)	(100)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

4.3.7 Disabled Population

A total of 30 people were reported to have one or other kind of disability. Of them, five people were fully disabled. Achham district had the highest number of 22 disabled people (2.7%). Salyan and Dolakha districts had three and five disabled persons, respectively. Among the caste/ethnic groups, BCTS and Dalit had higher percentage of disabled persons with 1.8 percent in both categories against only 0.7 percent for Adibasi/Janajati.

Table 4. 11: Distribution of Sample Population by Disability Condition

Categories	Fully Disabled		Partially Disabled	
By District				
Achham	1	(0.1)	21	(2.6)
Salyan	2	(0.3)	1	(0.2)
Dolakha	2	(0.4)	3	(0.6)
Total/ Overall	5	(0.3)	25	(1.3)
By Caste/Ethnicity				

Categories	Fully Disabled		Partially Disabled	
Dalit	1	(0.3)	5	(1.5)
Adibasi/Janajati	1	(0.2)	2	(0.5)
BCTS	3	(0.3)	18	(1.5)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

4.3.8 Institutional Associations

The surveyed household members were found attached with one or other local institutions. Quite a high percentage of the household members accounting for 36.8 percent were attached with different institutions revealing their opportunity in accessing the services from the institutions with which they are attached. Those associated with the institutions were highest in Achham (40.4%) and lowest in Dolakha (31.8%). Members of BCTS group accounted for highest percentage in having their association (39.4%) against lower figure (32.4%) among Dalit group. Three institutions with highest percentage of people's association were Forest Users Groups (51.9%) followed by Mothers' groups (41.8%) in the second place and Saving Credit groups (20.4%). Other institutions with association in smaller numbers are NGOs, CBOs, producer groups etc. It should be noted that higher percentage of people (56.2%) from indigenous group (Adibasi/Janajati) were associated with Mothers' groups (56.2% and Saving Credit groups (54.3%)

Table 4. 12: Number and Percentage of Population by Post Held in Local Institutions.

Categories	Chair Person		Vice-chairperson		Secretary/ Joing Secretary		Treasurer		Executive Committee Member		General Member		Reporting at Least One	
By District														
Achham	5	(2.4)	1	(0.5)	6	(2.9)	3	(1.5)			195	(95.1)	205	(100.0)
Salyan	6	(3.5)	1	(0.6)	3	(1.8)	2	(1.2)	16	(9.4)	154	(90.1)	171	(100.0)
Dolakha	8	(6.7)	5	(4.2)	7	(5.9)	4	(3.4)	1	(0.8)	100	(84.0)	119	(100.0)
Total/ Overall	19	(3.8)	7	(1.4)	16	(3.2)	9	(1.8)	17	(3.4)	449	(90.7)	495	(100.0)
By Gender of Household Head														
Male	16	(3.9)	6	(1.5)	15	(3.6)	6	(1.5)	12	(2.9)	373	(90.5)	412	(100.0)
Female	3	(3.6)	1	(1.2)	1	(1.2)	3	(3.6)	5	(6.0)	76	(91.6)	83	(100.0)
By Caste/Ethnicity														
Dalit	1	(1.4)			1	(1.4)	2	(2.7)	3	(4.1)	67	(91.8)	73	(100.0)
Adibasi/Janajati	7	(6.7)	4	(3.8)	6	(5.7)	4	(3.8)	1	(1.0)	89	(84.8)	105	(100.0)
BCTS	11	(3.5)	3	(1.0)	9	(2.8)	3	(1.0)	13	(4.1)	293	(92.4)	317	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

People having been associated with the local institutions were holding different positions. A large percentage of them (90.7%) were general members of the institutions with which they were associated. Remaining 9.3 percent were holding key positions viz Chairpersons (3.8%), Vice Chairpersons (1.4%), Secretary (3.2%), Treasurers (1.8%) and Executive members (3.4%). Among the caste/ethnic groups, higher percentage of people from Adibasi/Janajati group was holding the key positions such as Chairpersons, Vice Chairpersons, Secretaries and Treasurers.

CHAPTER V: LANDHOLDING

As farming is the main source of living in the project area, size of land holdings, ownership and tenancy pattern are important. This chapter contains details on types of land and their use. More than 99 percent of the sample households reported to have access to agricultural land. They owned about 0.53 hectares or about 10.5 Ropani of land on average. About 7.7 percent of total land or 0.0408 ha (about 12 Ana) per household was homestead that includes land occupied by house, animal shed and courtyard. Another 49.2 percent was unirrigated land and 26.7 percent irrigated land used for crop cultivation while remaining 16.4 percent of land was not cultivated.

5.1 Size of Holding

More than 99 percent of the sample households reported to have access to agricultural land. One out of 137 households in Achham and two out of 132 household in Salyan reported not having access to land. Two of the sample households not having access to land were Dalits while one household belonged to BCTS group.

Among the households that have access to land 400 households owned land while one person depended on rented-in land. Some 30 percent of the households also rented out their land. Number of households that used rented-in land for cultivation in addition to their own land was reported to be 61 (15.25 %). Frequency of renting land was higher in Dolakh followed by Achham. Similarly, land renting was higher among BCTS followed by Adibasi/Janjatis as detailed in Table 5.1.

Table 5. 1: Number and Percentage of Households having Access to Land

Categories	Own land		Rented-out land		Rented-in Land		Total	
By District								
Achham	137	(100.0)	9	(6.6)	27	(19.7)	137	(100.0)
Salyan	132	(100.0)	6	(4.6)	8	(6.1)	132	(100.0)
Dolakha	131	(99.2)	15	(11.4)	27	(20.5)	132	(100.0)
Total/ Overall	400	(99.8)	30	(7.5)	62	(15.5)	401	(100.0)
By Caste/Ethnicity								
Dalit	64	(100.0)	2	(3.1)	9	(14.1)	64	(100.0)
Adibasi/Janajati	113	(99.1)	12	(10.5)	21	(18.4)	114	(100.0)
BCTS	223	(100.0)	16	(7.2)	32	(14.4)	223	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

5.2 Ownership and Tenancy

Most of the households (77%) cultivated owned land only meaning that they did not rent-in or rent-out land, about 2 percent cultivated part of own land plus rented-in land while also renting-out part of land owned by them. This happened either because part of their land was away from home or they wanted to rent-in specific land such as irrigated, suitable for specific crop etc. Another 15 percent household cultivated part of their own land plus rented-in land. Less than one percent of the household rented-out their entire land. Female headed households were

found to have lower rate of renting-in land compared to male headed households. Also, lower proportion of Dalit households rented-in land for cultivation as detailed in Table 5.2.

Table 5. 2: Number and Percentage of Households by Tenancy Type

Categories	Cultivate own land only		Cultivate own land and rent-out some		Cultivate own land, rent-in and also rent- out some		Rent-out all land		Cultivate own land and rented-in some		Not cultivating	
By District												
Achham	102	(73.9)	8	(5.8)	1	(0.7)			26	(18.8)	1	(0.7)
Salyan	118	(88.1)	6	(4.5)					8	(6.0)	2	(1.5)
Dolakha	91	(68.9)	13	(9.9)	1	(0.8)	1	(0.8)	26	(19.7)		
Total/ Overall	311	(77.0)	27	(6.7)	2	(0.5)	1	(0.3)	60	(14.9)	3	(0.7)
By Gender of Household Head												
Male	246	(76.9)	20	(6.3)	2	(0.6)	1	(0.3)	49	(15.3)	2	(0.6)
Female	65	(77.4)	7	(8.3)					11	(13.1)	1	(1.2)
By Caste/Ethnicity												
Dalit	53	(80.3)	2	(3.0)					9	(13.6)	2	(3.0)
Adibasi/Janajati	82	(71.9)	10	(8.8)	1	(0.9)	1	(0.9)	20	(17.5)		
BCTS	176	(78.6)	15	(6.7)	1	(0.5)			31	(13.8)	1	(0.5)
Other												

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

The sample households owned about 0.53 hectares or about 10.5 Ropani of land on average. Average land holding ranged from 0.45 ha in Achham to 0.66 ha in Dolakha.Classified by ethnicity, Adibasi/Janajati held 0.66 ha per household followed by 0.55 ha per BCT household. Dalits owned only about 0.25 ha of land. Total land was classified in to four categories viz, homestead, unirrigated, irrigated and fallow land. The survey result shows that about 7.7 percent of total land or 0.0408 ha (about 12 Ana) per household was homestead that includes land occupied by house, animal shed and courtyard. Another 49.2 percent was unirrigated land and 26.7 percent irrigated land used for crop cultivation while remaining 16.4 percent of land was not cultivated meaning it might be used for growing fodder, trees or other purposes that does not require cultivation. Proportion of irrigated area was highest (61.7 %) in Dolakha followed by Salyan (44.2 %). By ethnicity, highest proportion of land owned by Adibashi/Janjati was irrigated.

Table 5. 3: Average Land Owned (Own Land Self Cultivated + Rented out Land) by Type of Land

Categories	Homestead (Ha/HH)		Un-irrigated (Ha/HH)		Irrigated (Ha/HH)		Fallow/ Uncultivated (Ha/HH)		Total (Ha/HH)	
By District										
Achham	0.02	(5.3)	0.17	(37.2)	0.12	(27.2)	0.14	(30.4)	0.45	(100.0)
Salyan	0.08	(16.0)	0.22	(44.2)	0.19	(38.9)	0.00	(0.9)	0.49	(100.0)
Dolakha	0.02	(3.1)	0.41	(61.7)	0.11	(17.2)	0.12	(18.1)	0.66	(100.0)
Total/ Overall	0.04	(7.7)	0.26	(49.2)	0.14	(26.7)	0.09	(16.4)	0.53	(100.0)
By Caste/Ethnicity										
Dalit	0.05	(18.1)	0.09	(35.8)	0.08	(31.7)	0.04	(14.5)	0.25	(100.0)
Adibasi/Janajati	0.02	(3.1)	0.41	(62.3)	0.11	(16.0)	0.12	(18.6)	0.66	(100.0)
BCTS	0.05	(9.1)	0.24	(43.0)	0.18	(32.6)	0.08	(15.4)	0.55	(100.0)

Note: Figures in parenthesis indicate percentage.

Source: Field Survey, 2020

5.3 Source of Irrigation Water

Water from rivers and streams was reported as the major source of irrigation for farming. As high as 74.3 percent households were using irrigation water from rivers/streams. Households who reported river/stream as the source of irrigation water were highest in Achham (89.1%) and lowest in Dolakha (50.8%). Few households (2.7%) also used reservoir/tank water for irrigation. Another 25.7 percent household reported "other" sources of irrigation water. In Dolakha, only 50.8 percent households used river/stream water for irrigation as compared to much higher figure in Achham and Salyan districts.

Table 5. 4: Number and Percentage of Households Reporting Different Source of Water for Irrigation

Categories	River / Stream		Reservoir / Tank		Canal		Other		Reporting at least One Source	
By District										
Achham	122	(89.1)					15	(11.0)	137	(100.0)
Salyan	109	(82.6)			1	(0.8)	23	(17.4)	132	(100.0)
Dolakha	67	(50.8)	11	(8.3)			65	(49.2)	132	(100.0)
Total/ Overall	298	(74.3)	11	(2.7)	1	(0.3)	103	(25.7)	401	(100.0)
By Caste/Ethnicity										
Dalit	51	(79.7)			1	(1.6)	13	(20.3)	64	(100.0)
Adibasi/Janajati	56	(49.1)	9	(7.9)			56	(49.1)	114	(100.0)
BCTS	191	(85.7)	2	(0.9)			34	(15.3)	223	(100.0)
Other										

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

CHAPTER VI: AGRICULTURE (CROPS)

Farming related activities are discussed in this chapter. Some 94 percent of the sample households cultivated at least one crop including, cereals, legumes, oil-seeds, cash crops, vegetables or fruits. Among the different crops, cereals (rice, wheat, maize, millet, barley and buckwheat) were most important and cultivated by 91.1 percent of the households. Similarly, vegetables were cultivated by 47 percent, legumes by 44.8 percent, oil-crops by 14.6 percent and fruits by 4.0 percent of the households. Almost 80 percent of the total cropped area was occupied by cereal crops, about 10 percent by vegetables, about 8 percent by legumes and less than one percent by oil crops cash crops and fruits. Total gross food grain production was 985 kg per household in Salyan, 793 kg per household in achham and 520 kg per household in Dolakha district.

6.1 Crop production and productivity

Crop farming is one of the major activities of the households in the project area. This is supported by the fact that more than 94 percent of the sample households grew crops. The survey result shows that about 99 percent of farmers in Dolakha, 97 percent in Achham and 86 percent in Salyan district cultivated one or other crops in last one year. Segregated by ethnicity, the highest proportion of household engaged in crop cultivation was among Adibasi/Janjatis (99.1%), followed by BCTS group (96.4%). The crops grown include cereals, pulses, oil-seeds, vegetables and fruits.

Table 6. 1: Number and Percentage of Households Growing Crops

Categories	Growing crops		Not growing crops		Total	
By District						
Achham	134	(97.1)	4	(2.9)	138	(100.0)
Salyan	115	(85.8)	19	(14.2)	134	(100.0)
Dolakha	131	(99.2)	1	(0.8)	132	(100.0)
Total/ Overall	380	(94.1)	24	(5.9)	404	(100.0)
By Caste/Ethnicity						
Dalit	51	(77.3)	15	(22.7)	66	(100.0)
Adibasi/Janajati	113	(99.1)	1	(0.9)	114	(100.0)
BCTS	216	(96.4)	8	(3.6)	224	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

Some 94 percent of the sample households cultivated at least one crop including, cereals, legumes, oil-seeds, cash crops, vegetables or fruits. Proportion of households that cultivated crops was highest (99.2%) in Dolakha followed by Achham (97.1%). Among the different crops, cereals (rice, wheat, maize, millet, barley and buckwheat) were most important and cultivated by 91.1 percent of the households. Data shows that some 85.1 (Salyan) to 95.6 percent (Achham) of the households cultivated cereals. Similarly, vegetables were cultivated by 47 percent, legumes (including soybean, bean, horse gram, pea, lentil, black gram and some other minor legumes) by 44.8 percent, oil-crops by 14.6 percent and fruits by 4.0 percent of the households.

Table 6. 2: Percentage of Households Growing Different Crops

Categories	Cereal	Legume	Oil crop	Cash crop	vegetable	fruit	At least one crop
By District							
Achham	95.65	64.49	13.04		50.00	0.72	97.10
Salyan	85.07	38.06	4.48	6.72		9.70	85.82
Dolakha	92.42	31.06	26.52	18.94	91.67	1.52	99.24
Total/ Overall	91.09	44.80	14.60	8.42	47.03	3.96	94.06
By Gender of Household Head							
Male	92.50	48.13	15.63	10.00	53.13	4.69	95.31
Female	85.71	32.14	10.71	2.38	23.81	1.19	89.29
By Caste/Ethnicity							
Dalit	75.76	33.33	1.52	1.52	12.12		77.27
Adibasi/Janajati	91.23	26.32	21.93	16.67	91.23	1.75	99.12
BCTS	95.54	57.59	14.73	6.25	34.82	6.25	96.43

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

Almost 80 percent of the total cropped area was occupied by cereal crops, about 10 percent by vegetables, about 8 percent by legumes and less than one percent by oil crops cash crops and fruits. It is important to note that vegetables covered more than 25 percent of the cropped area in Dolakha where as it was only about four percent in Achham. The reason is that access to markets via road network is much better in Dolakha compared to Achham. The highest proportion of land under vegetables was reported by Adibasi/Janjati households (27.1 % of total) where as it was lowest (< 1 %) among Dalits.

Table 6. 3: Average Area under Different Crops Grown

Categories	Cereals (Ha/HH)		Legumes (Ha/HH)		Oil-Crops (Ha/HH)		Cash Crops (Ha/HH)		Vegetables (Ha/HH)		Fruits (Ha/HH)		Total (Ha/HH)
By District													
Achham	0.427	(94.0)	0.010	(2.1)					0.017	(3.8)	0.000	(0.0)	0.454
Salyan	0.480	(80.3)	0.104	(17.3)	0.00	(0.4)	0.004	(0.7)			0.008	(1.4)	0.598
Dolakha	0.419	(67.9)	0.022	(3.6)	0.01	(1.6)	0.008	(1.3)	0.157	(25.4)	0.001	(0.1)	0.616
Total/ Overall	0.442	(79.6)	0.045	(8.1)	0.00	(0.7)	0.004	(0.7)	0.057	(10.3)	0.003	(0.6)	0.555
By Gender of Household Head													
Male	0.474	(79.2)	0.048	(7.9)	0.00	(0.7)	0.004	(0.6)	0.065	(10.9)	0.004	(0.6)	0.599
Female	0.317	(82.0)	0.035	(9.0)	0.00	(0.8)	0.005	(1.4)	0.026	(6.7)	0.001	(0.2)	0.387
By Caste/Ethnicity													
Dalit	0.267	(91.0)	0.025	(8.5)			0.000	(0.1)	0.001	(0.5)			0.293
Adibasi/Janajati	0.405	(66.9)	0.020	(3.2)	0.01	(1.2)	0.008	(1.4)	0.164	(27.1)	0.001	(0.2)	0.605
BCTS	0.512	(84.5)	0.064	(10.5)	0.00	(0.6)	0.003	(0.5)	0.019	(3.1)	0.005	(0.8)	0.606

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

Cropping intensity as defined by number of crops per unit area, was 154 percent in Salyan, 150 percent in Achham and 123 percent in Dolakha. Cropping intensity was found highest among Dalit households and lowest among Adibasi/Janjati households. Survey result also reveals lower the size of holding higher is the cropping intensity.

6.1.1 Cereals

It was revealed that maize occupied the largest proportion of the land under cereal crops (31.7 %) followed by paddy (27.8 %), wheat (27.1 %) and millet (11.3 %) in total. But the scenario was slightly different in the Hill districts where 31.6 percent of area under cereals was occupied by paddy. This is also consistent with the fact that higher proportion of land in those two districts was irrigated compared to mountain district. In terms of area, proportion of maize area out of total cereal area was highest (40.8%) among Adibashi/Janjati, where as proportion of area under paddy was found highest among Dalit (35.7%0 and BCTS (30.0%) households.

Table 6. 4: Average Area under Different Cereal Crops

Categories	Paddy (Ha/HH)		Maize (Ha/HH)		Wheat (Ha/HH)		Millet (Ha/HH)		Barley (Ha/HH)		Buck-wheat (Ha/HH)		Total Cereals (Ha/HH)	
By District														
Achham	0.125	(29.2)	0.121	(28.4)	0.124	(29.0)	0.035	(8.2)	0.022	(5.2)			0.427	(100.0)
Salyan	0.162	(33.7)	0.139	(29.0)	0.146	(30.4)	0.033	(6.9)					0.480	(100.0)
Dolakha	0.081	(19.4)	0.161	(38.4)	0.089	(21.3)	0.082	(19.7)	0.001	(0.2)	0.004	(1.0)	0.419	(100.0)
Total/ Overall	0.123	(27.8)	0.140	(31.7)	0.120	(27.1)	0.050	(11.3)	0.008	(1.8)	0.001	(0.3)	0.442	(100.0)
By Caste/Ethnicity														
Dalit	0.095	(35.7)	0.063	(23.7)	0.077	(29.0)	0.030	(11.2)	0.001	(0.4)			0.267	(100.0)
Adibasi/Janajati	0.078	(19.3)	0.165	(40.8)	0.083	(20.4)	0.074	(18.2)	0.001	(0.2)	0.005	(1.2)	0.405	(100.0)
BCTS	0.154	(30.0)	0.150	(29.3)	0.151	(29.6)	0.044	(8.5)	0.013	(2.6)			0.512	(100.0)

Note: Figures in parenthesis indicate percentage; / Source: Field Survey, 2020

Though maize occupied larger area compared to other cereals, production of paddy was more than maize as productivity of paddy was higher (2.45 kg/ha) than maize (1.59). It was recorded that production of rice was 300 kg per household, production of maize was 223 kg per household on average. Average production of of wheat, millet and barley was 168 kg, 65 kg and 11 kg per household, respectively. Production of buckwheat was recorded in Dolakha only, where it was about 2 kg per household on average. Total gross food grain production was 985 kg per household in Salyan, 793 kg per household in achham amd 520 kg per household in Dolakha district. Among the three major ethnic groups highest per household production of gross food gains was 979 kg per BCTS households.

Table 6. 5: Average Quantity of Different Cereal Crops Produced (Unit: kg/hh)

Categories	Paddy	Maize	Wheat	Millet	Barley	Buck-wheat
By District						
Achham	277	255	181	49	30	-
Salyan	509	213	214	48	-	-
Dolakha	113	200	105	99	1	2
Total/ Overall	300	223	168	65	11	1
By Caste/Ethnicity						
Dalit	232	106	119	40	1	-
Adibasi/Janajati	114	201	99	91	1	2
BCTS	415	269	217	59	18	-

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

Average productivity of paddy was recorded highest at 3.15 mt per ha in Salyan where as productivity of maize was highest (2.10 mt/ha) in Achham. Similarly, productivity of wheat

and millet were higher in Salyan compared to other two districts. A comparison of ecological belt shows that yields of all cereals were lower in the Mountains than in the Hills. Average productivity reported by Adibasi/Janjat households was normally lower than other two ethnic groups. No distinct pattern was observed on yieds of different crops reported by the male and female headed households. Compared to national average, yields of paddy and maize were lower while those of wheat, millet and barley were higher in the project area.

Table 6. 6: Average Productivity of Different Cereal Crops (Unit: kg/hh)

Categories	Paddy	Maize	Wheat	Millet	Barley	Buck-wheat
By District						
Achham	2,219	2,103	1,466	1,415	1,356	-
Salyan	3,150	1,532	1,470	1,462	-	-
Dolakha	1,394	1,245	1,181	1,204	1,352	361
Total/ Overall	2,447	1,593	1,399	1,312	1,358	362
By Ecological Belt						
Mountain	1,394	1,245	1,181	1,204	1,352	361
Hill	2,739	1,802	1,469	1,436	1,357	-
By Gender of Household Head						
Male	2,396	1,579	1,380	1,304	1,373	356
Female	2,733	1,673	1,494	1,363	1,231	-
By Caste/Ethnicity						
Dalit	2,427	1,671	1,539	1,334	1,212	-
Adibasi/Janajati	1,468	1,216	1,202	1,240	1,237	360
BCTS	2,705	1,795	1,433	1,367	1,361	-

Source: Field Survey, 2020

6.1.2 Pulses

Pulses are found to be important crops in the project area. Soybean, beans, horse gram, cowpea, lentil, peas, black gram and some other minor legumes are grown in the project area. Survey result shows that almost 45 percent of the households cultivated one or another type of pulses. Soybean is found to have cultivated by almost 40 percent of the households. It was most popular in Achham as about 63 percent of the households cultivated it and least popular in Dolakha. Among the different ethnic groups, as high as 52 percent of the BCTS households cultivated soybean. Beans and lentils were cultivated by about 9 percent of the households.

Table 6. 7: Percentage of Households Growing Different Legume Crops.

Categories	Soybean	Beans	Horse gram	Cowpea	Lentil	Peas	Blackgram	Others	At least one
By District									
Achham	63.04	18.84			2.17	0.72	6.52	0.72	64.49
Salyan	27.61	4.48	5.22	11.19	26.12	2.99	11.94	5.22	38.06
Dolakha	27.27	5.30		0.76		10.61	9.09		31.06
Total/ Overall	39.60	9.65	1.73	3.96	9.41	4.70	9.16	1.98	44.80
By Caste/Ethnicity									
Dalit	27.27	1.52		3.03	7.58		7.58	1.52	33.33
Adibasi/Janajati	22.81	4.39				9.65	9.65		26.32

Source: Field Survey, 2020

Though almost 45 percent of the households cultivated legumes, area covered by the legume crops was only about 0.052 ha or slightly more than one Ropani per household. In several cases legumes were cultivated as inter-crop or planted on bunds/borders.

Production of all legumes together accounted for 45 kg per household, consisting of 18 kg soybesan, 11 kg lentil, 3 kg each of blackgram, cow pea and peas, 4 kg horse gram, and about 1 kg of other pulses. The largest amount of legume production was reported in Salyan and smallest amount in Dolakha. Among the different ethnic groups BCTS produced an average of 65 kg legumes per household, whereas Dalits and Adibasi/Janajat produced 27 kg and 18 kg per household, respectively.

Table 6. 8: Average Quantity of Different Legume Produced (Unit: kg/hh)

Categories	Soybean	Beans	Horsegram	Cowpea	Lentil	Peas	Black Gram	Others	Total
By District									
Achham	17	2	-	-	0	0	1	0	21
Salyan	27	4	11	9	34	1	6	4	95
Dolakha	10	1	-	0	-	7	2	-	20
Total/ Overall	18	2	4	3	11	3	3	1	45
By Caste/Ethnicity									-
Dalit	11	0	-	5	8	-	2	0	27
Adibasi/Janajati	8	1	-	-	-	7	2	-	18
BCTS	25	4	7	4	18	2	4	2	65

Source: Field Survey, 2020

6.1.3 Oil seeds

Oil-crops were not very popular in the project area. It was recorded that less than 15 percent of the households cultivated common mustard called Tori in local language. Only one household in Achham reported cultivating another oil-crop called Sarsyu. Area under oil-crops was reported to be 0.004 ha equivalent to 1.25 Aana (local unit) per household. Productivity of oil-crops was recorded at 459 kg per hectare which is lower than national average of about one mt per hectare.

Table 6. 9: Number and Percentage of Households Growing Different Oil Crops

Categories	Households cultivating (No)		Area (ha/hh)	Production (kg/hh)	Productivity (kg/ha)
By District					
Achham	18	(13.04)	0.001	1.5	1500
Salyan	6	(4.48)	0.002	1.8	798
Dolakha	35	(26.52)	0.010	2.2	221
Total/ Overall	59	(14.60)	0.004	1.8	459
By Caste/Ethnicity					
Dalit	1	(1.52)	0.001	0.2	182
Adibasi/Janajati	25	(21.93)	0.008	2.0	261
BCTS	33	(14.73)	0.003	2.3	666

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

6.1.4 Vegetables

Potato, Bottle guard, cabbage, carrot, cauliflower, cucumber, french beans, onion, pumpkin, radish, tomato and some leafy vegetables were reported being grown in the project area. About 47 percent of the households cultivated vegetables on an average area of 0.057 hectare or 1.1 Ropani of land. Average production of vegetables was recorded at 409 kg per household. Adibasi/Janajatis were found to have cultivated vegetables on larger area and produced more vegetables than BCTS and Dalit households.

Table 6. 10: Households Growing Different Vegetable, their area and production

Categories	Households Growing Vegetables		Area (ha/hh)	Production (kg/hh)	Productivity (kg/ha)
By District					
Achham	69	(50.00)	0.017	104	6,002
Salyan					
Dolakha	121	(91.67)	0.157	1143	7,297
Total/ Overall	190	(47.03)	0.057	409	7,160
By Caste/Ethnicity					
Dalit	8	(12.12)	0.001	8	6,119
Adibasi/Janajati	104	(91.23)	0.164	1229	7,487
BCTS	78	(34.82)	0.019	109	5,755

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

6.1.5 Fruits

Banana, mango, guava orange and lime are the major fruits cultivated in the project area. It was recorded that only about four percent of the households cultivated fruits. Average area under fruits was only 0.003 hectare (9 Aana) per household. The households produced an average of 16 kg of fruits per household.

Table 6. 11: Households Growing Different Fruits, their area and production

Categories	Households Growing Vegetables		Area (ha/hh)	Production (kg/hh)	Productivity (kg/ha)
By District					
Achham	1	(0.72)	0.000	0.7	7,246
Salyan	13	(9.70)	0.008	45	5,417
Dolakha	2	(1.52)	0.001	2	2,983
Total/ Overall	16	(3.96)	0.003	16	5,314
By Caste/Ethnicity					
Dalit					
Adibasi/Janajati	2	(1.75)	0.001	3	3,070
BCTS	14	(6.25)	0.005	27	5,469

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

6.1.6 Cash crops

Cardamom, ginger and turmeric are the major cash crops grown in the project area. However, those cash crops were planted by only eight percent of the households in limited area. Total area under those crops was recorded at 0.004 hectare per households (1.25 Aana).

6.2 Adoption of Modern technology/practices in crop cultivation

It is encouraging to note that the sample households have started use of modern technology/practices to increase their crop production. About 12 percent of the households used mulching, 3 percent each used sprinkler irrigation and plastic house, 2 percent sprayed animal urine, about one percent used bio-fertilizer, soil solarization technique and botanical pesticide. About one percent of the farmers reported to have used drought resistant variety of crops and about 3 percent produced off-season vegetable using modern techniques. All of the above mentioned modern technologies/practices were reported to have practiced by one or another farmer in Dolakha. Sprinkler irrigation, plastic tunnel, and off-season vegetables were reported to have practiced by limited number of farmers in Achham. Use of animal urine, mulching and botanical pesticide use was reported by limited number of farmers in Salyan district. Slightly higher proportion of male headed households reported to have used modern technology/practices than female headed households. Among the ethnic groups, highest proportion of Adibasi/Janjat farmers used modern technology/practices.

Table 6. 12: Percentage of Households Adopting Modern Technologies/Practices

Categories	Bio-fertilizer	Animal urine	Mulching	Botanical pesticide	Soil solarization	Sprinkler irrigation	Draught resistant variety	Multiple water use	Dripirrigation	Plastic house	Off-season vegetable
By District											
Achham									0.72	0.72	0.72
Salyan		3.73	33.58	0.75							
Dolakha	3.79	3.03	1.52	2.27	3.03	10.61	2.27	0.76	1.52	9.09	7.58
Total/ Overall	1.24	2.23	11.63	0.99	0.99	3.47	0.74	0.25	0.74	3.22	2.72
By Gender of Household Head											
Male		1.88	9.69	0.94	1.25	4.06	0.94	0.31	0.94	4.06	3.44
Female		3.57	19.05	1.19		1.19					
By Caste/Ethnicity											
Dalit		6.06	15.15								
Adibasi/Janajati		1.75	0.88	2.63	1.75	10.53	2.63		1.75	7.02	7.02
BCTS		1.34	16.07	0.45	0.89	0.89		0.45	0.45	2.23	1.34

Source: Field Survey, 2020

6.3 Markets and Marketing Practices

Farmers reported to have visited collection centers and Haatbazaars to sell their products. Agriculture collection centers operated for trade of agricultural products such as vegetable, fruits and staples were reported in all of the three districts. Livestock products collection centers operated mainly for collecting milk was reported in Dolakha only. Walking distance from home to such collection centers was reported to be about 1.1 hours. Respondents in Achham and Dolakha reported that they also visit local Haatbazaars for selling their products and buying inputs as well as other essential commodities for household. Walking distance to such markets was repoprted to be 1.65 hours on average. Selling milk directly to chilling center was reported in Dolakha. Walking distance to such center was recorded at 1.68 hours on average.

6.3.1 Households Selling Agricultural Products

Agriculture farming in the project area can be defined as largely subsistence oriented. As high as 64 percent of the households reported to have not sold any crop products in the last one year, while remaining 34 percent sold at least one crop. Survey result shows that about 12 percent households sold cereals, 7 percent sold legumes, 5 percent sold cash crops, 18 percent sold vegetablesand 3 percent sold fruits during last one year. While largest proportion of households in Salyan (20.9%) reported selling cereals, largest proportion of households in Dolakha (45.4%) reported selling vegetables. By ethnicity, largest proportion of the Adibashi/Janjati households (48.2%) sold vegetables and largest proportion of BCTS (19.2%) sold cereals.

Table 6. 13: Percentage of Households Selling Different Agricultural Products

Categories	Cereals	Legumes	Cash crops	Vegetables	Fruits	At least one
By District						
Achham	8.70	6.52		10.14		21.01
Salyan	20.90	11.19	6.72		8.21	29.10
Dolakha	7.58	4.55	9.85	45.45	0.76	59.09
Total/ Overall	12.38	7.43	5.45	18.32	2.97	36.14
By Caste/Ethnicity						
Dalit			1.52			1.52
Adibasi/Janajati	6.14	3.51	8.77	48.25	0.88	57.89
BCTS	19.20	11.61	4.91	8.48	4.91	35.27

Source: Field Survey, 2020

Further breakdown of households selling food crops shows that 11 percent of the maize producers sold part of their product, while only over seven percent of paddy producers, seven percent of wheat producers and less than two percent of the millet producers sold part of respective products. No barley and buck wheat were sold last year by the sample households. Among the different ethnic groups, more than 20 percent of BCT households and 6.73 percent of Adibashi/Janajati households reported to have sold part of cereal products. None of the Dalit households reported selling cereals.

Table 6. 14: Number and Percentage of Households Selling Different Cereal Products

Categories	% of HH sold paddy	% of HH sold maize	% of HH sold wheat	% of HH sold millet	% of HH sold at least one
By District					
Achham	0.84	9.57	1.56		9.09
Salyan	17.17	21.50	16.00		24.56
Dolakha	4.08	3.31	4.17	3.95	8.20
Total/ Overall	7.49	11.08	7.00	1.68	13.59
By caste/ethnicity					
Dalit					
Adibasi/Janajati	5.13	2.91	5.17		6.73
BCTS	9.68	18.04	9.00	3.26	20.09

Source: Field Survey, 2020

6.3.2 Quantity of Agricultural Products Sold

An average household in the project area sold about 314 kg of different agricultural products comprised of 55 kg of food crops, 9 kgs of legumes, 3 kgs of cash crops, 236 kg of vegetables and 11 kg of fruits. Interdistrict comparison shows that largest quantity of food grains (130

kg/hh) was sold in Salyan, largest quantity of vegetable (696 kg/hh) was sold in Dolakha, largest quantity of fruit (29 kg/hh) was sold in Salyan and largest quantity of cash crops (6 kg/hh) was sold in Dolakha. Adibasi/Janjat households sold larger quantity of vegetables, while BCTS sold larger quantity of other products. Dalit households reported to have sold less than one kg of cash crops.

Table 6. 15: Average Quantity of Different Agricultural Products Sold (Unit: kg/hh)

Categories	Cereals	Legumes	Cash crops	Vegetables	Fruits	Total
By District						
Achham	22	4		25		51
Salyan	130	15	3		29	177
Dolakha	14	8	6	696	4	728
Total/ Overall	55	9	3	236	11	314
By Caste/Ethnicity						
Dalit			< 1			< 1
Adibasi/Janajati	14	10	3	755	4	786
BCTS	93	11	4	41	17	166

Source: Field Survey, 2020.

6.3.3 Income from the Sale of Crops

The sample households generated income from sales of different crops. On an average, households earned Rs 1,651 from the sale of four major cereals viz paddy, maize, wheat and millet. The households of Salyan district earned highest income by selling cereals which amounted to Rs 3,992 as compared to much lower figures amounting Rs 396 in Achham and Rs 586 in Dolakha district. Among caste/ethnic groups, the BCTS groups earned highest income (Rs 2674) from the sale of cereals in comparison to Adibasi/Janajati group (Rs 596). None of the Dalit households made income from the sale of cereals.

The sample households also made some income from the sale of different cash crops viz cardamom, turmeric and others. The cash crops generated income averaging Rs 1,252 per households which differed quite significantly across the districts viz Rs 1,267 in Salyan and Rs 2,546 in Dolakha. Households of Dolakha earned quite higher amount of income from cardamom (Rs 2,530). Also notable is the fact that, the Adibasi/Janajati households in Dolakha district made higher income from cardamom. Likewise, those groups also reported highest income amounting Rs 24,104 from vegetables, mainly potato. It is to be noted that Adibasi/Janajati households comprising mostly Tamangs of Lakuridada, Bhimeshwor Municipality reported significantly higher amount. This was also evident from the focused group discussions with the community. FGDs in Lakuridada confirmed that potato was increasingly turning out as the main livelihood source of the people and some of the households were earning as high as Rs 50,000 to Rs 600,000 per year from potato alone.

Table 6.16 presents the overall average income from the sale of different agricultural products. By district, households of Dolakha had the highest income amounting Rs 27,236 with the lowest in Achham amounting Rs 1,325. Among the social groups, Adibasi/Janajati households had the highest income amounting Rs 28,521 and the lowest Rs 45 among Dalit households.

Table 6. 16: Average income from the sale of agricultural products

Categories	Income from different sources (Rs/hh)			Total
By districts	Cereals	Cash crops	Vegetables	
Achham	396	-	929.3	1,325
Salyan	3,992	1,267	-	5,259
Dolakha	586	2,546	24,104	27,236
Total/Overall	1,651	1,252	8192.8	11,096
Dalit	0	45	0	45
Adibasi/Janajati	596	1457	26468	28,521
BCTS	2674	-	1306	3,980

Source: Field Survey, 2020

CHAPTER VII: LIVESTOCK

Livestock are an integral part of the agricultural production system, providing almost all of the draught power and fertilizer (manure) for crop cultivation. Information related to number and type of livestock and poultry birds were collected and analyzed. It was recorded that more than 95 percent of the sample households kept one or other animal species. Average size of goat was recorded at 3.9 heads that of cattle 1.7 heads, buffalo 0.7 heads, sheep 0.2 heads and poultry birds 2.4 heads per households. Average production was recorded at 114.6 kg of milk, 0.7 numbers of egg and 1.359 mt of Farm Yard Manure (FYM) per household.

Large ruminants (cattle, buffalo) play a vital role in the whole agricultural system and so have a large influence on the rural economy of Nepal. It can be said that large ruminants are the backbone of Nepalese agriculture and maintain the livelihood of large number of households which depends upon agriculture. In general, agriculture in Nepal is subsistence-based and very complex, with a mutual interdependency of crops, livestock and forest resources. It is the large ruminants which are central to these complex farming systems. Oxen are also used for hauling and transport of agricultural inputs and products. In the hills and mountains, mules, yaks, sheep and goats make an important contribution as pack animals. The situation in the project area is not different than national in general.

7.1 Livestock holding

It was recorded that more than 95 percent of the sample households kept one or other animal species. While all of the households in Dolakha reported keeping livestock, some 95 percent and 91 percent of households in Salyan and Achham reported keeping livestock, respectively. Among the different ethnic groups, all of the Adibashi/Janajati households, about 95 percent BCTS households and 91 percent Dalit households reported keeping livestock. It was also observed that larger proportion of male headed households kept livestock than female headed households.

Table 7. 1: Number and Percentage of Households Rearing Livestock

Categories	Yes		No		Total	
By District						
Achham	126	(91.3)	12	(8.7)	138	(100.0)
Salyan	128	(95.5)	6	(4.5)	134	(100.0)
Dolakha	132	(100.0)			132	(100.0)
Total/ Overall	386	(95.5)	18	(4.5)	404	(100.0)
By Gender of Household Head						
Male	310	(96.9)	10	(3.1)	320	(100.0)
Female	76	(90.5)	8	(9.5)	84	(100.0)
By Caste/Ethnicity						
Dalit	60	(90.9)	6	(9.1)	66	(100.0)
Adibasi/Janajati	114	(100.0)			114	(100.0)
BCTS	212	(94.6)	12	(5.4)	224	(100.0)

Note: Figures in parenthesis indicate percentage. / Source: Field Survey, 2020

Goat rearing is found most common among the sample households. It was recorded that more than 72 percent of the households kept goat. Similarly, almost 65 percent of the households kept cattle, 39 percent kept buffalo and 34 percent kept poultry birdson average. Sheep and pig are other livestock kept by about 9 percent and less than one percent of the households. Segregated by ethnicity of the households, largest proportion of Adibashi/Janjatis kept goat, while largest proportions of BCTS kept cattle.

Table 7. 2: Percentage of Households Rearing Different Animals

Categories	Cattle	Buffalo	Goat	Sheep	Poultry	At least one
By District						
Achham	71.74	57.25	47.83		13.77	91.30
Salyan	69.40	13.43	84.33	27.61	41.04	95.52
Dolakha	52.27	45.45	84.85		47.73	100.00
Total/ Overall	64.60	38.86	72.03	9.16	33.91	95.54
By Caste/Ethnicity						
Dalit	57.58	13.64	59.09	15.15	25.76	90.91
Adibasi/Janajati	49.12	46.49	84.21		46.49	100.00
BCTS	74.55	42.41	69.64	12.05	29.91	94.64

Source: Field Survey, 2020

Average size of goat was recorded at 3.9 heads per household. Average size of cattle was recorded at 1.7 heads per household, buffalo 0.7 heads per household, sheep 0.2 heads per households and poultry birds 2.4 heads per households. Households in Salyan reported to have kept largest number of ruminants (8.1 heads per household), and households in Dolakha kept largest number of poultry birds (3.7 head per household). By ethnicity, largest number of cattle was kept by BCTS (2.1 heads per household) and largest number of buffalo (0.9 heads per household), goat (4.3 heads per household) and poultry birds (3.5 heads per households) was kept by Adibashi/Janjati households.

Table 7. 3: Average Number of Different Animals Reared

Categories	Cattle	Buffalo	Goat	Sheep	Poultry
By District					
Achham	2.0	1.0	2.0		0.7
Salyan	1.9	0.2	5.3	0.7	2.9
Dolakha	1.2	0.9	4.4		3.7
Total/ Overall	1.7	0.7	3.9	0.2	2.4
By Caste/Ethnicity					
Dalit	1.4	0.2	2.9	0.4	1.0
Adibasi/Janajati	1.1	0.9	4.3		3.5
BCTS	2.1	0.7	3.9	0.3	2.3

Source: Field Survey, 2020

In order to increase the adoption of insurance facilities, Government of Nepal has been providing 75% subsidy to farmers on insurance premium, but its adoption is still poor due to lack of awareness and access among the farmers and level of commercialization. Only two percent of the sample farmers reported to have insured some of their livestock. Highest percentage of farmers that insured their livestock was 3.6 percent in Achham and lowest of 0.8 percent in Salyan.

7.2 Livestock products

Average production was 114.6 kg of milk, 0.7 numbers of egg and 1.359 mt of Farm Yard Manuar (FYM) per household. The largest amount of milk, egg and FYM production was reported in Achham and lowest in Salyan. Among the different ethnic groups BCTS produced largest amount of those products. Some of the households also processed milk in to ghee which is a major source of income and one of the major export items of those villages.

Table 7. 4: Average Quantity of Different Livestock Products Produced

Categories	Milk (Litre/hh)	Ghee (Kg/hh)	Curd (Litre/hh)	Egg (Number/hh)	FYM (Kg/hh)
By District					
Achham	185.7	4.7	51.8	1.2	2,559
Salyan	21.5	0.0	-	0.5	-
Dolakha	134.7	7.9	-	0.3	1,483
Total/ Overall	114.6	4.2	17.7	0.7	1,359
By Caste/Ethnicity					
Dalit	21.9	0.5	4.5	0.6	744
Adibasi/Janajati	113.5	5.4	-	0.4	1,570
BCTS	142.4	4.7	30.6	0.9	1,432

Source: Field Survey, 2020

7.3 Livestock Products Markets and marketing practices

Farmers reported to have visited collection centers and Haatbazaars to sell their products. Livestock products collection center operated mainly for collecting milk was reported in Dolakha only. Walking distance from home to such collection centers was reported to be about 1.1 hours. Respondents in Achham and Dolakha reported that they also visit Local Haatbazaars for selling their products and buying inputs as well as other essential commodities for household. Walking distance to such markets was reported to be 1.65 hours on average. Selling milk directly to chilling center was reported in Dolakha only. Walking distance to such center was recorded at 1.68 hours on average. Local tea stalls in the villages are the other major point of sell for fresh milk. Farm yard manure was not normally sold, rather it was sometimes exchanged with grain and wage in the village.

Majority of the households in the project area keep milch animal for subsistence rather than market purpose except in those areas which are well connected to all weather road. It was recorded that only about 14 percent of the households sold milk and milk products in last one year. Around 26 percent of the households in Dolakha reported selling milk or milk product. This proportion was just 14 and 2 percent in Achham and Salyan, respectively. Among the different ethnic groups about 24 percent of Adibasi/Janjati households reported selling milk/milk products, while only 2 percent of Dalit households reported selling milk/milk products. Average quantity of milk and ghee sold by sample households was 15 liter per household and 2 kg per household, respectively. Some of the households reported to have sold eggs, but the quantity was insignificant.

Table 7. 5: Percentage of Households Selling and Average Quantity of Livestock Products sold.

Categories	Percentage of household selling livestock product				Quantity of Livestock products sold		
	Milk	Ghee	Egg	At least one product	Milk (kg/hh)	Ghee (kg/hh)	Egg (No./hh)
By District							
Achham		14	1	14		2	< 1
Salyan	2	1	-	2	13	0	-
Dolakha	9	23	-	26	33	5	-
Total/ Overall	4	13	< 1	14	15	2	< 1
By Caste/Ethnicity							
Dalit		2	-	2		0	-
Adibasi/Janajati	10	20	-	24	32	3	-
BCTS	2	12	< 1	13	11	2	< 1

Source: Field Survey, 2020

7.4 Income from Livestock Products

The sample households reported income from the sale of different livestock products. The income varied largely across districts from a minimum of Rs 530 per household in Salyan and the highest Rs 6378 per household in Dolakha. Sample households of Dolakha produced quite a high amount of ghee/butter amounting 61.2 kg contributing to higher income than other two districts.

Table 7. 6: Average Annual Income from Sales of Different Livestock Products

(Unit: Rs/hh)

Categories	Milk	Butter/Ghee	Egg	Total
By District				
Achham		792	9	801
Salyan	522	7		530
Dolakha	2,323	4,055		6,378
Total/ Overall	932	1,598	3	2,533
By Caste/Ethnicity				
Dalit		61		61
Adibasi/Janajati	2,260	3,694		5,954
BCTS	531	984	5	1,521

Source: Field Survey, 2020

7.5 Live Animal Trade

Several households reported to have bought and sold different animals in last one year. More of the buffalo were sold than purchased in last one year indicating that total numbers of buffalo in the project area decreased. In case of cattle more numbers were purchased than sold in last one year indicating increase in number. Purchase of sheep was also higher than sales, while sales was higher than purchase of poultry birds. Overall income from trade of livestock was positive in all of the districts and ethnic groups. The survey results also show that a net of 10,082 Rs per household was surplus from trade of live animals last year.

Table 7. 7: Average Annual Net Income from Animal Trade (Sell-buy) in Last 12 Months

Categories	Cattle	Buffalo	Goat	Sheep	Poultry	Pig	Total (Net income)
By District							
Achham	-210	-420	764		802		936
Salyan	-131	-1045	14149	-60	554		13468
Dolakha	30	2152	12720		1343	-38	16207
Total/ Overall	-105	213	9110	-20	897	-12	10082
By Caste/Ethnicity							
Dalit	-45	530	6505	-197	61		6853
Adibasi/Janajati	-140	1351	12289		1402	-44	14858
BCTS	-105	-460	8259	22	886		8603

Source: Field Survey, 2020

CHAPTER VIII: HOUSE AND OTHER AMENITIES

Economic status of a person in the rural area is measured by land, animal, house and other amenities s/he owns. Each of the respondents was asked what type of house and other goods he holds. This chapter summarizes ownership of house and household durables. All of the sample households owned house for residential purpose. More than 63 percent of the survey households had rice cooker with them, about 32 percent of the household had radio/cassette player and 17 percent reported to have television with them. Piped water was reported to be their source of drinking water by almost 95 percent of the respondents. More than 97 percent of the households in the project districts also reported to have toilet facility. Most of the toilets were Pakka type (cemented floor), while another 10 percent wereKachcha type (wood or mud floor) and 3 percent temporary pits.

8.1 Type of Residential House

All of the sample households reported to have their own house. Ten of the households reported to have Pakki (Cement mortar wall/pillar with RCC/RBC roof) house. Another 232 (57 %) households reported to have Semi-Pakki (Stone wall with cement mortar/ plaster and GI sheet roof) house and remaining 162 (40 %) own Kachhi (Bamboo/wood/stone wall with mud mortar with thatch/straw roof) house. All of those having Pakki houses belong to Adibasi/Janjati community. Largest proportion of Kachhi house owners were from BCTS community.

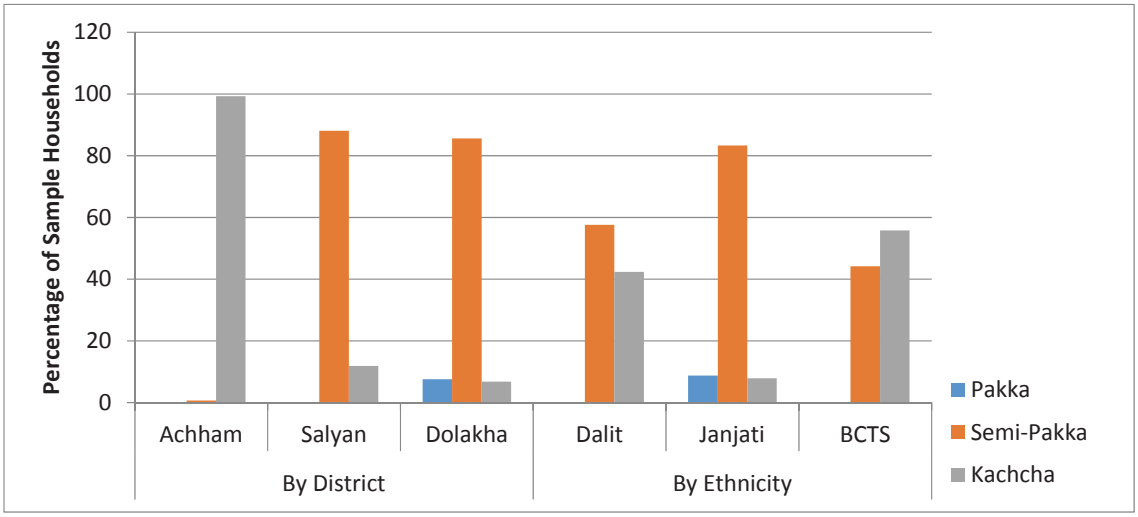


Figure 8. 1: Type of Houses owned

8.2 Household Durables

There has been rapid expansion of means of communication all over Nepal, including the project area. The present survey shows that telephone (land line/cell phone) has reached to more than 80 percent of the people. Rice cooker is another modern kitchen utensil in the project area. More than 63 percent of the survey households had rice cooker with them. About 32 percent of the household reported that they have radio/cassette/CD player and 17 percent reported to have television with them. Use of those modern electronics devices was more

common in Dolakha compared to other two project districts. A comparison among the different ethnic groups shows that larger proportion of Adibasi/Janjati households enjoy those modern facilities than BCTS and Dalits.

8.3 Drinking Water and Sanitation

Almost 8 percent of the households in Achham and 50 percent of households in Dolakha reported that piped drinking water facility was connected to their home. None of the sample households in Salyan reported such facility.

More than 97 percent of the households in the project districts also reported to have toilet facility. Most of the toilets were Pakka type (cemented floor) while another 10 percent wereKachcha type (wood or mud floor) and 3 percent temporary pits.

Table 8. 1: Percentage of Households Reporting Drinking Water and Toilet Facility Available in Current Residence

Categories	Private water tap	Toilet Facility			
		Pit	Kachcha	Pakka	Total
By District					
Achham	7.97	9.42	1.45	86.23	97.10
Salyan			2.24	97.76	100.00
Dolakha	50.00		26.52	68.94	95.45
Total/ Overall	19.06	3.22	9.90	84.41	97.52
By Ethnicity					
Dalit	1.52	3.03	4.55	90.91	98.48
Adibasi/Janajati	49.12		22.81	71.93	94.74
BCTS	8.93	4.91	4.91	88.84	98.66

Source: Field Survey, 2020

8.4 Sources of Drinking water

Piped water was reported to be their source of drinking water by almost 95 percent of the respondents including private tap by about 19 percent. Stone spout (Dunghe Dhara) was reported by 8 percent and seasonal spring by less than one percent. As high as 49 percent of Adibasi/Janjati households reported to have their resident connected with piped drinking water where as about one percent of Dalits and 9 percent of BCTS reported such facility.

Table 8. 2: Number and Percentage of Households Reporting Different Sources of Drinking water

Categories	Pipe water (Private tap)		Pipe water (Community)		Stone Spout (Perennial spring)		Spring (Seasonal)	
By District								
Achham	11	(7.97)	120	(87.0)	8	(5.8)	1	(0.7)
Salyan			119	(88.8)	15	(11.2)		
Dolakha	66	(50.0)	67	(50.8)	11	(8.3)	1	(0.8)
Total/ Overall	77	(19.1)	306	(75.7)	34	(8.4)	2	(0.5)
By Caste/Ethnicity								
Dalit	1	(1.5)	63	(95.5)	2	(3.0)		
Adibasi/Janajati	56	(49.1)	58	(50.9)	10	(8.8)	1	(0.9)
BCTS	20	(8.9)	185	(82.6)	22	(9.8)	1	(0.5)

Note: Figures in parenthesis indicate percentage. Percentage may add up to more than 100 as some households reported multiple sources. / Source: Field Survey, 2020.

8.5 Sources of Cooking Fuel

With opening up of roads, LP gas has started to be one of the major alternative source of cooking fuel. Almost all of the households use firewoods but at decreasing scale as LP gas and electricity are available for many of them. Kerosene and biogas are other sources of cooking fuel being used by limited number of people. The survey result shows that more than 21 percent of the households were using LP gas. Use of LP gaswas reported by more than 41 percent of Adibasi/Janjatis, while it was 7.6 percent among Dalit and 15.2 percent among BCTS families.

Table 8. 3: Number and Percentage of Households Reporting Sources of Cooking Fuel

Categories	Electricity		Firewood		Kerosene		Biogas		LP Gas	
By District										
Achham			138	(100.0)			1	(0.7)	7	(5.1)
Salyan	1	(0.8)	134	(100.0)	1	(0.8)			27	(20.2)
Dolakha	3	(2.3)	131	(99.2)			1	(0.8)	52	(39.4)
Total/ Overall	4	(1.0)	403	(99.8)	1	(0.3)	2	(0.5)	86	(21.3)
By Caste/Ethnicity										
Dalit	1	(1.5)	66	(100.0)					5	(7.6)
Adibasi/Janajati	1	(0.9)	114	(100.0)					47	(41.2)
BCTS	2	(0.9)	223	(99.6)	1	(0.5)	2	(0.9)	34	(15.2)

Note: Figures in parenthesis indicate percentage. Percentage may add up to more than 100 as some households reported multiple sources; Source: Field Survey, 2020.

8.6 Sources of Energy for Lighting

People prefer electricity for lighting purpose as it is clean, easier and cheaper compared to kerosene and fire wood (Diyalo) being used in the past. Thanks to rural electrification program that electricity has reached to even remote villages. Some 92 to 94 percent of households in Achham and Dolakha reported to have used electricity for lighting where as less than two percent of households in Salyan used electricity for lighting. At the same time solar energy was reported by 97 percent of households in Salyan. Use of electricity was reported by almost 94 percent of the Adibasi/Janjati, but by only 33 percent of Dalits.

Table 8. 4: Number and Percentage of Households Reporting Sources of Lighting Energy Being Used

Categories	Electricity		Solar		Dry cell (tuki)		Biogas		LP Gas	
By District										
Achham	127	(92.0)	32	(23.2)	1	(0.7)	1	(0.7)		
Salyan	2	(1.5)	130	(97.0)	9	(6.7)	1	(0.8)	14	(10.5)
Dolakha	125	(94.7)	46	(34.9)	5	(3.8)	1	(0.8)		
Total/ Overall	254	(62.9)	208	(51.5)	15	(3.7)	3	(0.7)	14	(3.5)
By Caste/Ethnicity										
Dalit	22	(33.3)	46	(69.7)	4	(6.1)	1	(1.5)	4	(6.1)
Adibasi/Janajati	107	(93.9)	43	(37.7)	5	(4.4)	1	(0.9)		
BCTS	125	(55.8)	119	(53.1)	6	(2.7)	1	(0.5)	10	(4.5)

Note: Figures in parenthesis indicate percentage. Percentage may add up to more than 100 as some households reported multiple sources. / Source: Field Survey, 2020.

CHAPTER IX: FOREST AND FOREST PRODUCTS

Forest and other natural resources have been one of the sources of livelihoods in all of the eighteen wards covered by the project. People are organized in different forest users' groups including Community forest, Leasehold forest and Religious forest for managing those resources and are being benefitted through their use. The rural households depend on different forest products extracted from Community/Public forest for their livelihood. It was recorded that 333 out of 404 of the sample households collected at least one type of forest products outside their farm. As high as 97 percent households collected firewood from non-private forests whereas 43 percent collected fodder from such forests. Three types of forest products viz. firewood, fodder and leaves were collected in larger quantity which amounted for 617 kg, 453 kg and 415 kg respectively, on average. Private forest and trees are one of the important sources contributing to the livelihoods of people. Farmers also owned different types of trees and NTFPs, although in small number. They owned 17.2 numbers of trees of which share of fodder trees was highest accounting for 47.4 percent followed by firewood trees (32.1%) and timber trees (15.6%).

9.1 Community/Leasehold Forest

Several Community Forest Users Groups (CFUGs) were active in the project area. Number of CFUGs ranged from two (in Bangad Kupinde-1, Mellekh-1 andJiri-5) to 15 (in Kumakh-1) and average number of CFUGs in the project wards was 5.7. Leasehold forestry users' groups were active in Ramarosan-5 and 6 and Sanfe-18 in Achham and Bangad-Kupinde-1 of Salyan district. Religious forests were also reported in Jiri-5 of Dolakha district. Altogether there were 104 community forest users' group, 27 leasehold forest users' group and one religious forest users' group active in the project area. Some of those groups reported to have made sub-groups as per their requirement. Making sub-group of landless/marginal farmers and let them operate specific activities like MAPs cultivation is an example.

People are also organized themselves in several groups including water users' group, farmers group, livestock farmers group, mothers' group and saving and credit groups. Some of those groups are women only and some others are mixed. A total of 533 such groups were active in the 18 wards coverd by survey during survey period. A summary of such organization is presented in Table 9.1. All of the wards covered by the project had number of CFUGs. The largest number of CFUGs was in Kumakh-1 of Salyan (15 CFUGs), followed by Kalinchok-6 of Dolakha (11 CFUGs). Sailung-4 and Bhimeshor-9 of Dolakha had 10 community forestry users' group each. Leasehold forestry users' grups were reported in Safe-18, Ramarosan-1 and Ramarosan-5 of Achham and Bangad kupinde-1 of Salyan district. Details of forest users' groups by type of group in the wards covered by the project are presented in Table 9.1 and the details in Annex 9.1.

Table 9. 1: A summary of resource users', agriculture and other groups in the Wards covered by the project

SN	Types of groups	Salyan	Achham	Dolakha	Total
1	Community forest users' group	35	29	40	104

SN	Types of groups	Salyan	Achham	Dolakha	Total
2	Leasehold forest users' group	12	15	0	27
3	Water users' group	31	22	18	71
4	Womens' groups	21	52	14	87
5	Farmers' groups	30	49	20	99
6	Livestock farmers' groups	16	13	4	33
7	Mothers' group	28	58	34	120
8	Saving credit group	13	11	11	35
9	Others	2	27	11	40
	Total	188	276	152	616

9.1.1 Collection of Forest Products

The rural households depend on different forest products extracted from Community/Public Forest for their livelihood. Most of the forest products are collected from community forests. This is evident from the fact that 333 out of 404 of the sample households collected at least one type of forest products outside their farm. As high as 97 percent households collected firewood from non-private forests whereas 43 percent collected fodder from such forest. Among the social groups, a large number of BCTS households (208 hhs) collected at least one type of forest products.

Table 9. 2: Percentage of Households Collecting Forest Products from Outside their Farm

Categories	Timber	Firewood	Fodder	Bamboo	Other	Collecting at Least One
By District						
Achham	0.72	100.00	29.71		72.46	100.00
Salyan	2.24	100.00	49.25	0.81		92.54
Dolakha	9.85	85.92	50.00	1.41	21.21	53.79
Total/ Overall	4.21	97.00	42.82	0.60	31.68	82.43
By Gender of Household Head						
Male	4.69	96.96	42.50	0.38	33.44	82.19
Female	2.38	97.14	44.05	1.43	25.00	83.33
By Caste/Ethnicity						
Dalit	4.55	100.00	40.91		21.21	93.94
Adibasi/Janajati	7.02	90.48	51.75	1.59	23.68	55.26
BCTS	2.68	98.08	38.84	0.48	38.84	92.86

Source: Field Survey, 2020

Collection of firewood and fodder from community forests was reported in all of the survey wards, but collection of timber was reported in all of the survey wards in Dolakha, Kumakh-1 and Bangad-kupinde-5 of Salyan and Sanfebagar-13 of Achham district. Similarly, collection of bamboo from the community forests was reported in Bangadkupinde-6 of Salyan district and Kalinchok-6 in Dolakha District.

9.1.2 Quantity of Forest Products Collected

The sample householdscollected different quantity of forest products. Three types of forest products viz firewood, fodder and leaves were collected in larger quantity which amounted for 617 kg, 453 kg and 415 kg, respectively, on average. Average collection of timber and bamboo from community/public forest was less than one (number) per household.

Table 9. 3: Average Quantity of Different Forest Products Collected from Outside their Farm

Categories	Timber (Number/hh)	Firewood (kg/hh)	Fodder (kg/hh)	Bamboo (Number/hh)	Leaves other than fodder (kg/hh)
By District					
Achham	< 1	1108	376		889
Salyan	1	525	654	< 1	
Dolakha	2	198	331	1	341
Total/ Overall	1	617	453	< 1	415
By Gender of Household Head					
Male	1	630	436	< 1	474
Female	1	570	519	< 1	189
By Caste/Ethnicity					
Dalit	1	776	616		180
Adibasi/Janajati	2	214	345	1	391
BCTS	1	776	461	< 1	497

Source: Field Survey, 2020

The largest sigle forest product collected by the sample household was firewood. It was reported to be an average of about 1.6 mt per household in Sanfebagar-13 followed by about 1.6 mt per household in RamaRosan-6 of Achham district. Average firewood collection from the forest in Salyan ranged from 353kg per household in Bangad kupinde-1 to 771 kg per household in Kumakh-1. Compared to other two districts, sample households in Dolakha collected smaller quantity of firewood.

Selling forest products collected from community/public forest was quite uncommon among the sample households. Only five sample households of Achham district reported that they sold some of those products. Two forest products sold by those households were firewood and other forest products.

9.2 Private Forest

Private forest and trees are one of the important sources contributing to the livelihoods of people. The survey reveals that 179 out of 404 or 44.3 percent of the sample households had trees/NTFP/MAP plants in their private land. They owned different types of trees and NTFPs, although in small number. The households, on an average, owned 17.2 numbers of trees of which share of fodder trees was highest accounting for 47.4 percent followed by firewood trees in the second place (32.1%) and timber trees in the third place (15.6%). Households of Salyan district owned highest number of trees per household (22.2) with the lowest (8.6) in Achham. Caste and ethnicity wise, Adibasi/Janajati households owned highest number of trees (20.5) whereas Dalit households had lowest number (6.9).

Table 9. 4: Average Number of Trees other than Fruits in Private Land (Unit: No/hh)

Categories	Timber Tree	Firewood tree	Fodder tree	Bamboo Clump (bushnumber)	Non-timber plants*	Medicinal and aromatic plants	Others	Total
By District								
Achham	0.2	3.9	4.0				0.5	8.6
Salyan	2.6	1.5	17.3	0.0	0.7		0.0	22.2
Dolakha	5.3	11.3	3.1	0.2		1.1		21.0

Categories	Timber Tree	Firewood tree	Fodder tree	Bamboo Clump (bushnumber)	Non-timber plants*	Medicinal and aromatic plants	Others	Total
Total/ Overall	2.7	5.5	8.1	0.1	0.2	0.4	0.2	17.2
By Caste/Ethnicity								
Dalit	0.8	0.6	5.5					6.9
Adibasi/Janajati	5.9	9.9	3.2	0.2		1.3		20.5
BCTS	1.6	4.7	11.4	0.0	0.4		0.3	18.5

* Non-timber plants such as cardamom, *amriso* (broom grass), asparagus etc.
Source: Field Survey, 2020

Comparison among the surveyed wards shows that households in Bangad kupinde-7 of Salyan district owned largest number of trees (31.4) on their private land closely follwed by Sailung-4 of Dolakha (30.4 trees) and Bangad kupinde-1 of Salyan district (30.2 trees). Fodder trees were reported in all of the wards, whereas firewood trees in 16 out of 18 wards

9.2.1 Products collected/harvested

The surveyed households produced different products viz timber, firewood, NTFPs for sale and also for household use. Firewood, fodders and NTFPs viz cardamom, Amriso and asparagus were the major products produced by the households. On an average, households produced a total of 23 kg of different products. Average quantity of these products varied largely across districts and social groups.

District wise, households of Dolakha produced highest amount of firewood amounting 21.6 kg whereas households of Salyan district produced more fodders (11.8 kg) on average. Male headed households produced much higher quantity of these products as compared to female headed households. Caste/ethnicity wise, indigenous group i.e Adibasi/Janajati households produced highest quantity of these products than other ethnic groups.

Table 9. 5: Average Quantity of Different Forest Products Produced from Own Trees other than Fruit

Categories	Firewood (Kg/hh)	Fodder (Kg/hh)	Bamboo Clump (No/hh)	Non-timber forest products (kg/hh)	Medicinal and aromatic plants (Kg/hh)	Other (Kg/hh)
By District						
Achham						11.8
Salyan	1.2	11.8		18.7		0.7
Dolakha	21.6	9.7	0.1			
Total/ Overall	7.4	7.1	0.0	6.2		4.3
By Gender of Household Head						
Male	7.4	8.7	0.0	7.8		5.4
Female	7.6	0.8				
By Ethnicity						
Dalit		18.9				
Adibasi/Janajati	22.1	11.1	0.1			
BCTS	2.1	1.5	0.0	11.2		7.7

Source: Field Survey, 2020

The most common forest products collected/harvested from privately owned trees was fodder. All of the surveyed wards in Salyan district and five of the six surveyed wards in Dolakha reported collecting fodder from privtely owned trees. Firewood was the second most important

product collected from privately owned trees. Collection of timber was reported in five of the six surveyed wards in Dolakha.

9.2.2 Sales of Private Forest Products

The survey result depicts that about 42 percent households in total sold one or other forest products. These included highest number from Dolakha district (27.27%), only 14.14 percent hh in Salyan and only 1 percent in Achham district. More households of Dolakha district sold firewood (16.67%). Only one household of Salyan reported the sale of NTFPs.

Table 9. 6: Percentage of Households Selling Own Forest Products

Categories	Timber	Firewood	Fodder	Bamboo	Non-timber forest products	Others	HH Selling at Least One
By District							
Achham						1.45	1.01
Salyan	0.75	3.73	14.93		0.75	0.75	14.14
Dolakha	8.33	16.67	10.61	5.30			27.27
Total/ Overall	2.97	6.68	8.42	1.73	0.25	0.74	42.42
By Caste/Ethnicity							
Dalit			1.52				0.51
Adibasi/Janajati	7.89	14.91	9.65	5.26			21.72
BCTS	1.34	4.46	9.82	0.45	0.45	1.34	20.20

Source: Field Survey, 2020

Income from the sale of forest products is very nominal in all districts averaging merely Rs 22.6 per household. Households of Dolakha district reported higher income (Rs 68.9 per hh) than the households from other districts. Adibasi/Janajati households earned more income amounting to about Rs 80 by selling forest products. None of the Dalit households reported income from the sale of forest products.

CHAPTER X: INCOME AND EXPENDITURE OF SAMPLE HOUSEHOLDS

As most part of agricultural production is consumed at farm level, people are involved in various off-farm activities for income generation. Details of those off-farm activities and income generated from those activities together with cash income from sales of agricultural products, livestock and livestock products and off farm activities are presented in this chapter. Earnings from off-farm wage was reported by more than 54 percent of the households. Foreign employment was reported by more than 28 percent and agricultural wage by almost 19 percent of the households. Other sources of off-farm income include business, industry, services, sales of assets and social security allowance. A sample household in the project area earned a total of Rs 151,326 in last one year on average. Off-farm wage was the single largest source of income contributing to 44,280 Rupees per household per annum, closely followed by foreign employment (26.5% of off farm income) and services in the country (20.7% of off-farm income).

10.1 Off-Farm Income

All of the sample households reported to have earned from one or the other sources of off-farm income. Off-farm wage was reported by more than 54 percent of the households. Foreign employment was reported by more than 28 percent and agricultural wage by almost 19 percent of the households. Other sources of off-farm income include business, industry, services, sales of assets and social security allowance.

Table 10. 1: Number and Percentage of Households Reporting Various Sources of Off-farm Income

Catagories	By District			Total/ Overall	By Caste/Ethnicity		
	Achham	Salyan	Dolakha		Dalit	Adibasi/Janajati	BCTS
Business	14	6	21	41	3	16	22
	(10.1)	(4.5)	(15.9)	(10.2)	(4.6)	(14.0)	(9.8)
Industry		1	7	8	1	6	1
		(0.8)	(5.3)	(2.0)	(1.5)	(5.3)	(0.5)
Service (in Nepal)	21	16	26	63	7	22	34
	(15.2)	(11.9)	(19.7)	(15.6)	(10.6)	(19.3)	(15.2)
Foreign Employment	60	36	19	115	22	14	79
	(43.5)	(26.9)	(14.4)	(28.5)	(33.3)	(12.3)	(35.3)
Agricultural Wage	8	52	12	72	15	8	49
	(5.8)	(38.8)	(9.1)	(17.8)	(22.7)	(7.0)	(21.9)
Off-farm Wage	69	86	66	221	46	63	112
	(50.0)	(64.2)	(50.0)	(54.7)	(69.7)	(55.3)	(50.0)
Assets Sale (Other than Livestock)	1		8	9		7	2
	(0.7)		(6.1)	(2.2)		(6.1)	(0.9)
Social Security Allowance	35	22	37	94	20	32	42
	(25.4)	(16.4)	(28.0)	(23.3)	(30.3)	(28.1)	(18.8)

Note: Figures in parenthesis indicate percentage. / Source: Field Survey, 2020

A sample household in the project area earned a total of Rs 151,326 in last one year on average. Off-farm wage was the single largest source of income contributing 44,280 Rupees per household per annum (about 29.3% of the off-farm income), closely followed by foreign employment (26.5% of off farm income) and services in the country (20.7% of off-farm

income). Among the project districts, largest off-farm income was reported in Salyan amounting to Rs 194,944 per annum and smallest amount of off-farm income was reported in Achham. By ethnicity, Adibasi/Janjati households reported to have earned Rs 165,190 per household per annum, while Dalit households reported to have earned Rs 124,838 per household.

Table 10. 2: Average Annual Off-farm Cash Income of SampleHouseholds

Categories	By District			Total/ Overall	By Caste/Ethnicity		
	Achham	Salyan	Dolakha		Dalit	Adibasi/Janajati	BCTS
Business	7,493	9,299	22,004	12,833	2,500	22,412	11,002
	(7.1)	(4.8)	(14.0)	(8.5)	(2.0)	(13.6)	(7.2)
Industry	-	239	5,248	1,794	485	6,024	27
		(0.1)	(3.3)	(1.2)	(0.4)	(3.7)	(0.0)
Service (in Nepal)	25,020	32,627	36,591	31,324	19,909	39,342	30,606
	(23.6)	(17.0)	(23.3)	(20.7)	(16.0)	(23.8)	(20.1)
Foreign Employment	29,290	58,612	32,727	40,139	27,470	31,842	48,094
	(27.6)	(30.5)	(20.8)	(26.5)	(22.0)	(19.3)	(31.6)
Agricultural Wage	1,140	14,450	1,428	5,649	4,838	1,004	8,251
	(1.1)	(7.5)	(0.9)	(3.7)	(3.9)	(0.6)	(5.4)
Off-farm Wage	28,529	64,434	40,288	44,280	57,500	46,167	39,425
	(26.9)	(33.6)	(25.6)	(29.3)	(46.1)	(28.0)	(25.9)
Assets Sale (Other than Livestock)	36	-	2,091	696	-	2,390	38
	(0.0)		(1.3)	(0.5)		(1.5)	(0.0)
Social Security Allowance	14,699	12,284	16,886	14,613	12,136	16,009	14,632
	(13.8)	(6.4)	(10.7)	(9.7)	(9.7)	(9.7)	(9.6)
Total	106,207	191,944	157,263	151,326	124,838	165,190	152,075
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Note: Figures in parenthesis indicate percentage. / Source: Field Survey, 2020

10.2 Farm Income

As already explained in previous chapters/sections, farm income comprising of sales of food grains, pulses, oil seeds, vegetables, fruits, livestock/livestock products and forest products was Rs 24,160. Average cash income was Rs 11,522 from different crops, Rs 12,615 from animal products and Rs 23 from forest products including products coming from private and community/public forests.

Table 10. 3: Average Annual Cash Farm-Income of Sample Households

Unit: Rs/hh

Categories	Agriculture		Forest Products		Livestock & Livestock Products		Total
By District							
Achham	1,501	(46.4)	-		1,737	(53.6)	3,238
Salyan	6,418	(31.4)	0	(0.00)	13,998	(68.6)	20,416
Dolakha	27,179	(54.5)	69	(0.14)	22,585	(45.3)	49,832

Categories	Agriculture		Forest Products		Livestock & Livestock Products		Total
Total/ Overall	11,522	(47.7)	23	(0.09)	12,615	(52.2)	24,160
By Caste/Ethnicity							
Dalit	45	(0.7)			6,914	(99.3)	6,959
Adibasi/Janajati	28,462	(57.7)	80	(0.16)	20,812	(42.2)	49,354
BCTS	6,282	(38.3)	0	(0.00)	10,124	(61.7)	16,406

Note: Figures in parenthesis indicate percentage. / Source: Field Survey, 2020

10.3 Total Income

Data collected from household survey revealed that average cash income of sample households was Rs 175,486 per household in the last one-year period. Because large proportion of agriculture/livestock products is consumed at household level, contribution of those products in cash income was about 14 percent of total. Contribution of Agriculture/livestock products in total cash income was about 24 percent in Dolakha, while it was only about 3 percent in achham. Among the different ethnic groups cash income from agriculture/livestock contributed to 23 percent in the case of Adibasi/Janjati and only about 5 percent among Dalit households.

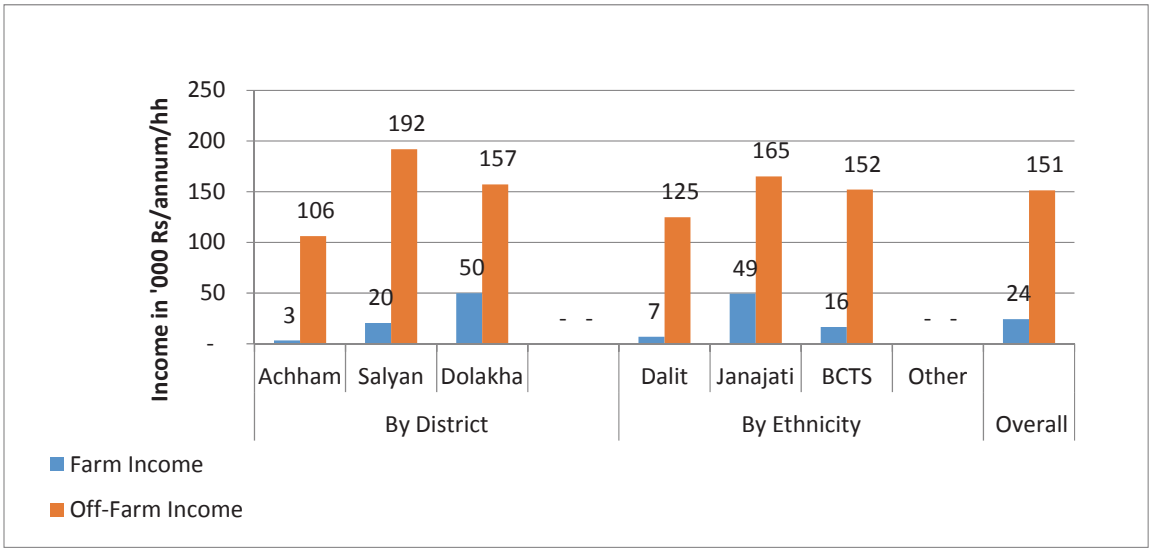


Figure 10. 1: Average Cash Income

CHAPTER XI: LIVELIHOODS

One of the alternatives of increasing capacity of local communities to cope with negative effects of climate change is through their livelihood improvement while maintaining eco-system. Three major topics – competency, livelihood assets and possible livelihood options- are described in this chapter. In Dolakha, argehli and lokta were identified as the most common forest products available abundantly in many areas which are used for paper manufacturing locally and also exporting as raw materials. Agricultural commodities demonstrating prospects for production and marketing were kiwi, potato, mushroom, cardamom and vegetables. In Salyan and Achham, the single potential forest based Income Generating Activity (IGA) identified was cultivation, collection and processing of timur both in community forests and private lands. Other agro based IGAs carried out in small scale but holding good prospect for growth in Salyan were ginger and turmeric production and processing; beekeeping, vegetable and mushroom production, and improved goat farming. In Achham, Nepali paper making was found as the most potential forest based enterprises some of which are already in operation. Other prospective enterprises are Ecotourism (home stay in the trekking route) and improved goat and sheep farming.

11.1 Competency Analysis

Strengths, Weaknesses, Opportunities and Threats (SWOT) of concerned communities were discussed in detail on Political, Economic, Social, Technological, Legal and Environmental (PESTLE) basis.

Abundance of natural resources such as timber/non-timber forest products including varieties of medicinal and aromatic plants (MAPs), specialty products such as Yak Cheese (in Dolakha), willingness of local community and political leaders to implement the EbA project, recognition of organic products by outsiders, suitable soil for different cash crops (for example: potato and kiwi in Dolakha, Ginger in Salyan and Timur in Achham) and willingness of youths in adoption of improved farming practices were reported to be some of the major strengths.

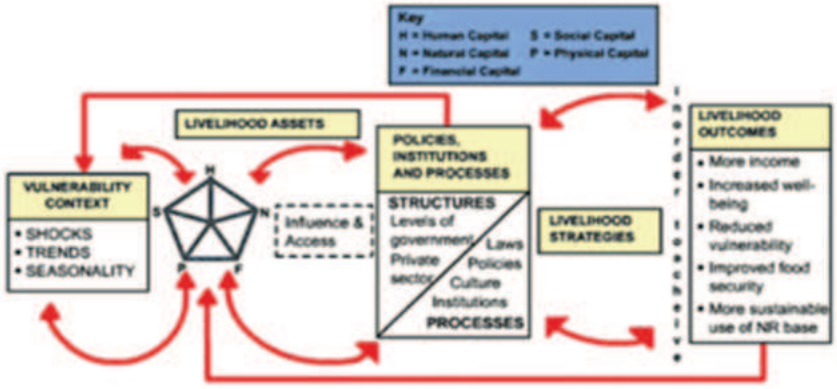
At the same time there were also several weaknesses reported by the participants. They included: politicizing of the development activities, information gaps and conflicts between Ward and Rural/Municipality authorities in prioritizing project activities, resource constraints, delay in budget allocation/release and conflict in extraction/distribution of natural resources.

Access to motorable roads, (though most of them were seasonal) has opened new opportunities of development for the project Rural/Municipalities. Cultivation/collection of MAPs, processing and marketing them has created some employment. People have also started cultivation of cash crops such as kiwi, potato and ginger replacing cereals such as maize and millet and other minor crops that give lower returns per unit of resources used. Similarly, opportunities to establishor upscale various forest-based small and medium enterprises (SMEs) were also noted in different sites under EbA-II.

Participants of FGDs also reported some of the threats in the development process. Possible damage by poorly planned/designed rural roads might cause landslide, siltation and drying up of water resources. New weeds and insects have been seen in recent years which may cause depletion of traditional plants and crops. Marketing of the products is seen as a major problem once there will be increased production. One such problem is already faced by paper industry in Jiri. Chauri farming is at the risk of closing because people are not willing to work in Chauri farm due to difficult living condition in remote areas.

Conceptual Framework of Livelihoods Capitals

The Livelihoods framework encompasses different resources or capitals and their efficient utlization that contribute to sustainable livelihood improvement of people even at the face of increased vulnerabilities and risks. The livelihoods capitals that are commonly utilized in development context are social, natural, financial, human and physical which are often strongly interlinked and can produce sustainable tangible outcomes and impacts in the life of people and communities at large. The sustainability element in livelihoods implies that the project beneficiaries encountering the risks and vulnerabilities can overcome the challenges and maintain or even improve their situation without over exploiting the limited resources. The crux of an ideal livelihood framework is that the livelihoods of the people can be sustained or even improved along with the improvement on the stock of resources or capitals that the people or communities are endowed since generations. Livelihood entails not only the activities that make up how people live, but also the resources that guarantee their satisfactory living, the risk involved in managing those resources, and the policies that supports or oppose their pursuit of good living.



Source: Sustainable livelihood approach for assessing community resilience to climate change: case studies from Sudan, AIACC Working Paper No.17, end August 2005.

Figure 11.1: Livelihood Assessment Framework

Following sections describe briefly the available capitals of the households and communities in EbA-II sites which apparently play significant roles in transforming their life and livelihoods. The information for the assessment of different capitals and resources, their quality and adequacy were obtained both from primary sources such as household survey, FGDs and key informant survey, and secondary sources such as published and unpublished reports and relevant municipality profiles.

11.1.1 Human Capital

In the context of livelihoods, human capital encompasses several variables related to the people and their activities. It is concerned mainly with the availability of the human resource of active age groups at a particular place and time, the technical skills and knowledge possessed by them, the educational level, vocational training, their ability to mobilize and lead the communities for certain purpose as well as their mental and physical condition. Household survey in project sites revealed that the total population of the sample household was 1996 with an average household size of 4.9 persons. This included 2.5 males and 2.4 females with some variations across districts. The economically active age group population of 15-49 years was 1035 with almost equal share of males (49%) and females (51%). Education wise, 88.2% of the sample population were literate in the project districts with varied levels of formal education. A good point in case of EbA sites is that a total of 258 household heads (67%) were members in at least one institution at local level. Being a member in the local institutions attaches significant value in the ability of the local people to participate actively in livelihood improvement efforts.

The survey team also noted that Kalinchowk Municipality and Gaurisankar Municipality of Dolakha districts were implementing different IGAs involving the local peoples, mainly females who were organized into different groups. These Municipalities and Wards also possessed relatively competent human resources viz agriculture and veterinary technicians, engineers and overseers at community level and have functional networks with number of INGOs and government agencies displaying important role to implement livelihood activities under EbA-II. Other Municipalities and districts that lacked technical manpower at local levels, however, need to manage the necessary manpower to plan and implement EbA supported activities.

11.1.2 Natural Capital

Natural capital is not only the most important resource but also a prerequisite for the implementation of EbA activities effectively. These capitals include quite a broad spectrum of resources such as forest and land, water resources, rangeland/pasture, climate, rains etc. The survey found that almost all communities in EbA project sites have long been involved in the management of community forest resources whereas some communities have also been involved in leasehold forest management. In addition, some households in the communities also own private forests from which they have been earning their livelihoods directly or indirectly. The EbA-II project sites have several degraded forest areas where efforts are needed for plantation and conservation that would greatly contribute to sustained livelihood improvement of local communities through forest resources. For details on forest condition and resources, please refer to earlier sections in Chapter 3.

Forests are the prime resources for the rural communities to sustain their livelihood. Timber, fuel wood, fodder, saplings, ground grass are important forest products that the communities use regularly to sustain their livelihoods. The households, however, can only access these forest resources for limited time and quantity, mainly due to limited yields of these products. In addition, varieties of non-timber forest products (NTFPs) and medicinal and aromatic plants

(MAPs) are produced either for local use or trade. Table 11.1 highlights some of the important forest and non-forest products with commercial potentialities.

Table 11. 1: Potential NTFPs and MAPs in the Project Sites

S.No.	Districts	Potential NTFPs and MAPs	Supports required
1	Dolakha	*Utis, Sallo, bamboo; Argheli/ lokta/amriso; machino, lothsalla, siltimur/boke timur, padamchal, budiokto, jatamasi, sunakhari, ban lasun etc.*	Nursery establishment in each site; supply of seedlings in the EbA communities for plantation; supports for training, inputs and technologies for production, processing and marketing.
2	Salyan	*Timur*, *amala*, tejpat, sisnoo, *burjo* etc	
3	Achham	*Utis, Sallo, timur*, *lothsalla*, *satuwa, setochini, argeli, amriso, padamchal, sunakhari*, sisno,	

Note: The potential NTFPs and MAPs mentioned in the table are common for the districts as well as the community forests of EbA-II sites.

Discussions with the communities revealed that current level of forest products extraction/collection, processing and marketing was insignificant. Only limited CFUGs reported that they were making limited income from the collection and sale of NTFPs and MAPs but these are also not recorded properly. The beneficiaries in most areas observed that restoration of forest/degraded lands and plantation of NTFPs and MAPs would contribute to enhanced production of many outputs. Besides, use of new technologies for processing of NTFPs and MAPs would also contribute to increased employment and income to the local people.

The total forest coverage in EbA-II Muncipalities is estimated at 222,494 ha of which forest area is 51.3%. The data clearly indicates that the non forest, other wooded forest and shrubs jointly account for about 49% of the total forest coveage implying that there is tremendous scope to convert these lands into forest area that would help improve people's livelihoods. Among three districts, the EbA-II sites of Dolakha has the highest amount of non forest land (62380 ha) as compared to smaller figures in Achham (17,500 ha) and Salyan (17,813 ha). Similarly, other wooded land area is also highest in Dolakha district. Disaggregated data on forest coverage by EbA-II Muncipalities are provided in table 11.2.

Table 11. 2: Forest Coverage of Municipalities Covered by EbA II Project

Districts	**Forest (ha)**	**Non-Forest (ha)**	**Other Wooded Land (ha)**	**Shrub (ha)**	**Total (ha)**
Achham	24,477.4	17,499.8	4,942.3	100.1	47,019.6
Dolakha	56,503.3	62,380.3	5,142.5	55.9	124,082.0
Salyan	33,240.3	17,812.8	329.8	9.8	51,392.6
Total (Ha)	**114,221.0**	**97,692.9**	**10,414.6**	**165.8**	**222,494.3**
%	51.3	43.9	4.7	0.1	100.0

Note: The figures are drawn from Table 3.1 Forest Coverage

Land and water are other important natural capital available in the project sites. The best use of land for growing different agricultural crops (cereals and cash crops i.e. fruits, potato and vegetables) could be immensely helpful for livelihood improvement of the local people. It is

noted that the lands owned by households are of different categories. In terms of water availability, unirrigated land accounts for highest percentage (49.2%) as compared to much lower figure of irrigated land in the EbA-II sites. Only 26.7% land owned by the households is irrigated which varies quite significantly across EbA-II Municipalities with the higest in Kumakh Rural Muncipality (49.9%) and the lowest in Bhimeshwor Municipality (7%). All the Munciipalities are also found to have fallow/uncultivated land with the overall average of 16.4% indicating propsects for cultivation by tapping available water resources under EbA-II.

Table 11. 3: Average Land Holding of Households (Own Land Self Cultivated + Rented-out Land) by Irrigation Status

Categories	Homestead (Ha/HH)		Un-irrigated (Ha/HH)		Irrigated (Ha/HH)		Fallow/ Uncultivated (Ha/HH)		Total (Ha/HH)	
Sanfebagar Municipality	0.0390	(6.7)	0.1151	(19.8)	0.1605	(27.6)	0.2676	(46.0)	0.5821	(100.0)
Ramaroshan Rural Municipality	0.0177	(4.5)	0.1626	(41.4)	0.1013	(25.8)	0.1111	(28.3)	0.3926	(100.0)
Mallekh Rural Municipality	0.0261	(5.4)	0.1952	(40.4)	0.1370	(28.3)	0.1252	(25.9)	0.4835	(100.0)
BangadKupinde Municipality	0.0810	(15.1)	0.2455	(45.9)	0.2028	(37.9)	0.0054	(1.0)	0.5347	(100.0)
Kumakh Rural Municipality	0.0630	(25.4)	0.0615	(24.8)	0.1240	(49.9)	0.0000	(0.0)	0.2485	(100.0)
Gaurishankar Rural Municipality	0.0237	(2.7)	0.6935	(78.8)	0.1254	(14.3)	0.0373	(4.2)	0.8799	(100.0)
Bhimeswor Municipality	0.0218	(2.5)	0.5700	(64.8)	0.0616	(7.0)	0.2265	(25.7)	0.8799	(100.0)
Kalinchowk Rural Municipality	0.0110	(3.2)	0.1721	(50.2)	0.0973	(28.4)	0.0624	(18.2)	0.3428	(100.0)
Shailung Rural Municipality	0.0184	(2.9)	0.3638	(57.6)	0.1726	(27.3)	0.0765	(12.1)	0.6314	(100.0)
Jiri Municipality	0.0422	(4.9)	0.4785	(55.7)	0.1555	(18.1)	0.1824	(21.2)	0.8586	(100.0)
Total/ Overall	0.0408	(7.7)	0.2619	(49.2)	0.1422	(26.7)	0.0874	(16.4)	0.5323	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

The EbA-II sites are also important pockets for rangelands and pasture. The area under grass lands varies quite significantly across municipalities depending upon their total area, topography and climatic condition. The data on grass lands available in EbA-II municipalities are presented in land use and land cover section (Chapter 3.10). All of the selected wards except three in Salyan (Bangad-Kupinde ward number 1 and 5, and Kumakh ward number 1) reported abundant number of pockets where rangeland/high altitude pasture could be developed. The highland pasture developments were considered significantly useful to promote the Chauri farming in Dolakha district. Grassland development in community forests and private forests were also considered important to promote goat farming in all of the project sites.

11.1.3 Financial Capital

Financial capitals are normally meant to the availability of cash with the households and their ability to invest in potential IGAs. Increased cash flow of the households from different sources i.e employment, business, remittance or credit from banks and micro finance institutions is essential. In this context, the sample households were found to have some cash income from different sources. On an average, the households earned income amounting Rs 16,629 annually from the sale of cereals, cash crops, vegetables and livestock. Households of Dolakha reported highest income from these sources (Rs 33,614) against lower income of households in Achham (Rs 2,126) and Salyan (Rs 5,789). The survey reveals that the households depended mostly on off-farm sources for their income. The households, on an average, reported Rs 151,326 as their income from various off-farm sources last year. Among different sources, income from wage figured out highest (Rs 44,280) followed by employment abroad (Rs 40,139) as the second highest income source and employment in Nepal (Rs 31,324) as the third highest source. Very high reliance of households on off-farm, agricultural wage and social protection are clearly the

manifestations of higher risk and vulnerability of surveyed households. District wise, the off-farm income was lowest among households of Achham district (Rs 106,207) and highest in Salyan district (Rs 191,944).

In addition to their own income, households also can generate financial capital from other sources. The village cooperatives and micro finance institutions (MFIs) and local saving and credit groups are important sources that provide some credits/loans to the households. In Nepalese context, these sources have played important role in extending much needed credits to the rural households with or without collateral. The EbA-II sites also have number of such agencies that can provide finance to the people to invest in potential IGAs. The communities also have access to development banks, normally, in the district headquarters and market centres for larger amount of loans.

11.1.4 Physical Capital

In a livelihood framework, physical capital comprises the basic infrastructure and facilities that enable the communities to increase their production, processing and marketing of the farm, livestock and forest products. In other words, physical capitals are the facilities that contribute to bring positive changes in the production and marketing of products eventually contributing to improved livelihoods of the people. These capitals normally include infrastructures viz irrigation, road and transportation, collection centres and markets, energy etc. In EbA sites, the communities are served with these facilities only partially. All the Municipalities have access to roads but their quality varies largely across the districts. While the mian raods linking the districts are reasonably in good condition, the link roads to the interior pockets are earthen and seasonal types. All the sites have access to local markets with limited level of communication facilities. Irrigation facilities are very limited in most sites and is evident from lower percentage of irrigated land (26%) owned by the beneficiary households.

11.1.5 Social Capital

Social capital is closely linked with structures and processes of the society that helps the transformation process leading to better livelihoods. In the context of EbA, it is the community and family support for enhanced participation in planning and implementation of livelihoods measures and this is even more pertinent when it matters for rural women. In broader terms, social capital is meant for building relationship between and among the communities and households, the leadership roles and skills to organize people, the ability to create cohesion among the households, meaningful roles in gender and social inclusion. The social capital in EbA sites were observed quite promising. The EbA sites, particularly the villages in Dolakha district demonstrated high social capital in terms of working in groups and improving their livelihoods. The communities in Dolakha include mostly homogenous ethnic groups viz Jirel, Tamang, Newar, Gurung etc. where leadership roles for undertaking joint activities including planning and implementation are effective. In Salyan and Achham districts, the communities are quite diverse with large number of Chhetries with fewer percentages of Dalits and indigenous group. In the EbA sites of these districts, communities need to come forward to undertake joint activities and improve their livelihoods.

11.2 Community Livelihood Development Plan

11.2.1 Introduction

The EbA-II is designed and implemented in two hill districts and one mountain district of Nepal aiming to reduce the climate induced vulnerability of local communities. These districts constitute Achham and Salyan in hills and Dolakha in the mountain region where the communities are subjected to a host of global environmental as well as socio-economic challenges and risks triggered by climate change. The project further aims to increase the capacity of national and local government institutions to adapt to the climate change by implementing ecosystem-based adaptation (EbA) approaches in the degraded forests and rangelands in selected locations of the project districts. Livelihood improvement of the vulnerable communities is one of the key areas of interventions of EbA which extends beyond increasing the income of the communities and considers ecosystem restoration and development in totality.

The concept of livelihoods basically looks at peoples' means of gaining a living as a process of accessing various livelihood assets for the purpose of achieving certain livelihood outcomes (e.g. food security, income generation, etc.). The Livelihood Improvement Plan (LIP) is drawn up at two levels: first at the household level and then the User Group (historically the CFUG) level[29]. Generally, the LIP results in the implementation of some form of income generating activities. While planning the intervention, particular attention is given to addressing the needs and interests of women and socially vulnerable groups.

11.2.2 Outcomes of Community Livelihood Improvement Plans

Output 3.4 of EbA-II envisages implementation of Community Livelihood Improvement Plans (CLIPs) in line with the economic benefits from forests, rangelands and agro-ecosystems that are implemented for local communities. Given the strong dependency of indigenous and local communities on the ecosystems for their livelihoods, CLIPs have been developed for livelihood improvement of communities to reduce their vulnerability in selected Municipalities. Identification of feasible Income Generating Activities (IGAs) that are conducive to the environment and demanded by the communities remains at the core of CLIP whereas it further constitutes other elements to make IGAs successful. The major outcomes of LIPs are expected to be as follows (UNEP, 2019):

- livelihood improvements, with poor households, primarily women, generating income with diversified and expanded IGAs;
- resource leveraging, by coordinating with other stakeholders including the government and the CFUGs to generate additional funds; and
- Policy advocacy, with LIPs included in revised FOPs and forest user groups.

[29]Historically, this has been conducted with CFUGs. In LDCF-financed projects, LIPs will be developed with user groups.

11.2.3 Approach and Strategies

11.2.3.1 General Approaches

General approaches include the underlying process that helps the project authorities to follow in planning and implementation of CLIPs in the project municipalities and wards. These involve set of activities that require to be accomplished in order to implement the CLIPs effectively.

i) Identification of targeted communities

Targeted communities have been identified based on review of project documents, discussions with local governments followed by field visit and interactions with the communities. The targeted communities of the EbA project include mostly the disadvantaged social groups, mainly Aadibasi/Janajatis, women and poor of the selected Wards and Municipalities already identified by the project. The identified social groups consist of largely Jirel, Thami, Tamanag, Gurung, Newar, Dalits and other caste groups viz Brahman and Chhetry in Dolakha district. Dolakha district is predominantly inhabited by indigenous ethnic communities viz. Tamang, Gurung, Jirel, Thami, Newar etc. In Salyan and Achham districts, the targeted groups include mostly the poor people from Dalit, Chhetry and Brahmin communities. Among the selected communities, women will continue to be the prime groups who will be engaged in operating most of the IGAs. The potential sites to implement the IGAs have also been identified in consultations with the local government authorities and the beneficiary communities.

ii) Identification of potential IGAs

The study team visited the identified project sites and held intensive discussions with the local government bodies (Ward and Municipal chiefs) and communities to identify the potential activities to be implemented under EbA. Main considerations taken into account while identifying the activities were: i) environmentally sound ii) socially and culturally acceptable, and iii) technically feasible. Forest and agro based activities that are potential to thrive and sustain on local ecosystem without adverse impacts on environment have been selected for intervention. Forest based activities include production, collection, processing and marketing of some NTFPs including medicinal and aromatic plants (MAPS) having potential for up-scaling and expansion. Similarly, agro based activities leading to increased income of the households using locally available resources viz. forest, land, water, labor etc have been identified for supports under EbA-II. In consequence, various forest based, land based and non-land based activities have been identified as potential IGAs in the selected Municipalities and presented under district specific IGAs in this report.

iii) Fund allocation and supports

Disbursement of funds is critical to make IGAs successful. The Project's funds as well as matching funds generated from among the users will be utilized to run the IGAs by the user groups. Funds will be disbursed among the poor members as grants, partial grants and interest-free loans depending on the types of IGAs. Fund allocation/disbursement will be made taking into account different factors: i) timely disbursement of fund at all levels ii) disbursement of adequate fund, and iii) generation of matching fund with the users and other co-financing agencies.

In addition to funding, user groups will require technical supports to get strengthened and adequately capacitated. Basic technical supports will be required to undertake different activities in organized manner. The basic supports required are: i) business literacy to the users ii) vocational training (skill) about relevant IGAs iii) institutional development of the groups including good governance and transparency. Similarly, the groups will also need inputs and extension services to start the IGAs at the initial stage.

iv) Implementation, Monitoring& Evaluation

Different agencies are involved in implementing the CLIPs under EbA-II. At central level, the Project steering committee supported by EbA-II Project Manager plays lead role in planning, financing and implementing the project interventions. At local level, the focal agencies involved in implementing the project are respective Rural/Municipalities in all three districts. However, with the adoption of federal government system, the capacity of district based government agencies has largely declined and at the same time the Municipal level capacity has not been sufficiently strengthened as desired. There are no forestry, agricultural or livestock experts at all local levels. Only some municipalities have recruited junior technician to work at local level which seems to be a major challenge in implementing EbA-II interventions effectively.

While the Municipalities play lead role in planning and implementing the EbA project, they need to have close coordination with other agencies as follows.

- Respective Ward Offices within Rural/Municipalities
- Division and subdivision forest offices
- Agricultural Knowledge Centres
- Veterinary Hospital and Livestock Service Expert Centers
- Agricultural farms/ nurseries
- INGOs/NGOs
- Local Micro Finance Agencies (MFAs)

Regular monitoring is key to track the progress and be responsive to changing contexts. The project requires undertaking periodic monitoring on the field activities, getting timely feedback and taking corrective actions during implementation of EbA-II. Besides, project's outcomes and impacts should be evaluated after the completion of project. The evaluation will focus on the project's achievements on key indicators established by the baseline report which include mainly the improvements made in restoration of water and natural resources viz. forests, rangelands, terrace improvements, construction and renovation of ponds etc. at community level. Besides, it will also capture household level changes on key livelihood indicators viz. assets ownership, production and sale of forest, livestock and agricultural products, income and expenditure, ownership of assets etc.

11.2.3.2 Strategies

The livelihood improvement strategies involve number of mitigation approaches and measures based on the nature of climate change induced impacts to different categories of people. In broad terms, the strategies considered are broadly of two types as follows.

General Strategies

- Strong partnership and collaboration with the local governments and INGOs/NGOs for sustainability and additional resources mobilization;
- Community-led decision-making for planning and implementation of CLIPs including IGAs;
- Integrated approach on small-scale community infrastructures and livelihood improvement;
- Cash-for-work modality on construction works to generate short-term employment opportunity and immediate income to the poor households;
- Promotion of local indigenous knowledge, resources and materials; and
- Gender equality, women empowerment and social inclusion, with focus on persons with disability at all levels, to promote social cohesion.

General strategies include most commonly accepted and practiced performance measures that help build synergyand generate required resources among the project implementing agencies and partners. In addition, these strategies also look for enhanced ownership and roles of communities on decision making, planning and implementation of activities that match with the need and priorities of the local people whether these are infrastructure related or employment and income generation. In case of EbA-II, local governments (respective Municipalities and Wards), provincial goverenemnts, INGOs/NGOs, government agencies and local communities are equally important stakeholders in implementing the strategies effectively.

Specific Strategies

Forest and rangeland based strategic measures constitute activities that help the rural communities to improve their employment and income through the use of forest based products, especially the NTFPs and MAPs using forest and water conservation approaches. The EbA-II municipalities have varied amount of forest, grass lands and barren lands and have largely been greatly used to support people's livelihoods. Spatial information with respect to forest and non-forest land including barren land are presented in Chapter 3.10 for all EbA-II municipalities. Specific measures will include activities that will involve production, collection, processing and marketing of various forest based products available in the community forests. Rangeland measures will include development/improvement of pasture land (ground grass and fodder trees) with increased water availability to animals to enable efficient grazing and increased fodder availability for stall feeding contributing to raise improved livestock breeds. Please refer to Annex 3.3 for existing community forest in project sites and related information.

Land based strategic measures include support activities to the farming families engaged in agriculture whose livelihood is dependent on land. These measures would generally require having greater focus on:

- Vegetable, fruit and cash crop production, livestock (ruminant) raising, and poultry and piggery farming with quality inputs and extension services;

- Skill training on crop and fruit farming viz. vegetables, potato, kiwi, cardamom, mushroom, honey, *timur* production, processing and marketing etc;
- Greater emphasis on promoting value chain approach from inputs-services-production-processing to product marketing for sustained growth and development of selected IGAs including development/renovation of micro irrigation facilities;
- Effective linkage development of farming communities with different types of service providers viz. financial as well as technical;
- Capacity building of farmer groups/women groups to plan and implement IGAs effectively;
- Gender and social inclusiveness in IGAs; and
- Implementation of pro-poor policies.

Non land-based strategies will help promote activities such as skill training in different vocational fields along with other supports which offers opportunities for self-employment and wage employment of the poor people. In the context of EbA-II, non-land based strategies could be considered and implemented for skill development in different fields that help improve the ecosystem through enhanced knowledge and practices of local people which could include, however, not limited to the followings.

- Training and skill development on plantation, conservation and harvesting of various forest products including tree, fodder, NTFPs and herbal species;
- Skill training on *Chauri* farming/breeding, improved goat and cattle raising;
- Training on small and medium enterprise development; and
- Skill training on tourism and home stay management including hospitality, cooking, hygiene and sanitation, guest services.

11.2.4 Institutions and their Capacity

Institution is a sub-concept within the concept of livelihoods but is equally a complex concept. Institutions are often referred to as the 'rules of the game' or 'how things are and should be done'. In the context of livelihoods and accessing livelihood assets, institutions include policies, laws, and general rules (formal or informal) that guide peoples' behaviour on what assets to access and how. Regarding EbA project, institution building is critical at three levels as follows (Bimal Regmi, et.al.).

- Federal level
- Provincial level
- Municipality level and
- User group level

At central level, the MoFE is the executing agency of the project in collaboration with the MoALD and it is the responsibility of MoFE to manage the project at the centre whereas the DoFSC under the MOFE is the implementing agency of the project. Under the leadership of Secretary of MoFE, a PSC has been formed at the centre to provide overall policy guidance for the implementation of the project. At local level, the selected Rural/Municipalities are the key agencies taking full responsibilities to implement the activities in the field. It is therefore quite crucial to develop the implementation capacity of Rural/Municipalities so that they can discharge responsibilities including managerial, financial and technical aspects of the project.

The user groups are also equally responsible to implement the project on the ground. User groups also need to be committed fully in the implementation of activities. They are accountable to perform various tasks on their part, however, not limited to the followings: i) participate actively in planning and implementation ii) contribute cash/kind/labour for a particular intervention iii) maintain all records and documents iv) hold timely group meetings, and v) integrate gender and social inclusion in all activities.

11.3.5 Coordination, Monitoring and Reporting

Coordination among different agencies is critical to make EbA-II effective and outcome oriented. The need to coordinate respective Division and subdivision of Forest office is important to solicit varieties of support services essential for the project such as skilled knowledge for site selection, supply of seedlings and inputs, plantation of different tree and herbal species as well as conservation and management of the community forests. Similarly, coordination with respective district Agricultural Knowledge Centre, Livestock Service Centre and other district or provincial officesis crucial to seek both technical and financial supports. Close monitoring and reporting of EbA-II interventions is also essential for tracking the progress as well as weaknesses hindering project implementation. Currently, the local government bodies have limited capacity to monitor and report field activities and also lack effective reporting mechanism. It is therefore quite important that the implementing agencies should develop mechanism for regular monitoring and reporting the progress to the project on a periodic basis.

11.3 District Specific Income Generating Activities in EbA Project Area

11.3.1 Dolakha District

Dolakha district**,** a part of Bagmati Pradesh, is one of the seventy-seven districts of Nepal. The district, with Charikot as its district headquarters, covers an area of 2,191 sq km and had a population of 186,557 in 2011. The district consists of 9 Municipalities, out of which two are urban municipalities and seven are rural municipalities. Also known as the gateway of Mount Everest and the Switzerland of Nepal, Jiri used to be a base camp for Mount Everest.It is a district with a strong religious affiliation. The historic Bhimeshwor temple, Kalinchok templa, Shailung Hills (also known as 100 hills), Gaurishankar Himal and Tsho Rolpa lakes are popular tourist attractions. The district possesses several opportunities of developing natural resource based, agriculture based and tourism based IGAs.

11.3.1.1 Potential IGAs

The study team thoroughly reviewed the project document which has identified potential IGAs from forests, rangelands and agro-ecosystems for selected wards. During field visit, the team further validated and identified different forest and non-forest products which could be utilized to enhance the employment and income of the people. These are: (i) fodder sapling harvesting and distribution (ii) *argheli* (*Daphne edgeworthia*) and *allo* (*Daphne bholua*) collection and processing (iii) cardamom cultivation, collection and processing (iv) bee-keeping and honey processing (v) cold water fish (trout) farming (vi) other economically valuable NTFPs cultivation, harvesting and processing; vii) eco-homestays and (viii) *chauri* farming for cheese,

churpi and ghee production, and iv) improved goat farming. Strong focus is laid on promoting IGAs by women-headed households of indigenous communities living in EbA project area. Opportunities to strengthen or establish links between the targeted communities and nearby markets also need to be explored to promote sustainability of CLIPs developed for Dolakha district. Field investigation reveals number of potential IGAs that could be supported under EbA in Dolakha district (Table 11.4). The Ward Chairman of Jiri Municipality Ward No. 5 recalled the slogan "Clean Jiri, Green Jiri and Organic Jiri" as an underlying development motto of Jiri Municipality.

Table 11. 4: Potential IGAs for Livelihood Improvement in **Dolakha District**

S.No.	Activities	Activity Details	Targeted beneficiaries/ communities	Potential sites/locations
1	NTFPs/Herbs	i) *Argheli/ lokta/amriso* production, processing and marketing (steamed *argheli* supplied to agent by few households in selected CFs which is exported to third country; high potential for up-scaling, employment and income)	Jirel/ Sherpa/ Gurung/ Thami/Tamang/Newar/ Dalits and Others	Jiri, Sailung, Kalinchowk, BhimeshworMun.
		ii) Nursery establishment for plantation/sale of seedlings (*machino, lothsalla, siltimur/boketimur, padamchal, budiokto, jatamasi, sunakhari, ban lasun etc. and fodder plants*)	Do	Do
		iii) Nepali paper processing/marketing (potential for up-scaling and product diversification in most communities where *lokta* and *argheli* is produced)	Do	do
2	Agro based activities	i) Kiwi farming (already initiated in some areas under kiwi zone /super zone program in Dolakha and supported by GoN, INGOs/NGOs. Productions and sales have just taken place in some sites locally)	Thami/Gurung/Others	Kalinchowk, Gaurisankhar, SailungMun.
		ii) Cardamom farming/production/drying. NGOs have supported distribution of cardamom seedlings in Lapilang village.	Thami/Gurung/Others	Kalinchowk, Jiri and GaurisankharMun.
		iii) Potato and offseason vegetable farming (tomato, *cauli*, cabbage and leafy vegetables. Potato is becoming prime source of income for many hhs and needs to be promoted in selected pockets)	Tamang/Thami/Newar/ Dalits/Others	Bhimeshwor, Jiri, Gaurisankar, SailungMun.
		iv) Tea plantation (initiated in about 150 ropani (7.5 ha) land in Suire CF with support from Palika)	Thami and others	Lapilang of KalinchworkMun.
3	Livestock based activities	i) Improved goat raising (cross breeds)	All caste/ethnic groups	Do
		ii) *Chauri* farming/*Chauri* breeding and cheese /*churpi* production	Jirel/Sherpa/ Thami	Jiri, Kalinchowk, GaurisankarMun.
4	Eco-tourism /homestay	i) Commercial homestay enterprises (Major attractions are Gumba, Tenjing-Hillary Park, Shiva Temple/ local culture and lifestyle of ethnic groups)	Do	Jiri, Gaurisankar and BhimeshworMun.
5	Fish farming	i) Cold water fish farming (rainbow trout)	Do	Jiri, Bhimeshowr andGaursankarMun.
6	Training	i) Training for local capacity building of user groups, skill training on forest resource conservation/management, improved farming/livestock raising and IGAs.	All caste/ethnic groups	All Municipalities

Source: Field Survey, 2020

Note: Scientific name of NTFP/MAPs found in project districts along with their distribution by altitude and parts used are given in ANNEX 11.1.

Forest based products-*Argheli* and *lokta* are the main forest products available abundantly in the community forests in EbA Project Municipalities of Dolakha district. These products are used to produce Nepali paper and also exported abroad. *Argheli* and *lokta* have also been identified as the most commercially viable biomass products with high potential for increased income. Of two, *argheli* is easily regenerated naturally while *lokta* grows in slightly higher altitudes, making it difficult to manage (FAO, 2015). Some of the CFUGs in EbA sites reported that they were selling *argheli* and *lokta* every year to the local paper mills or the middlemen. Handmade paper manufactured from *lokta* fetches higher market prices for its superior quality.

However, the volume of *lokta* produced is much lower than *argheli*.
Figure 11. 2: Dried *argheli* for sale in Jiri, Dolakha

Everest Gateway is a paper processing company established in joint partnership among CFUGs, local investors and private entrepreneurs, in early 2000. Located in Jiri in Dolakha district, the company manufactures handmade paper (referred to as "Nepali" paper) produced from *lokta* (*Daphne bholua*) and *argheli* (*Daphne edgeworthia*). It was also learnt that *argheli* is also used to make high quality paper (currency notes) and exported to Japan in raw form (steamed) by some agents. Both of these products were observed to have immense potential for income generation but given the constraints in processing (scientific heating and boiling) and marketing, these products have not been able to make significant contribution to raise the income of local people. Despite immense potentiality, the company has not been operated efficiently for internal issues. Some CFUGs met during field visit observed that scientific processing of these products and market linkage for export in third country would generate significant monetary benefits to the poor people of Dolakha district. Most CFUGs met during field visit informed that they were making nominal income from the sale of *argheli*. Currently, the sales are limited to local agents or enterprises who purchase dried *argheli* at low prices. *Lokta*, *amriso*, bamboo, *nigalo* and different fodder trees were demanded by the communities for plantation in degraded lands which not only help restoration of degraded areas but also useful for people's livelihoods.

Value chain is full range of activities to deliver agricultural commodities through the different phases of production (involving a combination of physical transformation and the input of various producer services), transformation and delivery to final consumers. In Nepal, ADS (2015-2035) has prioritized the need to accelerate the development of value chain by creating

Value Chain Development Program (VADEP) under "ADS flagship program." A total of 48 value chains across the four major sectors i.e. crops (32 commodities/products), livestock (11), fisheries (2), and forestry (NTFP/MAP - 3) were assessed and prioritized by establishing National Value Chain Development Program and clearly mentioned to improve productivity for smallholder farmers, postharvest operations and marketing of these commodities and policies, regulatory framework and institutions for agriculture sector (Manoj Sharma, 2019). From the perspective of pro-poor value chain, the opportunities exist mostly in increasing the production, processing and marketing of quality products that directly benefits the farmers. This requires farmers to use quality inputs, grow better quality products; clean and grade them properly enabling them to fetch higher prices for their products.

Table 11. 5: Identified Entry Points for Key Value Chains in EbA Project Area

S.No.	Subsector	Key Value Chains	Entry Points
1	Forest products including small and medium enterprises	i)*Argheli*, *lokta,* bamboo/*amriso* and various herbal products (*machino*, *lothsalla*, *chiraito*, *siltimur*/*boketimur*, *padamchal*, *budiokto*, *jatamasi*, *sunakhari*, *banlasun*etc) ii)Wood based small and medium enterprises (SMEs) viz. *sallo*, *uttis* and hard woods.	Production, collection, drying, processing, marketing and exporting of forest products including timber-based enterprises.
2	Agriculture	"High impact" crops viz. cash crops such as potato, kiwi, off-season vegetables, cardamom and mushroom etc.	Production, processing and marketing
3	Fishery	Fresh fish (cold water fish like trout) production	Production and marketing
4	Livestock	Improved livestock raising (*chauri and* goat farming)	Production, processing and marketing of *chauri* milk and goat meat.
5	Eco tourism	Commercial home stay blended with culture, lifestyle and tradition of indigenous people	Homestay business
6	Bee keeping	Commercial scale beekeeping and honey production with modern beehives	Production, processing and marketing

Source: Field Survey, 2020

NTFPs - mainly broom grass, black cardamom (*alaichi*), *chiraito,* and *amriso* are potential products to thrive in different pockets under EbA project area in Dolakha district. Mayor of Gaurisankar Municipality recalled that the area was traditionally known to consist 84 types of valuable herbs. Most common of them are *machino*, *lothsalla*, *siltimur*/*boketimur*, *padamchal*, *budiokto*, *jatamasi*, *sunakhari*, *banlasun* etc. which were reported as the potential products that could be promoted in the CFs of Dolakha district.

Skill-based livelihood support–Various bamboo made items viz. *Doko, Dalo, Bhakari, Mandro* etc. and furniture making are the potential products identified to be supported as micro enterprises. The Ward Chairman of Gaurisankar Municipality-Ward 8 informed that Khare village is traditionally famous for making these products which continues to be a major source of income for indigenous Gurung community. With EbA support, the poorer households of this community could promote these household level enterprises by diversifying to produce new bamboo products. Plantation of quality bamboo grooves in the CFs, landslide prone areas and river banks would not only check degradation of ecosystem but also provide opportunities for income to the households.

Agro based products -Potato, vegetable, kiwi, cardamom and mushroom farming are some of the agro products that are promising to enhance employment and income of households under

EbA in Dolakha district. Many pockets of Dolakha district are famous for potato production of which Lakuridada (Bhimeswor municipality) and Magapuwa (Sailung municipality) are major production pockets. In these villages, potato is one of the main sources of cash income for many households. Farmers informed that potato production could be enhanced with the supports for inputs, improved potato seeds, extension services, and collection centre to the farming communities.

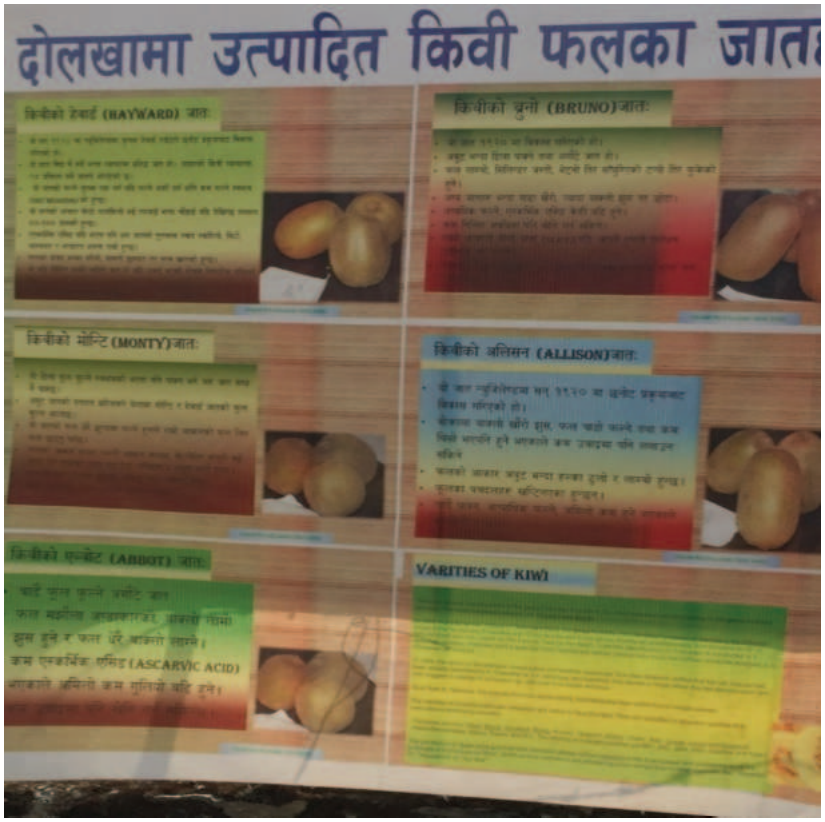


Figure 11. 3: Short description of Kiwi varieties published by PMAMP, Dolakha

The Prime Minister Agriculture Modernization Project (PMAMP) has declared Dolakha as a Kiwi zone[30]. Altogether, 22 Wards of 6 Municipalities of Dolakha district are selected for kiwi farming. Most of the EbA areas also belong to kiwi zone where farmers have initiated kiwi plantation very recently. In Jiri, Shailung, Gaurisankar and Kalinchowk Municipality, farmers have begun harvesting and selling kiwi fruits in small amount. However, to promote kiwi farming in commercial scale, farmers still require technical skills in many aspects viz. plantation, water and weed management, harvesting, post harvesting and packaging of kiwi. Strong network is also essential for marketing kiwi in larger markets outside district. Similarly, offseason vegetable production has tremendous scope to increase the income of households in EbA project area of Dolakha district. Efficient use of water resources such as sprinkler and drip irrigation combined with green house farming and other climate smart technologies would help farmers to undertake offseason vegetable production including tomato, cauliflower, cabbage, beans, leafy vegetables, chilly etc. In Kalinchowk Municipality, the Chairmand of Ward number- 5 informed about "one house one tunnel" campaign launched to enhance vegetable

[30] Under PMAMP a commodity should cover at least 500 ha to be declared as a zone.

farming in the Ward. It also has plan of kiwi farming in 200 *Ropani* (10 ha) land, cardamom plantation, poultry and piggery, and renovation/conservation of ponds under its ongoing development activities.

Livestock and Livestock Products- Households in EbA project area raise different types of livestock viz cattle, *chauri*, buffalo, goats etc. Most of the animals are local breeds and of smaller size. Although *chauri* farming is a traditional occupation in most of the high-altitude communities in Dolakha, this occupation has been gradually decreasing. The main reason behind decreased attraction on *chauri* farming is lack of manpower to take care of *chauri* herds. Nevertheless, *chauri* farming seems to be promising in selected areas of Dolakha district. Famous products of *chauri* are *churpi*, cheese and *ghee* which have abundant market in the domestic market and abroad. Most promising sites for the promotion of *chauri* farming are Jiri, Gaurisankar and Sailung Municipalities. Currently, a government supported *chauri* cheese factory and some other private cheese factories are operational in Dolakha district. The scope for up-scaling cheese factory is quite significant in the district.

Besides *chauri*, goat farming is also a promising enterprise for the people of EbA communities in Dolakha. Increased forest and grasslands with new fodder tree plantation would make goat raising a common rural enterprise for many poorer households. With the plantation of fodder trees in the community forests and private lands, many households could easily maintain number of goats in the shed. Stall feeding system has number of advantages compared to traditional goat farming system. High profit due to fast growth in weight, less diseases, better collection and use of manure etc. are some of the main advantages of stall fed goat farming system.

Supports required for *chauri* farming are: i) improved breeding of *chauri* ii) improvement in the pasture lands i.e rangeland/ grasslands iii) skill training for producing high quality cheese and *churpis*, and iv) support for market linkage in big cities such as Kathmandu and Pokhara and third country. Similarly, for goat raising, improved breeds /bucks are demanded by locals. Currently, local variety of goats are reared in the project area which are small in size. Supports required for goat raising are: i) improvement of sheds ii) use of improved bucks/ breeds iii) cultivation of grass like napier, splendida, andropogon and other fodder plants iv) training on improved goat raising to the households, especially women.

Ecotourism-Dolakha is traditionally the gateway to the Mount Everest base camp. The mountaineering and trekking tourists often starts their journey from Dolakha. Three EbA project sites viz Lakuridada of Bhimeshowr Muncipality, Jamune of Gaurisankar Muncipality and Jiri of Jiri Municipality are potential sites for the promotion of ecotourism due to their special advantages. Increased employment and income of households from tourism enterprises, mainly homestay, would shift the livelihood from traditional subsistence level to commercial profit-oriented level. In consequence, this would have positive impact on forest resources such as wood, timber and other products. Following table presents the potential sites of homestay and specific social groups that would be benefited from the venture.

Table 11. 6: Potential Sites for Promoting Ecotourism and Homestay

S.No	Locations	Beneficiary HHs	Attractions
1	Dhungegaon, Ward No. 5, Jiri Municipality	Jirel and Sherpa, about 10 hhs	Gumba, Tenjing-Hilary Park, Tony Hegen Park, Shiv Temple
2	Khare, Ward No.8, Gaurisankar Municipality	Gurung and others, about 10 hhs	Located along planned Jamune-Tsho-rolpa trekking route.
3	Jhigane and Dobate of Lakuridada, Ward No, 9, Bhimeshwor Municipality	Tamang and Newar, about 15 hhs	Panoramic views of hill tops and mountain/local culture and lifestyle

Source: Field Survey, 2020

Mushroom- Mushroom cultivation has been found as potential enterprise for development in different parts of Dolakha district. In particular, there is immense potential for shitake (*Lentinus edodus*) mushroom cultivation and income in the high altitude locations of EbA project area viz Jiri, Gaurisankar, Kalinchowk, Shailung Municipalities. Plenty of raw materials are available in the CFs and private lands which include branches and logs cut from the *utis* (*Alnus nepalensis*), *katus* (*Castanopsis*) and *khasuro* (*Quercus*) trees in the EbA project sites. The shitake mushroom is valued for its nutritional and medicinal properties, and its cultivation in these locations would help farmers generate cash income, and supplement nutritional value. The growing markets within Dolakha such as Charikot, Singati, Jiri and increasing flow of domestic and international tourists offer ready markets for the sale of mushroom grown in EbA project sites[31].

Figure 11. 4: Wooden logs are used for Shitake mushroom farming

Beekeeping -Beekeeping is one of the promising enterprises for economically poor farmers of EbA project area in Dolakha district. A study conducted at Kabre of Dolakha district during 1997-1999 has identified existing bee flora and a floral calendar. Based on the interview with bee farmers and visual observations, 119 important plant species were recorded out of which 47 species were found major sources for honeybees. Spring season (mid-March to mid-June) and autumn season (mid-Sept to Oct) were identified as honey flow periods having a number of floral plants such as *Guizotia abyssinica*, *Fraxinus floribunda*, *Prunus cerasoides*, *Pyrus communis*, *Castanopsis indica*, *Brassica spp*., *Citrus spp*., *Berberis spp*., *Rubus spp*.,

[31]The flow of tourists was reported to have decreased significantly in the district after January 2020 due to corona virus.

Rhododendron spp. and *Trifolium spp*. Winter season (mid- Nov to Feb) is the critical dearth period with a few flowering plants like *Reinwardtia indica, Pogestemon glaber, Caesalpinia spp. and Eupatorium spp*. The study further reveals that three different honeybee species were found at Kabre. They were little honeybee (*Apisflorea F.*), the common hive bee (*Apiscerana F.*) and the giant bee (*Apisdorsata F.*). According to farmers, the predominant species are *A. cerana* (78.6%), followed by *A. dorsata* (17.9%) and *A. florea* (3.6%) (Bista, S., & Shivakoti, G, 2000). In the EbA project area, very few households have maintained bee keeping in traditional method with low yield of honey. The project area households demonstrated prospects of beekeeping in commercial scale which demands technical supports from the project. In Gaurisnkar Municipality, Ward-8, about 40 households have already initiated beekeeping and farmers were provided training and beehives. Further supports to the beekeeping households would help increase their income in the years ahead.

vii) Fish Farming- Rainbow trout (*Oncorhynchus mykiss*) is one of the most suitable fish to cultivate in cold waters. It can survive in cold waters having a water temperature range from 0 to 25^0C, but performs relatively well for growth in 16-18^0C.The water temperature in the range from 9 to 14^0C is considered suitable for maintaining spawners for breeding and incubation. Waters originating from glaciers make the sites suitable to grow trout (Tek Bahadur Gurung, 2008). Some pockets of EbA-II sites of Dolakha apparently seem appropriate for farming rainbow trout or snow trout. Potential sites are Jiri, Gaurisankar, Bhimeshwor and Sailung Municipalities.

11.3.1.2 Implementation of CLIPs

The planning and implementation of interventions under EbA-II will be highly participatory and carried out by the local institutions and user groups. Given the nature of activities that will be supported under EbA-II, the role of local government as well as user groups will be critical in implementing the activities and achieving the targets. The implementing partners of project at local level are Municipalities and Ward offices. At these levels, the study team noted absence of competent technical staff to implement and manage EbA supported activities in almost every Municipalities and Wards. Only in some Municipalities, there were junior agricultural staff recruited locally by the Wards who, however, may not be able to handle the project's technical aspects.

Some Municipalities and Ward offices in Dolakha district were performing well than others at local level. Ward number 5 (Lapilang) and 6 (Gudung) of Kalinchowk Municipality demonstrated encouraging examples of implementing some income generating activities. These included kiwi farming, vegetable production, tea plantation, milk collection, mushroom farming, commercial goat raising and poultry farming by deprived women groups in Ward number 6. Financial supports for these activities were made available by INGOs, Municipality and Provincial Government. Discussions with the Ward offices reveal that these Wards would be able to implement the IGAs effectively if they are provided financial supports on time. Gaurisankar Municipality of Dolakha was also found a good model of competent local government authority. The Mayor informed that it has got almost all staff including 1 agriculturist, 1 veterinary technician, 1 engineer, and 2 overseers. The Municipality has also clear vision on the activities that it should promote in the communities. The priority areas of livelihood improvement of the Municipality were reported as organic farming of potato, kiwi,

fruits (orange and *khurpani*), ginger, turmeric etc. Because of its clear vision along with the technical staff recruited locally, the Municipality would be able to implement the IGAs under EbA effectively.

11.3.1.3 Training to EbA-II Communities

Effective implementation of EbA interventions depends on the ability of communities to handle and manage them properly. Local level training will be required mainly at two levels: i) district level staff of Division Forest Office, Agriculture Knowledge Centre, Veterinary Hospital and Livestock Service Expert Center as well as local government representatives, and ii) user groups in the Ward level within the Municipalities. Selection of user groups and suitable training material is important in order to impart relevant training to the groups. The training package should be developed depending upon the type of intervention (forest, water resource, rangeland intervention measures and IGAs) planned for implementation in a particular location. It was informed during field visit that the Municipality and Ward offices have limited capacity to provide skill training in resource conservation /management and different types of IGAs that are proposed under CLIPs. As such, separate but specialized training institutes/agencies should be selected and engaged for providing different types of training to the beneficiaries, if possible. During field visit in Dolakha, the study team noted that the Ward offices (Ward 5 and 6) of Lapilang of Kalinchowk Municipality had provided different training to the farmers. Most of the trainings were received by women of indigenous communities. In Ward-5 alone, about 300 women were united into 15 groups for different activities. The training was provided in kiwi farming, goat raising, vegetable production, women empowerment etc. It is notable that in all sites of EbA project area there are several groups already formed such as community forest groups, mother groups, kiwi groups, goat raising group, vegetable producer group etc. who could be offered various training under EbA.

11.3.1.4 Local Level Coordination

Coordination at local level is extremenly important to seek financial and technical assistance from other agencies to ensure that EbA-II interventions are carried out effectively on time and with quality. Coordination will be required with both government agencies as well as INGOs/ NGOs which are currently active in the project districts. In Dolakha district, different NGOs were actively involved in providing inputs and training to farmers, especially the women of socially deprived groups and their capacity building.

11.3.2 Salyan District

Salyan district is located in the mid-west hills of Nepal and lies between 28°22'31N and 82°9'42E. With a total of 242,444 population in 2011 AD, it has three urban municipalities and seven rural municipalities. The district is also classified as highly vulnerable district to climate change. With ecological vulnerability score of 0.47, Salyan is among the high-risk group districts. Of the total land area (195,178 ha) of Salyan, forest area accounts for 64% and *Sallo* is the dominant forest species of the district.

11.3.2.1 Potential IGAs

The study team thoroughly reviewed the project document which has identified potential IGAs from forests, rangelands and agro-ecosystems for selected wards. During field visit, the team

validated and identified different forest and non-forest products which could be utilized to enhance the employment and income of the people. These are: (i) fodder sapling harvesting and distribution (ii) *timur* cultivation, collection and processing (iii) ginger and turmeric production and processing iv) vegetable and mushroom production and processing (v) improved goat farming. LI-BIRD also selected five value chain products (fresh vegetables, ginger, turmeric, Timur and goat) as most potential products for livelihood improvement in three Municipalities of Salyan and one of them is Bangad-Kupinde Municipality (LI-BIRD). Strong focus is laid on promoting IGAs by women-headed households of indigenous communities living in EbA project area of Salyan. Similarly, opportunities to strengthen or establish links between the targeted communities and nearby markets also need to be explored to promote the sustainability of CLIPs developed. Field investigation reveals number of potential IGAs as follows that could be supported under EbA in Salyan district (Table 11.7).

Table 11.7: Potential IGAs for Livelihood Improvement in **Salyan District**

S.N.	Activities	Activity Details	Targeted beneficiaries/ communities	Potential sites/locations
1	NTFPs/Herbs	i) *Timur* production, processing and marketing in higher altitude community and private forests in EbA pocket areas. Nigalchula, Bame, Dumchaur, Mulkhola, Kafalpani etc are the main production pockets.	Dalits and BCTS	Main CFs for *timur* plantation are Shera, Bhateni.Shripane CFs.
		ii) Nursery establishment for plantation/sale of herbal products (*timur*, *amala*, *tejpat*, sisnoo, *burjo*, and fodder trees viz*bakaino*, *tatiamriso*, *kapro*)	Do	Shera, Bhateni. Shripane CFs.
2	Agro based activities	i) Offseason vegetable farming (tomato, cauliflower, cabbage, beans, pumpkin, cucumber, bitter guard and leafy vegetables). Some HVAP supported groups are active in few pockets.	Do	Aamkholi, Sallibazar, Chyura, Nathekhola,
		ii) Ginger and turmeric farming/production/collection/drying. Some farmers are growing these products for sale in local markets of Salyan and Surkhet districts.	Do	Bame, Suikot, Jimali, Mulkhola, Marmapuri- Kanda.
		iii) Mushroom farming- production, processing and marketing in Chinchu-Sallikot road corridor.	Do	Sallibazaar, Sangrahi, aamkhola.
3	Livestock based activities	i) Improved goat raising (cross breeds)	Do	Bangad-Kupinde and Kumakh Mun.
		ii) Ghee production	Do	Do
4	Beekeeping	i) Beekeeping using improved modern beehives	do	Do
5	Training	Training for local capacity building of user groups, skill training on forest resource conservation/management, improved farming/livestock raising and IGAs.	All caste/ethnic groups	do

Source: Field Survey, 2020

Forest and land-based products – *Timur* (*Zanthoxylum armatum*) is the main forest products available abundantly in the community forests and private land in EbA Project Municipalities of Salyan district. *Timur*, commonly known as Nepalese pepper, found mostly in open barren land and forest, has been as an integral source of income for women, landless and unemployed people. It is estimated that about 850 to 1,100 mt of *Timur* is collected annually in Nepal of which more than 80% is exported in raw and processed form to Indian markets whereas oil is exported in small volume to European markets. A study reveals that a total of 170 mt of *timur* was collected in a year in Chhinchu-Jajarkot road corridor. Of this quantity, 45 mt was collected in Baluwa Sangrahi and 15 mt in Salli Bazaar both of which are the major market centres of Bangad-Kupinde Municipality of EbA project sites in Salyan district. In Baluwa Sangrahi market, *timur* was collected from different pockets, namely Sangrahi, Palle, Kuvende, Chade, Sijuwatakura and Marke. Similarly, Salli Bazaar was the collection cenre of *timur* from Bame, Suikot, Jimali, Mulkhola, Marmapuri- Kanda etc (GoN, HVAP/SNV, 2011).

Table 11. 8: Identified Entry Points for Key Value Chains in EbA Project Area

S.No.	Subsector	Key Value Chains	Entry Points
1	Forest products including small and medium enterprises	i)*Sallo* and bamboo/*amriso* and various herbal products (*timur, sugandhawal, pakhanbed, rittha, amala*, *tejpat*, *gurjo*, and fodder trees viz. *bakaino*, *tati*, *kapro* etc) (District Forest Office, Salyan, 2018/19) ii)Wood based small and medium enterprises (SMEs) viz. *sallo, uttis* etc	Production, collection, drying, processing, marketing and exporting of forest products including timberbased enterprises.
2	Agriculture	"High impact" crops viz cash crops viz off-season vegetables (tomato, cabbage, cauliflower, beans etc), mushroom, spices viz. ginger, turmeric etc.	Production, processing and marketing
3	Livestock	Improved livestock raising (Goat farming)	Production and marketing of live goats of improved breeds.
		Ghee production (improved cattle and buffalo raising for milk and ghee production)	Production, processing and marketing
4	Beekeeping	Improved beekeeping with improved beehives	Production, processing and marketing

Figure 11. 5: A woman engaged in cutting/pruning of *timur plants*

In Salyan district, *timur* is collected from state, community, and private lands. These lands have different forms of tenure and are under different access regimes, resulting in different ways of exploiting and managing *timur*. According to a study, *timur* is a branched, scandent, or erect

shrub or a small tree, 6 m tall or more, with dense foliage. The species naturally occurs as an understory species in forests and on open sites at altitudes between 1000 and 2100 m. It is reported that timur grows best on sites with deep, moist soils that are also exposed to the sun (Hertog, W. Hden et al, 2000).

With 400–600 mt collected annually, *timur* is the main non-timber forest product in the Salyan district (Mountain Research and Development, 2000). A study reveals that during the last decade, the presence of *timur* in Salyan has increased considerably on both community-managed and private lands. Its use has changed as well. In the past, villagers cut the shrubs of *timur* around their crop land for local use as fuel-wood. At present, *timur* is no longer used this way. Instead, it is purposely protected and even increasingly cultivated to provide commercial products. Although *Timur* is a potential product to thrive as a pro-poor value chain in Salyan district, there are some constraints for its up-scaling. These are: i) lack of proper knowledge on harvesting and grading ii) low access to market information iii) taxes and royalty on its trade iv) financial problems of farmers and traders v) improper storage facilities, and vii) lack of networking among producers.

The EbA project sites of Salyan district hold prospect for growing different herbal products. It was known that different herbal plants were available in the community forests of Bangad-Kupinde and Kumakh Municipality. Potential herbal products that can grow in the CFs are a*mala*, *tejpat*, g*urjo* etc. that could be promoted in the CFs of Salyan district.

Agro based products – Ginger, turmeric and mushroom are some agro products that are promising to enhance employment and income of households under EbA in Salyan district. Salyan is the second largest ginger producing district in the country. In 2014/15, a total of 19,255 mt ginger was produced from 1995 ha land in Salyan district. Ginger farmers in Salyan are involved more in seed production and there is growing demand of seed rhizomes from Salyan each year from other districts. First grade rhizomes are kept for the seed purpose and second and third grade ginger is traded for consumption. *Aduwa Utpadak Krishi Sahakari Sanstha*, Malneta and *Aduwa Biu Utpadak Krishak Samuha*, Malneta are the two widely known cooperative and farmers group involved in the production of ginger seeds in Salyan (SAMARTH, 2016). Suikot of Kumakh and Mulkhola of Bangad-Kupinde Municipality are the major ginger production and collection pockets which are located in EbA project area.

Like ginger, turmeric is one of the cash crops grown in Salyan district. In 2010/11, turmeric was cultivated in 152 ha land with a total production of 1,289 mt. Turmeric is used for different purposes such as for medicinal use, food additive, food industry, cosmetics including essential oil and has growing market in the country and abroad (HVAP/SNV, 2011). The EbA project sites of Salyan districts are also important pockets for the production and sale of raw turmeric.

Mushroom Farming- Mushroom is an edible fungus and is a fast-growing sector of agriculture because of its high returns in relatively short period. The EbA project sites of Salyan are appropriate pockets where mushroom could be cultivated throughout the year under natural environmental conditions. Mushroom is most common variety which can be cultivated in these sites. One of the attractive factors towards mushroom farming is the short time period between cultivation and harvesting where people do not require much more initial investment and can

be grown with locally available resources. Mushroom can be easily cultivated utilizing the agricultural waste of wheat and paddy straw. The road and market linkage of Salyan with Dang, Surkhet, Kohalpur, Nepalgunj ensures good marketing prospect for selling mushroom.

Goat Farming- Goat farming is also a promising enterprise for the people of EbA communities in Salyan. Increased forest and grasslands with new fodder tree plantation would make goat raising a common rural enterprise for many poorer households. With the plantation of fodder trees in the community forests and private lands, many households could easily maintain number of goats in the shed. Stall feeding system has number of advantages compared to traditional goat farming system. High profit due to fast growth in weight, less diseases, better collection and use of manure etc. are some of the main advantages of stall-fed goat farming system. Currently, the goats are raised in traditional way with low income. Some of the recommendations for goat raising are: i) shed improvement ii) raising goats in commercial size and scale iii) use of improved breed iv) adopting stall fed goat raising practices, and v) plantation of nutritious fodder and grass in CFs and private land.

Figure 11. 6: Goat herd (local *khari*breed) taken out for open grazing in Salyan

Beekeeping - Beekeeping is one of the promising enterprises for economically poor farmers of EbA project area in Salyan district. Four out of nine honey bees, *Apis laboriosa* (Smith 1871), *Apis dorsata* (Fabricius 1793), *Apis florea* (Fabricius 1787) and *Apis cerana* (Fabricius 1793) are native to Nepal. In EbA sites in Salyan, traditional beekeepers use only traditional hives: horizontal log hives and wall hives which give low yield of honey. In order to maximize the return, famers need to undertake beekeeping in commercial scale using modern bee hives i.e. Newton hives, modified modern hives and African top bar – which are used to realize higher income from beekeeping.

Ghee production– Ghee is one of the main dairy products produced by the households of EbA project sites. The households raise local variety of cattle and buffalo in limited number to produce milk which is used for consumption as well as sale. In market area, the households

sell milk directly. However, households of distant villages prefer to sell ghee. Some pockets of EbA areas are potential for raising improved cow and buffalo and farmers have shown interest to upscale the production if they are provided financial supports and technical backstopping.

11.3.2.2 Implementation of CLIPs

The planning and implementation of interventions under EbA-II will be highly participatory in nature which will be carried out by the local institutions and user groups. Given the nature of activities that will be supported under EbA-II, the role of local government as well as user groups will be critical in achieving the targets. The implementing partners of project at local level are Municipalities and Ward offices. At these levels, the study team noted absence of competent technical staff to implement and manage EbA supported activities in almost every Municipalities and Wards. Only in some Municipalities, there are junior agricultural staff who may not be able to handle the project's technical aspects. In view of these issues, it is strongly recommended to hire a team of technical experts to provide technical supports viz training, supervision, management to make EbA successful. Effective implementation of CLIPs would require a fully dedicated team of managerial and technical staff at Municipality and Ward level. During field visit, the EbA project implementing agency i.e the Bangad-Kupinde Municipality and Kumakh Municipalties seemed to have inadequate manpower for planning and implementation of EbA activities. In Bangad-Kupinde, the EbA fund amounting Rs one million was released in the last fiscal year but in absence of prior planning the fund could not be utilized. It is, therefore, urgent to deploy dedicated team comprising of technical and managerial staff at local level to implement EbA activities. The team should be able to coordinate fully with other government agencies and INGOs/NGOs and start planning and implementing the activities. The Municipalities in Salyan district should also use the model that has been practiced by Kalinchowk and Gaurisankar Municipality of Dolakha district in implementing the IGAs.

11.3.2.3 Training to EbA-II Communities

Effective implementation of EbA interventions depends on the ability of communities to handle and manage them properly. Local level training will be required mainly at two levels: i) district level staff of Division Forest Office, Agriculture Knowledge Centre, Livestock Office as well as local government representatives, and ii) user groups in the Ward level within the Municipalities. Selection of user groups and training courses is important in order to impart relevant training to the groups. The training package should be developed depending upon the type of intervention (forest, water resource, rangeland intervention measures and IGAs) planned for implementation in a particular location. It was informed during field visit the Municipality and Ward offices have limited capacity to provide skill training in resource conservation /management and different types of IGAs that are proposed under CLIPs. As such, separate but specialized training institutes/agencies should be selected and engaged for providing different types of training to the beneficiaries, if possible. It is notable that in the EbA project Municipalities, there are some groups already formed by IFAD supported High Value Agriculture Project (HVAP) which worked with different value chains such as timur, vegetables, goat, ginger and turmeric farming in seven districts including Salyan. It is expected that some of the groups formed by HVAP still exist in the area which can be supported under EbA-II. The Municipality and Ward offices have to work closely to identify the beneficiary communities and organize them into groups to implement the activities.

11.3.2.4 Local LevelCoordination

Coordination at local level is extremenly important to seek financial and technical assistance from other agencies to ensure that EbA-II interventions are carried out effectively on time and quality. Coordination will be required with government agencies as well as INGOs/ NGOs which are currently active in the project districts. In Salyan district, some NGOs were actively involved in providing inputs and training to farmer groups and also helping them for capacity building.

11.3.3 Achham District

Achham covers an area of 1,692 square kilometers (653 sq mile) and located at Latitude: 280°46’ North to 290°23' North and Longitude: 810°32 East to 810°35' East. About 90% area of Achham is mid-hill and 10% is high-hill. The maximum elevation of the district is 3,820 meters (12,530 ft) and minimum elevation is 540 meters (1,770 ft) from the sea level. According to 2011 census, Accham District had a population of 257,477. With ecological vulnerability score of 0.53, Accham district is ranked under high risk group.

11.3.3.1 Potential IGAs

The study team thoroughly reviewed the project document which has identified potential IGAs from forests, rangelands and agro-ecosystems for selected wards. During field visit, the team further validated and identified different forest and non-forest products which could be utilized to enhance the employment and income of the people. These are: (i) fodder sapling production and distribution (ii) *Argheli/ lokta/badu/babiyo* and *allo* collection and processing (iii) kiwi, cardamom, potato and vegetable production, collection, processing and marketing (iv) ginger and turmeric farming (v) eco-home-stays and (vii) goat and sheep farming. Strong focus is laid on promoting IGAs by women-headed households of poor and indigenous communities living in EbA project area. Opportunities to strengthen or establish links between the targeted communities and nearby markets also need to be explored to promote sustainability of CLIPs developed for Achham district. Field investigation reveals number of potential IGAs that could be supported under EbA in Achham district (Table 11.9).

i) Forest and land-based products - *Timur* (*Zanthoxylum armatum*) is the main forest products available abundantly in the community forests and private land in EbA Project Municipalities of Achham district. *Timur*, commonly known as Nepalese pepper, found mostly in open barren land and forest, has been as an integral source of income for women, landless and unemployed people. It is estimated that about 850 to 1,100 mt of *timur* is collected annually in Nepal of which more than 80% is exported in raw and processed form to Indian markets whereas oil is exported in small volume to European markets. In EbA-II project sites, particularly in high altitude area of Ramaroshan and Mallekh Municipality, production and marketing of *timur* was reported as a potential product which could be grown in community and private land in commercial scale. A good point is that *timur* can be cultivated in marginal lands. Although *timur* is a potential product to thrive as a pro-poor value chain in Achham district, there are some constraints for its up-scaling. These are: i) lack of proper knowledge on harvesting and grading ii) low access to market information iii) taxes and royalty on its trade iv) financial problems of farmers and traders v) improper storage facilities, and vii) lack of networking among producers.

Table 11. 9: Potential IGAs for Livelihood Improvement in **Achham District**

S.No.	Activities	Activity Details	Targeted beneficiaries/ communities	Potential sites/locations
1	NTFPs/Herbs	i) Nepali paper production, processing. *Allo/ argheli/ lokta/badu/babiyo* are available in community forests of Mellekh (2,1,6) and Ramaroshan (5,6); *timur* is a potential product for increased production/collection and sale.	Dalit/BCT (Dhami/Buda)	Different wards of Mellekh, andRamaroshan Municipalities.
		ii) *Allo* collection, processing and fiber production as commercial enterprises.	Dalit/BCT	Rishidaha (Mellekh-1), Ramaroshan (5,6)
		iii) Nursery establishment for plantation/sale of seedlings (*timur*, *lothsalla*, *satuwa, setochini, argeli, amriso, padamchal, sunakhari*etc)	Dalit/BCT	Mellekh and Ramarosan
		iv) *Sisno* collection and packaging	BCT	Ramaroshan-5
2	Agro based activities	i) Kiwi farming (already initiated in some areas)	Dalit/BCT	Bhatkatiya (Ramaroshan 6); Babala (Safebagar 13), Sodasha (Mellekh-6)
		ii) Cardamom farming/production/collection, drying and marketing.	BCT	Bhatkatiya (Ramaroshan 6); Sodasha (Mellekh-6);
		iii) Potato and offseason vegetable farming (tomato, *cauli*, cabbage and leafy vegetables. Mellekh RM is planning to specialize on Wards specific product i.e. one ward one product.	All groups	Sodasha (Mellekh-6), Rishidaha (Mellekh -1), Bhatakatiya (Ramaroshan -6), Babla S'bagar-13)
		iv) Ginger and turmeric farming, processing, collection and marketing in commercial scale		Sodasha (Mellekh-6), Bhatkatiya (Ramaroshan 6)
3	Livestock based activities	i) Stall fed improved goat raising (Boyer and cross breeds) in commercial scale	All groups	Ramaroshan 6; Safebagar 13, Mellekh 6
		ii) Sheep rearing (higher altitudes)	BCT	Mellekh 1,2; Ramaroshan 5
4	Eco-tourism /homestay	i) Commercial homestay enterprises (Major attractions are Ramaroshan lake, local culture and lifestyle of ethnic groups. There is also possibility of developing eco-tourism in Babala.	Dalit/BCT	Ramaroshan, Babala, also trekking route to Khaptad National Park.
5	Training	i) Skill training on improved farming/livestock raising/furniture	All caste/ethnic groups	All Municipalities

Source: Field Survey, 2020

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Allo, argheli, lokta, badu and babiyo are potential forest based products that are potential to thrive as commercial enterprises in Achham district. These products are available abundantly in the project area of EbA-II in Achham district. *Allo* has been identified as a potential NTFPs found widely in the community forests of Achham which could be used as a sustainable source of employment and income of the people. *Allo* fiber is used to produce wide range of garments both for domestic and international markets. However, scientific production, collection and harvesting of these products is essential in order to make their use for processing and producing different products. In the EbA project sties and its surrounding, there are few Nepali paper making enterprises which are either passive or operating in very low capacity. It is reported that two enterprises operated in Ramaroshan Municipality exported a total of 400 *kori* (200 sheets make one kori) of Nepali paper worth Rs 1.2 million in the year 2074 BS.

Table 11.10: Identified Entry Points for Key Value Chains in EbA Project Area in Achham

S.No.	Subsector	Key Value Chains	Entry Points
1	Forest products including small and medium enterprises	i) *Allo /argheli, lokta/badu/babiyo/amriso*and various herbal products (*timur, lothsalla, satuwa, setochini, padamchal, sunakhari, tejpat, chiraito, kutki, bish* etc. ii) Wood and loktabased small and medium enterprises (SMEs) viz*sallo, uttis, lokta*etc	Production, collection, drying, processing, marketing and exporting of forest products including timberbased enterprises.
2	Agriculture	"High impact" crops viz cash crops including off-season potato, vegetables (tomato, cabbage, cauliflower, beans etc), kiwi, spices viz. ginger, turmeric, potato, cardamom etc.	Production, processing and marketing
3	Livestock	Improved livestock raising (Goat and sheep farming)	Production and marketing of live goat/sheep and wool.
4	Eco-tourism /homestay	Commercial homestay enterprises (commercial enterprises)	Local culture/tradition and lifestyle

Source: Field Survey, 2020

Figure 11. 7: Allo isone of the high potential NTFPs found in Achham (allo fiber)

The presence of several micro climatic conditions in Achham district provides conducive environment for the growth of various medicinal and aromatic herbs (MAPs) that can be used as a tool to develop enterprises in Achham District. However, there is no research done to find out the amount of the resource in the district. *Chiraito, lothsalla, lokta, atish, jhyau, kutki, jatimasi, bish, kaulo, satuwa, sugandhawal* etc are identified as the major herbal products which

are found and exported from Ramarosan, Santada, Rishidaha, Bhatikatiya, Binayak, Kuika and Sodasha (formerly VDCs) most of which are EbA project sites[32]. Scientific plantation and management of these herbs in the community forests could be developed as commercial enterprise making long lasting impact on the employment and income of the forest users.

ii) Agro based products – Various crops and spices like ginger, turmeric and cardamom are some agro products that are promising to enhance the employment and income of households under EbA in Achham district. Sodasha (Mellekh-6), Rishidaha (Mellekh -1), Bhatakatiya (Ramaroshan -6), Babla (Safebagar-13) are the main pocket areas for the production of vegetables, potato, spices like ginger, turmeric, cardamom etc. These areas are connected with the road and local markets offering good prospect for production and marketing. Turmeric is one of the cash crops grown in Achham district. In 2010/11, turmeric was cultivated in 100 ha land with a total production of 760 mt. Turmeric is used for different purposes such as for medicinal use, food additive, food industry, cosmetics including essential oil and has growing market in the country and abroad (HVAP/SNV, 2011). The EbA project sites of Achham district are also important pockets for the production and sale of turmeric where it could be promoted as commercial farming.

Mushroom is an edible fungus and is a fast-growing sector of agriculture because of its short cycle and high returns. The EbA project sites of Achham are appropriate pockets where mushroom can be cultivated throughout the year under natural environmental conditions. Straw mushroom is most common variety which can be cultivated in these sites. One of the attractive factors towards mushroom farming is the short time period between cultivation and harvesting where people do not require much more initial investment and can be grown with locally available resources. Mushroom can be easily cultivated utilizing the agricultural waste of wheat and paddy straw. The road and market linkage of Achham with Doti, Dadeldhura, Dhangadi, Mahendranagar etc ensures high market potentiality for selling mushroom.

Goat and Sheep Farming- Goat and sheep farming is also a promising enterprise for the people of EbA communities in Achham. Increased forest and grasslands with new fodder tree plantation would make goat and sheep raising a common rural enterprise for many poorer households. With the plantation of fodder trees in the community forests and private lands, many households could easily maintain number of goats in sheds. Stall feeding system has number of advantages compared to traditional goat farming system. High profit due to fast growth in weight, less diseases, better collection and use of manure etc. are some of the main advantages of stall-fed goat farming system. Currently, the goats are raised in traditional way with low income. Some of the recommendations for goat raising are: i) shed improvement ii) raising goats in commercial size and scale iii) use of improved breed iv) adopting stall fed goat raising, and v) plantation of nutritious fodder and grass in CFs and private land. In higher altitude area of Mellekh 1, 2 and Ramaroshan 5, sheep raising could be promoted. However, grasslands and fodder trees should be planted in order to raise goats and sheep in commercial scale.

Ecotourism- Ramaroshan National Forest with several small lakes (*simsar* area) has been proposed for conservation in the Municipality. Located in Ward-5 of Ramaroshan Rural

[32] MSFP, Enterprise Development in Achham District

municipality, the Ramaroshan lake and conservation area are accessible by road. A trekking trail has been developed from Sodasa of Mellekh rural municipality that extends to Ramaroshan-6 thereby passing to Ramaroshan lake in ward-5. This trail leads to Safebagar municipality in the first day and to Mellekh rural Municipality from where people could trek through Sodasa (MellekhWard-6) to Bhatakatiya (Ramaroshan-6) and Ramaroshan (Ramaroshan-5). Few small lodges and two home stays are initiated in Ramaroshan- 5 recently. The EbA sites are also connected with various temples, religious sites and touristic site. Some of the famous temples located in Safebagar Municipality are: Hadasain Madi (Siddhadhuni), Okhikot goddess temple, Patalkot, Kalika temple, Devishtan, Jalpadevi, Baidhdham etc. With the operation of new homestays in Ramaroshan-5, more tourists/ trekkers would be attracted to visit these sites from where they could further move to Khaptad National Park.

11.3.3.2 Implementation of CLIPs

The planning and implementation of interventions under EbA-II will be highly participatory in nature which will be carried out by the local institutions and user groups. Given the nature of activities that will be supported under EbA-II, the role of local government as well as user groups will be critical in achieving the targets. The implementing partners of project at local level are Municipalities and Ward offices. At these levels, the study team noted absence of competent technical staff to implement and manage EbA supported activities in almost every Municipalities and Wards of Achham district. There are no agricultural or livestock experts at these levels. The Municipalities and Wards also do not seem to have their experience in planning and implementing IGAs. In view of these issues, it is strongly recommended to hire a team of technical experts to provide technical supports viz training, supervision, management to make EbA successful. Effective implementation of CLIPs would require a fully dedicated team of managerial and technical staff at Municipality and Ward level. The team should be able to coordinate fully with other government agencies and INGOs/NGOs and implement the activities. The Municipalities in Achham district should also use the model that has been practiced by Kalinchowk and Gaurisankar Municipality of Dolakha district in implementing the IGAs.

The team observed that Safebagar Municipality and Mellekh rural municipality had already received some funds from EBA -II, while Ramaroshan rural municipality was yet to receive thefunds. While inquiring about EbA-II, the officials in Ramaroshan rural municipality informed that they were not aware of budget disbursement and the implementation of EbA-II. In Mellekh and Safebagar recharge ponds were constructed in the last year. Similarly, a nursery was established in Safebagar Municipality with the funding support of EbA- II. In view of these laspes, the Project should make efforts to coordinate fully with the local government bodies as well as other implementing partners and implement the activities.

11.3.3.3 Training to EbA Communities

Effective implementation of EbA interventions depends on the ability of communities to handle and manage them properly. Local level training will be required mainly at two levels: i) district level staff of Division Forest Office, Agriculture Knowledge Centre, Veterinary Hospital and Livestock Service Expert Center as well as local government representatives, and ii) user groups in the Ward level within the Municipalities. Selection of user groups and training courses is important in order to impart relevant training to the groups. The training package

should be developed depending upon the type of intervention (forest, water resource, rangeland intervention measures and IGAs) planned for implementation in a particular location. It was informed during field visit the Municipality and Ward offices have limited capacity to provide skill training in resource conservation /management and different types of IGAs that are proposed under CLIPs. As such, separate but specialized training institutes/agencies should be selected and engaged for providing different types of training to the beneficiaries. However, before that a training need assessment should be undertaken. It is notable that in the EbA project Municipalities, there are several forest user groups formed and supported by MSFP in the past which could be supported under EbA-II.

11.3.3.4 Local Level Coordination

Coordination at local level is extremenly important to seek financial and technical assistance from other agencies to ensure that EbA-II interventions are carried out effectively on time and quality. Coordination will be required with government agencies as well as INGOs/ NGOs which are currently active in the project districts. In Achham district, some NGOs were actively involved in providing inputs and training to farmer groups and also helping them for capacity building.

CHAPTER XII GENDER EQUALITY AND SOCIAL INCLUSION

In this chapter social inclusion and gender related subjects are discussed in terms of involvement of different ethnic group and women in decision making and ownership of assets. The sample size was composed of about 16 percent of Dalit, 28 percent Adibasi/Janjati and 55 percent BCTS. It was found that illiteracy was higher in Dalit communities compared to other caste/ethnic groups. Also, that higher proportion of females (17.34%) was illiterate compared to males (6.6%). Affiliation of women and Dalits in social/political/ community-based organizations was found lower Compared to others. The household survey results also showed that only 5.9 percent women have ownership over land and 7.4 percent women have ownership over house. However, regarding decision making it was revealed that role of female member of the family in decision making in household related matters was much higher than male.

12.1 GESI Status

Out of the 404 total sample households interviewed, there were 320 (79.2%) male headed households and 84 (20.8%) female headed households. According to cast/ethnicity, 74.2% Dalit, 87.2% Adibasi/janjati and 76.3% BCTS households were male headed households. Similarly, there were 25.8% Dalit 12.3% Adibasi/janjati and 23.7% BCTs women headed households. The details of male and female headed households by cast/ethnicity are presented in Table 12.1.

Table 12. 1: Status of surveyed household by gender and Ethnicity

S.N.	Name of District	Households headed by		Total Hhs	Households by Ethnicity		
		Male	Female		Dalit	Adibasi/Janajati	BCTS
1	Achham	113	25	138	23	0	115
2	Salyan	94	40	134	43	0	91
3	Dolkha	113	19	132	0	114	18
	Total	320	84	404	66	114	224

Source: Household survey-2020

For collection of household level data, interview was conducted with the head of households as far as possible. In case the household head was not available for some reason, senior most person available in the household was interviewed.

The respondents providing household level information consisted of both males and females. Male respondents figured out slightly higher percentage (56.7%) in total. Among the respondents, Dalit female figured out highest (48.5% followed by BCTS (43.3%) in the second place and the lowest among Adibasi/Janajati (39.5%).

Table 12. 2: Number and Percentage of Respondents by Gender

Categories	Male		Female		Total	
By District						
Achham	88	(63.8)	50	(36.2)	138	(100.0)
Salyan	65	(48.5)	69	(51.5)	134	(100.0)

Categories	Male		Female		Total	
Dolakha	76	(57.6)	56	(42.4)	132	(100.0)
Total/ Overall	229	(56.7)	175	(43.3)	404	(100.0)
By Caste/Ethnicity						
Dalit	34	(51.5)	32	(48.5)	66	(100.0)
Adibasi/Janajati	69	(60.5)	45	(39.5)	114	(100.0)
BCTS	126	(56.3)	98	(43.8)	224	(100.0)
Total/ Overall	229	(56.7)	175	(43.3)	404	(100.0)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

12.1.1 Population Structure by Gender, Age and Cast/Ethnicity

The sample population was composed of 51.6% (1030) male and 48.4% (966) female members of the households. As per cast/ethnicity, Dalit households were comprised of 55.1% male and 49.9% female, Adibasi/Janjati 53% male and 47% female and BCTS 50.1% male and 49.99% female. The age group wise population distributions show that there were 7.7 percent population of less than 5 years of age, 22.3% percent 5 to 14 years, 51.9% percent 15 to 49 years, 7.8% percent 50 to 59 years and 10.3 percent more than 60 years of age. The detailed information of gender, cast/ethnicity wise population is given in tables 12.3 and 12.4.

Table 12. 3: Sample population by Ethnicity and sex

S.N.	Name of District	Male	Female	Total
1	Achham	416	404	820
2	Salyan	354	314	668
3	Dolkha	260	248	508
	Total	1030	966	1996
By Cast/Ethnicity wise population				
1	Dalit	190	155	345
2	Adibasi/Janjati	230	204	434
3	BCTS	610	607	1217

Source: Household survey-2020

Table 12. 4: Sample Population by their age and sex

S.N.	Population	Achham			Salyan			Dolkha			Grand Total	
		M	F	Total	M	F	Total	M	F	Total	M	F
1	<5 years	44	36	80	30	18	48	15	11	26	89	65
2	5 – 14years	111	105	216	90	62	152	44	34	78	245	201
3	15- 49 years	200	211	411	178	188	366	129	129	258	507	528
4	50 - 59 years	31	23	54	22	23	45	25	32	57	78	78
5	> 60 years	30	29	59	34	23	57	47	42	89	111	94
	Total	416	404	820	354	314	668	260	248	508	1030	966

Source: Household survey-2020

12.1.2 Literacy

The household survey result shows that about 12 percent of the population is illiterate. Among the illiterate population, females account for a higher figure (17.34%) as compared to males (6.6%). Among the caste/ethnic groups, illiteracy was higher in Dalit communities compared to other caste/ethnic groups. Among all caste/ethnic groups literacy rate was higher for male population compared to females.

Table 12. 5: Distribution of Surveyed Population by Literacy Status

Categories	Illiterate						Literate					
	Male		Female		Total		Male		Female		Total	
By District												
Achham	9	(2.5)	25	(6.9)	34	(4.7)	347	(97.5)	336	(93.1)	683	(95.3)
Salyan	33	(10.4)	80	(27.5)	113	(18.6)	283	(89.6)	211	(72.5)	494	(81.4)
Dolakha	18	(7.4)	48	(20.5)	66	(13.8)	225	(92.6)	186	(79.5)	411	(86.2)
Total/ Overall	60	(6.6)	153	(17.3)	213	(11.8)	855	(93.4)	733	(82.7)	1588	(88.2)
By Caste/Ethnicity												
Dalit	16	(9.8)	35	(24.8)	51	(16.8)	147	(90.2)	106	(75.2)	253	(83.2)
Adibasi/Janajati	15	(7.0)	43	(22.5)	58	(14.4)	198	(93.0)	148	(77.5)	346	(85.6)
BCTS	29	(5.4)	75	(13.5)	104	(9.5)	510	(94.6)	479	(86.5)	989	(90.5)

Note: Figures in parenthesis indicate percentage.
Source: Field Survey, 2020

12.1.3 Affiliation in different institutions

A total of 495 people from 404 households were affiliated to social/political/community-based organizations, some 72 percent of them in more than one organization. Among those affiliated to some organizations 258 or about 52 percent were household heads. Compared by their caste/ethnicity, affiliation of Dalits was found lower. This can be seen from the fact that Dalits accounted for 16.3 percent of sample population, where as their participation in organization was only 14.7 percent.

Among those affiliated to some organizations, 5.2 percent were chairperson/vice chairperson, 3.2 percent Secretary, 1.8 percent treasurer, 3.4 percent executive member and more than 90 percent general member of the concerned organizations. This scenario varied among the different caste/ethnic groups. Only 1.4 percent of the Dalits held post of Chair/vice-chairperson, whereas 6.7 percent of Adibasi/Janjati and 3.5 percent of BCTS members hold post of chairperson/vice chair person in affiliated organizations.

Table 12. 6: Number and Percentage of Population by Post Held in Local Institutions

Categories	Chair Person		Vice-chairperson		Secretary/ Joing Secretary		Treasurer		Executive Committee Member		General Member	
By District												
Achham	5	(2.4)	1	(0.5)	6	(2.9)	3	(1.5)			195	(95.1)
Salyan	6	(3.5)	1	(0.6)	3	(1.8)	2	(1.2)	16	(9.4)	154	(90.1)
Dolakha	8	(6.7)	5	(4.2)	7	(5.9)	4	(3.4)	1	(0.8)	100	(84.0)
Total/ Overall	19	(3.8)	7	(1.4)	16	(3.2)	9	(1.8)	17	(3.4)	449	(90.7)

Categories	Chair Person	Vice-chairperson	Secretary/ Joing Secretary	Treasurer	Executive Committee Member	General Member
By Caste/Ethnicity						
Dalit	1 (1.4)		1 (1.4)	2 (2.7)	3 (4.1)	67 (91.8)
Adibasi/Janajati	7 (6.7)	4 (3.8)	6 (5.7)	4 (3.8)	1 (1.0)	89 (84.8)
BCTS	11 (3.5)	3 (1.0)	9 (2.8)	3 (1.0)	13 (4.1)	293 (92.4)

Note: Figures in parenthesis indicate percentage.

Source: Field Survey, 2020

12.1.4 Participation in decision making

Information on involvement of men and women in decision making process was collected from all of the sample households based on 13 indicators. The result shows that role of female member of the family in decision making ranged from 6 to almost 54 percent while role of male member of the household in decision making ranged from 7.7 percent to little over 36 percent only. Among the agriculture related activities role of female was higher in selection of crops, while role of male was higher in selection of livestock breed. Joint decision making was dominant in the rest of the activities. The details on role of male and female members of the family in decision making are given in Table 12.7.

Table 12. 7: Gender participation in Decision Makings

S.N.	Area of Decision making	Male %	Female %	Joint %
1	Selection of crop type	13.4	53.7	32.9
2	Selection of crop variety	14.1	53	32.9
3	Selection of Livestock type	26.7	32.7	40.6
4	Selection of Livestock breed	36.1	28.3	35.6
5	Selling the Agriculture product	9.2	30.9	59.9
6	Selling the Livestock product	11.2	26.7	62.1
7	Selling Land/House	33.9	7.2	58.9
8	Borrowing Credit	23	7.9	69.1
9	Education of Children	9.9	10.1	80
10	Ritual Ceremonies	8	6	86
11	Family Planning	13.8	18.6	67.6
12	Participation on community work	13.6	11.9	74.5
13	Seeking Health care/Treatment	7.7	6.2	86.1

Source: Household survey-2020

12.1.5 Ownership, access and control of resources

The sample households were asked about who owns land and other property. Compilation of their responses shows that 5.9 percent women have ownership over land and 7.4 percent over house. Similarly, 90 percent men had ownership over house and 85 percent over land. Some of the households also reported that both (male and female) own part of the property, cash and bank account. Joint ownership of different property, cash or bank account was also reported by several households. The details on ownership are given below in table 12.8.

Table 12. 8: Percentage of household reporting the Ownership of Property

S.N.	Area of Ownership	All by Male	All by Female	Both Male Female Separately	Both Male Female Jointly
1	Ownership of Land	85.7	5.9	7.2	1.2
2	Ownership of House	90.7	7.4	0.7	1.2
3	Ownership of Cash	15.1	63.1	6.2	15.6
4	Ownership of Livestock	6.4	26.5	2	65.1
5	Ownership of Bank Account	31.2	24.3	37.4	7.1
6	Ownership of Ornaments	1.5	87.4	0.5	10.6

Source: Household survey-2020

12.1.6 Skill Development Training

Altogether 115 persons reported to have received some sort of skill development training including farming, NTFP, construction, IGA etc. It is interesting to note that more numbers of women received training than men except in construction sector. In the case of IGA related activities such as knitting, weaving and sewing almost all were women. Considering by different ethnic groups, Adibasi/Janjati represented more than 50 percent of trainees. Details by training type, gender and ethnicity are presented in Table 12.9

Table 12. 9: Number of Sample Population that Received Skill Development Trainings

	Training Area							
	General Farming (Agriculture /Livestock)	**Climate Smart Farming (Agriculture /Livestock)**	**NTFP Cultivation/Production**	**NTFP Processing/Marketing**	**Earthquake Resistance Construction**	**IGA (Knitting/Weaving/Sewing)**	**Others**	**Total**
By Gender								
Male	13	1	1	1	11	1	19	47
	(24.5)	(25.0)	(33.3)	(33.3)	(91.7)	(6.3)	(79.2)	(40.9)
Female	40	3	2	2	1	15	5	68
	(75.5)	(75.0)	(66.7)	(66.7)	(8.3)	(93.8)	(20.8)	(59.1)
By Cast/Ethnicity								
Dalit	3	2				1	4	10
	(5.7)	(50.0)				(6.3)	(16.7)	(8.7)
Adibasi/ Janjati	30		2	1	9	6	10	58
	(56.6)		(66.7)	(33.3)	(75.0)	(37.5)	(41.7)	(50.4)
BCTS	20	2	1	2	3	9	10	47
	(37.7)	(50.0)	(33.3)	(66.7)	(25.0)	(56.3)	(41.7)	(40.9)
Total	**53**	**4**	**3**	**3**	**12**	**16**	**24**	115

Note: Figures in the parentheses are percentages.
Source: Household survey-2020

12.1.7 Sharing of Work by Gender

Both men and women are contributing their labor in the agriculture and other household level activities of the project area. Information on gender workload status of the project was collected from 404 sample households through 10 indicators of agriculture activity and 8 indicators of

household activity. The result shows that contribution of male in works related to agriculture has been 14 to 69 percentand contribution of women in those activities ranged from 30 to 85 percent However, the gender wise involvement in other than agricultural activities shows that women have been contributing in 51 to 85% work load. The gender workload sharing tables are given in table 12.10.

Table 12. 10: Percentage of Work Load Sharing between Men and Women

S.N	Agriculture Activity	Gender	
		Men %	Women %
	A. Agriculture related activities		
1	Land preparation	69.8	30.8
2	Manuring	36.7	63.3
3	Seed Broad casting	48.4	51.6
4	Planting	25.4	74.6
5	Land preparation	30.3	69.7
6	Irrigation	58.5	41.5
7	Harvesting	38.6	61.4
8	Transportation	45.1	54.9
9	Clearing/Processing	14.6	85.4
10	Storing	34.5	65.5
11	Marketing	43.9	56.1
	B. Other Activities		
1	Water fetching/Collecting fire wood	28.1	71.9
2	Crying fodder	28.4	76.1
3	Grinding grain	25.4	74.6
4	Washing Cloths	21.6	78.4
5	Cooking and Cleaning	16.7	83.3
6	Child care	31.9	68.1
7	Care of the elder	42.6	57.4
8	Purchasing goods and commodities	48.3	51.7

Source: Household survey-2020

12.2 Gender specific Issues of the project area

12.2.1 Concerns at project Level

- LGs are demanding EbA program related gender policy or guideline, manual for effectively ensuring meaningful participation of women, Dalit and disadvantaged community in the project activities and setting quotas for the women representation in the groups, institutions and trainings opportunity and benefits levels.
- From the project side there is no GESI focal person and social mobilizer appointed to ensure GESI activities and issues to mainstream project activity at local level.
- The project objectives and benefits has not yet been widely sensitized to local community people, CFUG members, Local government official and elected representatives, local NGOs or CBOs or groups in the project implementing areas.

- The EbA programme has delivered annual EbA programme budget to LGs but they lack implementation guideline. In this context there is a need to prepare proper EbA guideline, procedures to facilitate LGs in the implementation of planned activities.
- EbA should promote women friendly new tools, technology/inputs for reducing workload.
- LGs have conducted various types of training events at ward level. But it is found that LGs have not conducted special sessions on gender role, women development, gender policy and gender issues and mainstreaming GESI.

12.2.2 Concerns at Household level

- Illiteracy among female population is higher in comparison to male population of project area.
- CFU Group members have insufficient orientation/trainings; such as leadership, GESI, social mobilization, group management etc.
- In key position (chairperson, vice-chairperson, treasures and secretary) the presence of women and Dalit is less in general.
- There is a lake of the leadership skill among women Dalit and deprived members to enhance their participation in decision making process.
- Dalit households have fewer affiliations and participation in the local institutions of the project area.
- Insufficient women friendly technologies substituting labour intensive agriculture operation in project areas.

12.3 Proposed Approach for Mainstreaming GESI and Governance in EbA Project

The objective of the gender and governance approach of project is to address equal and meaningful participation of women and Dalit in decision making process, access to and control of women over resource, equal benefit sharing, increasing economic opportunities and improvement of the social status of target women, Dalit and disadvantaged groups at various stages of project activities. Women participation need to be increased in the groups/user committees, leadership positions, planning monitoring and decision making process etc. Overall, a minimum of 50% of program beneficiaries should be women. The detail proposed approach to mainstreaming GESI and Governance of project is given below.

Table 12. 11: Proposed Approach of Mainstreaming GESI and Governance of EbA Project

Area	Thematic Area	How to mainstream
System	Institution	Undertake constitutional mandate: at least 33% women's participation in all project structure and activities such as project managementstructure, user-committee, vital post of group management, monitoring in order to secure more equitable decision-making roles and responsibilities as well as distribution of benefits between gender.
		EbA should create GESI focal point in project district office for the effectively ensure to mainstream GESI policy of EbA project among the project stakeholders egLGs elected official and staffs including ward level offfice CFUGs, Agriculture and Livestock Offices, District Forest Offices and other concerned offices

Area	Thematic Area	How to mainstream
	GESI segregated data management	Develop gender disaggregated data base tools for EbA planning, budgeting, monitoring and reporting. Maintain gender and cast/ethnicity wise disaggregated data base system at LGs ward, district and group level.
	Delivery of Service	Formation of EbA women Sub -group from the CFUGs members.Strengthen and promote new women group through social mobilization of saving fund at productive activities and linkage it with market channel.
		Development of a menu of essential services with priorities to women and DAGs.
Legal frame work	Rules and regulation	Development of GESI sensitive rules and regulations, standard operating procedures and guideline for a uniform approach to mainstream GESI from EbA Project Management unit to local label . Priority should be given to tie-up EbA GESI policy into operational plans of CFUGs.
		Formulate the GESI policy and strategy and sensitize the stakeholders such as LGs elected official and staffs, executive members of CFUGs and other project stakeholders. .
Capacity Building	Targeted for capacity building of EbA stakeholders: LGs elected and staffs, EbA functional groups, CFUGs, Women groups, Agriculture and Livestock groups, NGOs, CBOs and other productive groups	Development/adaptation of GESI and Governance training manual and training materials on GRB/GESI analysis, GESI mainstreaming, GBV/VAW and Gender and Justice, role of women development, area of new technology for reducing workload of women for relevant groups both women and men .Training in leadership, Exposure visit of EbA groups, Design and organize specific capacity building program for women groups with focus on skill management, tailoring, grading and packing, dairy product technology, Local paper making NTFP processing etc.
Participation and partnership	Group members: Women and DAGs	Development of guidelines/orientation for ensuring effective participation of women and DAGs in planning and budgeting process.
Planning and program	LGs level planning process	Link EbA activities and Community forestry users group plan to LGs planning steps (steps are 2 to 5as per Local 2074-gorvernment Act). Ensure 33 %women participation of EbA group in the LGs planning process. At least 15% demand of EbA group endorse in LGs council of their planning .document
Women employment	Ensure employment to women in project construction activities, ensure equal wages for equal work	Ensure at least 33 % representation of women in construction or user's committee .Identify women interest in construction activities and provide employment opportunities on preferential basis. Ensue District wage rate norms for equal wage for equal work
Gender friendly technology	Ensure women access to project benefits by EbA activities that are sensitive to gender concern and needs	Encourage gender friendly technology and programme activities in the project design .Promote improved technology, e.g. Improved goat and poultry with shades, improved vegetable farming, improved seeds, equipment's, poly-house, production and processing equipment's that are affordable, manageable and reduce time and poverty of women..
Information and communications	Timely and Relevant Information and tools	Develop information and communication mechanism such as Electronic Media (Radio, television, or other form of digital media, Local newspaper, project leaflet, booklet, need to develop in local language.
Accountability and responsibility	LGs Council, executive meetings, EbA project unit meeting, and CFUGs executive meeting and Reporting	Undertake EbA's GESI agenda in LGs council or executive meetings or ward meeting and reporting. Discuss GESI related issues in CFUGs meetings and explore to LGs, Project units and other stakeholder for mitigation,

Area	Thematic Area	How to mainstream
		Apply public hearing, public audit and social audit tolls in the EbA activities at project area.
Functional Linkage	Coordination, collaboration and synergy building	Develop functional linkage guideline among EbA stakeholders eg. LGs, line offices farmer group to producer group, cooperative group, community associations, women group, processing group to marketing group for effective coordination and synergy building for EbA sustainability.
	Monitoring	Capacitate LGs ward level monitoring committee to institutionalize of EbA activity. Support in the development of LGs ward level monitoring guideline with 33% women representation from EbA group into ward level monitoring committee.
	Reporting	Development of GESI reporting format for regular reporting of EbA activities.
	Media	Invite local media to meeting and field visits to encourage wide coverage and reporting on GESI issues. Making video to sensitize about GESI. Success story of women group engage in project activities
Feedback	Public Audit and hearing	Organize public audits and public hearings of critical issues of gender related to good governance.
	Social Accountability tool	Use of Gender Safety Audits for ensuring gender based violence free EbA groups .
	Complaint Handling Mechanisms	Support in the establishment of GESI issue readdress mechanism committee at LGs ward level office, Municipality/Rural Municipality office, and CFUG Executive board Training issues readdress mechanism committee and other concerned staffs to respond to grievance and documentation of responses.
	Evaluation and Learning	Development of Gender Responsive Budget(GRB) Gender Audit tool and documentation of best practices and lessons learnt

12.4 Proposed Result frame work of GESI related activities

Key strategy to enhance the roles and opportunity of women is reflected in specific gender focused plan prepared for EbA project. Under the scope of project women will have improved access to EbA community level activities, a proportional role in their managements and decision makings and access to participation in all activities including trainings and other group management. The proposed result frame work of GESI and Governance has been given below:

Table 12. 12Result frame work of GESI and Governance

Issues	Activity	Target	Performance indicators	Responsibility
GESI related database management	Prepare/update socio-economic data disaggregated by gender and cast/ethnicity	All beneficiaries of EbA project	All project data are disaggregated by gender and social-economic groups	EbA project management office/District project office /LGs Ward office, CFUG management committee
No functional group of EbA	Formation of new or sub group of CFLGs of EbA functional groups	18 groups	At least 75 % women are group members	EbA project office/LGs/CF/LFUGs/Women groups

Issues	Activity	Target	Performance indicators	Responsibility
Less participation in the decision making process	Provide group management/leadership skill trainings,	All groups of EbA project	At least 75 % women members participate in the planning and decisionmaking process, 40 % women members have taken vital post in user's committee	EbA project management office/District project office /LGs Ward office, CFUG management committee
Insufficient leadership quality	Design or organize specific capacity building program for women group. Such as exposure visit, peer-peer learning, orientation & coaching ofthe project area	Women from Executive board of CFUGs and Functional group	At least 40 %of Training and exposure visit program are participated by women	EbAproject/LGs/EbA women groups
Limited access to services or less familiar with improved technology	Establish functional linkage with LGs capacity development component budget head and CFUG training budget DFO training component and other local level services provider as agriculture/livestock/cottage industry for the scope of NTFPand / micro enterprise .development	Women members from group involved in commercial farming	At least 40 % women group members are trained and commercialized	EbA project/LGs/other program stakeholder
Possible increase of workload due to involvement in extensive agriculture	Link with Agriculture, Livestock, cottage industry MEDPA, Forestry, and other relevant organization for modern technology support for affordable by women	Women members, Women headed hhs, disable household of the project area	At least 10 % household of the project area adopting the new technology	EbA, LG, DFO, CFUG, AKC, Cottage Industry, and other EbA stakehodler

12.5 Recommendation and conclusion

The assessment highlighted the issues of low representation of some of the cast/ethnicity, especially Dalit, in the EbA project activities owing to lack of access to information, poor leadership quality, workload of female, and gender disparities. The EbA project activities should develop appropriate strategies to address these issues and ensure that the project benefits are culturally appropriate and sustainable.

Following recommendations have been made as mitigation measure to be adopted by the project during the EbA II project implementation.

12.5.1 Proposed Gender and Social inclusion strategies:

- Develop GESI policies, strategies, plan, guideline, manuals, leaflet, booklets and GESI friendly programmes that creates favourable environment for mainstreaming GESI in the EbA inclusive programme at all levels.
- Enhance the capacity of service providers and ensure equitable access and use of EbA related benefits by the women, Dalit, disadvantage community and project stakeholders using the right base approach.
- Ensure inclusive decision making and benefit process by the women, Dalit, disadvantage community and project stakeholders using the right base approach.
- Harmonize and link GESI policy and GESI training curricula with LGs, District Forest offices, Women development office, Agriculture and Livestock offices and other service providers.
- Enhance and strength the capacity of GESI units of Municipalities and Rural Municipalities for sharing of best practices and endorse the GESI issues.
- Mapping the indigenous technology and link to Agro-based, NTFP based activates for enhance women and Dalit participation and to increase income and employment generation.
- Tie-up EbA gender policy into all operation plans.
- Develop GESI segregated data management system at local level

12.5.2 Proposed improved tools and technology for reducing of women workload

- Provide new technology tools/inputs to women and Dalit for reducing of women workload and generating more income and employment in the community level.

Achham	Improvement of indigenous technology, Skill development on Tailoring, Plumbing, Electricity wiring, New technical support on agriculture and livestock production and NTFP processing.
Salyan	Drinking water supply, health and hygiene, sheller mill, improved cooking stove, bio-gas, agriculture and livestock inputs and equipment's, NTF production, collection and processing
Dolkha	Promotion of bamboo farming for making of furniture, Muda, Namlo, Doka and Bhakari; Management of fodder and forage grass production; protection of water sources; promotion of kiwi farming, potato production; milk production technology; training for improved grass production and seed; mushroom and vegetable production training and inputs; paper making from Lokta and Argeli NTFP processing

12.5.3 Proposed Implementation modality for gender

Development of Coordination, collaboration and synergy building

The EbA project activities need to be implemented in the close coordination and collaboration with the local government offices, I/NGOs, CBOs, CFUGs and faramers organization such as cooperatives/groups for effective and meaningful participation of women, *Dalit* and disadvantage groups. Similarly, sharing of GESI related best practice/issues/lesson learned with stakeholders, regular interaction with project partners and key stakeholders will facilitate GESI mainstreaming and eventually benefit the target community.

Proposed GESI planning, Monitoring and reporting process

In accordance of Local Government Implementation guideline-2074, EbA project management unit should enhance the capacity of LGs ward office planning and monitoring committee members and staff, CFUG management members in the development of planning, monitoring tool/techniques and ensuring GESI at all project cycle. Similarly, project management should provide technical supports to LGs for addressing GESI needs in the LGs planning process, gender database management, GESI friendly governance at local levels, gender indicators, sharing of best practices, and reporting.

CHAPTER XIII: REFLECTION ON RESULT FRAMEWORK

The EbA II Project Document has prepared a detailed results framework that elaborates on project objectives, indicators, baseline targets, and means of verification. There are three major outcomes planned to be achieved during the project implementation with well-defined indicators and targets. Each of the outcomes is discussed in the following paragraphs and suggested some of the modifications.

13.1 Outcome One

The outcome one is related to increasing capacity of government officials and local user groups to implement EbA through enhanced institutional arrangements, intersectoral collaboration and information. There are four outcome indicator and targets set to achieve the objective. The first outcome indicator is formation of a technical working group, established within MCCICC, with a mandate to identify, prioritize and monitor EbA.

The second outcome indicator is enhanced capacity of the national, district and local officers and community members to identify prioritize and implement EbA. It is targeted that a total of 150 people will be trained on the said fields. However, the project document does not identify the trainees. Based on our consultation with local government officials it is suggested that Administrative Officers in Municipalities and Secretaries in concerned Ward Offices together with leaders of resource users' groups should be among the recipients of such trainings at village level. However, the curriculum (training materials) for Municipality/Ward Officials and users' groups should be different as per their responsibilities in different levels. Because EbA concept is comparatively new in Nepal, concerned technical officials at municipalities, AKCs, *VHLSECs, DFOs, SDFOs,* FECOFUN, *MoLMAC,* DoFSC, MoFE, MoALD and MoEST needs orientation toward managing EbA activities at national, provincial and local levels. The third outcome indicator is national campaigns implemented by the project to increase public awareness on EbA. At least two national campaigns are targeted to achieve this.

Development of educational tools including research findings to be used by the government institutions to integrate EbA in the educational programs and national planning is the fourth outcome indicator defined by the project document. This is very important and also urgent as local leaders and officials reported confusion in initiating project activities in the absence of project related briefs and guidelines. Materials should include step by step procedure of implementation. Introduction of latest effective techniques developed and recommended by research institutions and earlier EbA program need to be widely publicized. Inclusion of EbA in school curriculum will be an effective way for sustainable solution to the climate change implications. Some suggestions on outcome one targets are given in Table 13.1.

Table 13. 1: Summary of Output-1 Related Activities

Outcomes	Target	Baseline status	Baseline team Suggestions
Outcome 1 Increased capacity of government officials and local user groups	Technical working group established within IMCCCC	Zero/non	(*Technical working group already established within IMCCCC*)
	By project end-point, at least 150 people are trained	Zero/non	FUG: 104x1=104; Ward Official 18x1=18; Municipality Official 10x1=10; District Official 3x3=9; Central & Province =9
	3 Number of national campaigns implemented	Zero/non	3 national and 3 district level campaign to raise awareness on Benefits of EbA
	4 Number of educational tools including research findings developed	Zero/non	(i) EbA practical guideline, (ii) forest based enterprise development, (iii) Livelihood development plan (iv) GESI and inclusive development guideline/action plan, (v) water conservation, and storage, (vi) infrastructure to reduce rainwater run-off and erosion, (vii) rain water harvesting devise, (viii) bioengineering for river bank protection/ stabilization

13.2 Outcome Two

The outcome two is related to strengthening policies, strategies and plans to support smooth implementation of EbA activities. There are three targets set to be achieved. They are: development of at least one policy brief to guide the revision of a national policy/ strategy as per the requirement; development of EbA up scaling strategy and preparation of financing plan for EBA. We have no comment on these indicators and targets.

Table 13. 2: Summary of Output-2 Related Activities

Outcomes	**Target**	**Baseline status**	**Baseline team Suggestions**
Outcome 2 National Policies, strategies and plans are strengthened	At least one policy brief is developed	Zero/non	Policy brief on EbA strategy and livelihood
	EbA up-scaling strategy developed	Zero/non	EbA up-scaling / replication strategy (based on good practices and lessons learned)
	Financing plans developed	Zero/non	Financial plans disaggregated by activities and EbA II wards

13.3 Outcome Three

Outcome three is concerned with implementation of EbA by user groups to restore forests and rangelands in the project areas.As the activities targeted under outcome three are directly related to field level activities, each of the targets given in the project document were raised in focus group discussions participated by member of forest users' groups, political leaders, support institutions (agriculture, livestock, forestry offices) and knowledgeable persons in the wards covered by the project and their suggestions collected. Their comments suggestions are summarized in the following paragraphs.

In each of the project wards, the beneficiaries suggested some efforts need to be done to restore degraded forest lands. Of the total FUG managed forest area, about 1,557.5 ha of forest is requested by the stakeholder for the restoration, which is higher than project target of 1,000 ha. The high demand was in Achham as all of the project wards, except Ramaroshan-5 and Mallekh-6 suggested quite large area (150 - 244 ha) that needs restoration. Restoration of rangeland suggested by the concerned beneficiaries in the project districts (703 ha) is also higher than project target of 450 ha. The suggested rangeland restoration area is much higher in Achham (472 ha) than in Dolakha (72 ha) and Salyan (159 ha).

Most of the users committee have prepared and updated their operational plans. It was reported that the forestry office and NGOs had been helping users' group in updating their operational plans. A total of 31 operational plans needed to be updated, out of them 21 in Achham. This quantity is less than project target of updating 100 operational plans.

Terracing to prevent soil erosion is another activity targeted by the project. As the landscape in the project districts is uneven and soil structure varies there are several places that need terracing. Concerned beneficiaries have suggested terrace development over 188ha which is higher than project target of 120 ha.

A total of 74 water filtering dams were suggested in the project wards, more than two thirds of them in Salyan district. Two types of water conservation ponds were suggested by the respondents. Some of the ponds was suggested in rangeland, especially where *Chauri* are kept and some at swamp area or small water sources to collect water mainly for irrigation. A total of 73 water conservation ponds were suggested, including restoration of some existing ones. Similarly, rain water harvesting devices were suggested to be installed in those areas where drinking water sources are far. A total of 30 such devices were suggested in 12 out of 18 project wards.

Participants were more interested in livelihood development plans. Community livelihood improvement plans were suggested by all except Bangad-Kupinde-1 and 6 and Kumkh- 2. A total 30 such plans were suggested where as project target is only 3. The participants of FGD suggested some activities to be added in the project as part of forest management and livelihood improvement. One of the activities suggested was construction of fire control line along strategic locations to protect the forest from wild fire. Another activity is construction of sheds in *Chauri Kharka* (rangeland) for people looking after *Chauri*. As *Chauri* are moved from one to another *Kharka* depending upon season and availability of forage/fodder, each *Kharka* needs such facility. District wise summary of the project targets given in the project document and suggested by concerned people is given in Table 13.1. Ward wise details of the suggested activities are given in Annex 13.1.

Table 13. 3: Summary of Output 3 Related Activities Suggested by Local Beneficiaries

SN	Activities	Project Target	Suggestions from the field				Baseline Team Suggestions
			Salyan	Achham	Dolakha	Total	
1	Restoration of degraded forests (Ha)	1000	358.5	874	325	1557.5	1000
2	Restoration of rangelands (Ha)	450	159	472	72	703	450

SN	Activities	Project Target	Suggestions from the field				Baseline Team Suggestions
			Salyan	Achham	Dolakha	Total	
3	Updating operational plans (No)	100	5	21	3	29	29
4	Terrace development (Ha)	120	71	67	50	188	120
5	Water filtering dams (No)	36	27	21	26	74	36
6	Water conservation ponds (No)	36	37	26	10	73	36
7	Rain water harvesting devices (No)	24	5	17	8	30	24
8	Community livelihood improvement plans (No)	3	4	14	12	30	10 (1 in each Mun.)
9	Nursery establishment (No)	7	2	12	9	23	10 (1 in each Mun.)
10	Fire Control line	-	-	-	4	4	4
11	Sheds at *Chauri Kharka*	-	-	-	4	4	4

A long list of suggestions of FGD participants and officials at concerned ward offices was prepared regarding where the project activities should be implemented. Names of suggested sites for different activities are listed in the following paragraphs.

Restoration of degraded forest

Mastamandap Majhagaun, Telegadha, Mahetola, Gumeli, Syaule and Dhamigaun, of Mellekh-1; Danpada, Thala, Ghumekharke, Rolta, Bablegada, Sirkitte, Sundur khet, Chotimalika, Naulaban and Majaun of Mellekh -2; Madighada of Mellekh 6; Rumalerajthala, Ratolla, Bate, Salleri, Birchemala, Bhagobuiya, Sera and Salimkot of Ramarosan-5; Tursane, Junna, Bhatekada and Basanta of Ramarosan-6; and Aamruk, Karkale, Kada, Judepani, Lamasada and Kulakhal of Sanfebagar-13 are the sites suggested by the participants for restoration of degraded forest in Achham district.

Maur and Baghachour of Bangad-kupinde-1; Saleri, Lekhbesi, Thultakura, Bhatmare of Bangad-kupinde-4; Ramchour, Dhamachour, bhateni, Patyare and Gahaini of Bangad-kupinde-5; Yannechour, Damaighareli, Laiyachour, Lekbesi, and Shiddhamalika of Bangad-kupinde-6; Virchuli (Tibekhalikotala) of Bagad-kupinde-7; Gajiyachourkalimati, Bajyabajan, syaldada, simalchaur, Saunekhola, Kala mura, Ratamata, Thanekanachaur, Gnagatepani, Jalakanesayalkarka, Jayamarechaur, Gorkha goganpani, Bhimeswori, Bhatekhoriya, Bharalknola, Chotedadi, Harlegadi, kalimati, sallegaida, Milanchouk, and Sindurekhola of Kumakh-1 are the suggested sites for restoration of degraded forest in Salyan district.

Bhakare, Mahbhir, Ghattepakha and Pokhridil of Sailung-4; Manedada and Laphang of Gaurishankar-8, Sele, Bhituri, Phaltechour, Bimal, Palekoban, Selealambhir and Eklepakha of Bhimeshwor-9; Namathali of Kalinchok-5; Ramche, Jhareni, and Kuriban of Kalinchok-6; Kalibhir and Dhungeswori of Jiri-5 are the sites suggested for restoration of degraded forest in Dolakha district.

Restoration of rangeland

Restoration/improvement of rangelands at Mastamadau, Syaule, Telegada and Gumeli of Mellekh-1; Banpada, Thala, naulaban, Khadindramul, Majaun, Rolta and Sirkitte of Mellekh - 2; Kushedi, bileda, Bathane and Dudimela of Mellekh 6; Bagebachala and Netakot of Ramaroshan-5; Junna, Basanta and Sunni of Ramarosha-6; Jajar, Lambelo and Katrofalnesaldado of Safebagar-13 were suggested by participants in Achham district.

Saleri of Bangad-kupinde-4; Pipaledada, Chyandada, Kalikhet, Khola, Kolgade, Pakhapani, Garacha and Sanabarule of Bangad-Kupinde-5; Bhirchuli of Bangad-kupinde-7; were the sites suggested for restoration/improvement of rangeland in Salyan district.

Panigahiro of Sailung-4; Deurali, Girpanidada, Patal and Mulkharka of Gaurishankar-8; Bhitari and Bhidikhor of Bhimeshwor-9; Namathali of Kalinckok-5; Tutuwan, Ghyangdada of Kalinchok-6; Bhanjyang and Kapte of Jiri-5 were suggested for restoration/improvement of rangeland in Dolakha district

Updating operational plan of FUG

Operation plans of Mastamadau, Syaule, Telegada and Gumeli of Mellekh-1; Nandamata and Nandhunge of Mellekh-2; Kushedi, bileda, Bathaneand Dudimela of Mellekh-6; Bagebachala and Netakot of Ramaroshan-5; MKP and Kanchan of Ramaroshan-6; Neta, Rakse, Sukcha, Amruk, Ratomato and Saljhadi of Sanfebagar-13 needed to be updated in Achham.

Chisapani of Bangad-kupinde-4; Chautari and Hariyali of Bangad-kupinde-7; Chutari, Priyachour, Pragatishil Dalit and Chetanshil of Kumakh-1; needed to be updated in Salyan district. Similarly, Paiyukhola and, Ahale of Sailung-4; and Dhungeshwori of Jiri-5 needed updating their operation plan in Dolakha.

Terrace development

Terrace development at Dhamigaun, Kasachatpanimul, Bandhunga and Gogane of Mellekh-1; Bagadi, Bathan, Nunedhunga and Turkegada of Mellekh-2; Tamdimadu, Khadkawada, Dadakhet, Ligri, Bahunigaun, Jogibada, Seraerigaun, Chaitigadaand Bichali of Mellekh-6; Alledikodhik, Satalisen, Sadekhad, Sera and Chirkemala of Ramaroshan-5; Junna and Serapatal of Ramaroshan-6; and Thulakhal, Batali gaun, Bistagaun and Kunwartol of Safebagar-13 were suggested in Achham district.

Terrace development at Lekhbesi and Chisapani of Bangad-kupinde-4; Chiandada, Sera khola, Gol chaur, Bhat, ChourKhola, Ghartikhola, Katjanikhola and Maleni of Bangad-kupinde-5; KarakotiKhola and Sisnekhola of Bangad-kupinde-6; Dadapipal, GauraKhola, Sundurekhola and Lamadata of Kumakh-1 were suggested in Salyan district.

In Dolakha district- Salleri, Mahabhir, maithan and harisiddhi of Sailung-4; Manedada, Lanjing, Kaseri, Tatopani and Manedanda of Gaurishankar-8; Churikharka, Chautaragaun and Bhasme of Bhimeshwor-9; Kadabari of Kalinchok-5; and Suire of Kalinchok-6 were suggested for terrace development.

Water filtering dam

Construction of water filtering dams were suggested at Khadpada, Chaur Katan tallotol and Mahetola of Mellekh-1; Pagreni and Bagadi of Mellekh-2; Tkrene ban, Jukapani, Badegada, Rala, Dadhutala and Aarashenligri of Mellekh-6; Bhagebuya, Simaldada, Birchemala anf Gotalla of Ramaroshan-5; MKP, Serapatal, Tursane and Kanchan of Ramaroshan-6; Neta and saljhadi, of Sanfebagar-13 in Achham district.

Construction of water filtering dams were suggested at Simalkhola, Hirapani, Gunakhola, Rasukhola and Boyakhola of Bangad-kupinde-1; Saleri and Lekhbesi of Bangad-kupinde-4; Chiandada, Sera khola, Gol chaur, Bhat, ChourKhola, Ghartikhola, Katjanikhola and Maleni Of Bangad-kupinde-5; Chourgaunkhola, Kala pokhara, Jhalepaharkhola and Bahunekhola of Bangad-kupinde-6; Virchuli, Dharilagaune dado and Satbirkhola of Bangad-kupinde-7; Gajiyachour, Jalkane, Chotedada, Kalika, Chetanshil and Jhalegauda of Kumakh-1 in Salyan district.

Construction of water filtering dams were suggested at Lamcheahal, Chisapani, Makadeurali, Pokharidil and Dilpari of Sailung-4; Kaseri, Laphang, Gumba, Lanjing, Tatopani, Manthali, Babedanda and, Salle of Gaurishankar-8; Aalambhir, Chauri kharka and Bhitto of Bhimeshwor-9; Pahire, Deupure, Thali and Bhiramuni of Kalinchok-5; Mehegairi of Kalinchok-6; and Domankhola, Duduli, Sipto and Sewakendra of Jiri-5 in Dolakha district.

Nursery establishment

Establishment of plant nursery was suggested at Mastamandu, Telegada, Ghupeli and Syaule of Mellekh-1; Nandamata and Nandhunge of Mellekh-2; Nabagadha, Madhigada, Khadkawada, Tamdimandu or Aasashen of Mellekh-6; Saini, Mastamando, Tarigota and Gotalla of Ramaroshan-5; MKP[33] and Sunni ban of Ramarosan-6; Neta, Rakse, Ratomate or Aamruk of Sanfebagar-13 of Achham district.

In Salyan district establishment of plant nursery was suggested at Kalika CFUG in Bangad-kupinde-5; Gajhiyachour and Kalikabhagabati-Chisapani in Kumakh-1. Similarly, establishment of plant nursery was suggested at Salleri of Sailung-4; Mane dada and Laphang of Gaurishankar-8; Lakuri and Sankhadevi of Bhimeshwor-9; Dhunge, Sangi of Kalinchok-5; Balthali of Kalinchok-6; and Bhanjyang and Kapte of Jiri-5 in Dolakha district.

In addition, fire control lines were requested in Salleri of Sailung-4, Eklepakha of Bhimeshwor-9, Mauresi of Gaurishankar-8 and Kalobhir of Jiri-5. Namathali of Kalinchok-5 and Bhanjyang and Kapte of Jiri-5 were the specific sites suggested by beneficiary for construction of simple sheds for Chauri caretakers. A complete list of suggested sites for different project activities is given in Annex 13.2.

13.3.1 Suggestions on Outcome Three Targets

Considering the limited time remaining for project implementation and remoteness of some of the project sites, it does not seem possible to meet the demand of the beneficiaries as per their suggestions during the field visit. Therefore, it is suggested to maintain the targets given in

[33] Named after martyrs: Madan Saud, Karnali Saud and Pathan Saud.

Project Document except four activities viz. nursery, livelihood development plan, fire control lines and sheds at rangelands.

The project has targeted to establish/strength seven nurseries to produce/supply plants for forest restoration and/or cultivation of MAPs. Considering ease of transportation and also location specific types of plants required, it is suggested that one nursery should be established/strengthen in each project municipality. Livelihoods development plan, especially based on natural resources, would be very much beneficial to retain the youths that are forced to leave the villages due to lack of employment at local level. It will also help improve the quality of life and food security, especially to disadvantaged communities. Therefore, it is suggested that at least one livelihoods improvement plan for each project municipality be prepared and help to implement with project support. Similarly, one nursery in each municipality is suggested.

Forest fire is one of the major hazards that destroy valuable wood, flora and fauna every year. Construction of a fire protection lines along sensitive locations could save the forest. Though this activity is not included in project document we suggest that fire protection lines be constructed at 3-4 locations at pilot basis.

At all locations visited local representatives suggested that Number of *Chauri* farm as well as number of *Chauri* in those farms are decreasing. The major reason was the harsh climate and living condition. As the care takers have to move from one to other places with *Chauri* depending upon season and availability of forage/fodder, they live very difficult life. Now they carry a tent with them for their shelter which needs to be replaced and is also vulnerable to strong wind, rain/snow. Simple permanent sheds constructed at strategic locations would partially ease their life and help maintain/improve this activity.

13.4 Coordination and Co-financing

Coordination and co-financing are critical to make EbA project interventions effective and result oriented. Vertical and horizontal coordination is needed among different agencies involved in planning and implementation of EbA project. Vertical coordination is needed from concerned Ministry to Department and Division and Subdivision of Forest Offices. Similarly, horizontal coordination is important among the frontline agencies working in the field such as Municipality, district level Agricultural Knowledge Centre, Veterinary Hospital and Livestock Service Expert Center, INGOs/NGOs etc. The need to coordinate Division and subdivision of Forest office is important to solicit the skilled knowledge of forest technicians for plantation of different tree and herbal species and their conservation in the community forests. Similarly, coordination with Agricultural Knowledge Centre and *Veterinary Hospital and Livestock Service Expert* Center becomes imperative to seek technical skills for agricultural and livestock sector services.

Coordination with the local agencies including municipality and ward level leaders and political representatives is also important to plan and implement activities at grassroot level. During field survey some of the representatives expressed their disagrement in selection of of sites as well as activities. For example, Jiri Municipality expressed its surprise in selection of

ward number 5 where as there are other wards that are more vulnerable and need EbA activities. As many forest areas fall in more than one ward, concerned leaders requested that adjoining wards also need to be considered while running forest/rangeland restoration activities.

Coordination is also crucial to seek financial assistance from other agencies to ensure that EbA interventions get completed on time and quality. These may include government sector agencies as well as INGOs and NGOs which are currently active in the project districts. Educate the Children (ETC), Namsaling NGO, World Neighbors, USA, PlaNet Finance, Sustainable Environment and Ecological Development Society (SEED) are the some of the major NGOs/INGOs working in Dolakha district. Similarly, the INGOs/NGOs working in Salyan district are Dan Church Aid (DCA), Family Health International, Heifer Project International, USA, Renewable World, UK; and the INGOs/NGOs working in Achham district are Dan Church Aid (DCA), *SAKCHYAM*, Family Health International, Heifer Project International, USA, Renewable World, UK etc. As they have knowledge and experience of working with the concerned communities in utilizing natural resources for the benefit of local people, especially to women and deprived groups, and are already running some of the income generating activities, coordination with them will be beneficial to the project.

13.5 Monitoring and Reporting

Close monitoring of EbA interventions is essential to track the progress as well as weaknesses hindering project works during implementation. The team noted limited manpower with the project as well as the fund recipient Municipality in order to be able to monitor the field activities on a regular basis. In view of this, the project is suggested to undertake third party or independent monitoring every year. Likewise, the reporting system about the project progress is also found weak mainly in absence of adequate manpower with the project implementing agencies. It is strongly recommended that the implementing agencies should mandatorily submit progress report every quarterly and yearly basis. The progress reports should provide both financial as well as physical progress.

CHAPTER XIV SUMMARY AND CONCLUSION

Baseline information were generated using different approaches including review of relevant documents, collection of information from institutions such as Ministry, Department, Division and sub-division offices of Forestry, concerned Rural/Municipalities and ward offices; and collection of primary information from beneficiary households and other stakeholders.

Three municipalities, namely Safebagar, Mellekh and Ramaroshanare in Achham are rich in biodiversity and natural environment. Abundant natural resources and wilderness have further added the value of historical and religious importance of these municipalities. Various types of flora and fauna are found due to its diverse climate and topography. The district covers a total forest area of 98,640.25 ha which has different types of forest namely; *Abies spectabilis* & *Abies pindrow*, *Acacia catechu & Dalbergia sisso, Cedrus deodara*, Lower Mixed Hardwood, *Pinus roxburghii, Pinus wallichiana*, Quercus, Sal *(Shorea robusta*), Tropical Mixed Hardwood and Upper Mixed Hardwood.

Salyan district has 121229.3 ha of forest area. The forest cover of the district consists of different types of forest namely; Tropical Mixed Hardwood, Saal, *Pinus roxburghii*, Lower Mixed Hardwood, *Quercus*, Upper Mixed Hardwood, *Pinus wallichiana*, *Cedrus deodara*, *Acacia catechu & Dalbergiasisso* and *Picea smithiana*. Similarly, different types of NTFPs such as *Acorus calamus, Asparagus racemosus, Bergenia ciliate, Cinnamomum glaucescens, Cinnamomum Tamala, Dioscorea deltoidei, Juglans regia, Lichens, Phyllanthus emblica, Piper lungum, Rubia manjith, Sapindus mukorossi, Tionospora sinensis, Valeriana jatamansi, Zanthoxylum armatum* etc. are available in the district. *Timur*, *amala*, *tejpat*, *sisn*oo, *burjo* etc were identified as the potential NTFPs that could be promoted in the community forests of Salyan district for long term employment and income point of view.

Dolakha district contains three physiographic zones namely - Hill, Middle Mountain and High Mountain. Jiri Municipality and Gaurishankar Rural Municipality lie in Hill, Middle and High Mountain zones whereas the other three municipalities (Bhimeshwor M, Kalinchowk RM and Sailung RM) are in Hill and Middle Mountain zones only. Dolakha has 97,068.39 ha of forest land which includes varieties of forest types. The forest areas vary significantly with altitudinal ranges, climatic regions and geomorphology. Flora and fauna of both Mid Hill and High Mountain zones can be found in the district. For example, Bhojpatra (*Betula utilis*), Tasipatra, ThingureSalla, Dhupi (*Cryptomeria japonica*), Khasru (*Quercus semecarpifolia*), Phalat, Bashet, Laligurash (*Rhododendron arboretum*), Banjh (*Quercus leucotricophora*), Champ (*Micheliachampaca*), Ageri, Lauthsalla (*Taxus wallichiana***)**, Uttis (*Alnus nepalensis*), Saur, Pate Sallo, GobreSallo (*Pinus wallichiana*), Arkhulo, Kattus (*Castanopsis indica*) are some of the tree species found in Dolakha. Likewise, *Nigalo, Jatamsi, Bisphej, Chiraito, Bishjara, Lokta, Argeli, Allo, Van lasun, Jhyau, Sunakhari, Pakhandev, Thulo Okhati, Sughandhavala, Timur, Bojo, DhasingrePadamchal, satuwa, argeli, paanchaule, Majhitho, Dhasingre, Kurilo* etc. are some examples of NTFPs found here. NTFPs such as *machino, lothsalla, siltimur/boketimur, padamchal, budiokto, jatamasi, sunakhari, banlasun*etc were also reported

to have high medicinal value but their use has been constrained for different reasons such as lack of efficient technologies, lack of secured markets and quality of the products.
The three EbA-II project districts are ranked under different risk categories based on ecological vulnerability scores. With a score of 0.53, Achham district is ranked under high risk group followed by 0.47 score for Salyan under high risk category. With ecological vulnerability score of 0.33, Dolakha district is ranked under moderate risk group. However, located in the mountain region, Dolakha is ranked as vulnerable district to climate change on NAPA's "Climate Change Vulnerability Mapping for Nepal". GLOF is the biggest threat for Dolakha with very high vulnerability index. TshoRolpa Lake of Dolakha is one of the 20 potentially dangerous glacial lakes in the country.

The three districts have distinct caste and ethnic groups of people. In Achham and Salyan districts, Chhetries and Thakuris were the dominant caste groups which belong to BCTS (Brahmin, Chetri, Thakuri and Sanyasi) category whereas in Dolakha, the sample households were predominantly Adibasi/Janajti consisting maily of Tamang, Newar, Jirel, Thami, Gurung etc. The Average family size in the project area was 4.9 persons which is slightly higher than average family size in Nepal (4.6 persons). Sex ratio (male to female ration) was 1.07 meaning that there were 107 males per 100 females among sample households. Of the total population about 7.7 percent were less than 5 years of age, 23.3 percent from 5 to less than 15 years of age, 59.7 percent from 15 to less than 60 years of age. The ratio of older people was higher among Adibasi/Janjati indicating more longevity compared to other ethnic groups. The literacy rate (among population aged more than 5 years) of the project area was 88 percent which is higher than national average of about 70 percent. Literacy rate was highest among the BCTS households and lowest among Dalit households. Of the total children aged between 5 to 14 years, 447 (97.8%) were attending school during the time of survey. The figures of school going children were between 97.6% in Achham and 98.1% in Salyan; and 96.6% among Dalits and 98.3 percent among BCTS households.

More than 99 percent of the sample households reported to have access to agricultural land. One out of 137 households in Achham and two out of 132 household in Salyan reported not having access to land. Two of the sample households not having access to land were Dalits while one household belonged to BCTS group. Among the households that have access to land 400 owned land while one person depended on rented-in land for farming.

The sample households owned about 0.53 hectares (about 10.5 Ropani) of land on average. Average land holding ranged from 0.45 ha in Achham to 0.66 ha in Dolakha. Classified by ethnicity, Adibasi/Janajati held 0.66 ha per household followed by 0.55 ha per BCT household. Dalits owned only about 0.25 ha of land per household. The survey result shows that about 7.7 percent of total land or 0.0408 ha (about 12 Ana) per household was homestead that includes land occupied by house, animal shed and courtyard. Another 49.2 percent was irrigated land and 26.7 percent rainfed land used for crop cultivation while remaining 16.4 percent of land was not cultivated.

Some 94 percent of the sample households cultivated at least one crop including, cereals, legumes, oil-seeds, cash crops, vegetables or fruits. Proportion of households that cultivated crops was highest (99.2%) in Dolakha followed by Achham (97.1%). Among the different

crops, cereals (rice, wheat, maize, millet, barley and buckwheat) were most important and cultivated by 91.1 percent of the households. Data shows that some 85.1 (Salyan) to 95.6 percent (Achham) of the households cultivated cereals. Similarly, vegetables were cultivated by 47 percent, legumes (including soybean, bean, horse gram, pea, lentil, black gram and some other minor legumes) by 44.8 percent, oil-crops by 14.6 percent and fruits by 4.0 percent of the households. Almost 80 percent of the total cropped area was occupied by cereal crops, about 10 percent by vegetables, about 8 percent by legumes and less than one percent by oil crops cash crops and fruits. It is important to note that vegetables covered more than 25 percent of the cropped area in Dolakha where as it was only about four percent in Achham. The reason is that access to markets via road network is much better in Dolakha compared to Achham.

Though maize occupied larger area compared to other cereals, production of paddy was more than maize as productivity of paddy was higher (2.45 kg/ha) than maize (1.59 kg/ha). It was recorded that production of rice was 300 kg per household, and that of maize was 223 kg per household on average. Average production of wheat, millet and barley was 168 kg, 65 kg and 11 kg per household, respectively. Production of buckwheat was recorded in Dolakha only, where it was about 2 kg per household on average. Total gross food grain production was 985 kg per household in Salyan, 793 kg per household in achham amd 520 kg per household in Dolakha district.

Pulses are found to be important crops in the project area. Survey result shows that almost 45 percent of the households cultivated one or another type of pulses. Soybean was found to have cultivated by almost 40 percent of the households. It was most popular in Achham as about 63 percent of the households cultivated it and least popular in Dolakha. Though almost 45 percent of the households cultivated legumes, area covered by the crops was only about 0.052 ha or slightly more than one*Ropani* per household. In several cases legumes were cultivated as inter-crop or planted on bunds/borders. Production of all legumes together accounted for 45 kg per household.

Oil-crops were not very popular in the project area. It was recorded that less than 15 percent of the households cultivated common mustard called *Tori.* Area under oil-crops was reported to be 0.004 ha equivalent to 1.25 *Aana* (local unit) per household. Productivity of oil-crops was recorded at 459 kg per hectare which is lower than national average of about one mt per hectare.

About 47 percent of the households cultivated vegetables on an average area of 0.057 hectare or 1.1 *Ropani* of land. Average production of vegetables was recorded at 409 kg per household. Adibasi/Janajatis were found to have cultivated vegetables on larger area and produced more vegetables than BCTS and Dalit households.

It is encouraging to note that the sample households have started use of modern technology/practices to increase their crop production. About 12 percent of the households used mulching, 3 percent each used sprinkler irrigation and plastic house, 2 percent sprayed animal urine, and about one percent used bio-fertilizer, soil solarization technique and botanical pesticides. About one percent of the farmers reported to have used drought resistant variety of crops and about 3 percent produced off-season vegetable using modern techniques.

It was recorded that more than 95 percent of the sample households kept one or other animal species. While all of the households in Dolakha reported keeping livestock, some 95 percent and 91 percent of households in Salyan and Achham reported keeping livestock, respectively. Among the different ethnic groups, all of the Adibashi/Janajati households, about 95 percent BCTS households and 91 percent Dalit households reported keeping livestock.

Average size of goat was recorded at 3.9 heads per household. Average size of cattle was recorded at 1.7 heads per household, buffalo 0.7 heads per household, sheep 0.2 heads per households and poultry birds 2.4 heads per households. By ethnicity, largest number of cattle was kept by BCTS (2.1 heads per household) and largest number of buffalo (0.9 heads per household), goat (4.3 heads per household) and poultry birds (3.5 heads per households) was kept by Adibashi/Janjati households.

Average production of livestock products was 114.6 kg of milk, 0.7 numbers of egg and 1.36 mt of Farm Yard Manuar (FYM) per household. The largest amount of milk, egg and FYM production was reported in Achham and lowest in Salyan. Among the different ethnic groups BCTS produced largest amount of livestock products. Some of the households also processed milk in to ghee which is a major source of income and one of the major export items of the villages.

Farmers reported to have visited collection centers and *Haatbazaars* (periodic markets) to sell their products. Agriculture collection centers operated for trade of agricultural products such as vegetable, fruits and staples were reported in all of the three districts. Livestock products collection center operated mainly for collecting milk was reported in Dolakha only. Walking distance from home to such collection centers was reported to be about 1.1 hours. Respondents in Achham and Dolakha reported that they also visit Local Haatbazaars for selling their products and buying inputs as well as other essential commodities for household. Walking distance to such markets was repoprted to be 1.65 hours on average. Selling milk directly to chilling center was reported in Dolakha. Walking distance to such center was recorded at 1.68 hours on average.

All of the sample households reported to have their own house for residential purpose; ten of them were *Pakki* another 232 Semi-*Pakki* and remaining 162 *Kachhi* houses. Telephone (land line/cell phone) has reached to more than 80 percent of the people. More than 63 percent of the survey households had rice cooker with them. About 32 percent of the household reported that they have radio/cassette/CD player and 17 percent reported to have television with them. Those modern electronics devices were more common in Dolakha compared to other two project districts.

Piped water was reported to be their source of drinking water by almost 95 percent of the respondents including private tap by about 19 percent. Stone spout (*Dhunghe Dhara*) was reported by 8 percent and seasonal spring by less than one percent. More than 97 percent of the households in the project area also reported to have toilet facility. Most of the toilets were *Pakka*type, (cemented floor) while another 10 percent were*Kachcha* type (wood or mud floor) and 3 percent temporary pits.

The rural households depend on different forest products extracted from Community/Public Forest for their livelihood. This is evident from the fact that 333 out of 404 of the sample households collected at least one type of forest products outside their farm. As high as 97 percent households collected firewood from non-private forests whereas 43 percent collected fodder from such forests. Three types of forest products viz firewood, fodder and dry leaves were collected in larger quantity which amounted for 617 kg, 453 kg and 415 kg per household respectively on average.

One of the alternatives of increasing capacity of local communities to cope with negative effects of climate change is to reduce the climate induced vulnerability through their livelihood improvement while maintaining eco-system. Available options, opportunities and constraints were discussed with the local political and community leaders and beneficiaries through focus group discussion and triangulated through consultation with local government officials and line agencies mainly the DFO, AKC and VHLSEC in the districts. The identified IGAs under EbA-II demonstrate immense opportunities for the engagement of women in all sites as most of the proposed activities are traditionally carried out by women. These include agricultural productions (crop, fruits, potato and vegetables), livestock raising and poultry farming. With further enhancement measures like skills, technologies and knowledge, the women beneficiaries could realize much more benefits from the activities targeted to them.

In Dolakha, *argehli* and *lokta* were identified as the most common forest products available abundantly in many areas which are used for paper manufacturing locally and also exporting as raw materials. Agricultural commodities demonstrating prospects for commercial production and marketing in Dolakha were kiwi, potato, mushroom, cardamom and vegetables. The high altitude villages of Dolakha such as Jiri, Shailung, Gaurisankar and Kalinchowk Municipalities are attractive sites for the promotion of *Chauri* farming and cheese production, fishery (rainbow trout), potato and mushroom cultivation. In Salyan and Achham, potential forest based IGA identified was cultivation, collection and processing of *timur* (Zanthoxylumarmatum) both in community forests and private lands. Other agro based IGAs carried out in small scale but holding good prospect for growth in Salyan were ginger and turmeric production and processing; beekeeping, vegetable and mushroom production, and improved goat farming. In Achham, Nepali paper production was found as the most potential forest based enterprises some of which are already in operation. Raw materials like *argheli/ lokta/babiyo* for making paper and a*llo* for garments are available abundantly in the community forests of Mellekh and Ramaroshan of Achham district. Similarly, kiwi, cardamom, potato, offseason vegetables, ginger and turmeric farming were also the potential IGAs reported by the people in Achham district. Other prospective enterprises in Achham are Ecotourism (home stay in the trekking route) and improved goat and sheep farming.

Given the potentialities of different IGAs in all sites, it is strongly recommended to carry out technical assessment to verify and confirm few best IGAs in consultations with the local beneficiaries and relevant experts. The project would require to provide technical and financial supports to implement the feasible IGAs. Existing functional groups of women and vulnerable groups should be supported, where possible. The Project Municipalities/Wards should recruit the technical manpower in agriculture/forestry sector and also work in partnership with I/NGOs to plan and implement the IGAs.

Each of the targets given in the project document (results framework) were discussed in focus group discussions participated by member of forest users' groups, political leaders, support institutions (agriculture, livestock, forestry offices) and knowledgeable persons in the project wards and their suggestions collected. The sum of the demand of the local beneficiaries for project targeted activities viz. restoration of degraded forests and rangelands, terrace development, water filtering dams, water conservation ponds, rain water harvesting devices, community livelihood improvement plans, and nursery establishment were higher than given in results framework. However, considering the limited time remaining for project implementation and remoteness of some of the project sites, it does not seem possible to meet the additional demand of beneficiaries. Therefore, it is suggested to maintain the targets given in Project Document except the following four activities.

Livelihoods development plan, especially based on natural resources, would be very much beneficial to retain the youths that are forced to leave the villages due to lack of employment at local level. It will also help improve the quality of life and food security, especially to disadvantaged communities. It is suggested that at least one livelihoods improvement plan for each project municipality be prepared and help to implement with project support. Lack of planting materials for plantation in the degraded forest and also cash crops including MAPs and spices was reported in the project area. It is suggested that one nursery be established in each of the project mmunicipality.

Forest fire is one of the major hazards that destroys valuable wood, flora and fauna every year. Construction of a fire protection lines along sensitive locations could save the forest from wild fire. Though this activity is not included in project document we suggest that fire protection lines be constructed at 3-4 locations at pilot basis.

Local representatives suggested that the number of *Chauri* farms as well as number of *Chauri* in those farms are decreasing. As the care takers have to move from one to other places with *Chauri* depending upon season and availability of forage/fodder, they live very difficult life. Simple permanent sheds constructed at strategic locations would partially ease their life and help maintain/improve this activity. It should be included in project as additional activity.

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Annex 3. 1: Digital Elevation Model of EbA II Districts

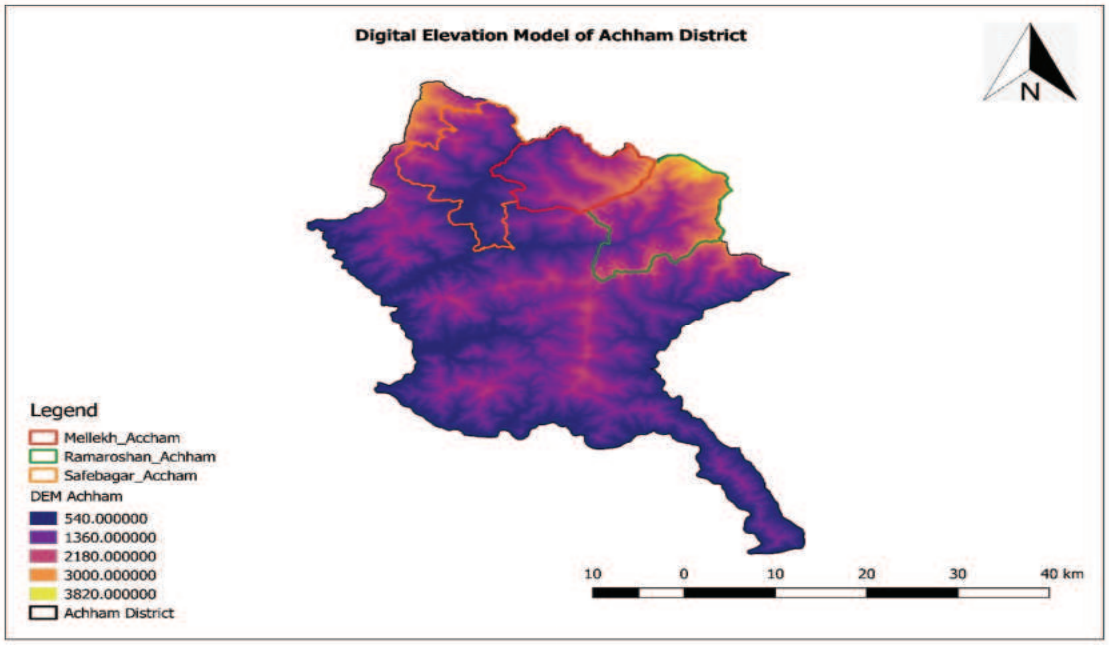

Figure 3. 26: DEM of Achham distrct

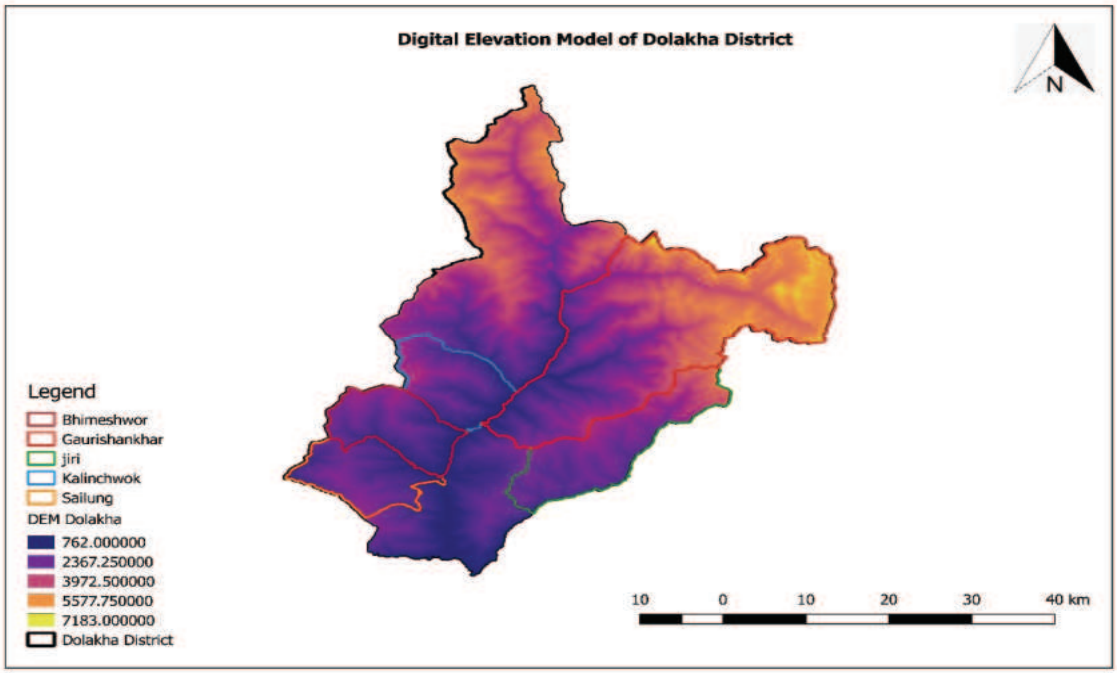

Figure 3.27: DEM of Dolakha distrct

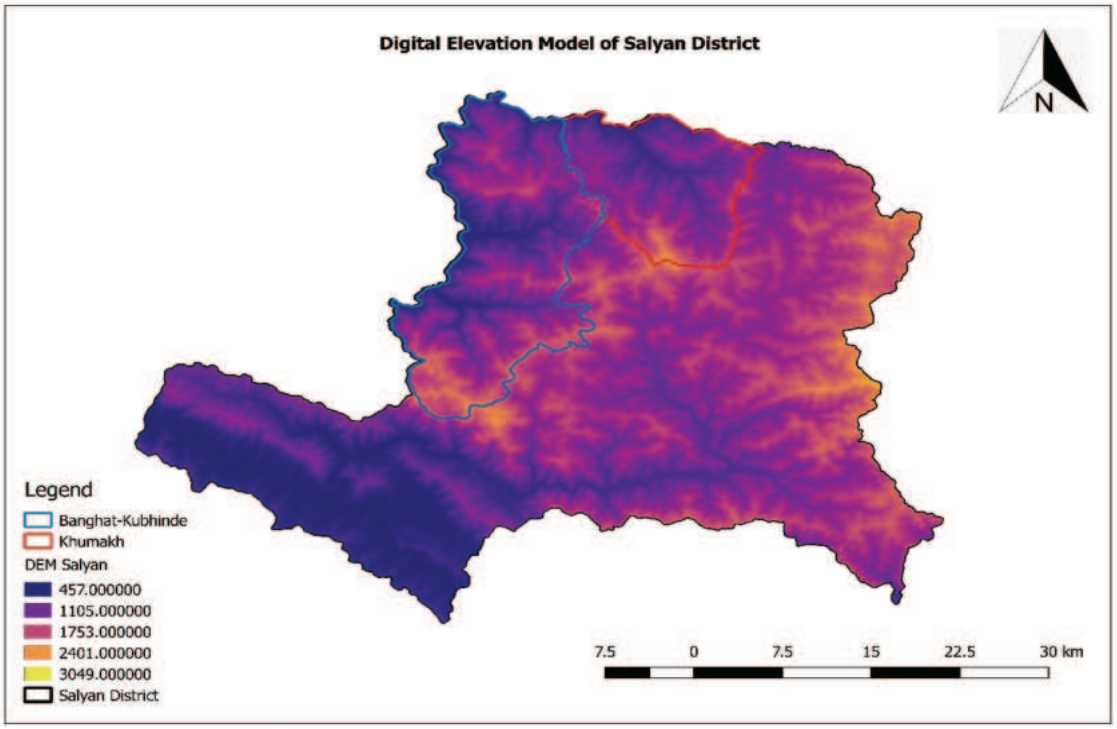

Figure 3.28: DEM of Salyan district

Annex 3. 2: Forest Cover Map of EbA II Municipalities/Wards

Achham District

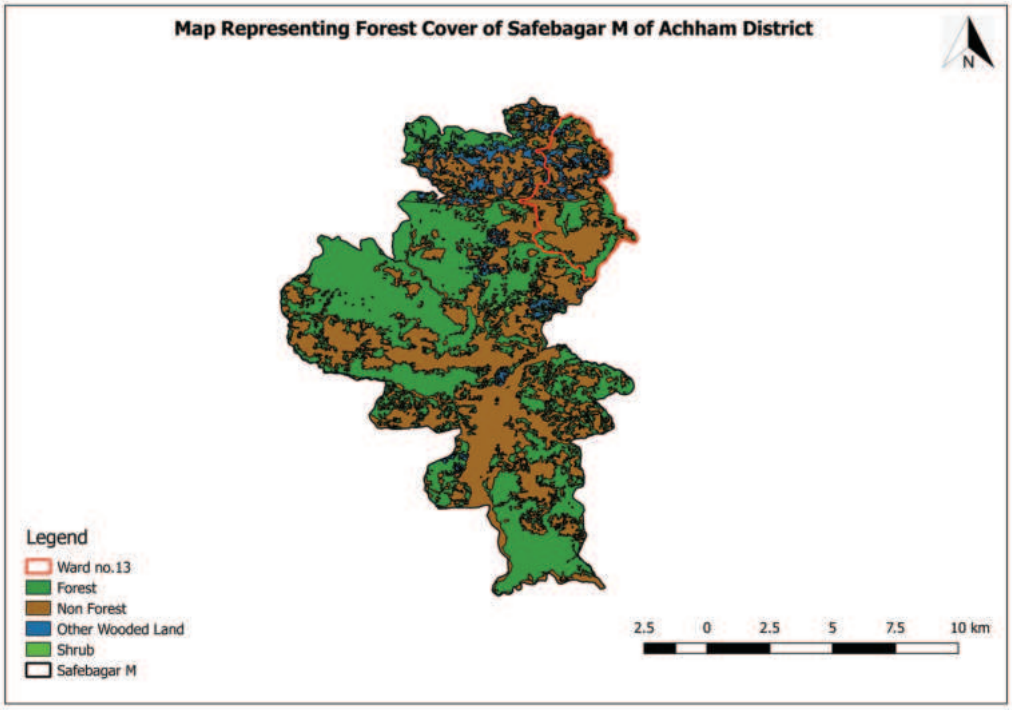

Figure 3.29: Forest Cover of Safebar Municipality

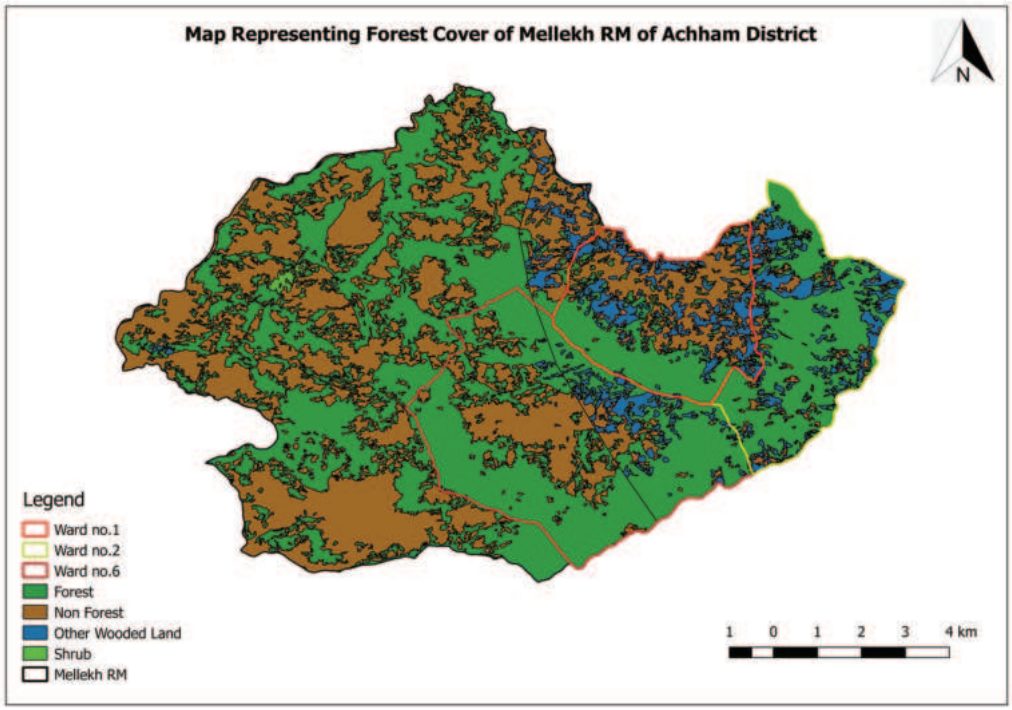

Figure 3.30: Forest Cover of Mellekh Municipality

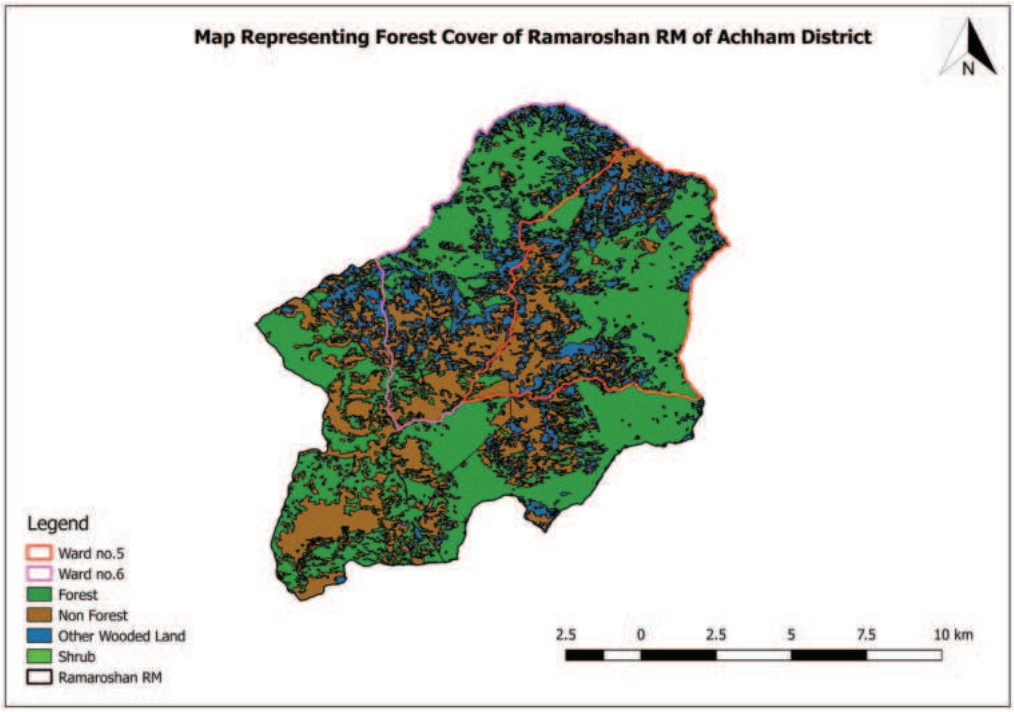

Figure 3.31: Forest Cover of Ramarosan Municipality

Salyan District

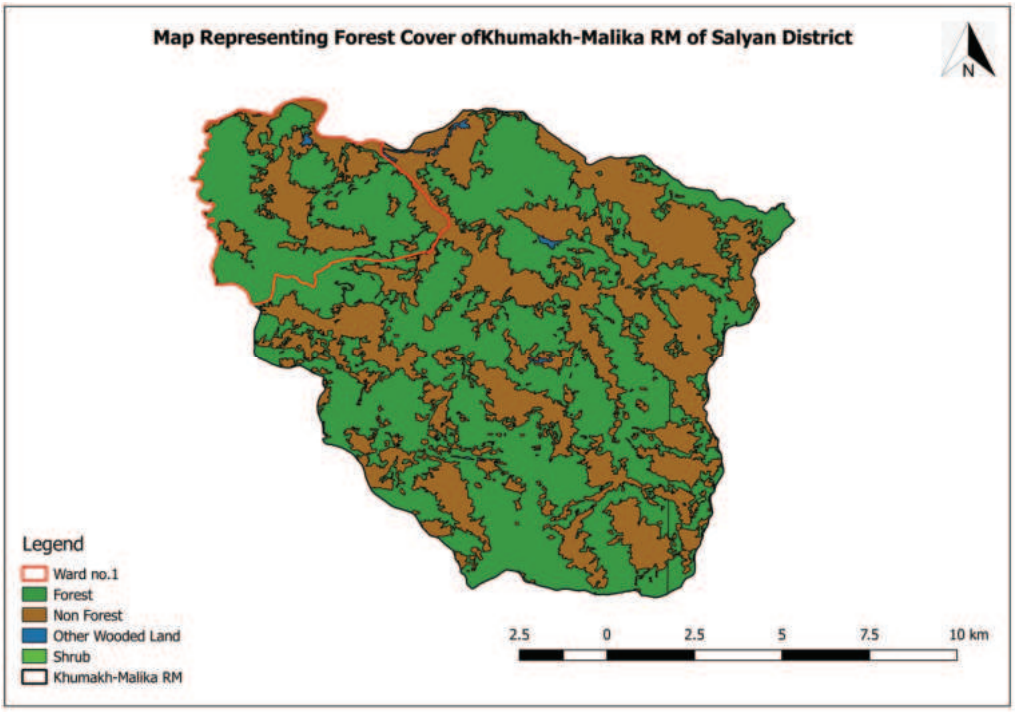

Figure 3.32: Forest Cover of Kumakh Municipality

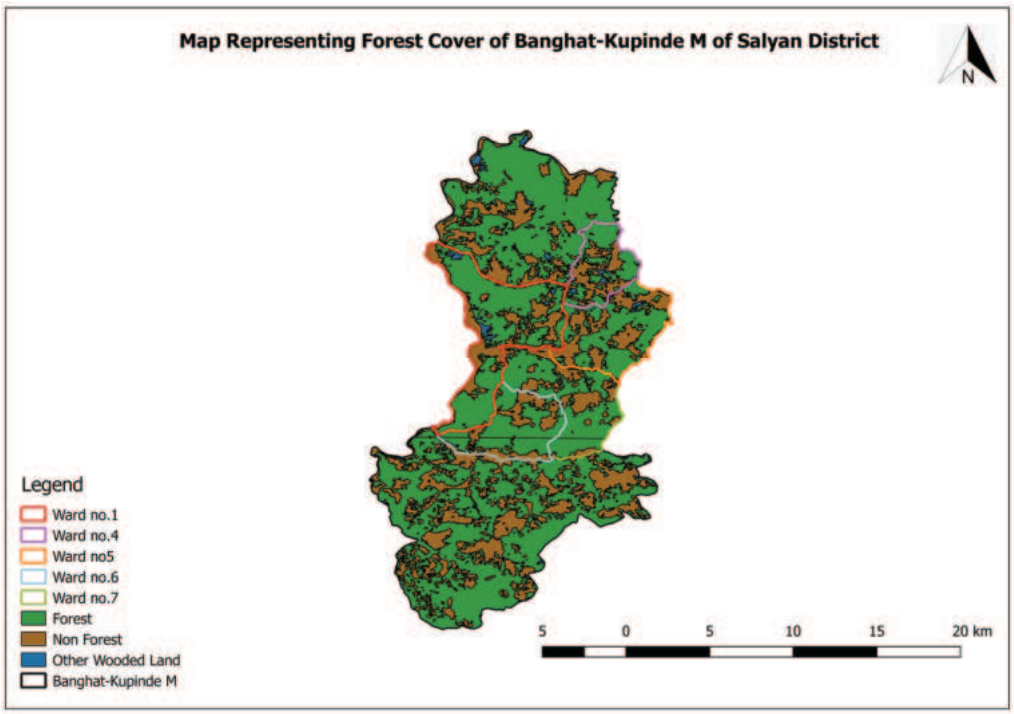

Figure 3.33: Forest Cover of Bangad-Kupinde Municipality

Dolakha District

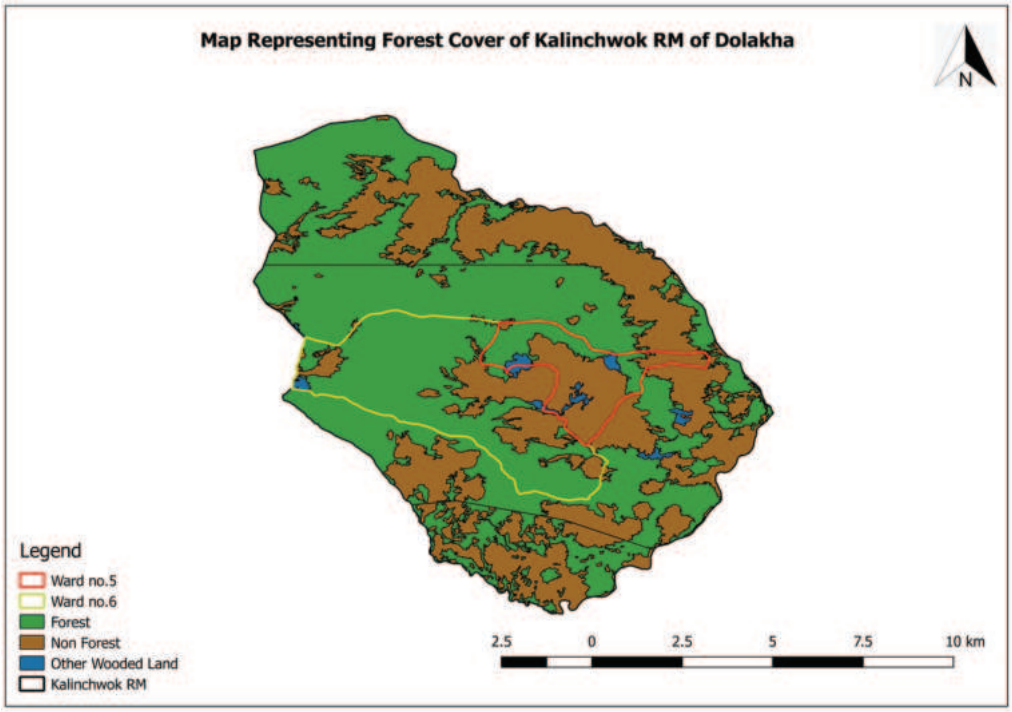

Figure 3.34: Forest Cover of Kalinchwok Municipality

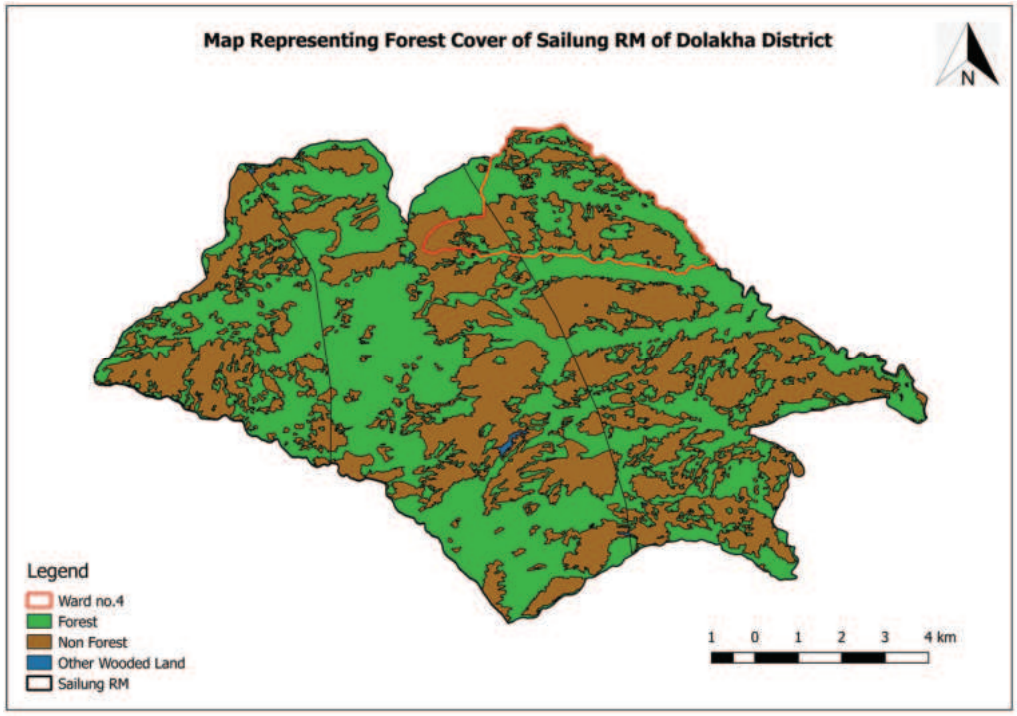

Figure 3.35: Forest Cover of Sailung Municipality

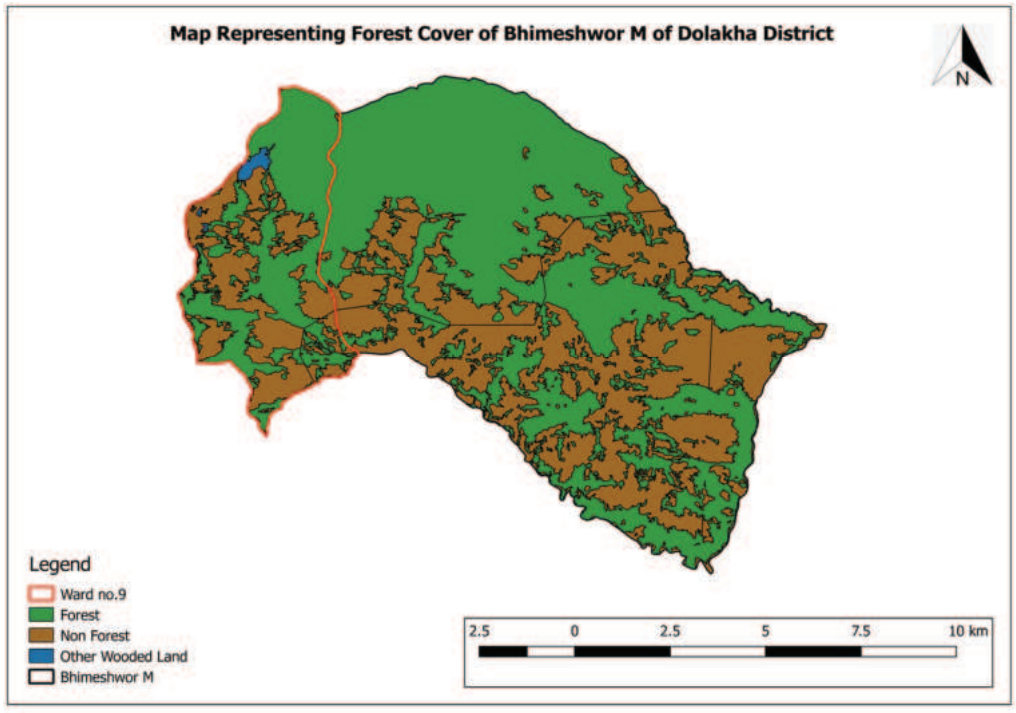

Figure 3.36: Forest Cover of Bhimeshwor Municipality

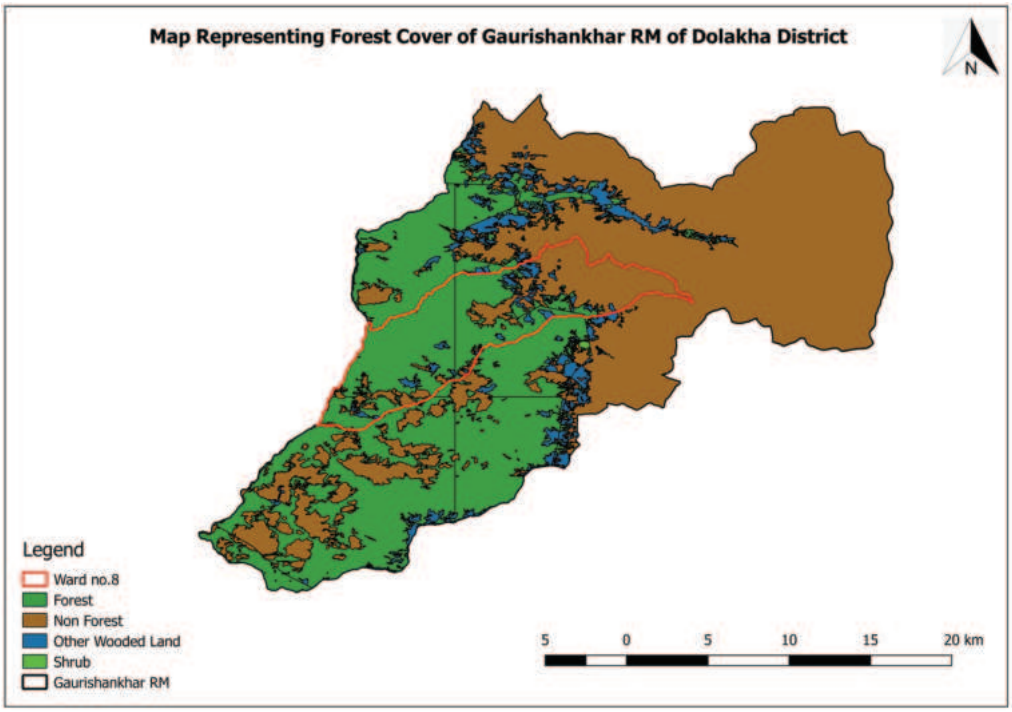

Figure 3.37: Forest Cover of Gaurisankar Municipality

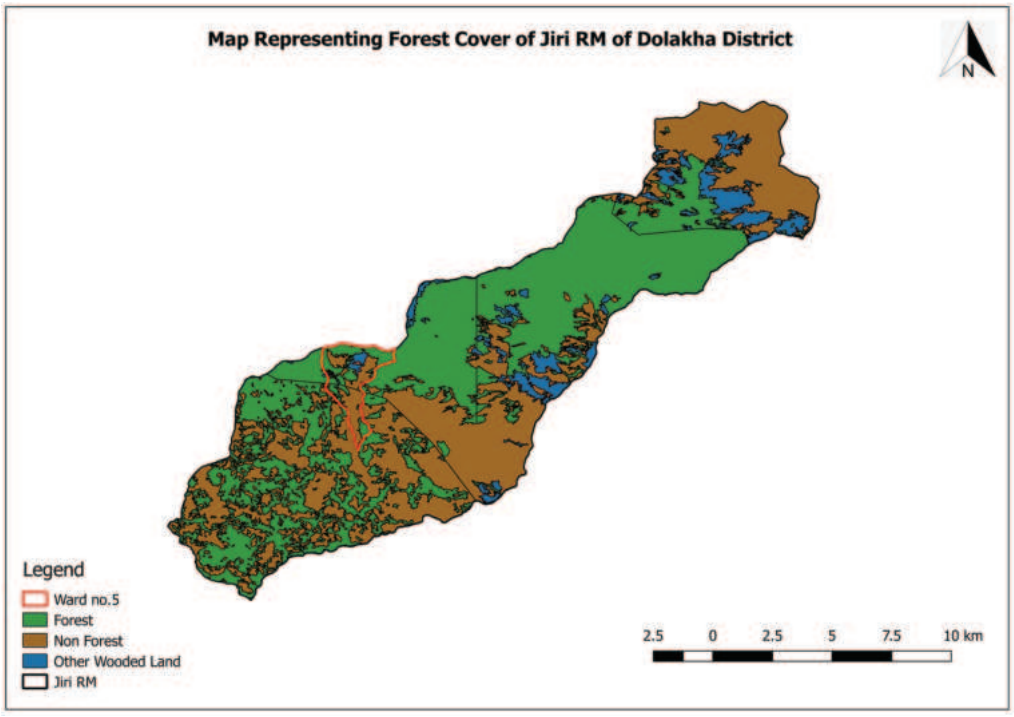

Figure 3.38: Forest Cover of Jiri Municipality

Annex 3. 3: EbA II Wise Degradation Map

ACHHAM DISTRICT

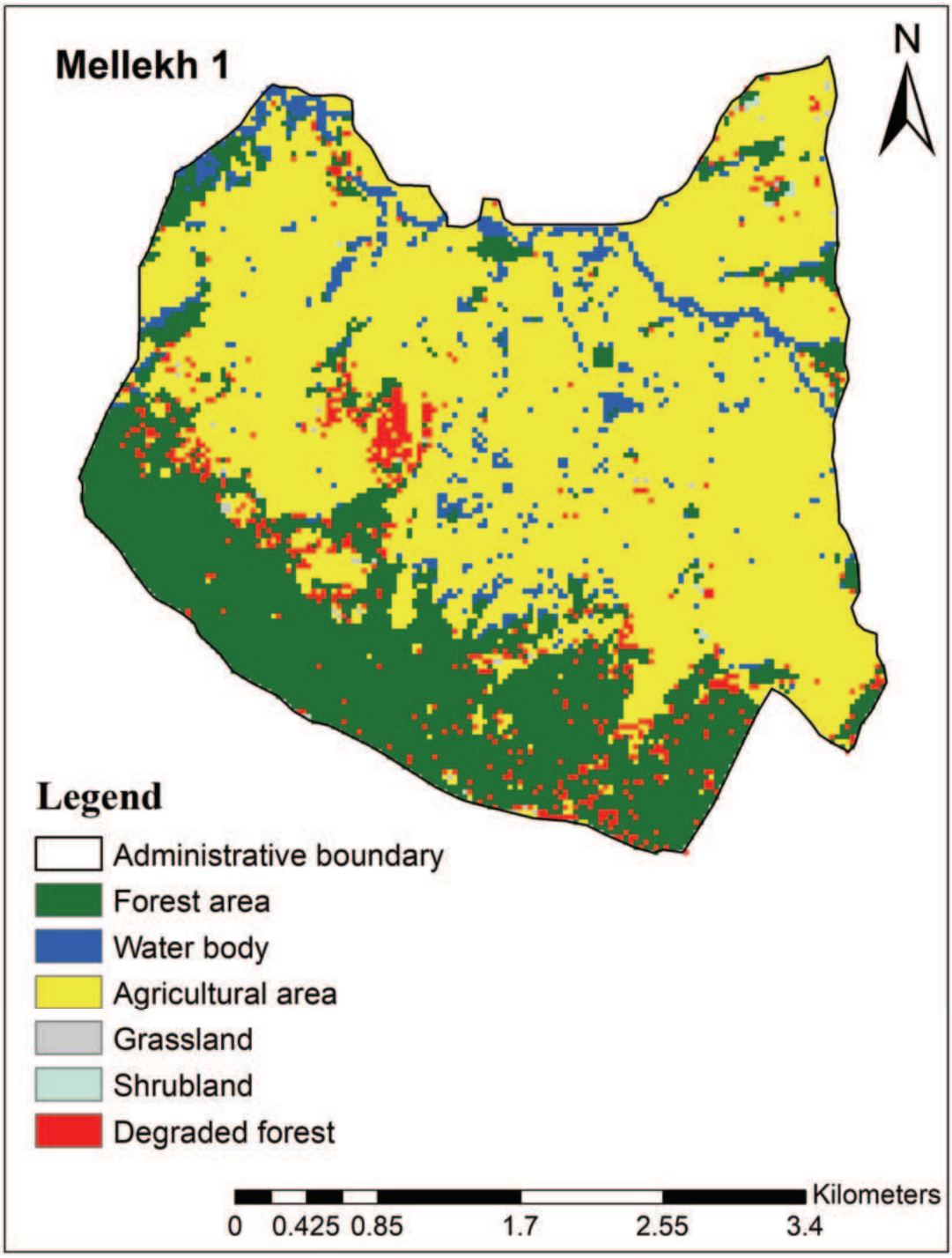

Figure 3.39: Degraded area, Mellekh 1, Achham

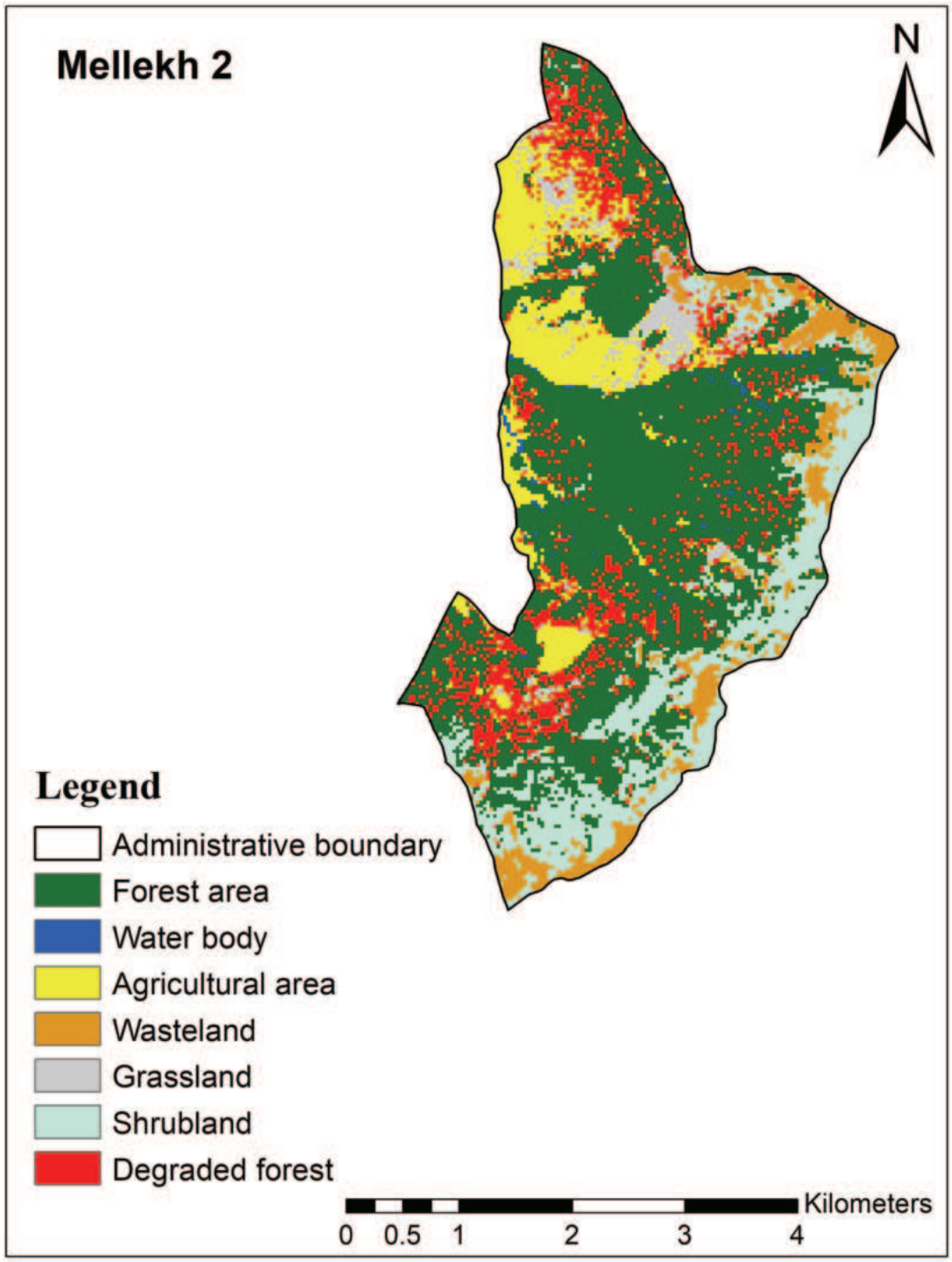

Figure 3.40: Degraded area, Mellekh 2, Achham

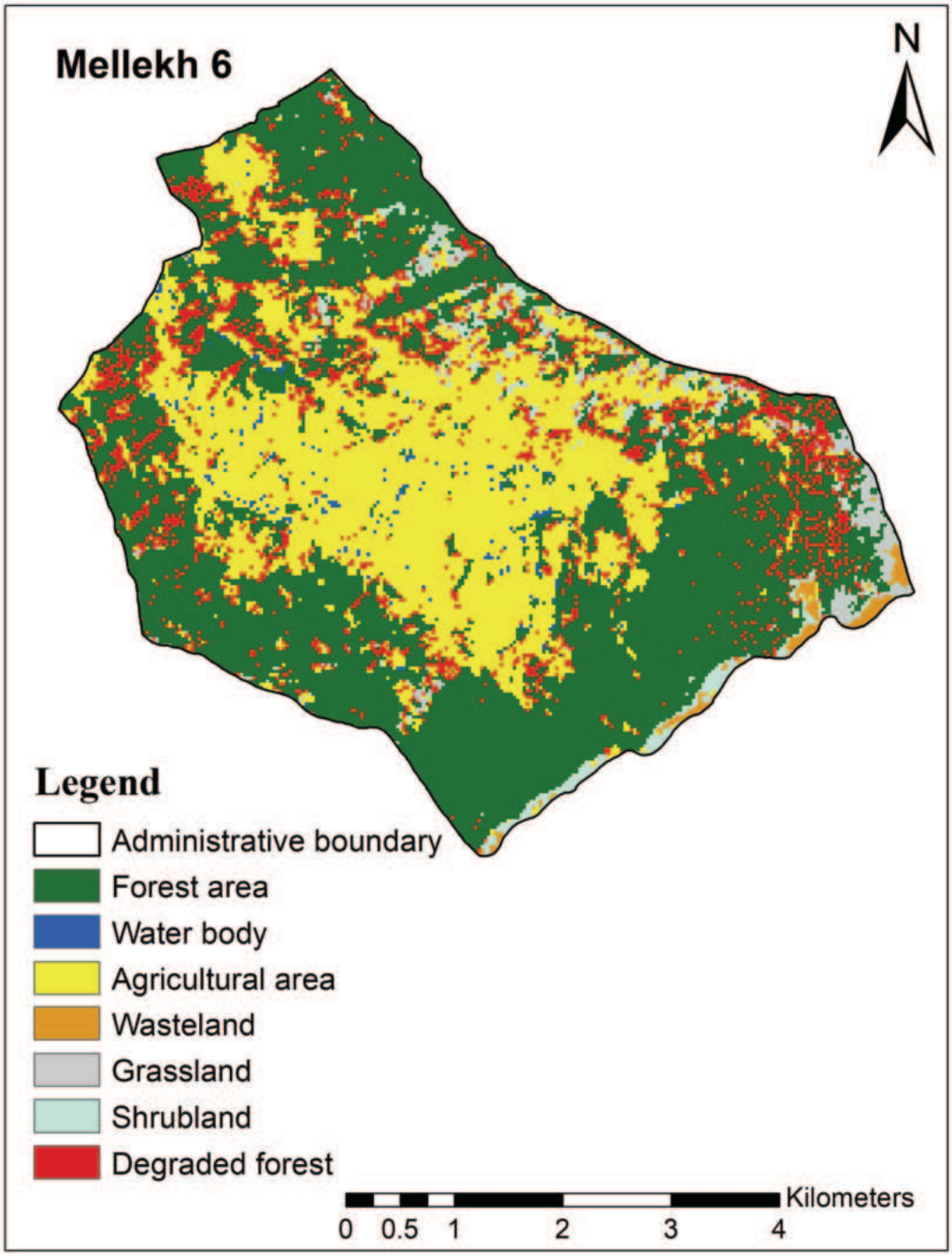

Figure 3.41: Degraded area, Mellekh 6, Achham

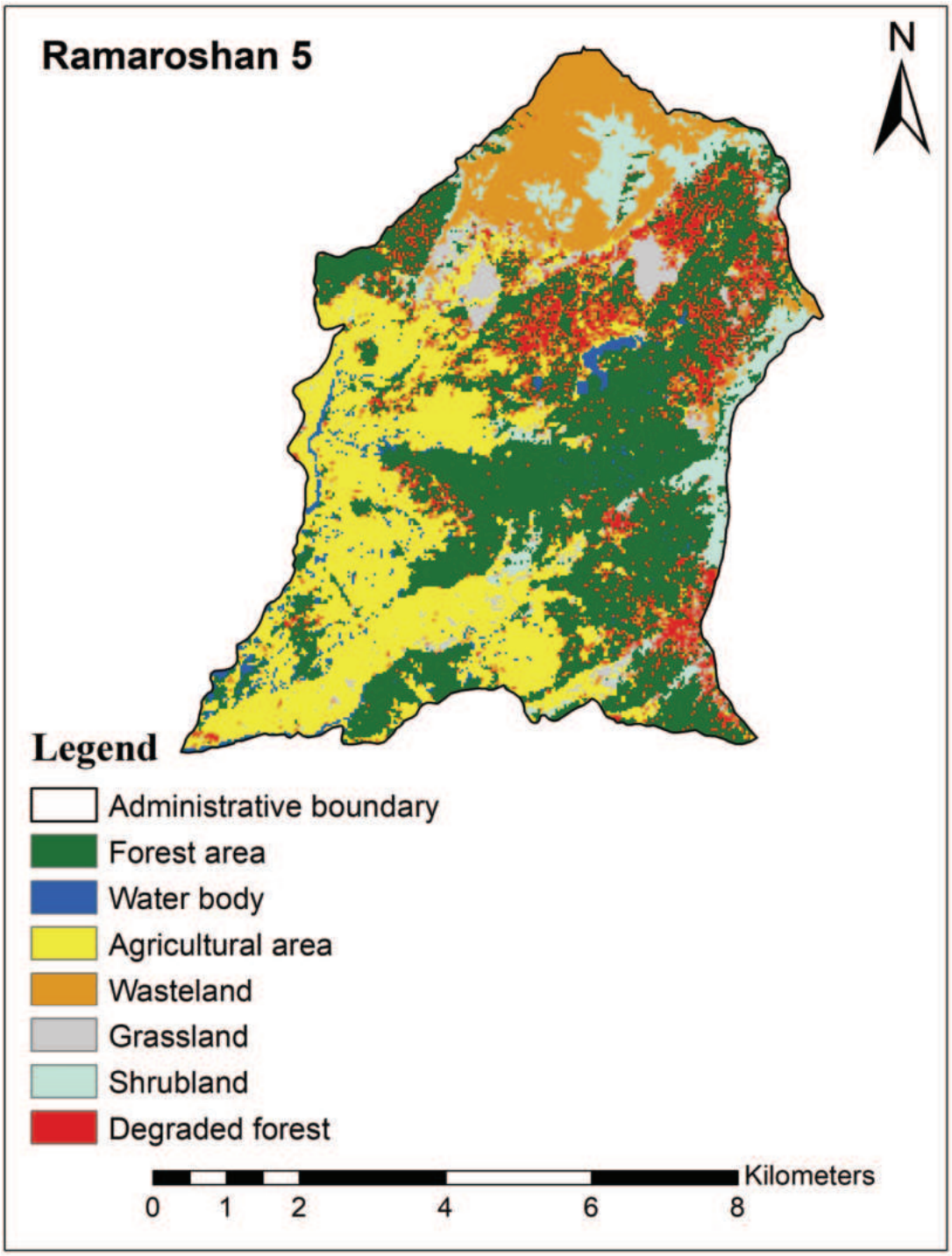

Figure 3.42: Degraded area, Ramarosan 5, Achham

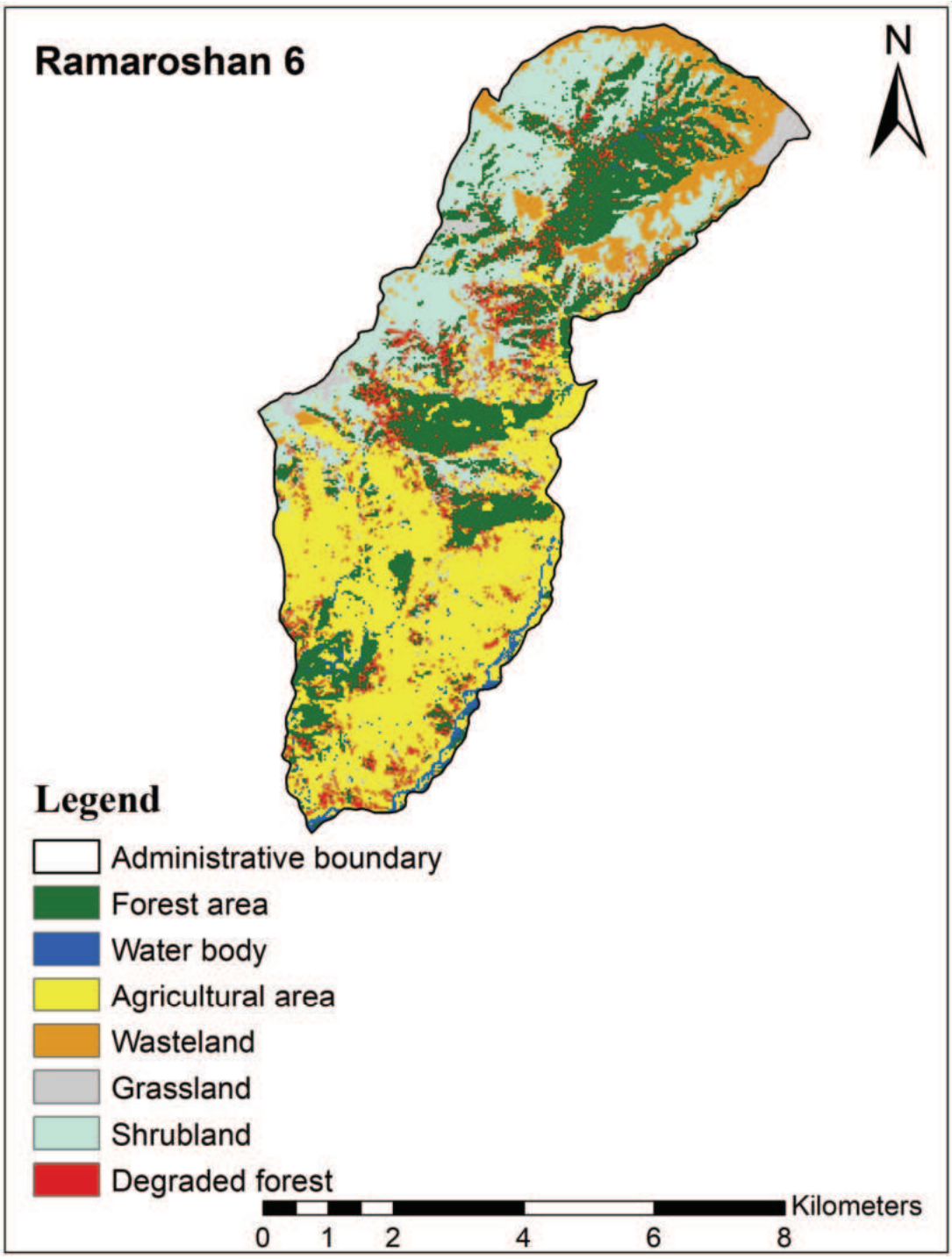

Figure 3.43: Degraded area, Ramarosan 6, Achham

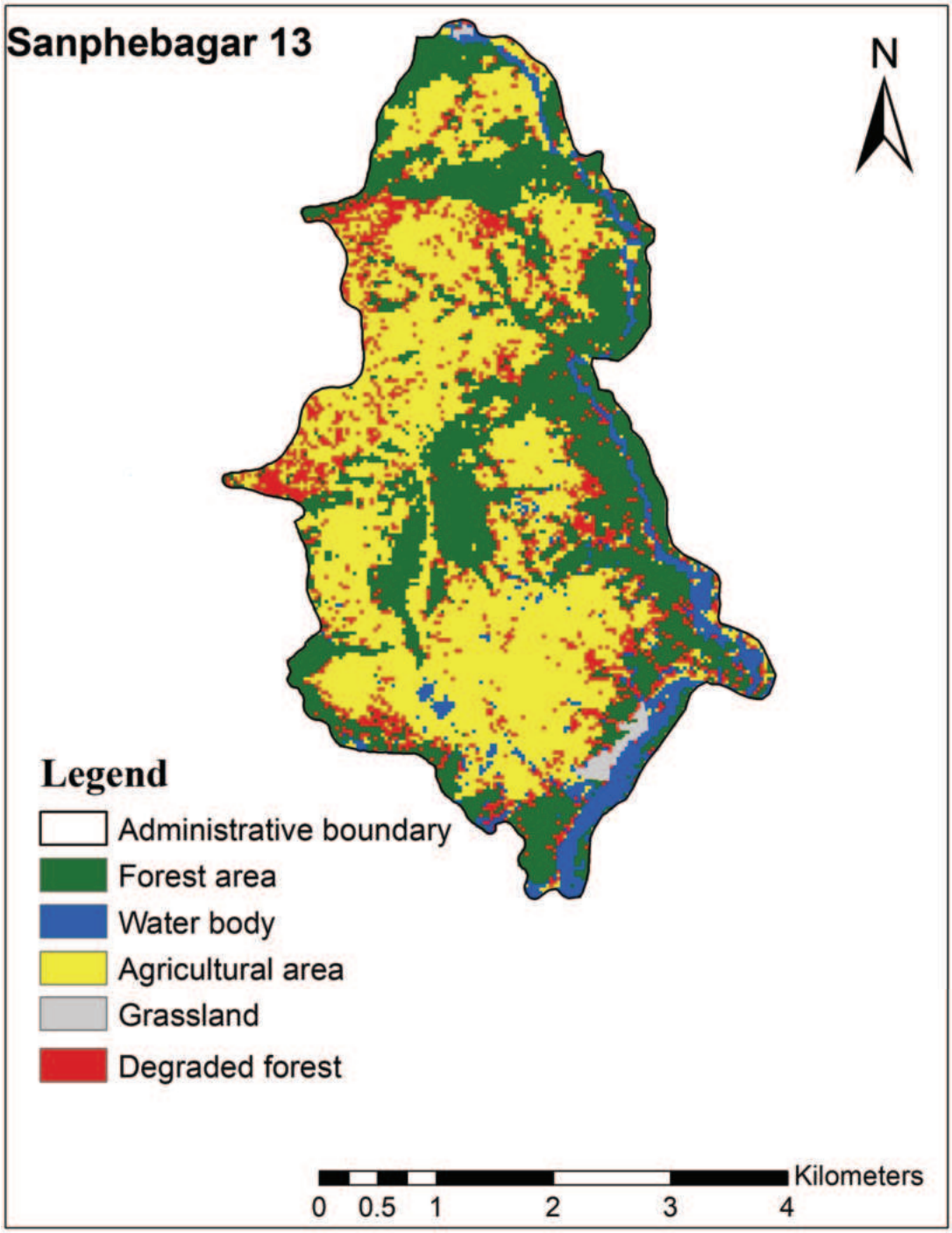

Figure 3.44: Degraded area, Sanfebagar 13, Achham

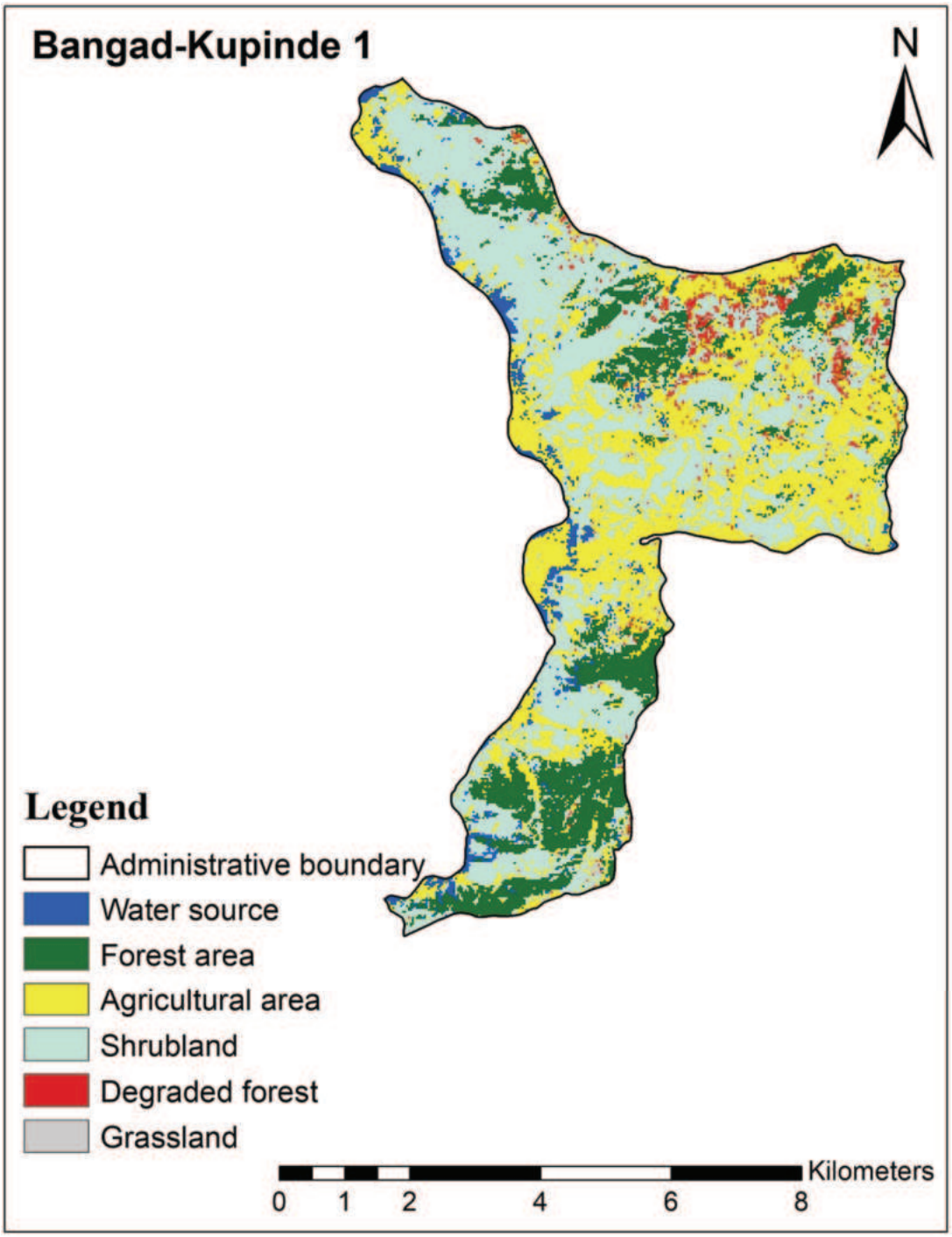

Figure 3.45: Degraded area, Bangad-Kupinde 1, Salyan

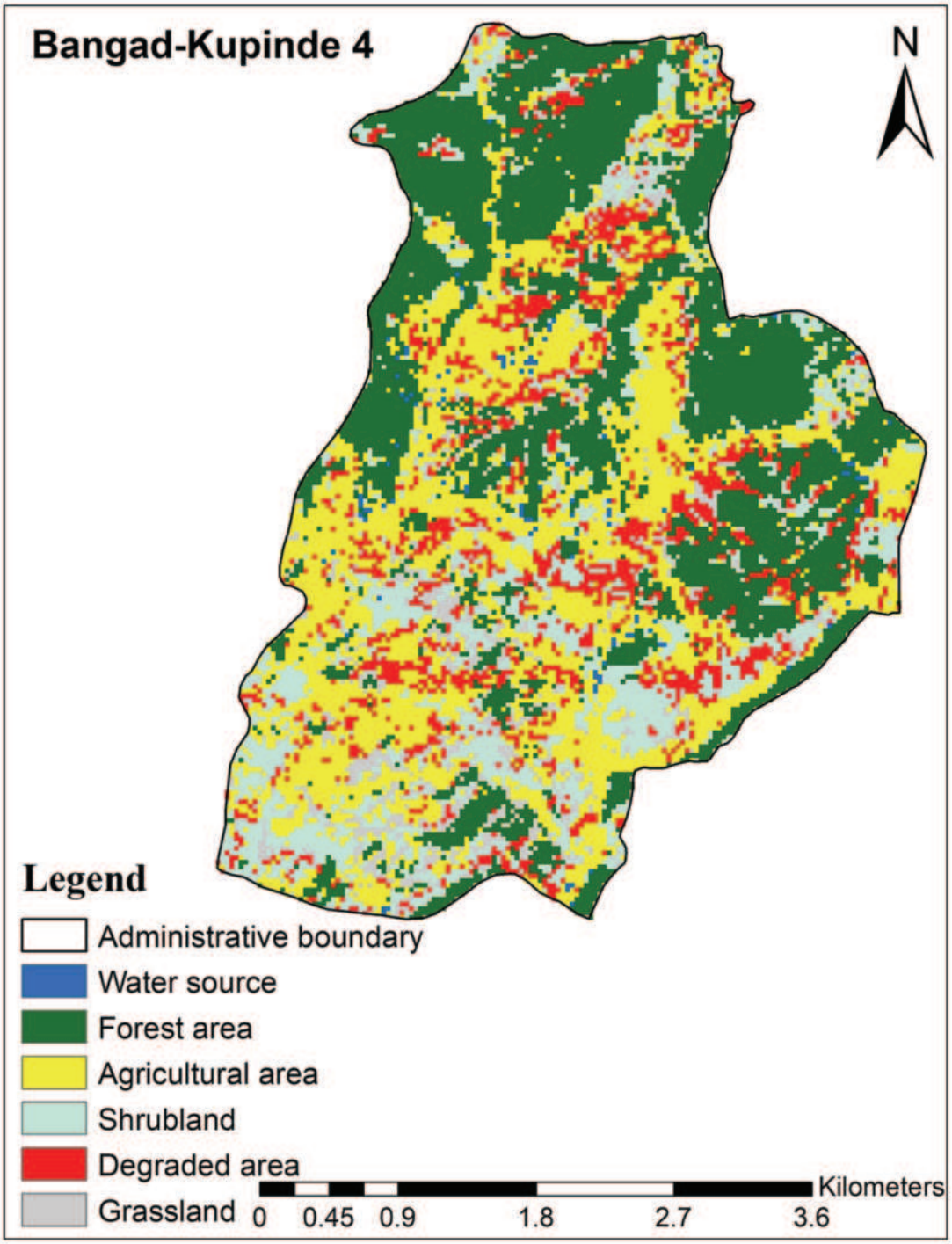

Figure 3.46: Degraded area, Bangad-Kupinde 4, Salyan

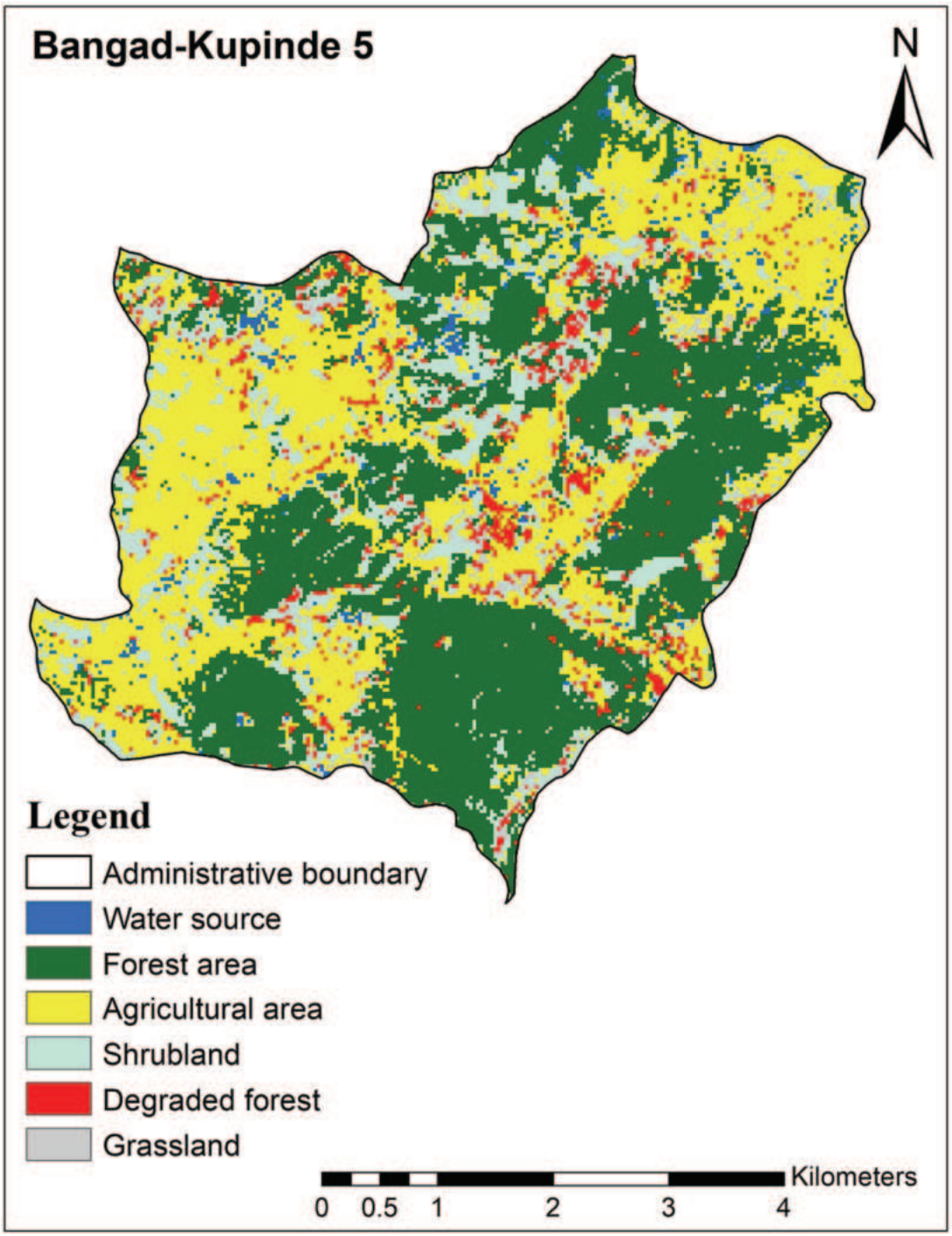

Figure 3.47: Degraded area, Bangad-Kupinde 5, Salyan

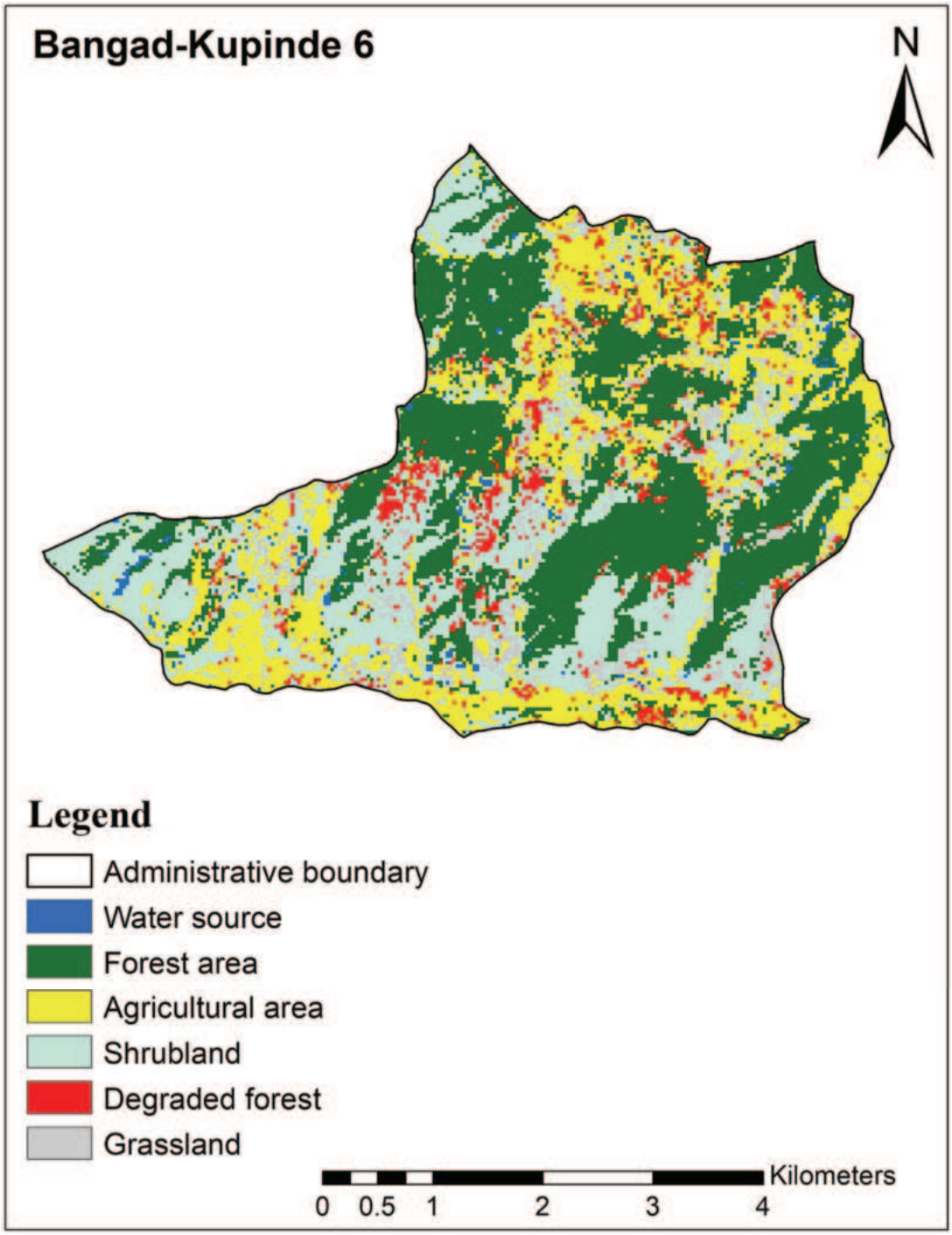

Figure 3.48: Degraded area, Bangad-Kupinde 6, Salyan

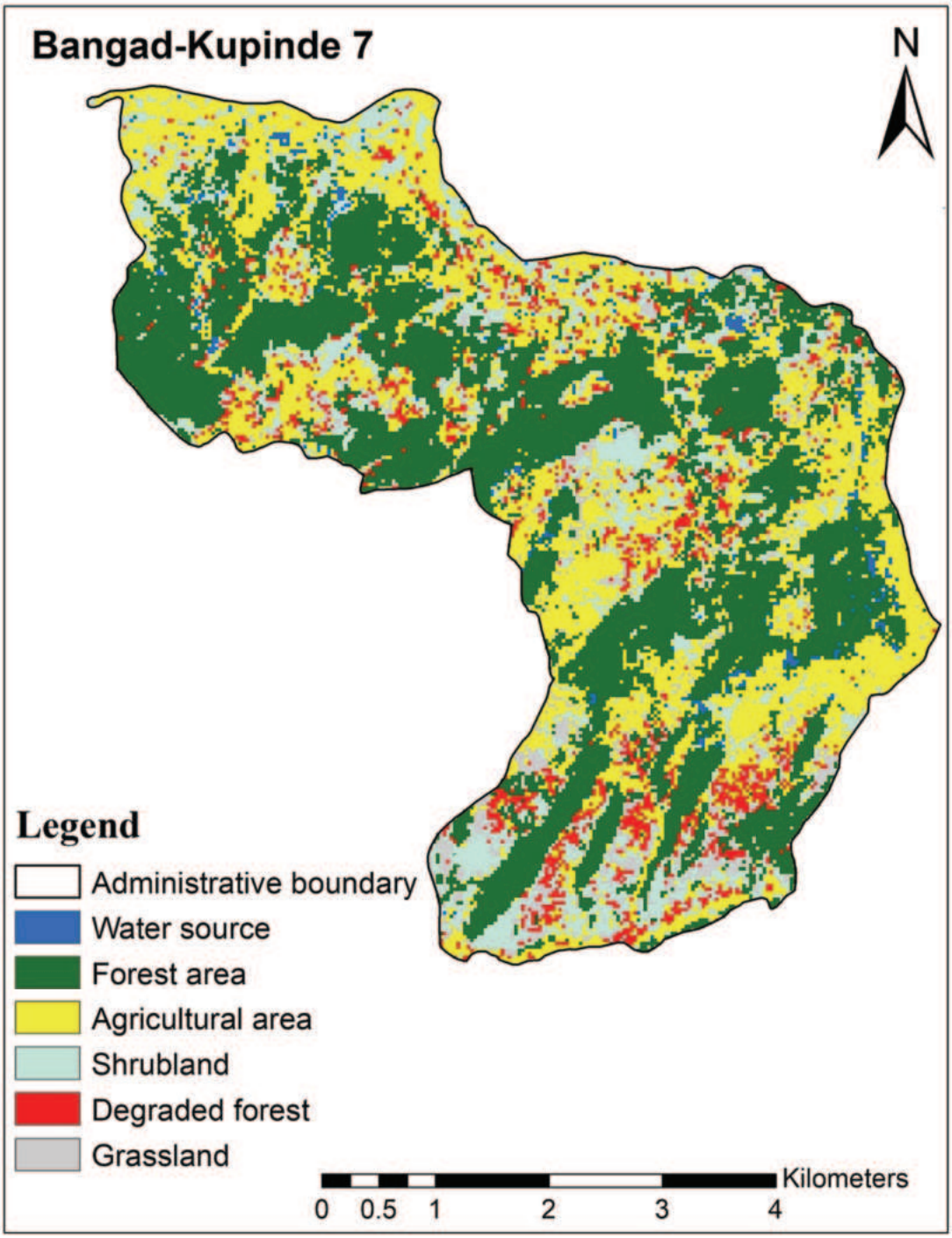

Figure 3.49: Degraded area, Bangad-Kupinde 7, Salyan

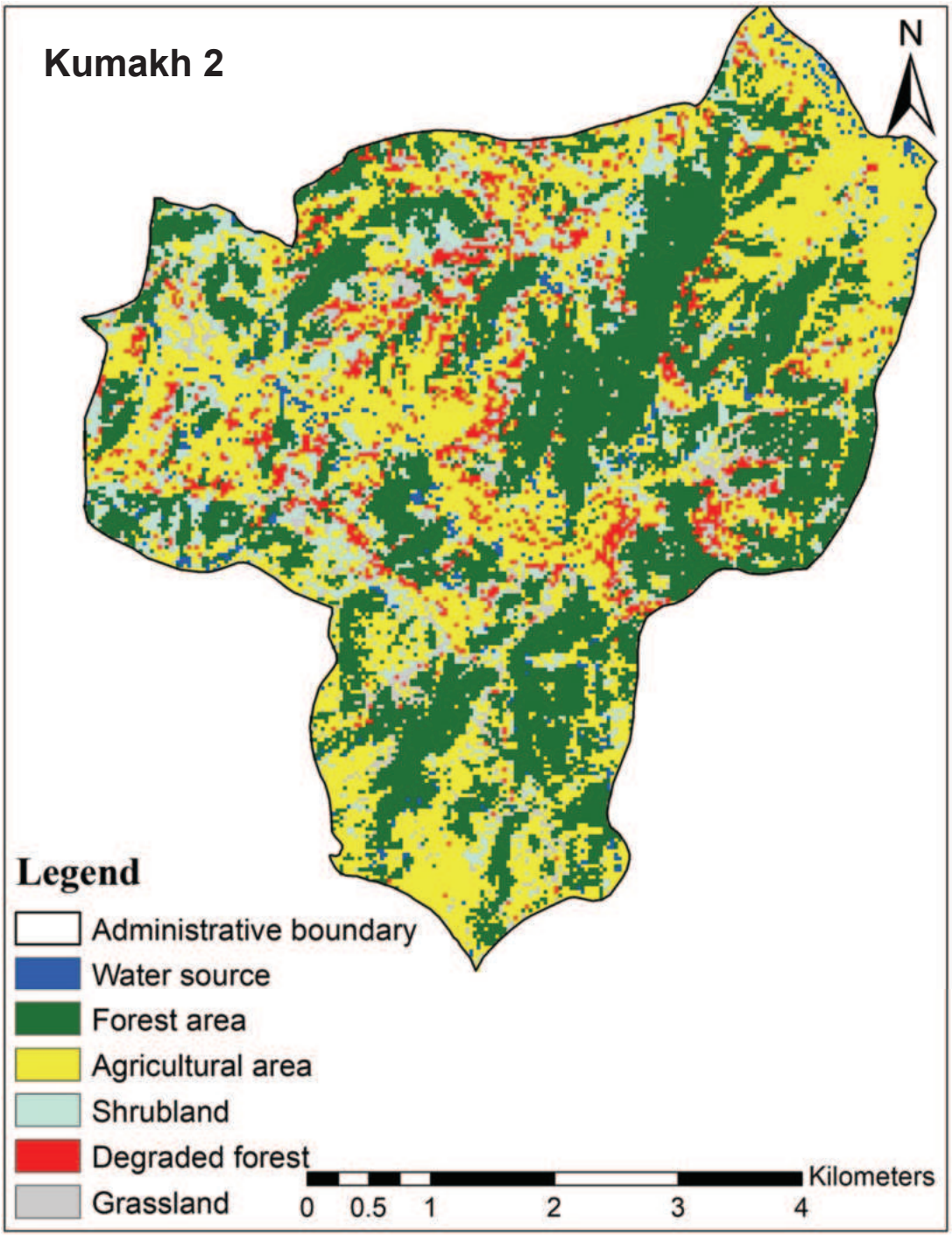

Figure 3.50: Degraded area, Kumakh 2, Salyan

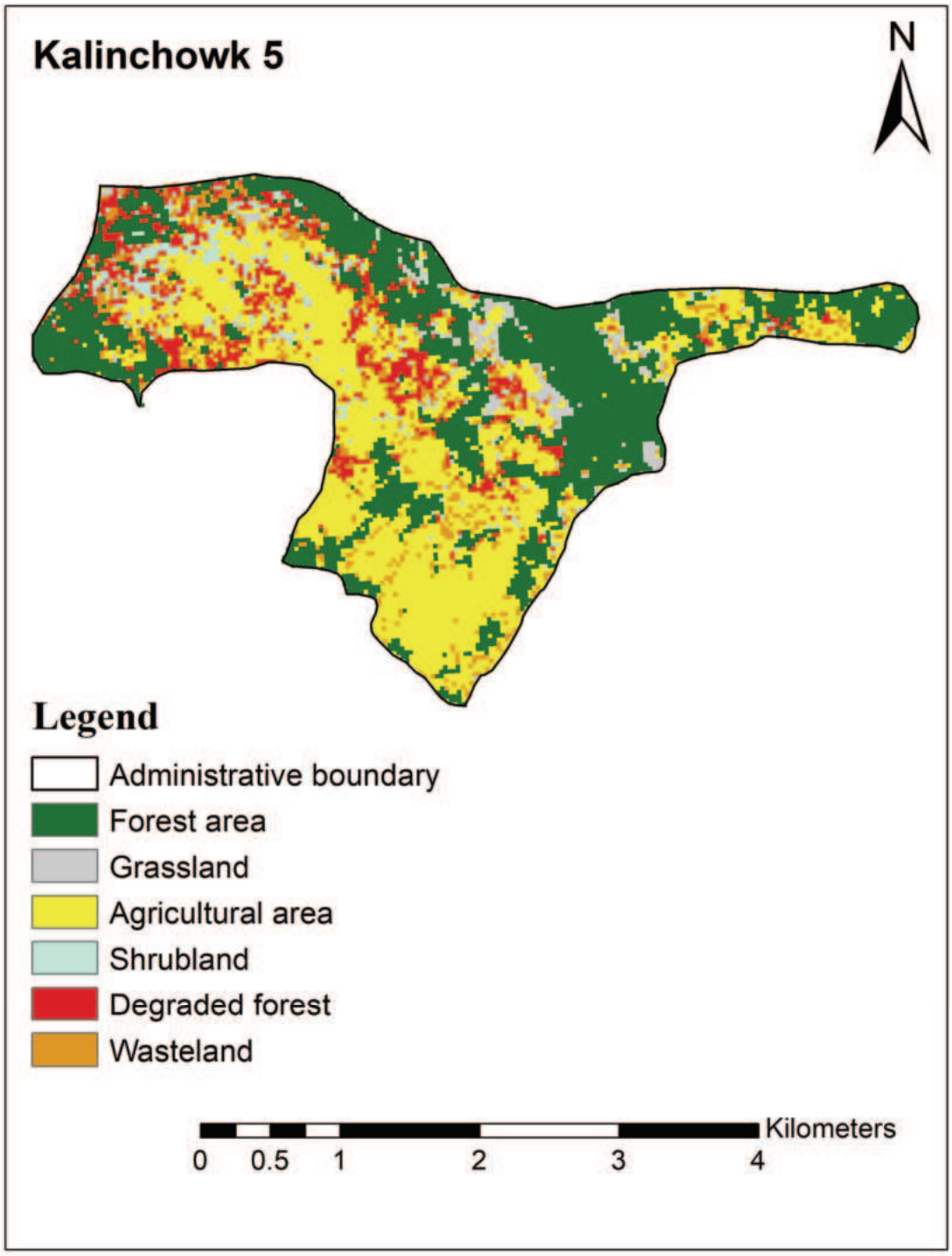

Figure 3.51: Degraded area, Kalinchowk 5, Dolakha

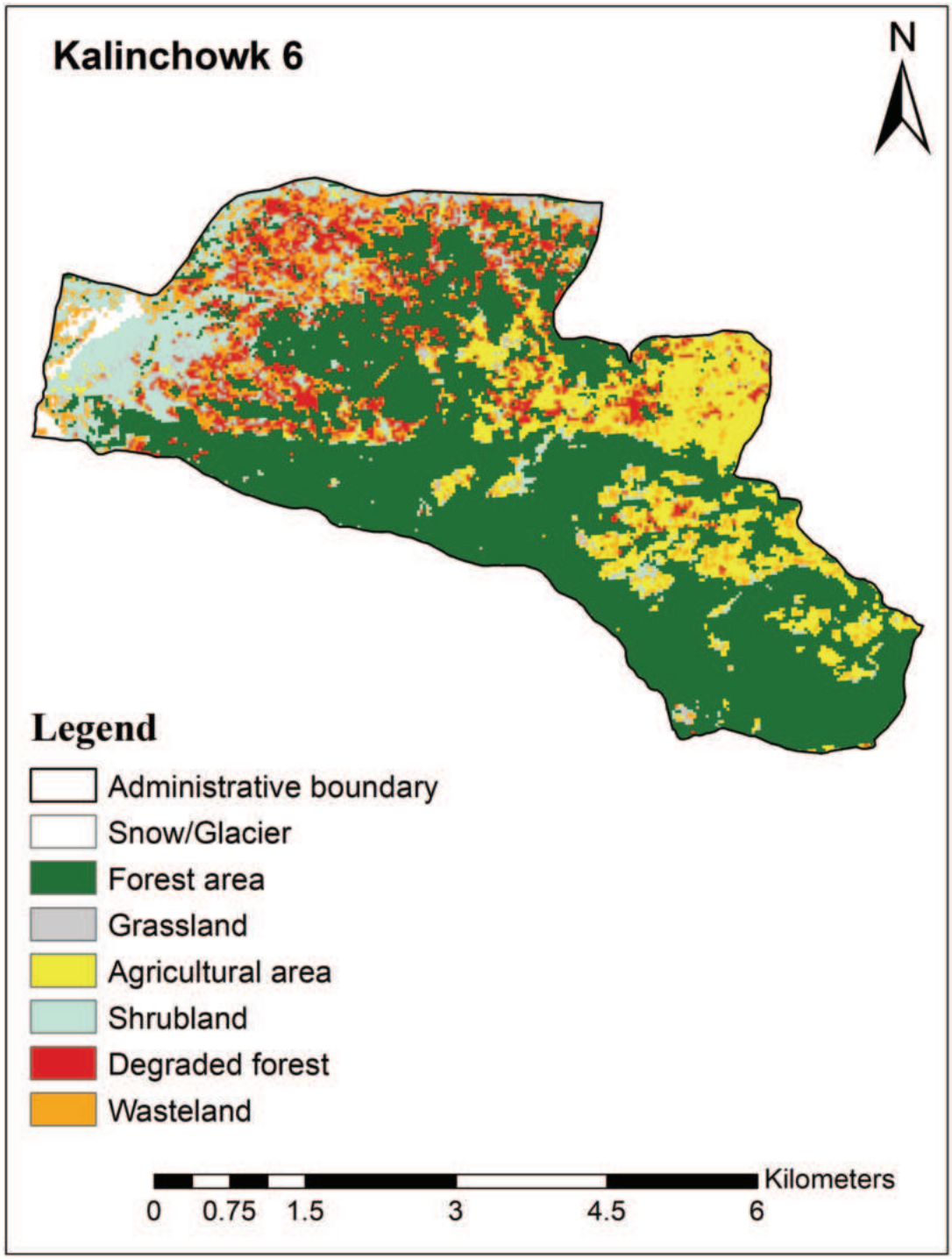

Figure 3.52: Degraded area, Kalinchowk 6, Dolakha

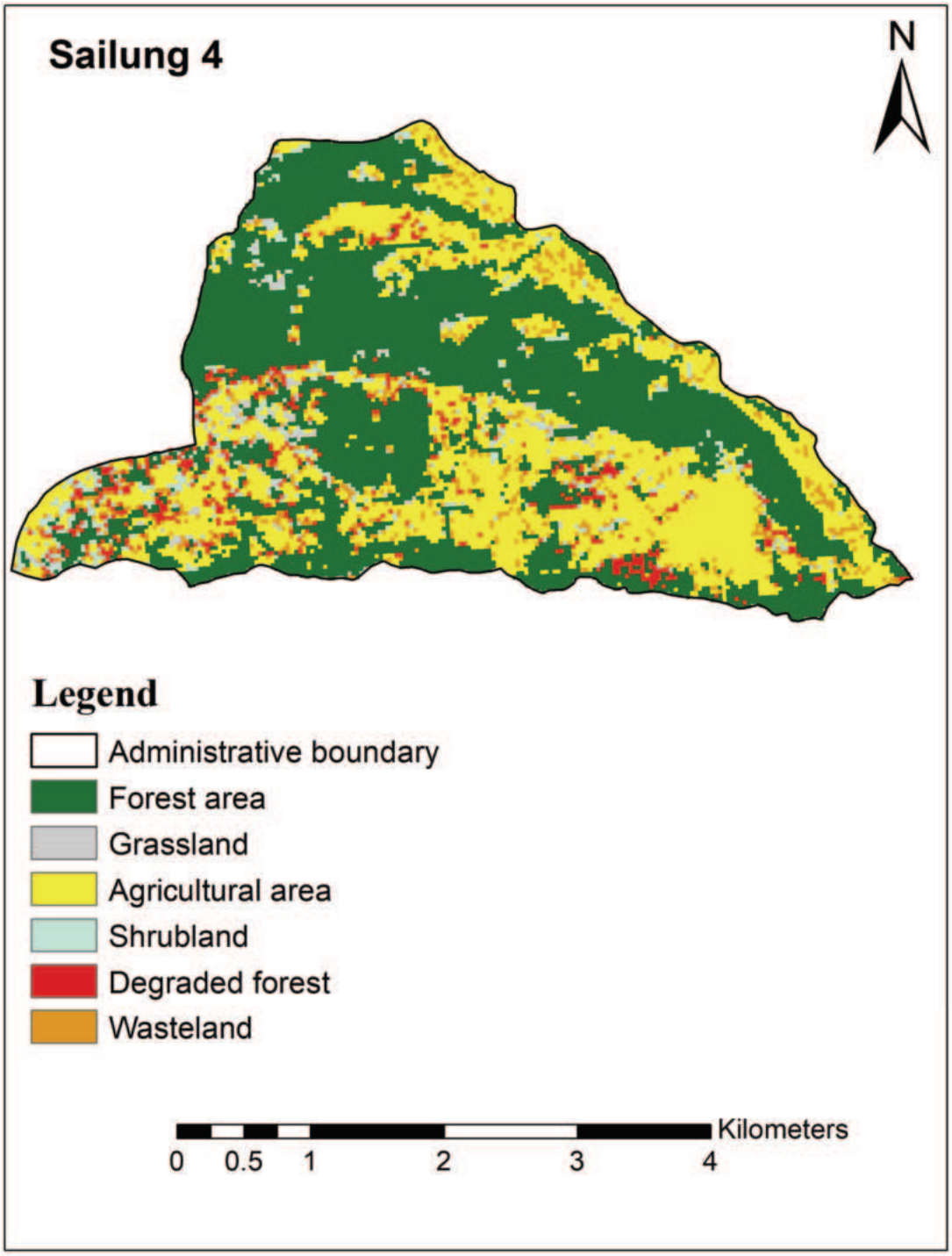

Figure 3.53: Degraded area, Sailung 4, Dolakha

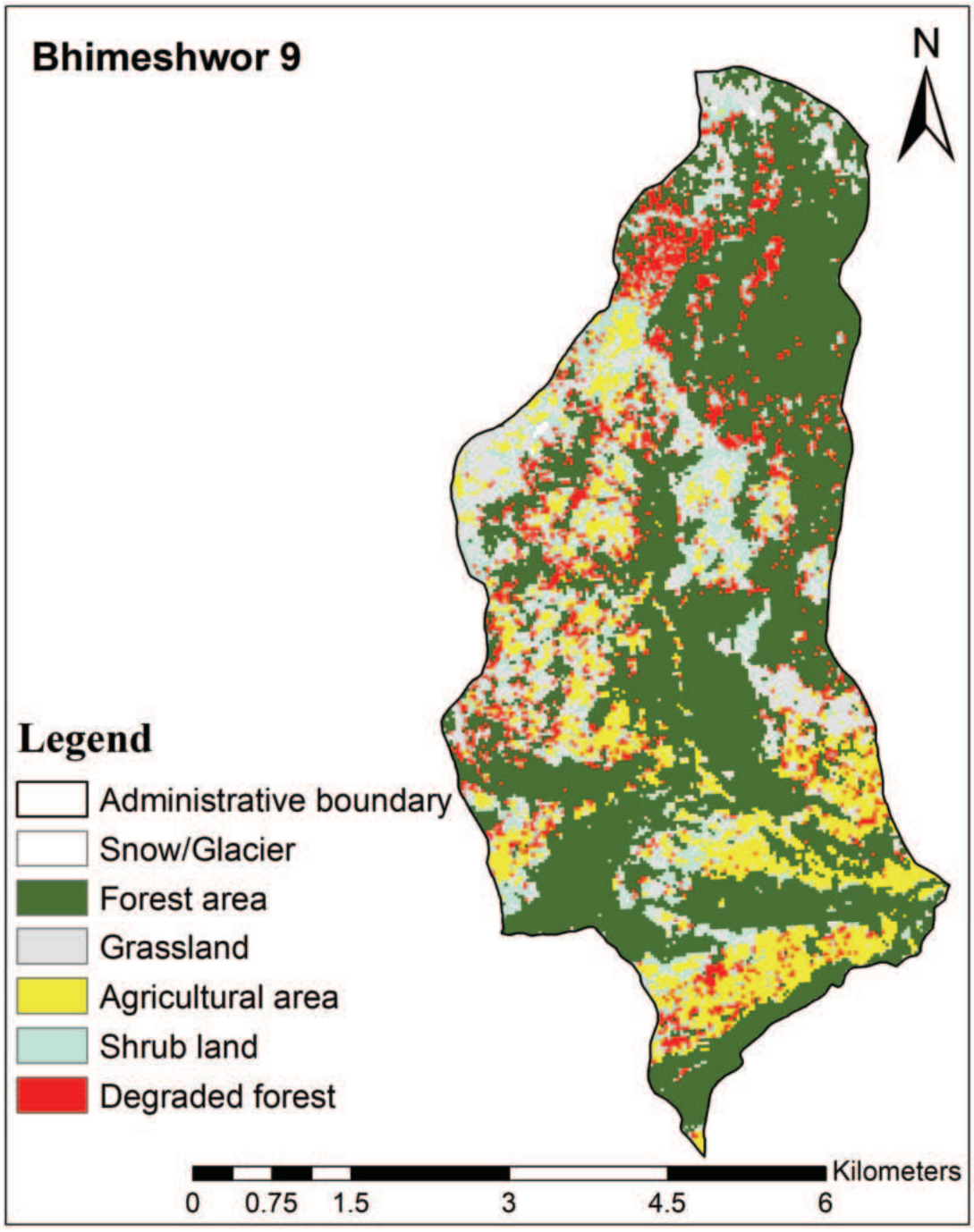

Figure 3.54: Degraded area, Bhimeshwor 9, Dolakha

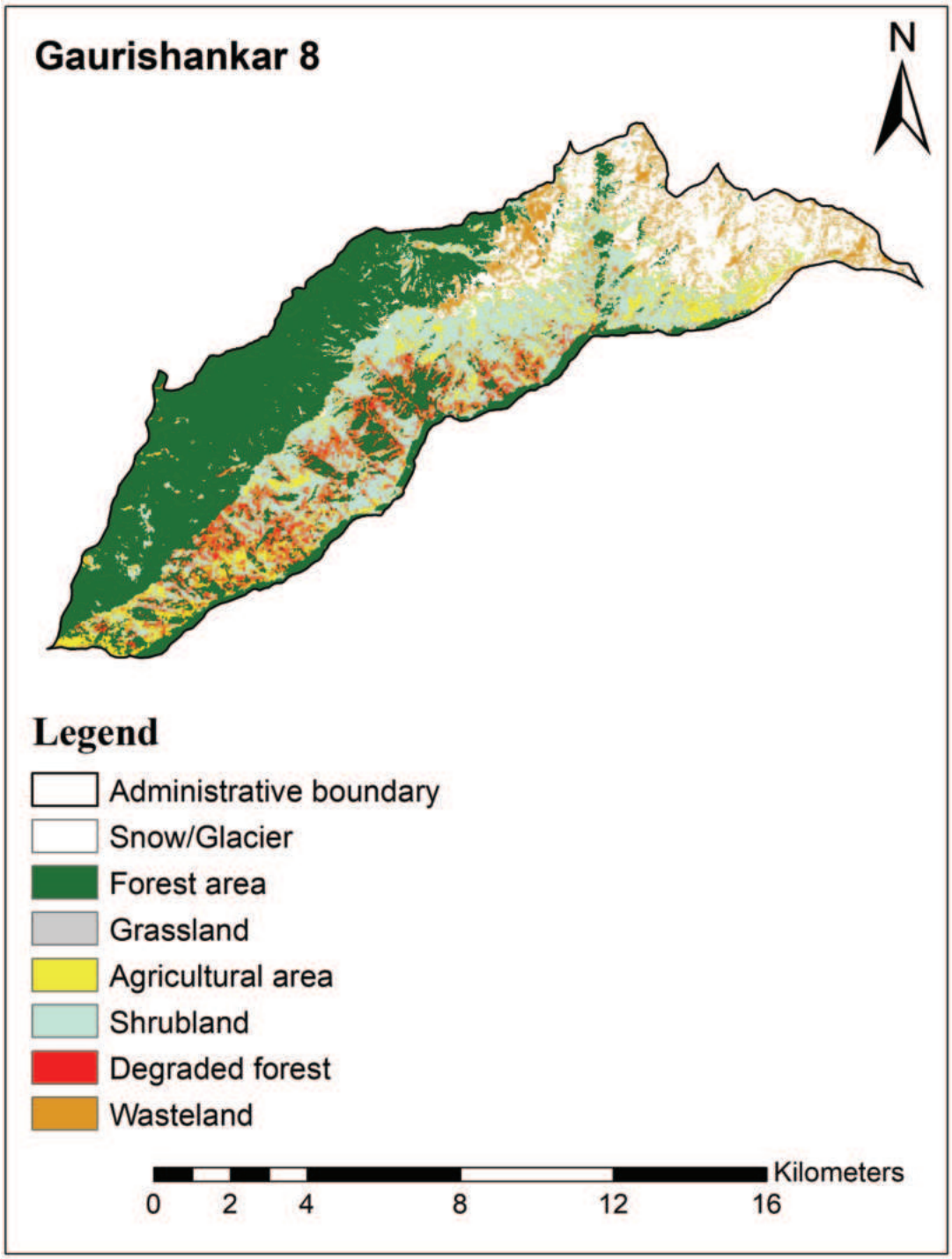

Figure 3.55: Degraded area, Gaurisankar 8, Dolakha

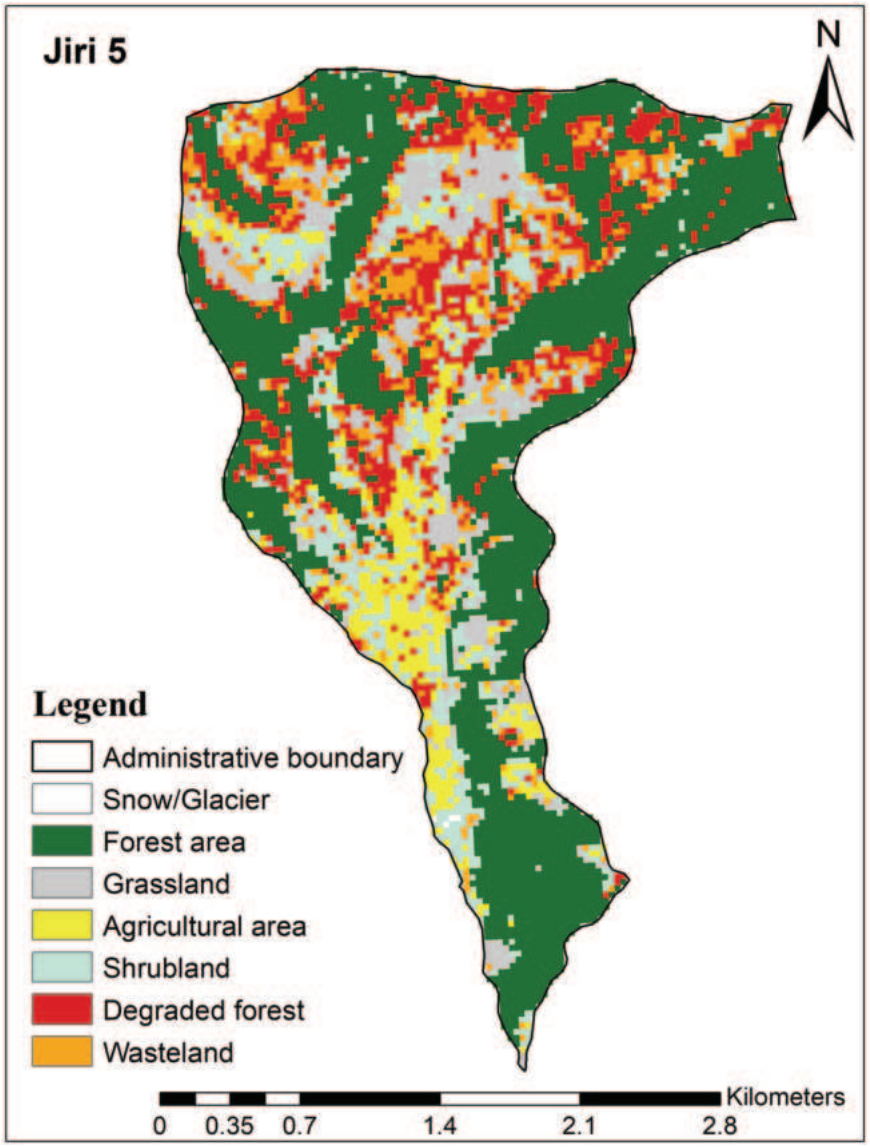

Figure 3.56: Degraded area, Jiri 5, Dolakha

Annex 3. 4: Community Forests in EbA II Project Sites

District	Municipality - ward No	SN	Forest/CFUG Name	Area (ha)
Salyan	Bangad Kupinde- 1	1	Maur CFUG	100
		2	Hariyali CFUG	99
	Bangad Kupinde-4	1	Bhatmare CFUG	123.15
		2	Thultakure CFUG	135.52
		3	Salleri CFUG	252.15
		4	Lekbesi CFUG	191.8
		5	Chisapani (ka) CFUG	165
		6	Chisapani (kha) CFUG	80
	Bangad Kupinde -5	1	Shree kalika CFUG	223.42
		2	Shree pani CFUG	58
		3	Shree Shera CFUG	288
		4	Shree Bhateni CFUG	90.65
		5	Shree paniCheuchau	70
	Bangad Kupinde- 6	1	Shanti CFUG	185.75
		2	Siddhartha CFUG	111
		3	Lekbesi CFUG	11
		4	Shiddhamalika CFUG	204
		5	Kalapokhara CFUG	241
		6	Saunepani CFUG	174
	Bangad Kupinde -7	1	Choutari CFUG	167.5
		2	Bhirchuli CFUG	229.85
		3	Hariyali CFUG	130
	Kumakh -2	1	Gajiyachour CFUG	125
		2	Smidahadada CFUG	118
		3	Laligurans CFUG	145
		4	Mahilapragatishil CFUG	206.73
		5	Gorakhagoganpani CFUG	66.35
		6	Choutari CFUG	135
		7	Shalghari CFUG	129.2
		8	Rumalegaun CFUG	57
		9	Priyachour CFUG	48.87
		10	Simalchour CFUG	10
Achham	Mellekh- 1	1	Mastamando CFUG	180.62
		2	Telegada CFUG	207.06
		3	Bhumeli govt forest	210
		4	Syaule govt forest	100
	Mellekh -2	1	Nandamata CFUG	325
		2	Nandhunge CFUG	184.95
	Mellekh -6	1	Madigadha CFUG	343.84
		2	Nawaghar CFUG	300
		3	Arasaina CFUG	255.61

	Ramarosan -5	1	Bhagibuya CFUG	495
		2	Salimkot CFUG	323
		3	Bate CFUG	96
		4	Bagebachala CFUG	64
		5	Ratilla CFUG	35
		6	Rumale Bajhthala CFUG	26
		7	Salleri CFUG	NA
		8	Birchemala CFUG	23
		9	Sera CFUG	21
		10	Masuri paita LFUG	7
		11	Chisapani LFUG	6
		12	Simal dada LFUG	5
	Ramarosan -6	1	Kanchan CFUG	52
		2	MKP CFUG	15.23
		3	Sera Patal CFUG	32.04
		4	Tursane CFUG	135
		5	Junna CFUG	180
		6	Bhatekanda CFUG	147.5
		7	Basanta CFUG	20.9
		8	Dhad LFUG	3.25
	Safebagar -13	1	Neta CFUG	131.88
		2	Rakshekoti CFUG	118.8
		3	Sugdaha CFUG	75.4
		4	Amrukh CFUG	65
		5	Ratomati CFUG	63.2
Dolakha	Sailung -4	1	Tharlange CFUG	214.45
		2	Pokhari CFUG	20.37
		3	Pauwa CFUG	44.32
		4	Ramite CFUG	8.02
		5	GhattePakhaCFUG	5.91
		6	Salleri CFUG	110.62
		7	Mahavir CFUG	53.36
		8	Bhakkare CFUG	101.2
		9	Kukutungkhola CFUG	12.18
	Gaurisankar -8	1	Gumbadeurali CFUG	115.5
		2	Kirase devithan	480
		3	Sitapaila CFUG	357
		4	Mauresiprideswori CFUG	855
	Bhimeshwor -9	1	Selealambhir CFUG	55.74
		2	Thumakadada CFUG	44.31
		3	Eklepakhapatalepokhari CFUG	320.41
		4	Napkeyanmara CFUG	160.88
		5	Timure TinsalleCFUG	133.25
		6	Sankha devi CFUG	301.1

		7	Setidevi Dadar CFUG	368.56
		8	Palekoban CFUG	1.36
		9	Dimal CFUG	79.5
	Kalinchok 5	1	Walthali hariyali	117.92
		2	Mehelekanle CFUG	42.56
		3	NamathaliKalipokhari	199.25
		4	Pahire CFUG	5.72
	Kalinchok 6	1	Jhareni CFUG	198.25
		2	Kaden hariyali	147.72
		3	Suire Nepane	142.01
		4	Ganesh CFUG	66.36
		5	Dharmathali CFUG	77.66
		6	Ramche Salleri	68.41
		7	Hariyali sukram	207.75
		8	Dudhapokhari	17.69
		9	Bhadrawati	8.68
		10	Ratamate Gagaren	17.85
	Jiri-5	1	Kalobhir CFUG	545.2
		2	Dhungeswori CFUG	13.85

Note: Some of the areas under community forests may not match with total forest area as they are extended beyond ward boundry to adjoining ward and/or municipality.
Source: Field Survey 2020 and Division Forest Offices in concerned districts.

Annex 3. 5: Climate Change Induced Hazards and Vulnerability in Project Wards

3.5.A. Dolakha District

Project area	Hazard	Impact	Vulnerable group	Coping
Gaurisankar 8	Drought in 2072 and frequent	Losses of crops	Farmers	Use of saving, loan, neighbors
	Heavy rainfall causing flood In 2074 and 2076	Losses of crops	Wage labor and farmer	Loan, neighbors, relatives
	Forest fire	Loss of bio-diversity. Loss of forest resources	Marginalized community	Awareness creation
Bhimeshwor 9	Drought	Lost income from agriculture/crops	Farmers	Use of saving,loan, neighbors, relatives
	Temperature increase during summer and monsoon season	Lock of irrigation water Health impact	Women, children, old	None
	Landslide	Disturbances in drinking water supply. Residential area threatened	Residents of Bhasme locality. Marginalized community	Shifted to another location
Kalinchok 5	Drought in 2072 summer and frequent	Scarcity of drinking/irrigationwater. Reduced crops output	Farmers. Women and children	Use of savings
	Average precipitation decreases in winter and increase in monsoon season	Loss of crops/fruits/garden	Farmers	Loan from neighbors/relatives
	Temperature increase during summer and monsoon season	Health hazards Scarcity of irrigation water	children, old Farmers.	None
	Landslide	Scarcity of safe drinking water Loss of crops and land	Farmer, wage labor	Migration Neighbors, relatives
Sailung 4	Drought in 2072 winter and summer	Loss of income from agriculture	Farmer, wage labor	Loan, borrowing Neighboring, relatives
	Average seasonal temperature increase	Scarcity of drinking water, reduced income	Farmer, wage labor	not aware
	Landslide during monsoon	Loss of crops/loss of income	Farmers and wage labor	None
Kalinchok 6	Drought in 2072 summer and frequent	Scarcity of drinking/irrigationwater	Farmers. Women and children	None
	Landslide	Loss of crops and livestock	Farmers	Use of saving, loan, neighbors
	Flood	Loss of crops	Low land owners	None
Jiri 5	Average temperature increase	Shift of vegetations	Farmers (mainly cash crops)	Use of modern technology
	Forest fire	Loss of bio-diversity. Loss of forest resources	Marginalized community	Awareness creation
	Flood	Damage to micro hydro-electricity and irrigation canal	All	Small dams

3.5.B. Salyan District

Project area	Hazard	Impact	Vulnerable group	Coping
Bangad-Kupinde 4	Prolonged drought (2074)	Losses of crops Scarcity of drinking water	Farmers, women (longer duration for collecting water)	Use of saving, migration
	Forest fire (*every year*)	Losses in forest products; Members injured and cloths burned while controlling the fire	Community as a whole Women (workload increased in collection of firewood)	None
Bangad-Kupinde 5	Prolonged drought (2074 winter season)	Losses of crops Scarcity of drinking water	Farmers, children, old age and marginalized people	Alternate income source, use of saving, migration
	increasing temperature during summer season	Losses of crops	Community as a whole	None
	Forest fire	Loss of forest resources	Community as a whole Women (workload increased in collection of firewood)	Not done as no proper equipment available.
Bangad-Kupinde 6	Drought 2074 and frequently During winter - summer	Crop loss Scarcity of drinking water	Farmers, especially elderly people	Use of saving, migration
Bangad-Kupinde 7	Drought 2074 and frequently During winter - summer	Crop loss Scarcity of drinking/irrigation water	Farmers, elderly people, women,	Use saving, migration seasonal
Bangad-Kupinde 1	Drought 2074 and frequently During winter - summer	Crop loss. Scarcity of drinking/irrigation water	Farmers, elderly people, women, marginalized community	Use saving, migration seasonal
	Drought 2074 and frequently During winter - summer	Crop loss. Scarcity of drinking/irrigation water	Farmers, elderly people, women, marginalized community	Use saving, migration seasonal
	Forest fire	Losses of forest, destroyed house, scarcity of drinking water	Farmers, women, elderly people	None

3.5.C Achham District

Project area	Hazard	Impact	Vulnerable group	Coping
Mellekh 1	Drought-very frequent Medium to high severity	Losses of crops	Farmers, especially smallholders	Use of saving, informal loan, migration,
	Flood/ 2074 - during monsoon season	Losses of crops. Loss of 8 individuals in 2074 flood	Farmers	Loan from group and informal sources
	Landslides due to heavy monsoon rain and road construction	Losses of agriculture land and crops, animals and human	Smallholder farmers especially residing in the marginal land	Migration, loan, community help
Mellekh6	Drought in 2072 monsoon season	Losses of crops/fruits	Farmers	Use of saving, earning from migration, loan
	Flood- high precipitation 2076	Losses of crops, scarcity of safe drinking water	Farmersand community as a whole	Community, loan from FOs
	Hail stone -2075/76Ashwin	Losses of crops and fruits	Farmers	Use of saving
Mellekh2	Frequent drought	Losses of crops	Farmers	Use of saving
	Flood in 2072 and 2076	Losses of crops	Farmers	Use of saving
	Forest fire – 2066 and 2073	Degradation of forest Loss of forest product	Community people	Collection of fuel wood from other forest
Safebagar 13	Drought 2072 and 2068 monsoon	Losses of crops and income from wage labor	Farmers, especially smallholders,	Use of saving, loan
	Flood- 2072	Losses of crops	Farmers	Use of saving
Ramarosan 5	Drought- frequent	Losses of crops/fruits	Farmers	Use of saving, loan
	Hailstorm, frequent (Chait, Baishakh, Gestha)	Losses of crops up to 45%	Farmers	None
	Disease outbreak, pest problem (Falgun, Chaitra)	Maize (*khumrekira*) and potato (*surkula*) crops effected, direct impact on livelihood	Farmers	Migration, reduced consumption
	Soil erosion (Gamtala, Birchemala) and reducing fertility (slowly) due to heavy rain	Low productivity	Farmers	None
	Landslides	Losses of agriculture land and disturbances in water supply (Irrigation and drinking water)	Community, especially farmers	None
Ramarosan 6	Prolonged drought - frequent	Reduced production	Farmer, child and women are impacted. Increased workload of women Disruption in water source	Migration, reduced consumption,
	Heavy rain in 75/76	Losses crops		
	Hailstorm- every year	Losses crops		

Source: Field Survey, 2020.

Annex 9. 1: Number of Grassroots Level Organizations in the Project Wards.

District	Municipality-Ward	Com. forestry user group	Leasehold forestry user group	Water user group	Women groups	Farmer groups	Livestock groups	Mothers group	Saving credit group	Others	Total
Salyan	Bangad-Kupinde 1	2	12	11	3	4	0	3	10	0	45
	Bangad-Kupinde 4	5	0	2	0	4	2	4	2	2	21
	Bangad-Kupinde 5	4	0	2	4	3	1	4	1	0	19
	Bangad-Kupinde 6	6	0	6	4	7	4	6	0	0	33
	Bangad-Kupinde 7	3	0	3	4	5	5	5	0	0	25
		15	0	7	6	7	4	6	0	0	45
	Sub-Total	35	12	31	21	30	16	28	13	2	188
Achham	Mellekh 1	2	0	2	1	13	0	0	6	2	26
	Mellekh 2	2	0	0	8	12	2	6	1	0	31
	Mellekh 6	3	0	2	10	10	3	14	1	1	44
	Ramarosan 6	7	1	6	10	10	0	12	0	0	46
	Ramarosan 5	9	5	12	5	0	0	16	0	24	71
	Safe 18	6	9	0	18	4	8	10	3	0	58
	Sub-Total	29	15	22	52	49	13	58	11	27	276
Dolakha	Sailung 4	10	0	0	3	3	0	2	1	1	20
	Gaurisankar 8	4	0	2	2	0	0	2	0	0	10
	Bhimeswor 9	10	0	3	0	0	0	3	1	0	17
	Kalinchok 5	3	0	3	1	5	1	15	3	0	31
	Kalinchok 6	11	0	5	7	9	3	10	5	3	53
	Jiri 5	2	0	5	1	3	0	2	1	7	21
	Sub-Total	40	0	18	14	20	4	34	11	11	152
All Total		104	27	71	87	99	33	120	35	40	616

Annex 11. 1: Scientific names of important NTFPs Existing in Project area

SN	Local Name	Scientific Name	Family	Distribution (m) 1/	Parts Used
1	Kurilo, Satavari	*Asparagus racemosus*	Liliaceae	150-2100	Root, tendril
2	Budo Okhati	*Astilbe rivularis*	Saxifragaceae	1800-2100	Rhizome
3	Pakhanved, Pashanved	*Bergenia ciliate*	Saxifragaceae	1600-3600	Rhizome
4	Sugandhakokila	*Cinnamomum glaucescens*	Lauraceae	2000-2500	Fruit
5	Lokta	*Daphne bholua, D. papyracea*	Thymelaeaceae	2000-3100	Bark
6	Argeli	*Edgeworthia gardneri*	Thymelaeaceae	1500-3000	Bark
7	Dhasingre, Patpate	*Gaultheria fragrantissima*	Ericaceae	1200-2700	Leaf
8	Allo	*Girardinia diversifolia*	Urticaceae	1700-3000	Leaf, stem, bark
9	Siltimur	*Lindera neesiana*	Lauraceae	1800-2700	Root, bark, fruit
10	Jatamansi	*Nardostachys grandiflora*	Valerianaceae	3600-5000	Rhizome
11	Kutki, Katuki	*Neopicrorhiza scrophulariiflora*	Scrophulariaceae	3600-4800	Root, Rhozome
12	Satuwa	*Paris polyphylla*	Trilliaceae	2000-3000	Rhizome
13	Amala	*Phyllanthus emblica*	Euphorbiaceae	150-1400	Fruit
14	Khote salla	*Pinus roxburghii*	Pinaceae	900-2100	Resin, leaf
15	Padamchal, Chulthi amilo	*Rheum australe*	Polygonaceae	3000-4200	Rhizome, stem
16	Lali guras	*Rhododendron arboreum*	Ericaceae	1500-3600	Leaf, flower
17	Bhaki amilo	*Rhus javanica*	Anacardiaceae	1300-2400	Fruit
18	Majitho	*Rubia manjith*	Rubiaceae	1200-2100	Stem, root
19	Ainselu	*Rubus ellipticus*	Rosaceae	1200-2500	Fruit, root
20	Rittha	*Sapindus mukorossi*	Sapindaceae	1000-1400	Fruit, seed, bark
21	Lauth salla	*Taxus wallichiana*	Taxaceae	2400-3400	Leaf
22	Barro	*Terminalia bellirica*	Combretaceae	300-1100	Fruit
23	Harro	*Terminalia chebula*	Combretaceae	150-1100	Fruit
24	Amriso	*Thysanolaena maxima*	Gramineae	500-2000	Stem, flower
25	Gurjo	*Tinospora sinensis*	Menispermaceae	300-1500	Tender
26	Sisnu	*Urtica dioca*	Urticaceae	1000-2500	Leaf
27	Timur	*Zanthoxylum armatum*	Rutaceae	1100-2500	Fruit
28	Bojho	*Acorus calamus*	Araceae	200-2300	Root
29	Jimbu	*Allium hypsistum*	Amaryllidaceae	4000-5000	Leaf
30	Tejpat	*Cinnamomum tamala*	Lauraceae	450-2100	Bark
31	Nigalo	*Drepanostachyum falcatum*	Gramineae	1500-2700	Stem, tendril
32	Guchi chyau	*Morchella conica*		2000-3500	Whole plant
33	Bajradanti	*Potentilla fulgens*	Rosaceae	1700-4800	Root

1/ FNCCI-AEC/NEHHPA, 2012. NTFPs/MAPs Business Promotion Strategy (2012 – 2016), Kathmandu.

Annex 13. 1: Activities Suggested by Local Beneficiaries of Project Area

	Restoration of degraded forests (Ha)	Restoration of rangelands (Ha)	Updating operational plans (No)	Terrace development Ha)	Water filtering dams (No)	Water conservation ponds (No)	Rain water harvesting devices (No)	Community livelihood improvement plans (No)	Nursery establishment (No)	Fire control line (No)	Sheds at Chauri Kharka (No)
Salyan District											
Bangad-Kupinde 1	5	-	-	-	5	2	-	-	-	-	-
Bangad-Kupinde 4	260	60	1	10	2	2	1	1	-	-	-
Bangad-Kupinde 5	35	95	-	16	7	6	-	1	1	-	-
Bangad-Kupinde 6	27	-	-	40	4	5	1	-	-	-	-
Bangad-Kupinde 7	4	4	2	-	5	9	2	2	-	-	-
	50.5	-	2	5	8	13	1	-	1	-	-
Salyan Total	**358.5**	**159**	**5**	**71**	**31**	**37**	**5**	**4**	**2**	**-**	**-**
Achham District											
Mellekh 1	200	107	4	3	3	4	4	2	2	-	-
Mellekh 2	200	100	2	12	2	3	4	2	2	-	-
Mellekh 6	20	50	3	12	6	5	-	3	1	-	-
Ramarosan6	244	120	2	20	4	3	2	1	2	-	-
Ramarosan 5	60	45	3	12	4	5	2	4	4	-	-
Safe 18	150	50	7	8	2	6	5	2	1	-	-
Achham Total	**874**	**472**	**21**	**67**	**21**	**26**	**17**	**14**	**12**		**-**
Dolakha district											
Sailung 4	10	2	2	4	5	1	-	3	1	1	-
Gaurisankar 8	50	10	-	20	9	1	5	2	2	1	-
Bhimeswor 9	15	5	-	1	3	1	1	2	1	1	-
Kalinchok 5	100	40	-	20	4	5	-	1	2		2
Kalinchok 6	100	5	-	5	1	1	-	2	1		
Jiri 5	50	10	1	-	4	1	2	2	2	1	2
Dolakha Total	**325**	**72**	**3**	**50**	**26**	**10**	**8**	**12**	**9**	**4**	**4**
All Total	**1557.5**	**703**	**29**	**188**	**74**	**73**	**30**	**30**	**23**	**4**	**4**

Annex 13. 2: Proposed sites for Implementation of EbA Core Activities

13.2.A Salyan District

Bangad-Kupinde, ward No. 1

Restoration of Degraded Forest	Maur CFUG, Baghachour
Restoration of Range Land	-
Updating Operational Plan	-
Terrace Development	-
Water Filtering Dam	Simalkhola, Hirapani, Gunakhola, Rasukhola, Boyakhola
Water Conservation Pond	Bakiyadada – improvement. Pipaltakura - improvement
Rain Water Harvesting Device	-
Community Livelihood Improvement Plan	-
Nursery Establishment	-

Bangad-Kupinde, ward No. 4

Restoration of Degraded Forest	Saleri, Lekhbesi, Thultakura, Bhatmare
Restoration of Range Land	Saleri section 3 and section 4
Updating Operational Plan	Chisapani CFUG
Terrace Development	Lekhbesi and Chisapani
Water Filtering Dam	Saleri, Lekhbesi
Water Conservation Pond	Aathmane, Thulatakura
Rain Water Harvesting Device	Dadhagaun of Saleri CFUG
Community Livelihood Improvement Plan	Cisno powder production
Nursery Establishment	-

Bangad-Kupinde, ward No. 5

Restoration of Degraded Forest	Sera CFUG - Ramchour, Dhamachour, Bhateni CFUG - bhateni, Patyare, Gahaini
Restoration of Range Land	Shreepani CFUG - Pipaledada, Chyandada, Sera CFUG - Kalikhet, Khola, Kolgade, Bhateni CFUG - Pakhapani, Garacha, Sanabarule
Updating Operational Plan	-
Terrace Development	Shree pani CFUG – Chiandada, Shree Sera CFUG - Sera khola, Gol chaur, Bhat, ChourKhola, Bhateni CFUG - Ghartikhola, Katjanikhola, Maleni.
Water Filtering Dam	Shree pani CFUG - Khadapakha (tarjali) (1), Sera CFUG - Chatekhola, Sera khola (4), Bhateni CFUG - Pakhapanikhola, Salghariknola (2)
Water Conservation Pond	Shree pani, Ramachour - new construction -1. Sher pakhari, Dhamachour – 2. Malenipanipokhari, Goganpani - 3
Rain Water Harvesting Device	-
Community Livelihood Improvement Plan	Supprt to user group of Bhateni CFUG in goat farming
Nursery Establishment	Kalika CFUG

Bangad-Kupinde, ward No. 6

Restoration of Degraded Forest	Santi CFUG - Yannechour, Damaighareli, Laiyachour of Kalapokhara, Lekbesi – Chour, Shiddhamalika.
Restoration of Range Land	-
Updating Operational Plan	-
Terrace Development	Shiddhartha – Karakoti Khola, Malika - Sisnekhola
Water Filtering Dam	Chourgaunkhola, Kala pokhara, Jhalepaharkhola, Bahunekhola
Water Conservation Pond	Kalapokhara, Gate kodada, Gate kotakura, Damaighareli Jugepani of Lekbesisawan (total 5 nos)
Rain Water Harvesting Device	Dadakotbasti
Community Livelihood Improvement Plan	-
Nursery Establishment	-

Bangad-Kupinde, ward No. 7

Restoration of Degraded Forest	Virchuli CFUG (*Tibekhalikotala*)

Restoration of Range Land	Potentiality of developing pasture in Bhirchuli CFUG
Updating Operational Plan	Chautari CFUG and Hariyali CFUG
Terrace Development	-
Water Filtering Dam	Tarjali in Virchuli CFUG, Dharilagaune dado, Satbirkhola - in 3 locations
Water Conservation Pond	Pond improvement: Sairakhola, Dadakhani, Ratanbudhai Tibekhali, Khalidada, Jadekhali New construction: Chalaunekhali, Jal, Ratikhali
Rain Water Harvesting Device	Bagkhor and Raktachauligaun
Community Livelihood Improvement Plan	Chautari CFUG - Timur and Goad farming
Nursery Establishment	-

Kumakh, ward No. 1

Restoration of Degraded Forest	Gajiyachourkalimati, Bajyabajan, syaldada, simalchaur, Saunekhola, Kala mura, Ratamata, Thanekanachaur, Gnagatepani, Jalakanesayalkarka, Jayamarechaur, Gorkha goganpani - Pataukothama, Bhimeswori, Bhatekhoriya, Bharalknola, Chotedadi, Harlegadi, kalimati, sallegaida, Milanchouk, Sindurekhola
Restoration of Range Land	-
Updating Operational Plan	Chutari CFUG, Priyachour CFUG, Pragatishil Dalit CFUG, Chetanshil CFUG
Terrace Development	Dadapipal and GauraKhola, Sundurekhola (baghkhor); Lamadata in Bhitri
Water Filtering Dam	Gajiyachour, Mahilapragatishil CFUG, Jalkane, Bhitri and Chotedad, Kalika, Chetanshil, Jhalegauda
Water Conservation Pond	Mitri CFUG - Chotedadi, Phaple. Malika CFUG – Haledadi. Chetanshil CFUG - Ranatakura, Kamal gauri, samichaka. Malika bhagabati CFUG - Chisapani, Parikhola, Thulokholapokhari. Janasewa CFUG - Sindurekhola CFUG - Patekhola, Bamchour, Bhaban takura, Lamadada. Kalikahariyai CFUG (20)
Rain Water Harvesting Device	Baruletol
Community Livelihood Improvement Plan	-
Nursery Establishment	Gajhiyachour, Kalikabhagabatichisapani

13.2.B Achham District

Mellekh, ward No. 1

Restoration of Degraded Forest	MastamandapMajhagaun, Telegadha, Mahetola, Gumeli, Syaule, Dhamigaun,
Restoration of Range Land	Telegadha, Mastamandau, Syaule, Gumeli
Updating Operational Plan	Mastamadau, Syaule, Telegada, Gumeli,
Terrace Development	Dhamigaun, Kasachatpanimul, Bandhunga, Gogane
Water Filtering Dam	Khadpada, Chaur Katan tallotol, Mahetola
Water Conservation Pond	Nara, Lidegada, Tilegada, Basjhula,
Rain Water Harvesting Device	Gopalegaun, Gharmekharkiya, Degbina, Madelaya, Dhamigaun
Community Livelihood Improvement Plan	Majhagaun, Mahetola, Dhamigaun (goat and vegetable farming)
Nursery Establishment	Two among Mastamandau, Telegada, Ghupeli, Syaule

Mellekh, ward No. 2

Restoration of Degraded Forest	Danpada, Thala, Ghumekharke, Rolta, Bablegada, Sirkitte, Sundur khet, Chotimalika, naulaban, Majaun
Restoration of Range Land	Banpada, Thala, naulaban, Khadindramul, Majaun, Rolta, Sirkitte,
Updating Operational Plan	Nandamata CFUG, NandhungeCFUG
Terrace Development	Bagadi, Bathan, Nunedhunga, Turkegada
Water Filtering Dam	Pagreni, Bagadi
Water Conservation Pond	Sindurekhet, Binigada, Bakhrokot
Rain Water Harvesting Device	Nandamata Ma. Bi., Health post, Kamal Pra. Bi.,
Community Livelihood Improvement Plan	Ranikhet, Dadashree (vegetables), Nandhunge and Khadpakhatol (goat)
Nursery Establishment	Nandamata and Nandhunge CFUG

Mellekh, ward No. 6

Restoration of Degraded Forest	Madighada CFUG Block no. 4 and 2
Restoration of Range Land	Kushedi, bileda, Bathane, Dudimela
Updating Operational Plan	Madigaun, Nawaghar CFUGs, (one for government forest)
Terrace Development	Tamdimadu, Khadkawada, Dadakhet, Ligri, Bahunigaun, Jogibada, Seraerigaun, Chaitigada, Bichali
Water Filtering Dam	Tkrene ban, Jukapani, Badegada, Rala, Dadhutala, Aarashen Ligri.
Water Conservation Pond	Majhigaun, Kalapani, Nabgadha, Kolseni, Madigadha
Rain Water Harvesting Device	-
Community Livelihood Improvement Plan	Majhigaun, Kalapatal, Nabagadha, Madigaun, (3 on vegetable, and goat)
Nursery Establishment	One in Nabagadha, Madhigada, Khadkawada, Tamdimandu or Aasashen

Ramarosan, ward No. 5

Restoration of Degraded Forest	Rumalerajthala, Ratolla, Bate, Salleri, Birchemala, Bhagobuiya, Sera, Salimkot,
Restoration of Range Land	Bagebachala, Netakot
Updating Operational Plan	Birchamal, Sera, Gotalla
Terrace Development	AlledikoThek, Satalisen, Sadekhad, Sera, Chirkemala
Water Filtering Dam	Bhagebuya, Simaldada, Birchemala, Gotalla
Water Conservation Pond	Sallisen, Dabalekhal, Salingkot, Bate, Gotalla
Rain Water Harvesting Device	Yasoda High school
Community Livelihood Improvement Plan	Rame, Sera, Tarigota, Mastamando
Nursery Establishment	Saini, Mastamando, Tarigota, Gotalla

Ramarosan, ward No. 6

Restoration of Degraded Forest	Tursane, Junna, Bhatekada, Basanta, MKP
Restoration of Range Land	Junna, Basanta, Sunni
Updating Operational Plan	MKP and Kanchan CFUG
Terrace Development	Junna (*junnakotalatira*), Serapatal
Water Filtering Dam	MKP, Serapatal, Tursane, Kanchan

Water Conservation Pond	Basanta, Sunni ban, Bhatekada
Rain Water Harvesting Device	Health post
Community Livelihood Improvement Plan	Impovement plan on NTFP in Sunni ban
Nursery Establishment	MKP, Sunni ban

Safebagar, ward No. 13

Restoration of Degraded Forest	Aamruk, Karkale, Kada, Judepani, Lamasada, Kulakhal
Restoration of Range Land	Jajar, Lambelo, Katrofalnesaldado
Updating Operational Plan	Neta CFUG, Rakse CFUG, Sukcha CFUG, Amruk CFUG, Ratomato CFUG, Saljhadi Samrachyan Samiti
Terrace Development	Thulakhal, Batali gaun, Bistagaun, Kunwar tol
Water Filtering Dam	Neta, saljhadi,
Water Conservation Pond	Neta, Rakse, Sugdha, Aamruk, Ratomato, Saljhadi
Rain Water Harvesting Device	Ward office, School, and Health post
Community Livelihood Improvement Plan	Batali gaun (goat, Pig farming), Bitagaun and Kunwar tol (vegetable farming)
Nursery Establishment	One in Neta, Rakse, Ratomate or Aamruk

13.2.C Dolakha District

Sailung -4

Restoration of Degraded Forest	Bhakare, Mahbhir and Ghattepakha; Bhakare, Salleri (fire control line); Pokhridil
Restoration of Range Land	Panigahiro
Updating Operational Plan	Paiyukhola, Ahale
Terrace Development	Salleri, Mahabhir, maithan, harisiddhi
Water Filtering Dam	Lamcheahal, Chisapani, Makadeurali, Pokharidil, Dilpari
Water Conservation Pond	Pokhari, Salleri
Rain Water Harvesting Device	-
Community Livelihood Improvement Plan	Livestock/goat farming (Pokhare, Bhakare, Salleri)
Nursery Establishment	Salleri

Gaurisankar- 8

Restoration of Degraded Forest	Manedada, Laphang (fire control line in Maure)
Restoration of Range Land	Deurali, Girpanidada, Patal, Mulkharka
Updating Operational Plan	-
Terrace Development	Manedada, Lanjing, Kaseri, Tatopani, Manedanda
Water Filtering Dam	Kaseri, Laphang, Gumba, Lanjing, Kaseri, Tatopani, Manthali, Babedanda, Salle
Water Conservation Pond	Deurali
Rain Water Harvesting Device	Girpanidada, Kaseri, Laphang, Bhandare, Khanidada
Community Livelihood Improvement Plan	Goat farming, Kiwi farming (Gumba)
Nursery Establishment	Mane dada, Laphang

Bhimeshwor- 9

Restoration of Degraded Forest	Sele, Bhituri, Phaltechour, Bimal, Palekoban, Selealambhir, Eklepakha, (+fire control line)
Restoration of Range Land	Bhitari, Bhidikhor,
Updating Operational Plan	-
Terrace Development	Churikharkakholsa, Chautaragaun, Bhasme
Water Filtering Dam	Aalambhir, Chauri kharka, Bhitto
Water Conservation Pond	Sell
Rain Water Harvesting Device	Bhandare, Khanidada
Community Livelihood Improvement Plan	Off-season vegetable production; goat farming (Bhitari)
Nursery Establishment	Lakuri (Katus, Khusu, pahele), Sankhadevi

Kalinchok- 5

Restoration of Degraded Forest	Namathali
Restoration of Range Land	Namathali (Upper part)
Updating Operational Plan	-
Terrace Development	Kadabari
Water Filtering Dam	Pahire, Deupure, Thali, Bhiramuni
Water Conservation Pond	Aahaldada, Thalthale, Pokharegaun, Sikhda
Rain Water Harvesting Device	-
Community Livelihood Improvement Plan	Vegetable farming; Nigalo processing (Namathali, Mehele)
Nursery Establishment	Dhunge, Sangi
Sheds for Chauri caretaker	Namathali Chauri kharka

Kalinchok- 6

Restoration of Degraded Forest	Ramche, Jhareni, Kuriban
Restoration of Range Land	Tutuwan, Ghyangdada
Updating Operational Plan	-
Terrace Development	Suire
Water Filtering Dam	Mehegairi
Water Conservation Pond	Balthali
Rain Water Harvesting Device	-
Community Livelihood Improvement Plan	Goat farming and Kiwi farming
Nursery Establishment	Balthali

Jiri- 5

Restoration of Degraded Forest	Kalobhir (+fire control line) and Dhungeswori
Restoration of Range Land	Bhanjyang, Kapte
Updating Operational Plan	Dhungeswori CFUG
Terrace Development	-
Water Filtering Dam	Domankhola, Duduli, Sipto and Sewakendra
Water Conservation Pond	Kyanse/Tyakse
Rain Water Harvesting Device	Ahaldanda and Nursery Pakha
Community Livelihood Improvement Plan	Off-season vegetable farming, NTFP processing
Nursery Establishment	Dhungeswori
Fire control line	Kalobhir
Sheds for Chauri caretaker	Bhanjyang, Kapte

Annex 13. 3: Project Results Framework

Project objective	Objective indicator	Baseline	Target	MoV
Increased capacity of national and local government institutions in Nepal to adapt to climate change by implementing EbA in degraded forests and rangelands in mid-hill and high mountain areas	1. The degree to which capacity of targeted government institutions is strengthened at national and sub-national levels to identify, prioritise, implement, and assess the effectiveness of EbA interventions.	1. Baseline study to be conducted at the project inception stage. Institutions are in the process of identifying climate change risks, but not EbA interventions to manage these risks. As a result, management systems are not in place to implement EbA, and this approach is not included in budget allocations. Through the BMUB-funded project, the MoFSC had been involved in implementing EbA interventions in the Panchase area. A quantitative assessment of the baseline for this indicator will be conducted at the inception stage. Capacity enhancement of local institutions (Municipalities and Wards) required in the field of identification and mitigation measures of climate change induced risks.	1. The increase of at least 3 in the capacity score of each institution. (Max 10, Min 0) (Suggestion of baseline team: no change in target)	1. Verified through Scoring methodologies developed by the TAMD and PPCR and adapted from the GEFSec - AMAT (2014)[34]. *The indicator is based on five-step criteria of capacity assessment framework (expressed as questions):* *1. Are the institutions in the process of identifying climate change risks and appropriate EbA interventions?* *2. Are the institutions prioritising EbA interventions and specifying budget allocations and targets for these interventions?* *3. Have the institutions defined clear roles and responsibilities for the coordination and implementation of EbA interventions?* *4. Is there evidence of effective implementation of EbA interventions by the institutions?* *5. Is there evidence of adequate institutional capacities for the continuous assessment, learning and review of adaptation strategies and measures?* Each question is answered with an assessment and scores for the extent to which the associated criterion has been met: not at all (= 0), partially (= 1) or to a large extent/ completely (= 2). An overall score is calculated, with a maximum score of 10 given five criteria. These five criteria will be reviewed and validated at the inception phase of the project. 2. Household surveys and reports
	2. A number of beneficiaries benefitting from project interventions disaggregated by gender.	2. No of total households and beneficiaries in EbA II project area: No. of HHs – 11453 Total Pop. – 56170 Female Pop. – 29331 (52.2%)	2. At least 1000 (to be validated at inception). (Suggestion of baseline team: no change in target)	
Outcome 1 Increased capacity of government officials and local user groups to implement EbA through enhanced institutional arrangements, intersectoral collaboration and information	**Outcome indicator** 1. A technical working group with a mandate to identify, priorities and monitor EbA established within IMCCCC.	1. The technical working group does not exist.	1. The technical working group established within IMCCCC, of which membership 5% are women and conducted meetings. (Suggestion of baseline team: no change in target)	1. Project progress reports. Attendance registers and minutes from IMCCCC meetings

[34] Adapted from TAMD (2013) and PPCR (2014) scorecard indicators.

Project objective	Objective indicator	Baseline	Target	MoV
	2. Number of the national, district and local officers and community members with the capacity to identify, priorities and implement EbA	2. Currently, national stakeholders lack capacity to identify, prioritise and implement EbA. District and local officers in Panchase have been trained on implementing EbA in that particular area. District and local officers at intervention sites have capacity to undertake business-as-usual restoration interventions in forests and rangelands. At the grassroots, capacity building is needed among functional groups (forestry, agriculture, livestock, IGAs, mother groups etc) through various training (skill, business development, financial literacy etc). Technical inputs are required to implement EbA interventions. In the changed context of federalism, these services have been devolved to local government bodies (municipalities). Recruitment of technical persons (Agriculturist, Veterinarian, Engineer, Overseer etc) by the Municipality/ Wards would augment local capacity in planning and implementation of EbA interventions. Capacity building at local level would also require meaningful coordination and collaboration between the stakeholders viz Communities, Municipalities, provincial government, NGOs/INGOs etc.	2. By project end, at least 150 people are trained, of which 30% are women (to be validated by the baseline study) (Suggestion of baseline team: 150 people consisting of FUG: 104x1=104; Ward Official 18x1=18; Municipality Official 10x1=10; District Official 3x3=9; Central & Province =9 persons)	2. Attendance registers from training sessions and training reports. A scoring scale methodology will be used to measure the capacity of trained officers. To measure people's capacity to identify, prioritise, implement, monitor and evaluate adaptation strategies and measures; the tracking tool recommends the following scoring scale: 1 = Very limited or no evidence of capacity 2 = Partially developed capacity 3 = Fully developed, demonstrated the capacity Depending on the nature and scope of the training provided, the tracking tool may provide an average score based on an assessment of capacity along the following criteria: (a) understanding and interpreting climate information; (b) assessing vulnerability; (c) identifying EbA adaptation options; (d) implementing EbA measures (e) Monitoring, evaluating and learning from EbA interventions. Note - See training plan for details on the training sessions (Appendix 8).
	3. Number of national campaigns implemented by the project to increase public awareness on EbA	3. Zero	3. By project mid-point, at least one national awareness campaign; by project end-point, at least two national awareness campaigns. (Suggestion of baseline team: 3 national and 3 district level campaign to raise awareness on Benefits of EbA) 4. Four tools developed	3. Public awareness campaign design and final report. Project progress reports. Evidence of public awareness tools used for the campaigns.

Project objective	Objective indicator	Baseline	Target	MoV
		4. Zero	(Suggestion of baseline team: eight tools (i) EbA practical guideline, (ii) forest based enterprise development plan, (iii) Livelihood development plan (iv) GESI and inclusive development guideline/action plan, (v) water conservation, and storage guidelines, (vi) infrastructure to reduce rainwater run-off and erosion, (vii) rain water harvesting devise, (viii) bioengineering for river bank protection/ stabilization	4. Feedback from national stakeholders within MoFE, MoALD and MoEST
	4. Number of educational tools including research findings developed by a project that is being used by government institutions to integrate EbA in the educational programmes and national planning			
Outcome 2 National Policies, strategies and plans are strengthened to promote EbA implementation	**Outcome indicator** 1. Number of policy briefs to guide the revision of the policies/ strategies to integrate EbA	1. No revisions of any strategy/policy are made to date to integrate EbA as part of an adaptation strategy in Nepal.	1. At least one policy brief is developed that has guided the revision of a national policy/ strategy (Suggestion of baseline team: Policy brief on EbA strategy and livelihood improvement)	1. Policy briefs, policy/ strategy documents.
	2. Upscaling strategy for EbA in forests and rangelands developed.	2. No EbA upscaling strategy developed to date in Nepal.	2. EbA upscaling strategy developed (Suggestion of baseline team: EbA up-scaling / replication strategy (based on good practices and lessons learned)	2 EbA upscaling strategy document.
	3. Financing plans developed for EbA, including proposed budget allocations.	3. No financing plans for EbA exist to date in Nepal.	3. Financing plan (Suggestion of baseline team: Financing plans disaggregated by activities and wards to be developed)	3. EbA financing plan
Outcome 3 EbA implemented by user groups to restore forests and rangelands in the mid-hills of Achham and Salyan and high mountains of	**Outcome indicator** 1. A number of ha of forests restored by the project in selected wards using EbA[35].	1. As per the Baseline finding the total degraded forest area in EbA II project area is 2937.75 ha	1. At least 1000 ha of forests restored using EbA. (Suggestion of baseline team: No change in target)	1 and 2. Field surveys at intervention sites. GPS/GIS data captured and converted into shapefiles/maps.

[35]Plant species that have one or more of the following characteristics will be selected for forest restoration: i) grow quickly in the face of drought[35]; ii) are broad-leaved, thereby reducing rainfall impact on the soil; iii) have deep root systems, thereby increase water infiltration into the soil; and iv) produce natural resources that provide benefits for indigenous and local communities (including fodder, income from NTFPs and medicinal products).

Project objective	Objective indicator	Baseline	Target	MoV
Dolakha to decrease the sensitivity of local communities. (Support *Chauri* farms declining due to harshness of pasture lands)	2. A number of ha of rangelands reseeded by the project in selected wards using EbA[36]. 3. A number of operational management plans updated to include EbA interventions as part of VDC adaptation strategies. 4. Number of techniques introduced in selected wards[37] to conserve top-soils and water 5. Number Community Livelihood Improvement Plans (CLIPs) developed from forests, rangelands and agro-ecosystems of and implemented in selected wards[38]	2. As per the Baseline finding the total degraded rangeland in EbA II project area is 433.4 ha 3. Zero Non of the existing operational managment plan include EbA related actions 29 Operational managment plans reported to be outdated At least 71 plans needs upgrading to include EbA intervention 4. Zero 5. Zero The survey results indicate the need for Community Livelihood Improvement Plans; however, no community Livelihood Improvement Plans reported in the Project area.	2. At least 450 ha of rangelands restored using EbA. (Suggestion of baseline team: No change in target) 3. 100 operational management plans updated. (Suggestion of baseline team: 29 plans of CFUGs need to be prepared. Rest of the plans need modification as per the guideline of EbA-II) 4. 120 ha of improved terraces, 36 filtering dams, 36 water conservation ponds and 24 community rainwater harvesting devices constructed in selected Wards (Suggestion of baseline team: No change in target) 5. Three CLIPS developed. (Suggestion of baseline team: At least one livelihoods improvement plan in each project municipality based on available natural resources and potential IGAs. Experts' inputs will be sought to develop CLIPs along with appropriate IGAs.) 6. (Suggestion of baseline team: At least one nursery each for each project municipality)	do 3. Reports for operational management plans. 4. Reports and field surveys at intervention sites 5. Household surveys at project sites at project inception (baseline assessment), mid-term and termination, including a section on income from livelihoods and field surveys at intervention sites.

[36] Grass species that grow quickly in the face of drought; and/or can withstand warming temperatures will be selected to reseed rangelands. In addition, fast-growing and useful tree species will be selected to plant intermittently in restored rangelands

[38] in Achham, Dolakha and Salyan intervention sites.

Project objective	Objective indicator	Baseline	Target	MoV
	6. Number of nurseries established by users' group for easy availability of specific plants for improvement of degraded forests and increase production of NTFPs/MAPs	6. Zero	7. (Suggestion of baseline team: fire protection lines constructed at 3-4 locations on pilot basis	6. Reports and field surveys at intervention sites.
	7. Fire control lines constructed at sensitive locations to save destruction of valuable wood, flora and fauna from forest fire	7. Zero	8. (Suggestion of baseline team: Four simple permanent sheds constructed at strategic locations on pilot basis).	7. Reports and field surveys at intervention sites.
	8. Number of sheds constructed for caretakers of *Chauri* in pasture sites. (*Chaurikharka*)	8. Zero		8. Reports and field surveys at intervention sites

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