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Baseline Agrobio Survey Report:

Madhyanepal-5, Lamjung

कृषि जैविक विविधता आधार- रेखा सर्वेक्षण प्रतिवेदन: मध्यनेपाल-5, लमजुङ

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Kathmandu, Nepal | 2025

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NAGRC, 2025

NAGRC, NARC, (Khumaltar, Lalitpur; https://genebank.narc.gov.np/)
National Agriculture Genetics Resources Center (NAGRC), commonly called Genebank was established in 2010 under the Nepal Agricultural Research Council (NARC) for the conservation and utilization of all agricultural genetic resources (AGRs), including the six components of agrobiodiversity (crop, forage, livestock, aquatic, insect and microorganism) and four subcomponents (domesticated, semi domesticated, wild related species and wild edible species). AGRs are managed through four strategies (ex-situ, on-farm, in-situ and breeding) and by deploying the 101 Good Practices across the country. AGR repositories Include seed banks, tissue banks, DNA banks, field genebanks, community genebanks, livestock farm genebanks, aqua pond genebanks, agro gene sanctuaries, and so on. All AGRs are managed scientifically and made available for research, study and production. Conservation through utilization following agroecology is also one of the strategies of this Center.

FAO (Rome, Italy; https://www.fao.org)
The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger. FAO's goal is to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives. With 195 members - 194 countries and the European Union, FAO works in over 130 countries worldwide.

BSF (https://www.fao.org/plant-treaty/areas-of-work/benefit-sharing-fund/projects-funded/en/)
The Benefit-sharing Fund (BSF) of the International Treaty is an essential element of the Funding Strategy and of the Multilateral System of Access and Benefit-sharing. The BSF is the operational mechanism for receiving, utilizing and sharing the monetary benefits arising from the Multilateral System and plays a catalytic role in international cooperation on plant genetic resources for food and agriculture (PGRFA).

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Cover photo: Project site, Mahyanepal-5, Lamjung

Contents

Acronyms

AGR	Agriculture Genetic Resources
AKC	Agriculture Knowledge Center
APGR	Agriculture Plant Genetic Resources
BSF	Benefit Sharing Fund
CBS	National Bueau of Statistic
CSB	Community Seed bank
CWR	Crop Wild Relatives
EPB	Evolutionary Plant Breeding
FAO	Food and Agriculture Organization
FGD	Focused Group Discussion
HH	House Hold
ICARDA	International Center for Agricultural Research in the Dry Areas
KII	Key Informant Interview
LEC	Landrace Enhancement and Conservation
MoALD	Ministry of Agriculture and Livestock Development
NAFHA- Project	Nuts and Fruits Hilly Area Project
NAGRC	National Agriculture Genetic Resource Center
NGO	Non-Governmental Organization
NRs	Nepalese Rupees
PGR	Plant Genetic Resources
PGRFA	Plant Genetic Resources for Food and Agriculture
PRA	Participatory Rural Appraisal
PVS	Participatory Variety Selection
SQCC	Seed Quality Control Center
USD	United States Dollar
VDC	Village Development Committee

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The authors would like to express their heartfelt gratitude to all the farmers of the ward-5 of Madhyanepal municipality, Lamjung for their generous cooperation and willingness to share valuable information on socio-economic and agricultural biodiversity of this area.Their valuable support was indispensable in carrying out the baseline survey. We are particularly thankful to Bal Kumar Joshi (former chairperson of ward), Ombir Gurung (chairperson of ward-5), Santosh Tiwari (principal of Samjhana secondary school) Dukumaya Gurung (custodian farmer) for providing essential insights into the village, which greatly enhanced the depth of our understanding. Their local knowledge was invaluable to the success of the survey. Special thanks go to Ms. Shanti Gurung, Project staff, for her dedicated efforts in field data collection and successfully completing the data entry process. We also acknowledge the significant Lastly, we would like to extend our heartfelt thanks to all the helping hands who directly or indirectly contributed their valuable time and suggestions to the preparation of this report.

The local communities micro-level baseline

The local community micro-level baseline will indicate the level of crop and varietal diversity within the agroecosystems and type of production system that are cultivated by the type of farmers, the availability of crop/varietal traits and the traits that are needed. The baseline will also indicate the institutional support and the capacity building needs of the farmers.

With core functionality in mind, and keeping the approach effective yet as simple as possible, the FGD serves as the practical approach for implementation. The FGDs, and the corresponding set of questions, aim to support farmers to assess and identify their own breeding objectives, such as traits preferences and issues of access to both cultivars and seeds. The FGD should be facilitated and documented in such a way that enable genuine farmers' data, their own analyses and setting their own objectives. The participation of men and women farmers, and ownership are of utmost importance. The FGDs should help sustain commitments from communities and stakeholders. In this regard, it is important to avoid extractive data collection and analysis where farmers are only a source of data collection and validation.

About 8 to 15 participants are needed per FGD. In cases where the agro-eco-system and production types are similar, 4 to 5 FGDs are enough. In cases where the projects will cover more than one type of agro-eco-system and production types, 3 FGDs per type should be useful. To capture differentiated priorities by gender, economic status, youth, ethnicity, segregated FGDs should be conducted per agro-eco-system and production types. Identifying and segregating farmers by economic status is important and needs to be handled sensitively. Segregation based on similar grouping is more important than representation. Representation by unequal power and wealth positions can influence FGD results. Contradicting opinions provide depth of perspectives and understanding. Towards the end, a consensus should be achieved at the level of FGDs, so that each FGDs set their own on priorities. After all the FGDs are conducted, a community presentation of the various results and priorities of each FGDs would be ideal for the further buy-in of local leaders. However, given existing social differentiation within communities, there is no need to get a consensus at community level. Instead, the project should respond to the diverse needs and priorities identified by each FGDs.

When conducting a comprehensive baseline, and specifically after the project inception period, the use of the crop diversity wheel[1] is highly recommended during the project implementation. The crop diversity wheel is particularly useful when targeting the specific communities and segregated for gender and social inclusion. At such a stage the crop diversity wheel can inform the crop values and breeding objective of specific farmers.

[1] See for example https://sdhsprogram.org/assets/2021/08/Illustrated-Field-Guide-Module-2-on-Diagnostic-Stage_revised.pdf#page=15 or https://himalayancrops.org/concepts-tools/four-cell-analysis/

Executive summary

Nepal's rich heritage of agricultural biodiversity and traditional farming knowledge is under serious threat due to neglect, modernization, and the growing impacts of climate change. Madhyanepal Municipality in Lamjung District is a vivid example of this crisis, where rare landraces, wild plant species, and traditional farming practices are rapidly disappearing. Once self-reliant and diverse, the local agriculture system is facing disruptions in circular integrated farming, increasing dependence on external agricultural inputs, and declining resilience to environmental and socio-economic stresses. This report presents the baseline findings from a detailed agrobiodiversity survey conducted as part of the FAO-funded on-farm project titled "Enhancing Conservation and Utilization of Plant Genetic Resources in Nepal for Food and Nutrition Security under Unpredictable Climate Conditions," under the International Treaty's Benefit Sharing Fund.

The project was initiated to bridge the growing gaps in conservation, characterization, and use of agricultural plant genetic resources (APGRs). It emphasizes building capacity among farmers, researchers, extension agents, and local communities. Through strengthening seed systems, fostering participatory collaboration, and reviving traditional practices, the project seeks to ensure food, nutrition, health, business, and environmental security. It aims to enhance the competitiveness of farmers' varieties and promote sustainable agricultural practices that are adaptive to climate change.

To gather baseline information, Participatory tools were applied. A household-level survey was conducted in which 57 households (23% of the ward's total) were randomly selected for detailed data collection. Focus Group Discussions (FGDs) were held in Magar Gaun and Amdanda with 24 and 23 participants, respectively. In addition, five-cell analysis and four key informant interviews were carried out.

The findings confirm that agriculture remains the backbone of Madhyanepal's rural economy, characterized by mixed farming systems. A significant proportion of households (49%) depend on agriculture and livestock, while 36% also rely on remittances. Small landholdings dominate the landscape, with 56% of households owning between 1 and 5 ropani, and 40% with less than 1 ropani. Women play a dominant role in agriculture: 96% of the surveyed respondents were female, and they were actively involved in seed selection (96%) and household-level decision-making (54%). These statistics highlight the critical role of women in agricultural biodiversity conservation and household food security.

The survey explored six target crops — Amaranthus, buckwheat, finger millet, black gram, naked barley, and broad bean. Among these, only finger millet is widely cultivated in the area. Staple crops such as rice, maize, and finger millet form the backbone of the local food system, supplemented by legumes, vegetables, fruits, and some cash crops. Traditional practices like crop rotation, intercropping, and basic water management techniques are still in use to enhance productivity and ecological sustainability. Forage species like kutmero, mulberry, bamboo, siru, kaas, kamlo, gidari, khar, salme, and katus are also part of the integrated farming system, supporting livestock rearing.

The productivity and usage patterns of local crops were also assessed. Around 94% of respondents reported finger millet yields of 100–500 kg annually, while 24% produced more than 500 kg. A mixed seed sourcing strategy was observed among 63% of households, with cereals often stored in sacks after drying. Importantly, 51% of households had year-round sufficiency of cereal crops, and a similar percentage had year-round access to green vegetables. However, the utiliztion of crop wild relatives (CWRs) was very limited — 60% of households had access to them for only up to 15 days annually.

Subsistence farming still dominates, with 89% of households producing solely for home consumption and only 11% engaging in market sales. This underlines the urgent need for value chain development and market access to enhance income generation. Traditional food systems, deeply rooted in local geography and cultural practices, rely on locally grown ingredients and offer opportunities for nutrition-sensitive and sustainable food development.

Culturally significant crops such as black gram (identified as the most important by 95% of respondents) and finger millet (89%) are vital to the local diet and farming system. Soil health, while moderately good in some areas due to organic content, remains a concern due to erosion, nutrient depletion, and pH issues (acidic to neutral). These environmental stressors, compounded by changing climate patterns, pose a serious risk to the region's agrobiodiversity and long-term food security.

Beyond agriculture, Madhyanepal is home to important religious and cultural sites such as Nagbhairab Mandir, Ishaneshwor Mandir, and Balkanya Mandir. These sites offer a unique opportunity to integrate cultural heritage with conservation and agrotourism strategies. Furthermore, the region's ethnically diverse population, with 68% Janajati and 19% Dalit representation, brings a wealth of indigenous knowledge and community-based resource management systems that must be harnessed.

Based on the findings and gap analysis, additional underutilized crops like wild fruits and vegetables, mango landraces, horse gram, rice bean, and traditional vegetables have been identified for future conservation and utilization efforts. To support this, a comprehensive set of project interventions is proposed, including:

- Conservation and Seed Systems: Germplasm collection and repatriation, household and community genebanks, agro-gene sanctuaries, and diversity blocks.
- Community-Based Innovation: Raithane nursery, participatory landrace enhancement (LEC, PVS, EPB), monkey-protected natural farming, and agro-plantation.
- Capacity Building and Youth Engagement: School field genebanks, agrobiodiversity and food fairs, and training programs for farmers and local institutions.
- Sustainable Practices and Inputs: Liquid manure preparation, soil improvement, insects and microbes management, hedgerows and living fences, and traditional storage and packaging.
- Market Development and Product Diversification: Raithane Hatbazar, product diversification, marketing of native products, and promotion of traditional food items.
- Exploration and identification of potential crop species for conservation through utilization.

In conclusion, the baseline survey confirms that Madhyanepal-5 is both rich in traditional agricultural knowledge and biodiversity, yet vulnerable to multiple pressures including climate change, socio-economic transformation, and the erosion of traditional practices. This project, with its multifaceted approach and inclusive framework, has the potential to revitalize local agrobiodiversity, improve food and nutrition security, and ensure the sustainability of farming livelihoods. By empowering farmers, especially women, and fostering resilient farming systems, the initiative provides a model for climate-adaptive, biodiversity-based agriculture in Nepal and beyond.

1. Background

Genetic erosion is occurring rapidly on a global scale. The massive loss of agricultural genetic resources, termed as "genetic wipe-out," is a continuous and widespread process (Harlan, 1975; Wilkes, 1993; Chhetri and Chaudhary, 2011). Predictions indicate that approximately 60,000 plant species—around 25% of the world's total—could be lost by 2025 if current trends persist (ICARDA, 1999). Agricultural plant genetic resources (APGRs) are directly linked to the livelihoods of Nepalese farmers. However, the loss of these resources is rapid, often irreversible, and irreplaceable in several cases due to various endogenous and exogenous factors, particularly climate change (FAO, 2009b). This has led to the erosion of crucial gene pools and associated indigenous knowledge (FAO, 1997). Despite their significance, APGRs have not been comprehensively conserved through ex-situ, on-farm, or in-situ approaches. The introduction of exotic high-yielding varieties has led to the loss of nearly 50% of native and local genetic diversity, and Nepal's dependency on foreign germplasm for research and experimentation has reached 95%. In addition to crop genetic erosion, the loss of associated biodiversity, particularly agro-insects, has resulted in pollination challenges and a decline in genetic diversity maintenance. The reduced diversity of crop varieties in the field has created further challenges, including farmers' inability to maintain their own seeds, increased reliance on costly and non-environmentally friendly chemicals, and disruptions to traditional circular agricultural systems. As a result, farmers have become increasingly dependent on external institutions for agricultural inputs. Several factors have accelerated genetic erosion, including technical, socio-economic, legislative, and environmental challenges. The loss of natural habitats has further narrowed the genetic diversity available for both breeders and farmers.

Moreover, the lack of characterization and identification of elite lines within the local germplasm pool has limited efficient breeding efforts, reducing options for developing new crop varieties that can meet emerging agricultural challenges. The limited number of crop species currently cultivated is highly vulnerable to diseases, climate change, and other environmental stressors. Ideally, as agricultural challenges increase, genetic diversity should also expand, but in reality, field diversity has significantly narrowed, with most cultivated varieties being non-evolutionary and monogenotypic. The widespread practice of cultivating large areas with a single variety should be replaced with a more site-specific approach to crop selection and breeding. However, international treaties, agreements, and national policies have restricted genotype movement within the country, posing additional challenges to food security and sustainable agriculture.

In Nepal, farmers and breeders have limited access to and knowledge of multilateral genetic resource systems. Since 2010, the National Genebank has been in operation as an ex-situ reservoir for agricultural genetic resources (AGRs), employing four conservation strategies: ex-situ, on-farm, in-situ, and conservation breeding. These strategies are supported by 101 documented good practices. Despite these efforts, many unique genetic resources remain unexplored, uncollected, and unduplicated in national and international genebanks. Additionally, many conserved genetic resources still require characterization, identification of elite landraces, and broader deployment for agricultural use. Germplasm documentation and the dissemination of associated information remain incomplete, limiting access for farmers and researchers.Small-scale farmers, who depend on APGRs for food, nutrition, and health security, must be empowered to cultivate better-adaptive varieties

that can withstand biotic and abiotic stresses, ultimately contributing to the achievement of Sustainable Development Goals (SDGs) in sustainable food production. Strengthening the capacity of researchers, farmers, and other stakeholders within the agricultural value chain is essential. Collaboration with farming communities, value chain actors, and local enterprises should be prioritized as part of project planning to enhance conservation and utilization efforts. Making farmers' varieties more competitive is a key priority to ensure food, nutrition, health, business, and environmental security.

1.1 Project context

Agricultural plant genetic resources (APGRs) are vital for Nepalese livelihoods but have been severely compromised due to the loss of native landraces and overdependence on foreign germplasm. Since the introduction of exotic high-yielding varieties, approximately 50-100% of local genetic diversity has been lost. This, coupled with a narrow genetic base in the field and the loss of associated biodiversity, has reduced resilience to climate change and pests. Small-scale farmers face difficulties maintaining seed systems, relying on costly inputs, and lacking access to climate-resilient varieties. While the National Genebank has made strides in conservation, many genetic resources remain unexplored, uncharacterized, and underutilized.

This project aims to address these gaps by enhancing the conservation, characterization, and utilization of APGRs. By building capacity among farmers, researchers, extension officials and local communities, improving seed systems, and fostering collaboration, the project will ensure food, nutrition, health, business and environment security, strengthen agrobiodiversity, and create sustainable agricultural practices, addressing challenges posed by climate change and other stresses.

The main objective of this project is to address the lack of comprehensive conservation of agricultural plant genetic resources (APGRs) in Nepal, which has led to the loss of native genetic diversity and heavy reliance on foreign germplasm. By operating the National Genebank and implementing such as ex-situ, on-farm, in-situ, and conservation breeding, efforts are made to conserve and utilize these resources effectively. Specific objectives are:

- To enhance conservation and utilization of plant genetic resources in Nepal for food and nutrition security under unpredictable climate
- To contribute in enhancing conservation through utilization of agriculture genetic resources for climate change preparation
- To build a robust germplasm access and exchange mechanism for the country

As a local autonomous body, the municipality is committed to providing services efficiently and equitably, improving clean drinking water and transportation facilities, establishing social services for women, indigenous communities, and marginalized groups, and promoting advanced agricultural systems. It also works to activate community forest user groups and maintain environmental balance.

1.1.1 Stakeholders

The project brings together a diverse range of stakeholders, including community seed banks (CSBs) Community Genebank Network. Key partners also include local government bodies from various rural municipalities across different provinces. Several organizations and enterprises contribute to value chain development and market linkages, while academic and research institutions, along with multiple research stations under the Nepal Agricultural Research Council (NARC), support research, conservation, and capacity-building efforts. Government agencies such as the Ministry of Agriculture and Livestock Development (MoALD), the Seed Quality Control Center (SQCC), and other specialized research centers and NGOs play a vital role in policy formulation and implementation. Collectively, these stakeholders aim to enhance the conservation, utilization, and commercialization of PGRFA across Nepal.

1.1.2 Funding agency and Period

The International Treaty's new Funding Strategy features the Benefit-sharing Fund (BSF, managed by FAO) as a key component, operating through global calls for proposals and a competitive selection process and partial in-kinds support from NARC. Project period is of 4 years (20 April 2024 to 20 April 2028).

1.1.3 Outputs

The main outputs expected during the implementation period are the following:
Output 1: Adapted PGRFA managed or improved with farmers' participation.
Output 2: Enhanced local value chains improve the production and consumption of adapted PGRFA.
Output 3: Mechanisms strengthened to enhance the sharing of PGRFA materials, data and knowledge.

1.2 Objectives of Baseline study

This baseline report summarizes the native and local agricultural genetic resources, traditional knowledge held by farmers, and the socioeconomic context of farming systems within the project area.

The broad objectives of the baseline survey are:

- To collect the empirical data at farmers level for evidence-based problem diagnosis for revision of the project rationale, objectives and activities.
- To identify the national programs, priorities and gaps at National level

The Specific objectives are:

- Documenting the extent of genetic diversity, the uses, and potential of native crops.
- Understanding the cultural, religious, socioeconomic, and demographic aspects of farming communities in relation to native agrobiodiversity.
- Recording and analyzing traditional knowledge, particularly concerning intra-specific diversity, seed management, and crop processing practices.
- Identifying challenges to the sustainable use of crop diversity and the key factors influencing its conservation.
- Establishing a baseline and providing guidelines for future program planning in the project sites.

2. Methodology

The community micro-level baseline survey was conducted in Madhyanepal Municipality, Lumjung adopting the different approaches mentioned. The baseline was conducted at two levels: a national macro-level baseline and community micro-level component. The national level of baseline was conducted using the tools such as interactions and Key informant interaction with the policy people, extension agents and with the aim of informing the partnerships and the orientation of the project activities and obtaining the feedbacks for the finalization of the project activities. The literature review comprised various sources such as from FAO and the national government and research institutions which complimented the macro-level baseline information collection. Macro level baseline mainly focused on the documentation of the contribution of the project to the National Agrobiodiversity policies and regulations. This documentation provides the guidelines for the project activities and targets and designing on the implementation methodology. This survey also focuses on the compilation of the information on the present status of the target crops. For the micro level baseline, multiple PRA tools and techniques were utilized to document the baseline information.

2.1 Questionnaire preparation and pre testing

semi structured questionnaire was developed with the aim of documenting the household state information on agrobiodiversity conservation and utilizations. The questionnaire was designed and verified for pre-testing followed by the execution of the baseline study. Household survey was conducted in both the sites during February/ March with the aim of documenting the conservation status, status of skill, existing cultivation practices, unique crops and custodian farmers.

2.1.1 Household survey

Sampling

Collecting information from the sample is considered as a more appropriate method to minimize the costs and it also provides acceptable results (Casley & Kumar, 1988. The random sampling was opted for the baseline study. households were selected for gathering primary data. As per the population census 2021, there were 6427 households in in Madhya Nepal municipality and residing total of 21971 population. As per the population census 2021, there were 270 households in ward no 5 of Madhya Nepal municipality. A total of 57 (23%) households **(ANNEX 1)** were selected randomly for household level data collection. The households that were actively involved in agricultural farming using traditional knowledge and growing indigenous crops and varieties of agricultural crops were randomly selected for household level data collection.

Figure 1: Some glimpses of household survey

2.2 Focus Group Discussion:

To facilitate the discussions, a checklist was developed and finalized in collaboration with an expert team (Annex 7). A total of two FGDs were conducted in Magar Gaun and another in Amdanda. Magar Gaun is located at latitude 28.1316°N, longitude 84.2288°E, with an altitude of 676 meters above sea level (masl), while Amdanda is situated at latitude 28.126°N, longitude 84.251°E, at an altitude of 1,011 masl. The discussions were held on February 22 and 23, 2025, engaging local farmers in identifying key agricultural challenges and exploring potential solutions for sustainable farming practices. There were 24 participants in Magar Gaun and 23 participants in Amdanda during FGD **(ANNEX 2 and 3).**

Figure 2: Participants of focus group discussion at magar gaun (Left) and Amdanda (Right)

2.3 Key Informant survey:

The KIS was conducted to understand institutional support mechanisms, policy challenges, and opportunities for scaling regenerative agriculture. A separate checklist was prepared to carry out interview with key informants (Annex 8). In total, four key informant interviews (KIIs) **(ANNEX 4)** were conducted in the project sites with key stakeholders such as custodian farmer, principal of school and local leaders.

2.4 Data entry and analysis

The data collected from the project sites were systematically coded and data were entered. The dataset was cleaned and the key variables for analysis were prepared in Microsoft Excel. The cleaned data were converted to standard units before analysis through cross-site sharing and experiences of the team members. Missing data were filled up through follow ups making phone calls to the respective household. Results and their interpretation are presented in this report.

3. Site characteristics

3.1 District Overview

Lamjung District, located in the Gandaki Province of Nepal, is renowned for its diverse geography, rich cultural heritage, and abundant natural resources. Covering an area of 1692 km^2, the district is divided into three distinct geographic regions: the mid-hill, high-himal, and high-hill areas (Joshi et al., 2019). Lamjung lies at latitude 28.2765° N and longitude 84.3542° E, with elevation ranging from approximately 300 meters in the southern lowlands to over 8,000 meters in the northern Himalayan region, home to Manaslu, the eighth-highest mountain in the world at 8,163 meters. The district is strategically situated in the central part of Nepal, bordered by Gorkha District to the east, Tanahun District to the south, Kaski District to the west, and Manang District to the north. This geographic positioning adds to Lamjung's significance as a gateway to the Annapurna Circuit, a renowned trekking destination. Lamjung is home to a diverse mix of ethnic communities, including Gurung, Brahmin, Chhetri, Newar, and others. The Gurung community holds a particularly strong cultural presence in the district, contributing to the area's vibrant traditions and cultural heritage. The district also boasts historical landmarks, such as the Lamjung Durbar, an ancient palace that reflects the architectural style of the region.

The agricultural sector plays a central role in Lamjung's economy, with most of the population engaged in farming. The district is known for its crop diversity, with a variety of crops grown across its different altitudes. Common crops include rice, maize, millet, wheat, vegetables, and legumes, with farmers also practicing livestock farming, particularly goat and cattle rearing. This diverse farming system allows farmers to produce a range of food crops and cash crops, contributing to the community's food security and economic stability.In addition to agriculture, households often rely on remittances from family members working abroad, providing an additional livelihood option. Many also engage in small-scale businesses, handicrafts, and tourism-related activities, especially in areas close to the Annapurna Circuit. This combination of agricultural and non-agricultural income sources offers a degree of economic resilience, although challenges remain in terms of market access, infrastructure, and climate-related risks.Lamjung is administratively divided into 8 local governments, including 4 municipalities (Besisahar, Madhyanepal, Rainas, and Sundarbazar) and 4 rural municipalities (Dordi, Dudhpokhari, Kwhlosothar, and Marsyandi).While Lamjung holds significant development potential due to its natural beauty, agricultural productivity, and cultural richness, it also faces challenges common to Nepal's hilly regions. These include limited infrastructure, remoteness, and

socioeconomic disparities. However, Lamjung's blend of cultural heritage, natural landscapes, and its role in Nepal's tourism sector positions it as an integral part of the nation's cultural and economic framework.

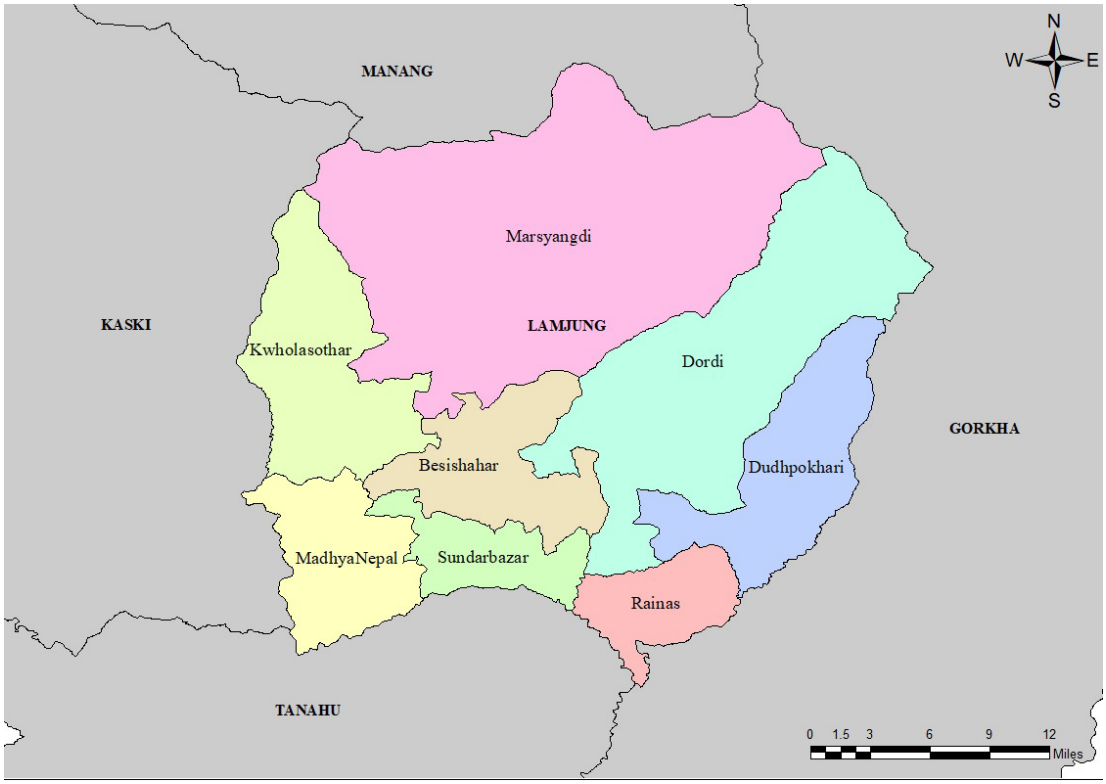

Figure 3: Map of lamjung district

Site description

Madhyanepal municipality is located in Lamjung District, Gandaki Province, Nepal. It is one of the four municipality located in Lamjung District in Gandaki Province of Nepal. Madhyanepal reestablished on 10 March 2017 renaming the former Karaputar municipality merging with Neta VDC. The former Karaputar municipality was established in 2015, declaring Karapu Bazar the admin center. Total area of the municipality is 113.86 square kilometres (43.96 sq mi). According to the National Population and Housing Census 2021, the municipality has a total population of 21,971. Among the ten wards of municipality, ward no five has a population of 866 consisting of 397 males and 469 females (CBS,2021) which covers the area from Parajuli besi to kharka. This site covers ethnically diverse, population representing various communities, including Gurung, Brahmin-Hill, Chhetri, Kami, Sarki, Newar, Damai/Dholi, Dura, Thakuri, Gharti/Bhujel, Magar, Kumal, Sanyasi/Dashnami, Tamang, Khawas, Muslim, Majhi, Rai, Tharu, Kurmi, Thakali, and Badi, among others. The Gurung community holds a prominent cultural presence in the municipality. This diversity contributes to a rich cultural heritage, with each group adding its unique traditions, languages, and customs to the area's identity. The overall literacy rate is 78.9%, with male literacy at 87.8% and female literacy at 71.6%. The region is known as the birthplace of the rare folk music genre "Thado Bhaka," and is rich in various traditional and cultural dances such as Ghatu, Chudka, Kaura, as well as traditional Teej songs and dances.

Although some residents are employed in government jobs, trade, and foreign employment, agriculture remains the primary source of income. The fertile and evergreen valleys along rivers like Madi, Khahare, Golyangdi, Risti, Chardi, Midim, and Pisti are suitable for farming. This area holds uniques cultural importance due to many temples.This area experiences a subtropical to temperate climate due to its diverse elevation and topography. The area has a mix of hill and mountainous terrain, with elevations ranging from about 300 meters in the southern parts to over 1970 meters in the higher elevations. This variation significantly influences the weather patterns and climate conditions of the municipality..

Agriculture remains the backbone of Madhyanepal's economy, with mixed farming systems being a common practice. Farmers in the region grow a variety of crops, including rice, maize, millet, wheat, and a wide range of vegetables. In addition to crop cultivation, many households also engage in livestock farming, raising animals such as goats, cattle, and chickens. This mixed farming approach not only ensures food security for local families but also provides income through the sale of both crops and livestock products. The region's crop diversity supports sustainable agricultural practices, although there are growing concerns about the reduction in agro-biodiversity, which may impact long-term food security. To address these challenges, there is a need for better integration of sustainable farming techniques and strategies to preserve traditional agricultural knowledge.Despite these challenges, the diverse agricultural and cultural landscape of Madhyanepal Municipality offers significant opportunities for development, particularly in promoting agro-biodiversity and sustainable farming practices.The integration of modern agricultural practices with traditional knowledge could help enhance the resilience of the community, particularly in the face of climate change and evolving market demands.

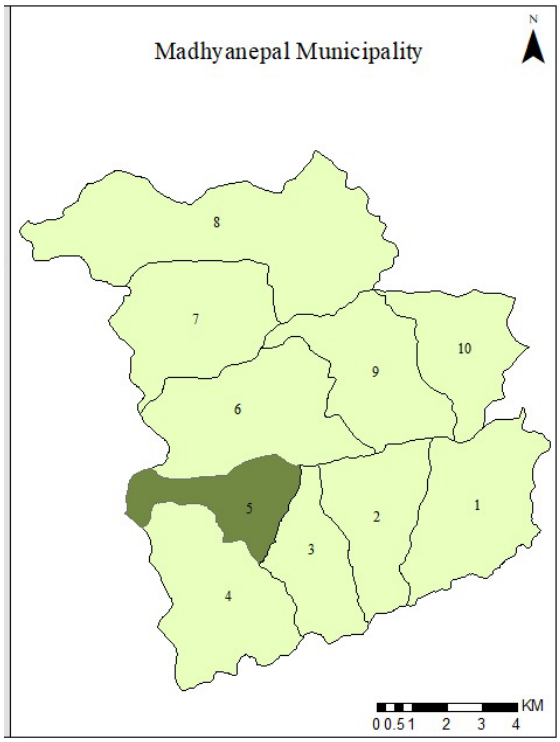

Figure 4: Figure 4: Map of Madhyanepal Rural Municipality

Figure 5: Project sites (Lafagaun at left and Amdanda at right) at Madhyanepal-5, Lamjung

4. Findings

4.1 Demographic Information

The ethnicity distribution of surveyed households indicated that the majority (68%) belong to the Janajati group, making it the most represented ethnic category. Dalit households constitute 19% of the total, reflecting a significant presence within the surveyed population. In comparison, Brahmin/Chhetri households account for 9%, while the remaining 4% fall under the "Other" category. This highlights the predominance of the Janajati group within the surveyed area, with relatively lower representation from other ethnic groups.

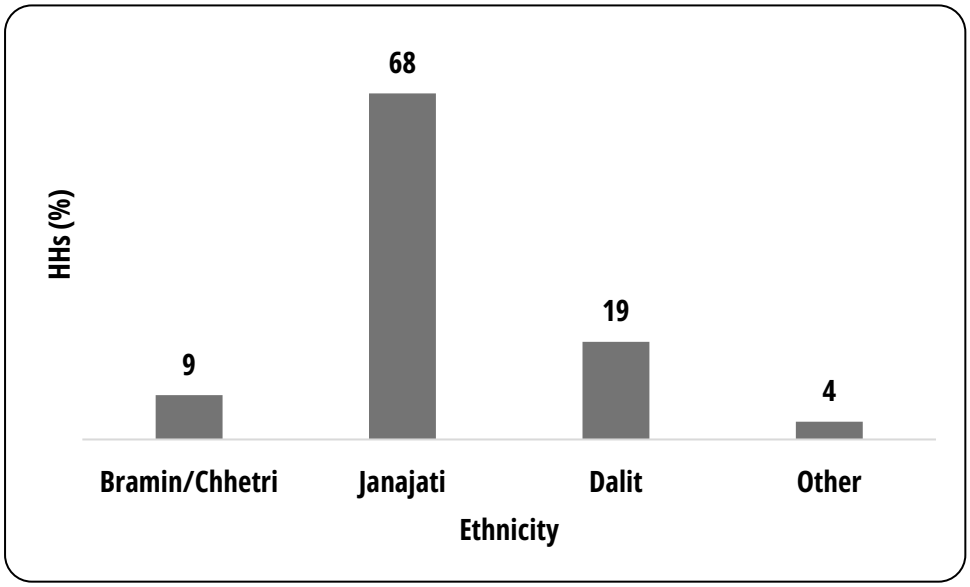

Figure 6: Ethnicity of respondents in Samibhajyang, Lamjung

Among the respondents, the majority (88%) were between the ages of 15 and 60 years, while the remaining 12% were aged above 60 years. This indicates that the surveyed population primarily consists of individuals within the working-age group, with a smaller proportion of elderly respondents.

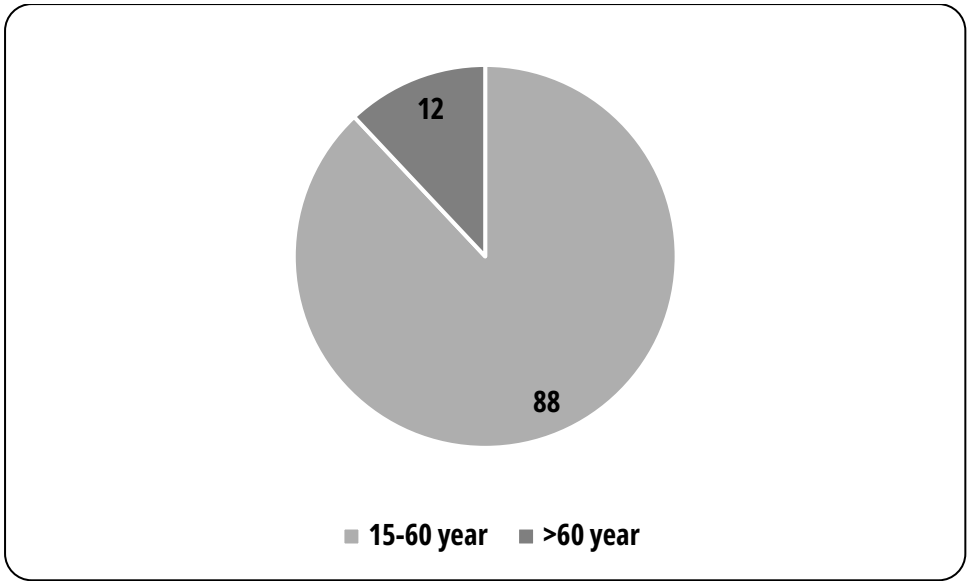

Figure 7: Age distribution of respondents in Samibhajyang, Lamjung

Majority of respondents (96%) were female, while only 4% are male. This suggested that the survey primarily engaged female participants, which may reflect the demographic characteristics of the study area or the targeted respondent group.

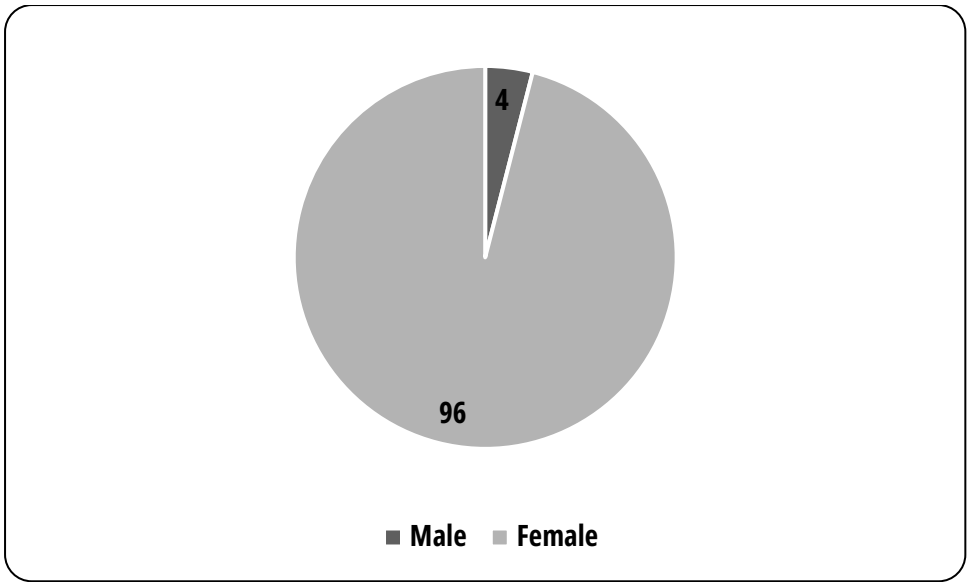

Figure 8: Gender of respondents in Samibhajyang, Lamjung

4.2 Socio economic factors

4.2.1 Sources of income

Households in Madhyanepal are engaged in various occupations, including agriculture, livestock, remittance, and other income sources such as pensions and businesses. In Samibhajyang, 49% of households primarily rely on both agriculture and livestock, while 36% depend on agriculture, livestock, and remittance. Additionally, 5% of households rely solely on agriculture, while 9% generate their primary income from other sectors.

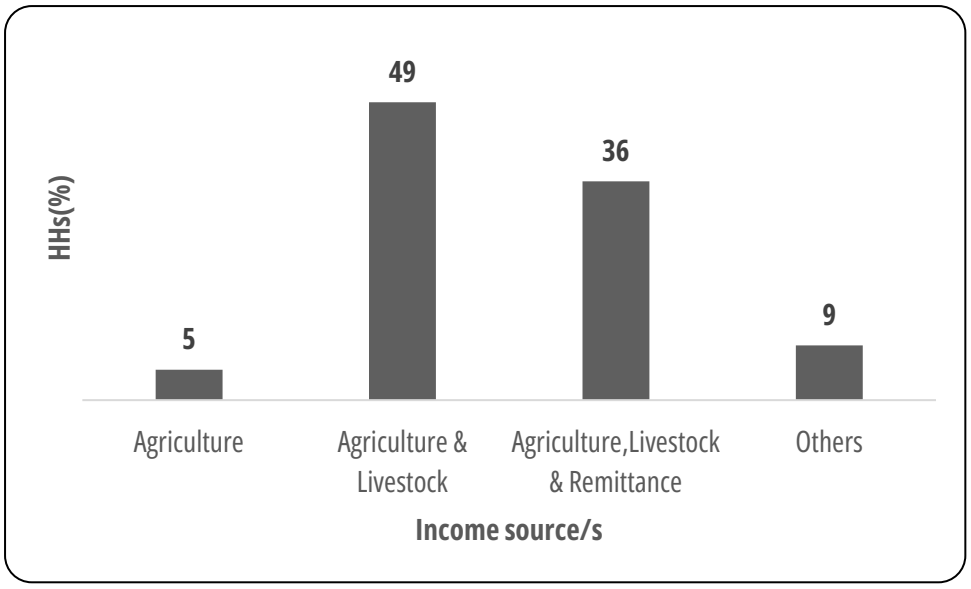

Figure 9: Major sources of income in Samibhajyang, Lamjung

4.2.2 Land holding

Among the households, 56% had a landholding of 1 to 5 ropani, followed by 40% with less than 1 ropani. Similarly, only 2% of households had more than 5 ropani of land.

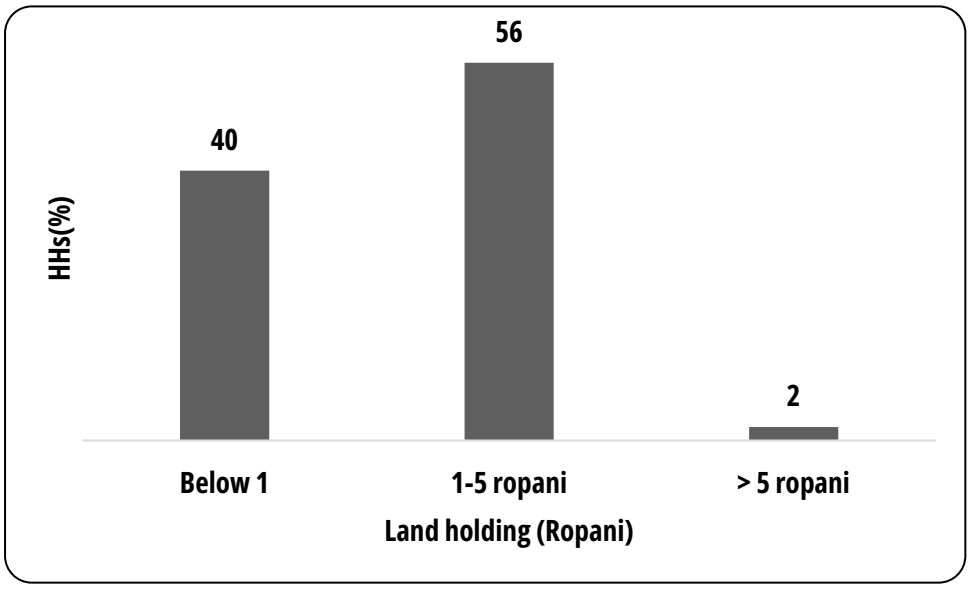

Figure 10: Land holding in Samibhajyang, Lamjung

4.3 Crop status and Food Security

4.3.1 Cereal food sufficiency

The results indicate that the majority of households (51%) had year-round cereal crop sufficiency. This was followed by 18% of households with food sufficiency lasting 6 to 9 months. Additionally, 16% of households had cereal food sufficiency for 3 to 6 months, while only 2% had sufficient cereal food for up to 3 months.

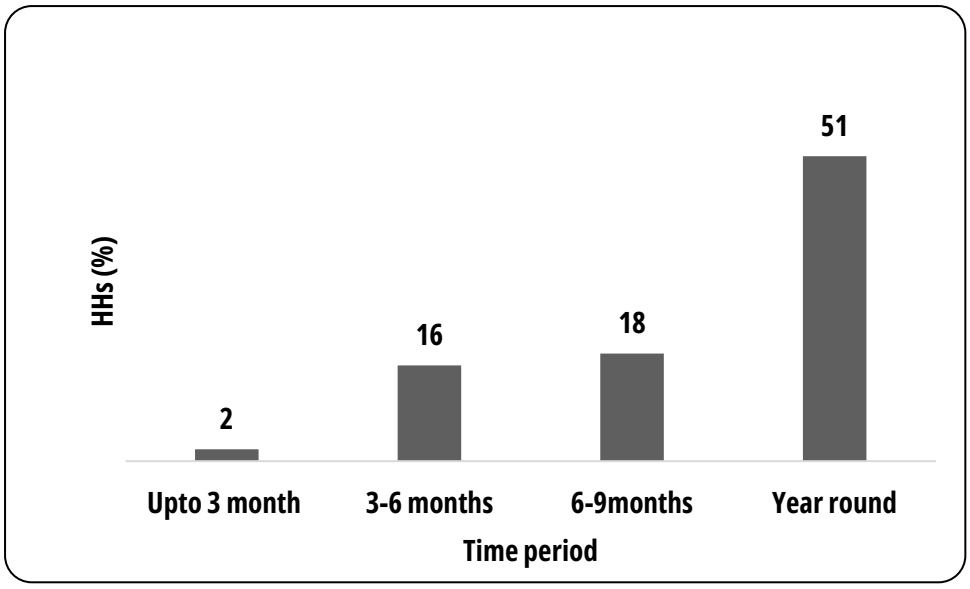

Figure 11: Cereal crop sufficiency in HHs in Samibhajyang, Lamjung

4.3.2 Green vegetable sufficiency

The results indicate that the majority of households (51%) had year-round green vegetable sufficiency. This was followed by 26% of households with sufficiency lasting 3 to 6 months. Additionally, 19% of households had green vegetable sufficiency for 3 to 9 months, while only 2% had sufficient cereal crops for up to 3 months.

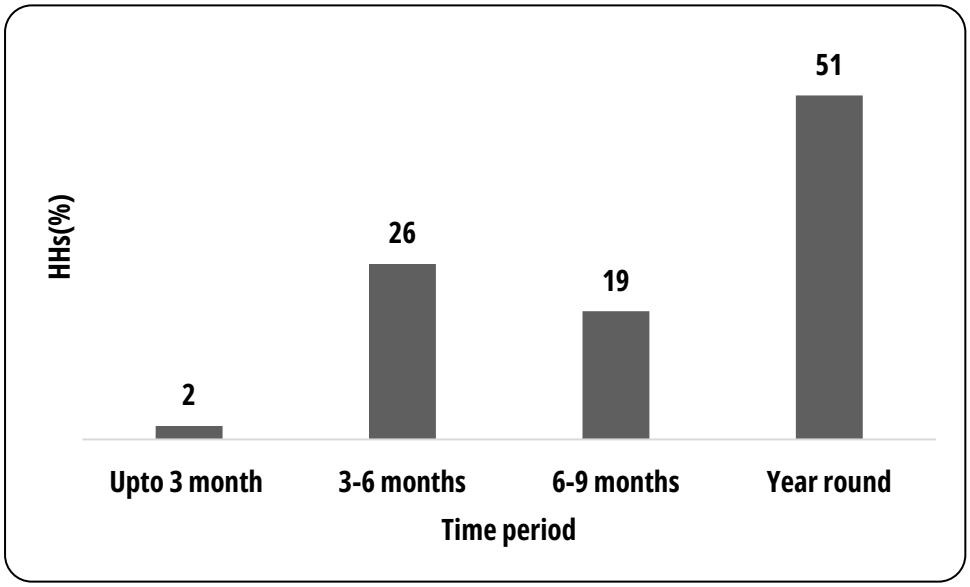

Figure 12: Green vegetable sufficiency in HHs in Samibhajyang, Lamjung

4.3.3 Vegetable sufficiency

The results indicated that the majority of households (63%) had vegetable sufficiency for 3 to 6 months. This was followed by 25% of households with sufficiency lasting 6 to 9 months. Additionally, 11% of households had sufficient vegetables for up to 3 months, while only 2% had year-round vegetable sufficiency.

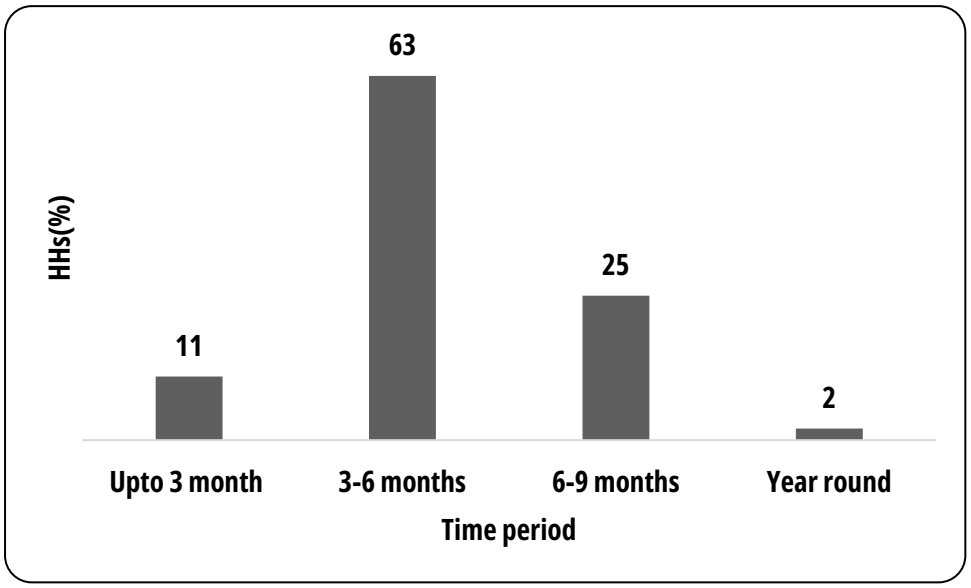

Figure 13: Vegetable sufficiency in HHs in Samibhajyang, Lamjung

4.3.4 Crop wild relative sufficiency

The results indicate that the majority of households (60%) had crop wild relatives (CWR) sufficiency for up to 15 days per year, followed by 16% of households with sufficiency for up to one month. Additionally, 14% of households had CWR availability for up to two months, while 11% used CWR occasionally.

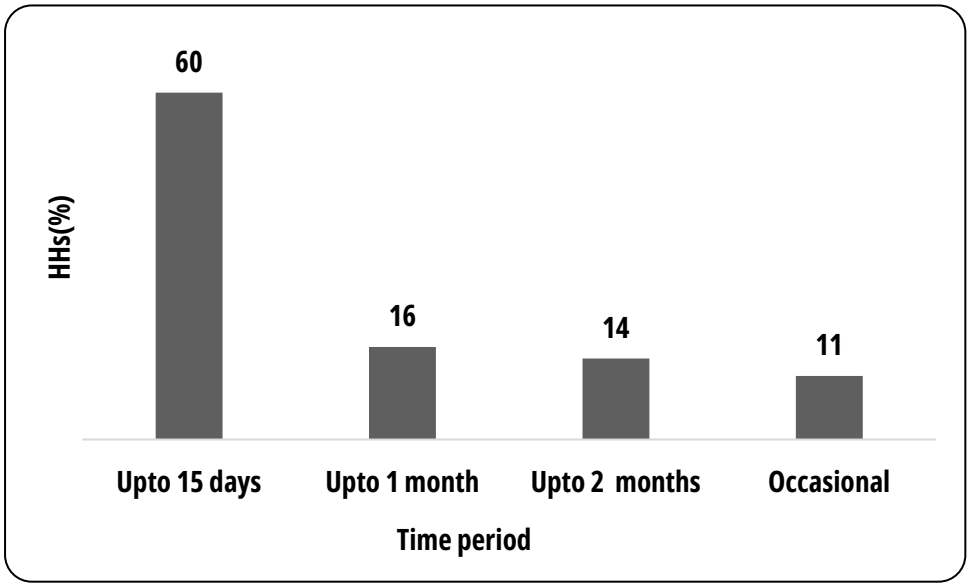

Figure 14: Crop wild relatives' sufficiency in Samibhajyang, Lamjung

4.4 Agricultural Practices

4.4.1 Cropping pattern

Rice, maize, and finger millet are the main cereal crops with legumes, vegetables, fruits, and cash crops integrated into the farming systems. Crop rotation, intercropping, and water management techniques are

common practice of the agriculture system. Maize and taro intercropping is common practice where maize is planted alongside of taro. Mixed cropping is also widely practiced in the region, legumes like cowpea, soybean, ricebean, and bean are grown together. These crops are commonly interplanted in the same field, allowing farmers to diversify their produce and increase overall yield from the same plot of land. The detailed crop calendar of the project site is presented in Table 1.

Table 1: Crop calendar of project sites

S.N.	Crop/s	Planting time	Harvesting time
1.	Rice	Jesth-ashar	Kartik-mangsir
2.	Maize	Chitra -baisakh	Bhadra-ashoj
3.	Fingermillet	Shrawan-bhadra	Mansir -poush
4.	Black gram	Shrawn- bhadra	Ashoj-kartik
5.	Horsegram	Shrwan -Bhadra	Mangsir-poush
6.	Vegetable	Seasonal	Seasonal
7.	Potato	Mangsir-poush	Falgun-chaita
8.	Beans,pumpkin,Taro	Chaitra -baishak	-

4.4.2 Production system and mandated crop diversity

Maize, beans (including black gram, horse gram, and soybeans), and root crops like taro, potato, and yam are commonly grown. Additionally, spices such as turmeric and ginger are cultivated, along with fruits like banana, mango, and amla (Indian gooseberry). The area also sees the production of vegetables like radish, pumpkin, chili, and garlic, as well as sugarcane. These crops are often grown using intercropping and mixed cropping systems, allowing farmers to make the best use of available land, enhance soil fertility, and reduce the risks of crop failure. This diverse array of crops reflects the adaptability of the local farming community and the varied climatic and topographical conditions of the region. Besides this, maize, beans, black gram, horse gram, soyabean, taro, turmeric, ginger, sugarcane, radish, pumpkin, potato, chilli, garlic, yam, banana, mango and amala are cultivated in this area.

Forage crop species such as Kutmero, Mulberry, Bamboo, Siru, Kaas, Kamlo, Gidari, Khar, Salme, and Katus are also cultivated in the Madhyanepal region of Lamjung. These forage crops provide essential feed for livestock and play a key role in the region's agricultural ecosystem. Additionally, various wild mushroom species are found in the area, with types like Wild, Patke, Dhudhe, Salle, Chamre, Dalle, Kaldhunge, and Saleri being commonly harvested. These wild mushrooms contribute to the diversity of local food sources and are often valued for their nutritional and medicinal properties.

Among the six targeted crop species (Amaranthus, buckwheat, finger millet, blackgram, Naked barley and broad bean) fingermillet is extensively cultivated in this site. There are three varieties of fingermiilet i.e. kartike, lapre and panhenle. Among these, panhenle is cultivated in large with greater numbers of housholds. The preference for panhenle is due to shorter maturity days.

Among the respondents, 94% produce 100–500 kg of finger millet annually, while 24% cultivate more than 500 kg per year. The remaining 6% produce less than 100 kg of finger millet. This data highlights the dominance of small to medium-scale production, with only a fraction of farmers achieving higher yields.

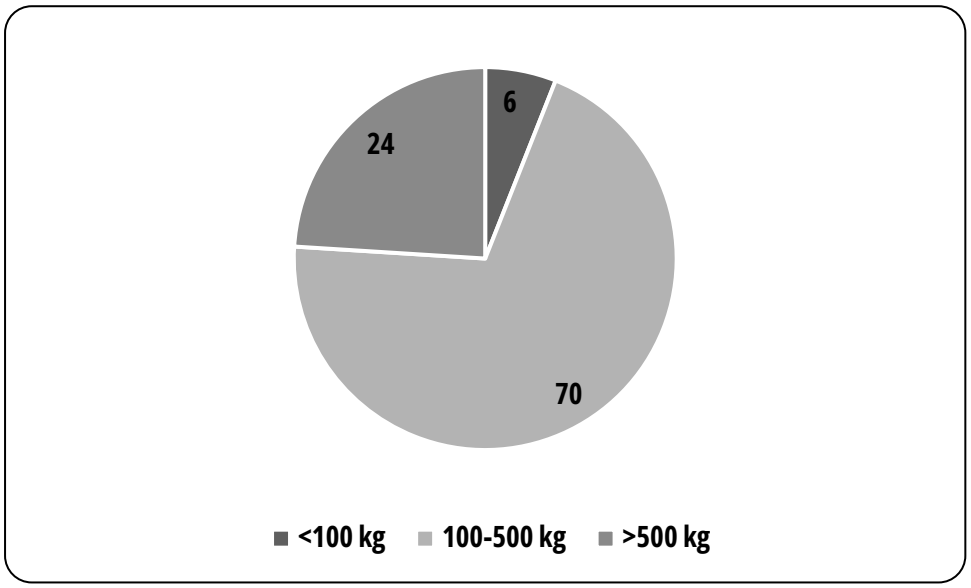

Figure 15: Production status of fingermillet in Samibhajyang, Lamjung

4.4.3 Seed Sources, selection and storage methods

Among the respondents in the region, a significant majority, 63%, use seeds from a combination of sources for in the next season. These sources included their own stock, seeds from neighbors, and purchases from agrovet stores. This suggests that most households rely on a mix of self-saved seeds, seeds exchanged or shared with neighbors, and external sources like agrovet shops to meet their seed requirements.

In comparison, 33% of households used a combination of seeds from their own stock and neighbor-supplied seeds. This indicates that while these households rely on their own seed saving practices, they also benefit from local seed exchange with neighbors, highlighting a community-based approach to maintaining seed availability. Only 4% of households relied solely on their own saved seeds for the next planting season. This smaller percentage might reflect households that have stable access to sufficient and reliable seed stocks from previous harvests, reducing the need for external sources.

Overall, these figures illustrate the importance of seed sharing and community-based seed saving practices, where both traditional knowledge and local networks play a crucial role in ensuring continued access to seeds for the next growing season. Additionally, the relatively small reliance on external sources like agrovet shops (compared to neighbors and self-saved stocks) suggests that local, seed systems is a key part of agricultural resilience in the region.

Different practices are employed for the storage of seeds in the region. Cereal crops are typically harvested, dried thoroughly, and then stored in sacks to preserve their quality for future planting. On the other hand, legume crops are dried first, and after drying, they are mixed with ash. This mixture helps protect the seeds

from pests and diseases, acting as a natural preservative. These storage practices reflect local knowledge and traditional methods aimed at ensuring the seeds remain viable and free from contamination until the next planting season**.**

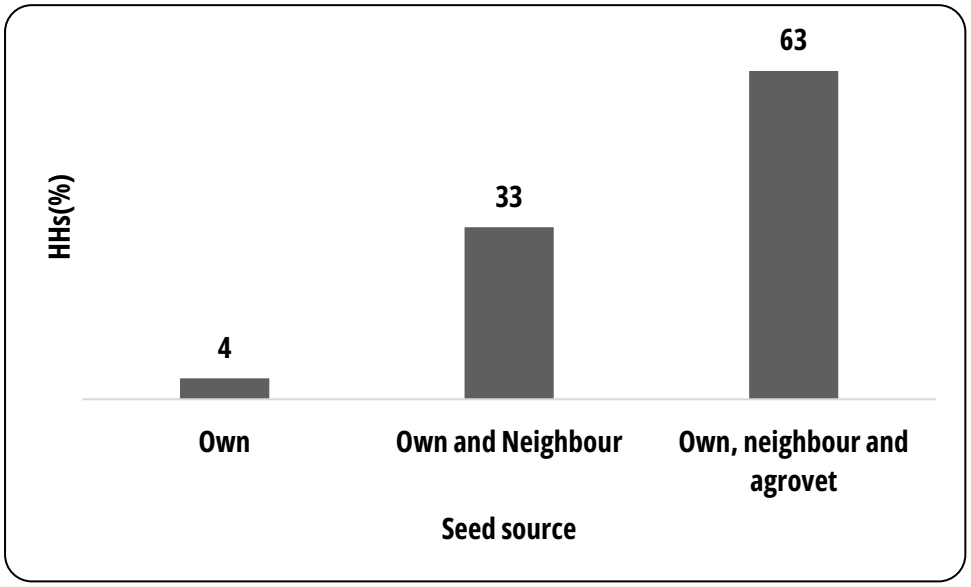

Figure 16: Major sources of seed in Samibhajyang, Lamjung

4.4.4 Gender Roles in Agricultural Decision-Making

Decision-making in agriculture encompasses a wide range of aspects, including the selection of crop varieties, adoption of cultural practices, management of inputs, post-harvest handling, market access, and pricing decisions. The survey results revealed a strong presence of female participation in agricultural decision-making across several key domains.

Among the surveyed households, women were the primary decision-makers in 54% of cases. In contrast, male-only decision-making was observed in 23% of households, which was equal to the proportion of households where both male and female members participated jointly (23%). This distribution suggests that women hold a predominant role in managing household-level agricultural activities, while exclusive male involvement remains relatively limited. The presence of shared decision-making in nearly a quarter of households reflects an emerging trend of gender collaboration in farming decisions.

A closer look at specific decision areas highlights women's strong role in seed selection. Women were actively involved in seed selection in 96% of the surveyed households, with only 2% reporting male-only involvement, and another 2% indicating joint male-female participation. This finding underscores the critical role of women in maintaining seed systems, preserving local varieties, and influencing crop choices—key factors that shape agricultural resilience and household food security.

These patterns point to the central role of women in agricultural decision-making, particularly in tasks tied closely to production planning and resource management at the household level. While men's roles are more

visible in market interactions or physically intensive tasks, the data suggests that women are pivotal actors in sustaining farming systems, particularly through their influence on crop selection and seed management.

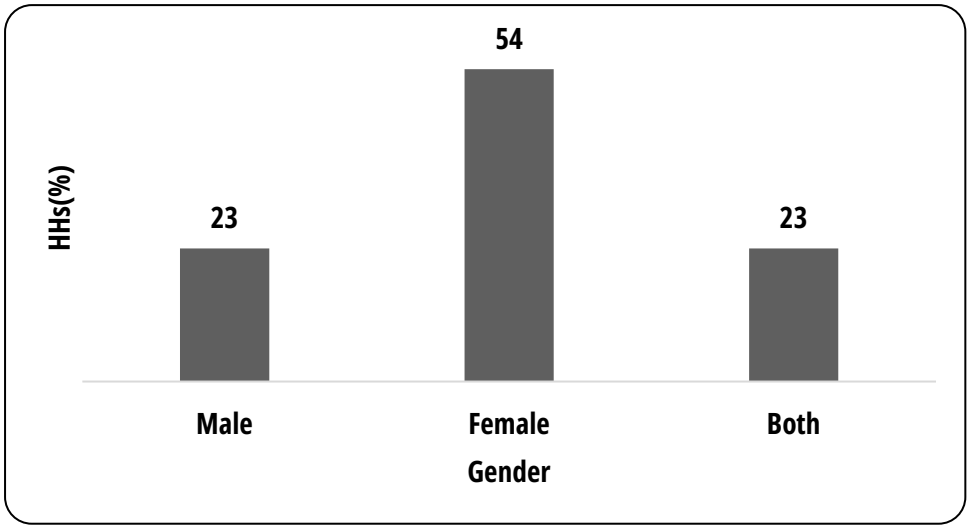

Figure 17: Gender decision in seed selection in Samibhajyang, Lamjung

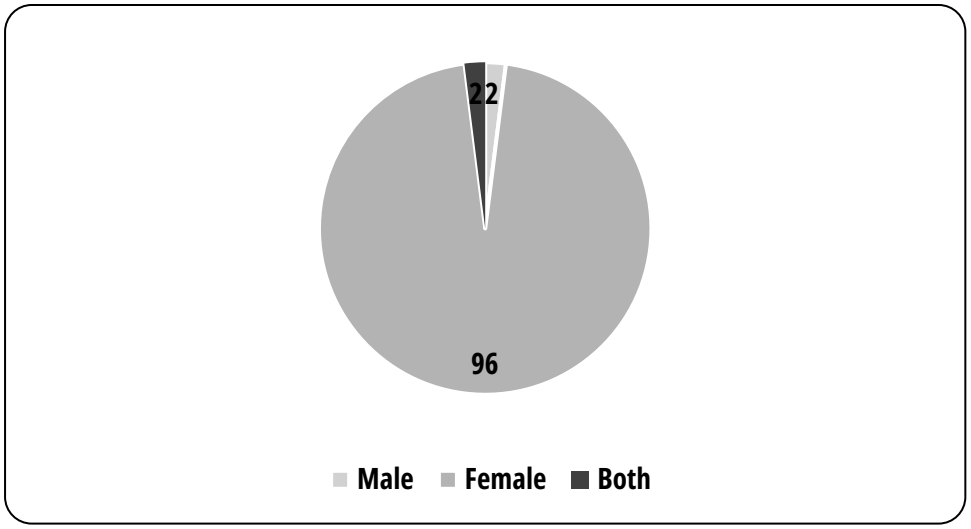

Figure 18: Gender involvement in seed selection in Samibhajyang, Lamjung

Figure 19: Traditional method of seed and straw storage method at project sites (Tauwa (Left,) and (Kuri).

4.5 Indigenous and Traditional Crops

4.5.1 Production and market trends

A substantial 89% of households primarily cultivate agricultural crops for household consumption. This indicates that many farming families are engaged in subsistence agriculture, focusing on producing food to meet their own nutritional needs rather than for commercial sale. The predominant crops grown likely include staple items such as rice, maize, and vegetables, which are essential for daily sustenance and household food security. This pattern reflects the community's strong reliance on self-sufficient farming systems, with occasional small-scale exchanges or barter taking place within local networks.

In contrast, only 11% of households reported producing crops for sale in local markets or the broader community. These households may cultivate surplus production or high-value crops such as vegetables, fruits, spices, or cash crops like maize or legumes, aiming to generate supplemental income. Although relatively small, these market-oriented farmers contribute to the local economy and demonstrate a potential shift toward commercial agriculture within the community.

Overall, the agricultural production system in the region remains largely consumption-driven, with a minor but notable proportion of farmers diversifying into market-linked activities. This balance underscores a landscape where food self-reliance is the dominant strategy, yet opportunities for economic integration through agriculture are emerging.

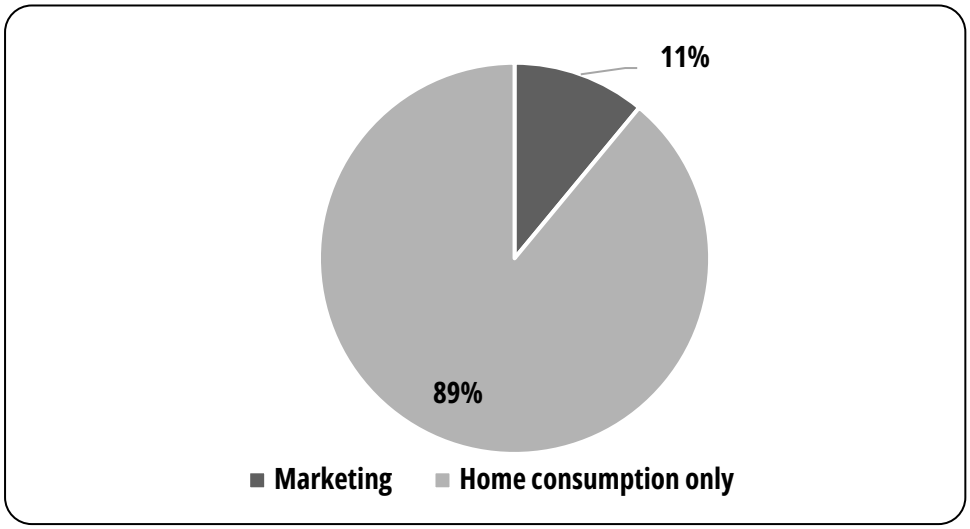

Figure 20: Marketing pattern of agricultural product in Samibhajyang, Lamjung

4.5.2 Local crops use and consumption trend

In Lamjung district, traditional food consumption is closely interwoven with local culture, agricultural practices, and the availability of indigenous crops. The dietary habits reflect a reliance on locally grown cereals, legumes, and vegetables, contributing to food self-sufficiency and nutritional diversity.

One commonly consumed traditional dish is Maasko Bara, prepared from ground black lentils, deep-fried into round fritters, and typically served with chutney or sukuti (dried meat). It is particularly popular during the festival of Maghe Sankranti. Another seasonal dish is Latte, a porridge made from Anadi rice, which is traditionally consumed during Poush 15 and the Teej festival. Rice porridge, often eaten with milk or yogurt, serves as a frequent breakfast item and underscores the cereal-based dietary pattern of the region.

Dhindo, made from finger millet or buckwheat flour, is a staple alternative to rice, commonly served with vegetable curry or sukuti. Roti, a flatbread made using wheat, maize, or millet flour, is typically eaten for lunch or dinner alongside dal (lentil soup) or seasonal vegetables. Saatu, prepared from roasted barley or buckwheat flour, is consumed as a porridge or beverage by mixing with water, milk, or yogurt, especially during colder seasons.

Sukuti, traditionally prepared from dried and cured buffalo or goat meat, is an important protein source and is often served as a side dish or snack. Gundruk, a fermented product made from mustard greens or radish leaves, is widely used for its sour flavor and nutrient content, especially during the off-season when fresh vegetables are limited. Another notable dish is Galmat, a spicy chutney made from taro and beans, commonly paired with dal bhat or roti.

Fultung, a traditional mixed food prepared using sisnu (stinging nettle), lentils, rice, and finger millet flour, is also consumed in the area, showcasing the resourceful use of locally available crops.

These food traditions are often associated with community events and social gatherings, helping to preserve culinary knowledge and strengthen cultural identity. The widespread cultivation and consumption of indigenous crops demonstrate a high degree of agro-biodiversity and resilience in local food systems.

Furthermore, the Lafa Homestay operating in this region promotes traditional cuisine by serving visitors authentic meals prepared from locally sourced ingredients. Guests are typically welcomed with local alcoholic beverages, gundruk, and popcorn—providing a direct taste of the region's cultural and culinary heritage. This form of community-based tourism not only supports rural livelihoods but also helps in preserving and promoting traditional agricultural and food practices.

Figure 21: Traditional food items (Selroti and donot of finger millet and gundruk and makai) in Samibhajyang, Lamjung

4.5.3 Status of wild varieties of crops

Lumjung is famous for wild mushroom species that are collected and consumed locally. Some of the commonly found wild mushrooms include:

- Patke Mushroom – A commonly found edible variety.
- Dhudhe Mushroom – Recognized for its milky texture and edibility.
- Salle Mushroom – A flavorful wild mushroom variety.
- Chamre Mushroom – Used in traditional dishes.
- Dalle Mushroom – A locally found wild mushroom with a distinct taste.
- Kaldhunge Mushroom – Known for its specific growing conditions and local consumption.
- Saleri Mushroom – Harvested seasonally from the forests

Besides these, the region is also home to himalayan nettle, wild cucumber, wild yam, and two varieties of fern—pani and kali—which are commonly harvested for consumption. Additionally, himalayan raspberry, bayberry, and gooseberry are found in the area, contributing to the rich biodiversity and providing seasonal edible resources for the local community. These wild plant species play a vital role in traditional diets, herbal remedies, and local ecosystems.

4.5.4 High-Potential Indigenous Crops

The majority of respondents (95%) identified black gram as the most important crop in their locality, highlighting its significance in local agriculture. This was followed by 89% of respondents who reported finger millet as a major crop in the area. Additionally, 47% of respondents considered horsegram to be an important crop, emphasizing its role in the agricultural practices of the region. These findings suggest that black gram and finger millet are particularly vital to the local farming systems, while horse gram also holds considerable value for a significant portion of the community.

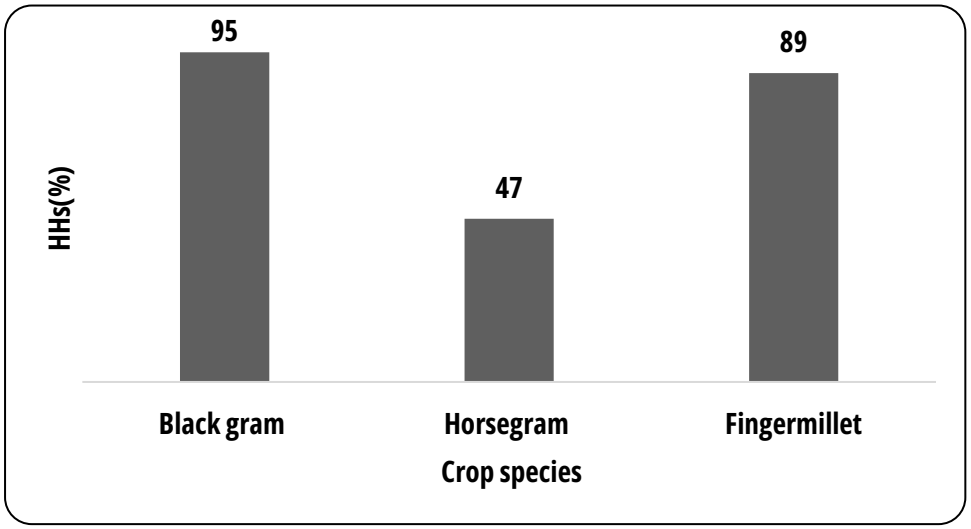

Figure 22: Important crop species in Samibhajyang, Lamjung

4.5.5 Soil status and locally available resources

The soil status in project sites varies depending on elevation, land use, and climatic conditions. The region primarily consists of red and black soils which support diverse agricultural activities. While some areas have moderate to high organic matter, soil fertility is often challenged by erosion, declining nutrient levels, and acidic to neutral pH. Farmers traditionally use organic practices such as composting, manure application, and crop rotation to maintain soil health, but increasing soil degradation calls for improved conservation measures. The region is rich in locally available resources, contributing to both agriculture and livelihoods. Forestry resources such as Kutmero, Mulberry, Bamboo, and Katus provide timber, fodder, and raw materials for various uses. Agricultural crops, including finger millet, maize, rice, legumes, and vegetables, are widely cultivated alongside fruit species like lemon, mango, banana, gooseberry, bayberry, and Himalayan raspberry. Spices such as turmeric and ginger are also significant, both for household consumption and trade. Water resources in the area include seasonal streams, springs, and small irrigation channels, which are essential for farming but often insufficient, making irrigation improvements a priority. Despite the region's rich biodiversity and agricultural potential, challenges such as soil erosion, declining fertility, and limited irrigation facilities pose threats to sustainable agriculture. Addressing these issues through better soil management, water conservation, and agrobiodiversity conservation strategies will be crucial for long-term agricultural resilience in the region.

4.5.6 Public areas, institutes and agrobiodiversity

The Agriculture Knowledge Centre, along with the Agriculture Section and the Nuts and Fruits in Hilly Areas Project (NAFHA), is actively working on the conservation and promotion of agrobiodiversity in this region. At the community level, several agricultural groups, including Lafa, Kuthe, Nagbhairab Mauri Palak, and Simle, have been successfully operating various agricultural initiatives. In terms of education, the area is home to key institutions such as Ishaneshwor Secondary School, Bharab Kali Secondary School, and Samjhana Secondary School. Lafa homestay plays a vital role in preserving and promoting traditional culture and local food heritage. Additionally, the region features significant religious sites, including Nagbhairab Mandir, Ishaneshwor Mandir, and Balkanya Mandir, which hold cultural and spiritual importance for the local community. There are also some old orchards of mango and jackfruit.

Figure 23: Consultative meeting with different schools at Samibhajyang, Lamjung

4.5.7 Focus Group Discussion

The Focus Group Discussions (FGDs) yielded valuable qualitative insights into local agricultural practices, climate adaptation strategies, and the challenges faced by farmers. During these sessions, several lost and near-extinct crop varieties were identified (Tables 1 and 2).

Table 2: Lost crops and varieties in the project sites

S.N.	Crops	Lost varieties
1.	Beans	Local maize beans
2.	Barnyard Millet	Local
3.	Rice	Ghaiya,pakhe,Jhinuwa, guruji,mansuli,naldhunge,mansara,Purkayo,kalo dale,
4.	Peanut	Local badam
5.	Finger millet	Seto kodo
6.	Cucumber	Dalle and Madale kankro
7	Pigeon pea	Local varieties

Table 3: Threatened Crops and Varieties within the Project Site

S.N.	Crops	Lost varieties	Maintained by farmer
1.	Buckwheat	Local	Bina Gurung
2.	Sorghum	Local	So maya Rana
3.	Lemon	Local	Dhan Bahadur Gurung
4.	Sweet potato	Local	Somaya Rana
5.	Pumpkin	Local	Farmers of gaubesi area
6.	Bean	Hiude simi	Farmers of gaubesi area
7.	Soybean	Local	

4.5.8 Key Informant surveys

Based on Key Informant Surveys (KISs), Lekh Maya Gurung, Min Bahadur Shahi, and Bal Kumar Shrestha were identified as potential citizen scientists in the area. These individuals possess valuable knowledge of local agricultural practices and can contribute to research, conservation, and the promotion of indigenous crop varieties. However, several challenges hinder agricultural development in the region. Farmers face low production levels, primarily due to unavailability of quality seeds and losses caused by wild animals. Additionally, there is a lack of sufficient research and studies focused on indigenous agricultural practices, limiting opportunities for innovation and improvement. Marketing challenges further restrict farmers from accessing better pricing and market linkages, while the shortage of trained manpower affects the adoption of modern and sustainable farming techniques. Addressing these issues through research, training programs, and policy interventions can significantly improve agricultural sustainability and productivity in the region.

Although the district is recognized as a hotspot for mango landraces, the surveyed site is notably deprived of such diversity. Currently, only a single mango tree exists in the area, highlighting the urgent need for conservation and rescue efforts to preserve this existing genetic resource. This situation underscores the

importance of reviving traditional fruit varieties and promoting on-farm conservation to safeguard local agrobiodiversity.

4.6 Climate change impact and adaptation

The farmers' perception of the climate change can be summarized as increasing drought, temperature, flooding, increased occurrence of pests and diseases, erratic rainfall, hailstorms, natural disasters, and shifts in cropping time.

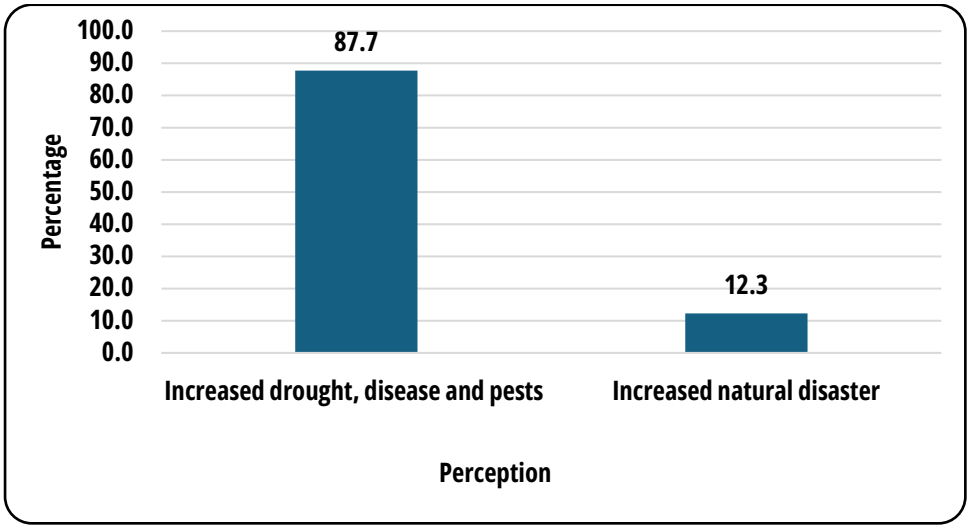

Figure 24: farmers' perception of the climate change

4.7 Awareness and Capacity Building

Most farmers in the region have received training on homestay operations and product diversification, equipping them with the necessary skills to enhance rural tourism and improve local agricultural products. Additionally, some capacity-building programs were conducted by the Agriculture Knowledge Center (AKC) and the agriculture section of the municipality, focusing on various aspects of farming and entrepreneurship.

5. Discussion

5.1 Socio-economic and demographic context

The population of Samibhajyang, Madhyanepal is predominantly janajati (68%) including magar and gurung followed by Dalit (19%). Amdanda is predominated by gurung and lafa gaun is dominated by magar. The demographic profile of the surveyed population indicates a predominance of individuals within the working-age group, consistent with Nepal's national census data, which shows that approximately 60% of the population falls within this age bracket (CBS, 2021). This reflects the active engagement of the rural workforce in agriculture and allied sectors, which remain the primary sources of livelihood in Nepal's rural areas. The relatively smaller proportion of elderly respondents aligns with broader demographic trends characterized by increased rural-to-urban and international labor migration among younger cohorts (Gartaula et al., 2012). Consequently, older individuals often assume more domestic and traditional roles, while the working-age

population predominantly participates in field activities. These patterns underscore the importance of targeting agricultural interventions and capacity-building programs towards the working-age group to enhance rural productivity and resilience. Gurung is dominated janajati in ghanpokhara lamjung (Gurung et al., 2016). Major respondents were female (96%) showed that females are engaged in household works whereas male members are involved in income generation activities. Gender roles in agricultural decision-making and work division also have an impact on agrobiodiversity. The decisions need to be made on what crops and varieties to plant, technologies to adopt and division of work load. Studies have shown that female members tend to maintain more diversity than males, as males are more inclined toward economic benefits while females are interested in trying a variety of things (Gurung et al., 2016). With males more like to migrate than females, women's role in agriculture is going to be even more crucial. This baseline study is unable to provide an in-depth understanding of the role of gender in genetic resource conservation. It is essential to develop a better understanding in this regard. Understanding the gender dimension in agrobiodiversity management will be crucial for the project team in designing local crop conservation strategies.

Agriculture and livestock remain the primary sources of livelihood for nearly half (49%) of households in the study area, highlighting the region's heavy reliance on traditional farming and animal husbandry. This finding corresponds with national data showing that about two-thirds of Nepal's rural population depend primarily on agriculture for income (CBS, 2021). The strong linkage between local livelihoods and factors such as land productivity, seasonal climate variability, and access to agricultural inputs underscores the persistent vulnerabilities characteristic of Nepal's rural economy (Sharma et al., 2019). Additionally, 36% of households reported income derived from a combination of agriculture, livestock, and remittances, reflecting the expanding role of labor migration in sustaining rural household economies (Adhikari & Hobley, 2015). While remittances contribute significantly to financial stability and poverty reduction (World Bank, 2020), they also pose challenges by potentially reducing agricultural labor availability, which can affect productivity and sustainability (Gartaula et al., 2012). These intertwined dynamics emphasize the need for diversified income strategies, including the adoption of improved agronomic techniques, value addition in agricultural commodities, and sustainable livestock management. Enhancing rural market connectivity and investing in infrastructure are critical to bolstering economic resilience and inclusive development in the region (IFAD, 2019).

Our results further indicate that the proportion of dependent individuals aged over 60 is relatively low (12%) compared to the working-age population. This suggests a demographic profile dominated by economically active individuals, which may favor economic productivity and community development. A robust working-age population provides a vital labor force for agriculture, livestock, and other income-generating activities. However, the comparatively smaller elderly population may be indicative of youth migration for employment, leaving fewer older adults in the community. Such demographic shifts carry social implications, including potential declines in traditional knowledge transmission and challenges in elderly care provision. To promote sustainable development, it is essential to implement policies that support both working-age individuals and senior citizens through investments in skill development, employment creation, and social welfare programs. Shahi et al. (2025) similarly observed that the largest population cohort in Madhya Nepal (Lamjung) falls within

the 30–64 years age group, followed by the 18–29 years group, while dependent age groups below 17 and above 65 remain comparatively low.

5.2 Mandated crop diversity

In the project site, rice, maize, and finger millet remain the staple crops, complemented by a diverse range of legumes, vegetables, fruits, and cash crops integrated within local farming systems. Neupane et al. (2021) documented a total of 92 neglected and underutilized plant species in Lamjung district, highlighting the region's rich agrobiodiversity. Among the six targeted crop species of the project—Amaranthus, buckwheat, finger millet, black gram, naked barley, and broad bean—only finger millet is currently cultivated in the area, valued for its multiple uses. Notably, the local variety of finger millet known as Seto Kodo has been completely lost from the region. Of the three extant native finger millet varieties, Panhenle is the most preferred by the community, prized for its color and taste.

Farmers reported substantial declines in rice diversity throughout the region, with numerous traditional varieties such as Ghaiya, Pakhe Jhinuwa, Gurji, Mansuli, Naldhunge, Mansara, and Purkayo disappearing over time. Among these, Purkayo was particularly favored due to its agronomic traits and cultural significance. The erosion of these traditional rice varieties has been linked to shifts in farming practices, market demands, and changing environmental conditions (Gentle et al., 2014). Gentle et al. further noted Mansara as a unique genetic resource adapted to marginalized lands in Nepal, whose disappearance might be due to its limited cultivation area. Another variety, Pakhe Jhinuwa (locally called Masina or Hiunde Dhan), cultivated during winter, is recognized as an important genetic rice resource in Nepal. Recent work by Shahi et al. (2025) also reports a significant loss of rice species in the Madhya Nepal region, including varieties such as Naldunge, Mansara, Porleaya, Kauno, Ghaiya, and Sama. Similarly, maize landraces like Bhadaure, traditionally grown during Bhadra month (Nepali calendar), are lost, and millet species such as Lurke are declining due to low yields and harvesting difficulties. Respondents in our survey further indicated that crops like buckwheat, sorghum, lemon, sweet potato, pumpkin, bean, and several others are approaching local extinction.

Regarding landholdings, 56% of surveyed households own between 1-5 ropani, 40% possess less than 1 ropani, and only 2% have holdings exceeding 5 ropani. These small landholdings likely constrain agricultural productivity and economic opportunities. Despite ownership, a significant portion of land remains fallow, potentially due to factors such as low soil fertility, water scarcity, labor shortages, limited access to agricultural inputs, and markets. Migration and changing livelihood preferences also contribute to land underutilization. The major constraints identified include marginal land quality, drought, physical incapacity, caste-related restrictions, and land conflicts (Shahi et al., 2025). Addressing these challenges through improved irrigation, access to high-yielding varieties, promotion of agroforestry, and incentives to cultivate fallow land could enhance land use. Support for cooperative farming, mechanization, and value chain development are also crucial to boost productivity and resilience.

Consumption patterns indicate that households occasionally consume millets and maize, while rice remains the staple diet. Despite access to maize and millet within households, many prefer purchasing rice from the

market, suggesting shifts in dietary preferences and increasing market dependency (Shahi et al., 2025). Food sufficiency varies, with 51% of respondents reporting year-round access to cereals and green vegetables, while 63% have food sufficiency lasting only 3-6 months. Additionally, 60% have access to crop wild relatives for up to 15 days annually, reflecting the seasonal availability of traditional food resources. These findings align with Shahi et al.'s (2025) observations of food sufficiency averaging six months in Madhya Nepal, with ward-level variations attributable to differences in agricultural productivity, food storage, and market access.

Culturally, traditional rice varieties such as Anadi Chamal in Lamjung and other western districts hold significant importance during festivals and special occasions. This rice is traditionally served to guests, used in making kheer (rice pudding), sel roti, and local delicacies like latte during major festivals such as Dashain, Teej, and Tihar. Finger millet is similarly versatile; households prepare it as roti, dhido, khole, and local beverages, while its by-products serve as livestock fodder. Notably, alcohol produced from finger millet generates a considerable supplementary income, with an average household earning approximately NPR 15,000 (USD 113) monthly from sales (Shahi et al., 2025)

5.3 Climate change impact and adaptation

The major adverse impacts of climate change observed in the study region include prolonged droughts, flooding, increased prevalence of pests and diseases, erratic rainfall patterns, hailstorms, natural disasters, and shifts in cropping calendars. These climatic stressors have substantially undermined agricultural productivity and threatened food security. In response, local farmers have adopted a range of adaptive strategies to mitigate these impacts. These include adjusting planting and harvesting schedules to better align with altered weather patterns, enhancing irrigation infrastructure to secure water availability during dry spells, employing biopesticides as environmentally sustainable pest management options, and diversifying crop portfolios to buffer against climatic uncertainties. Such measures are critical for sustaining agricultural outputs and safeguarding rural livelihoods in the face of increasing climate variability.

Households in Nepal's rural mountainous regions, particularly those dependent solely on rainfed agriculture, are disproportionately vulnerable to these climatic shocks (Poudel et al., 2020). Studies in Lamjung's Kunchha and Khudi VDCs highlight the drying of water sources, irregular rainfall, and escalating pest incidences, which collectively exacerbate challenges for subsistence farming and household food security (Poudel et al., 2020). These findings resonate with broader research indicating that climate change amplifies the vulnerability of Nepal's hill farmers by disrupting traditional agricultural cycles and natural resource availability (Paudyal et al., 2017; ICIMOD, 2019). Therefore, enhancing adaptive capacity through improved water management, climate-resilient crop varieties, and knowledge dissemination remains pivotal to bolstering community resilience against ongoing and future climate challenges.

5.4 Awareness and Capacity Building

Despite ongoing sensitization and capacity-building efforts by various stakeholders, awareness among farmers regarding the National Genebank—which plays a pivotal role in conserving native genetic resources—remains

limited. Moreover, training and awareness programs focused on the conservation and promotion of native agrobiodiversity have largely been absent. Consequently, local farmers possess insufficient knowledge about the significance of preserving indigenous crop varieties, maintaining traditional agricultural practices, and the benefits of incorporating agrobiodiversity conservation into their farming systems. This knowledge gap undermines efforts to sustain agricultural biodiversity and secure food systems in Nepal's rural communities (Shrestha et al., 2020; Paudel & Subedi, 2018). Addressing this shortfall through well-designed, community-targeted training and awareness initiatives is essential to bolster sustainable agricultural practices, enhance food security, and safeguard traditional genetic resources in the region (Khatiwada et al., 2019).Problems and constraints

5.5 Climate change impact and adaptation

Several challenges hinder agricultural production in the region. Farmers face drought, low production levels, primarily due to unavailability of quality seeds and losses caused by wild animals. Additionally, there is a lack of sufficient research and studies focused on indigenous agricultural practices, limiting opportunities for innovation and improvement. Marketing challenges further restrict farmers from accessing better pricing and market linkages, while the shortage of trained manpower affects the adoption of modern and sustainable farming techniques. Similar findings is reported by (Neupane et al., 2021).

6. Conclusion

The baseline study of samibhnjyang lamjung highlights key aspects of agricultural practices, food security, and land use in the region. Agriculture and livestock remain the primary sources of livelihood, though a significant portion of households also rely on remittances for financial stability. Despite the agricultural potential, the area has witnessed a decline in crop diversity, with several traditional varieties being lost over time. Furthermore, despite having access to millets and maize, households predominantly prefer purchasing rice from the market, indicating a shift in dietary preferences. Landholding patterns show that most households own small plots with a significant portion of land remaining fallow. Factors such as limited irrigation, labor shortages, and market constraints may contribute to land underutilization. Addressing these challenges through sustainable land use practices, improved irrigation systems, and promotion of traditional crops could enhance agricultural productivity and food security in the region. Moving forward, efforts should focus on revitalizing traditional crops, improving food self-sufficiency, and strengthening market linkages to create a resilient and sustainable agricultural system in this area.

7. Ways forward: Guidelines for implementing project activities

To ensure the sustained availability and competitiveness of native technologies and germplasm at both local and global levels, it is essential to develop targeted strategies and action plans. Enhancing genetic diversity is crucial for building resilient agricultural systems that are climate-adaptive and sustainable. Agricultural challenges should be addressed through locally available biodiversity-based solutions, leveraging their proven

adaptability and effectiveness. Additionally, strengthening localized seed systems while expanding global product markets can create a balanced approach that enhances community resilience and integrates local strengths into the global economy.

Supporting native and circular agriculture rooted in agroecology plays a vital role in fostering a healthy environment, ensuring food and nutrition security, and improving overall well-being. Documenting and preserving the cultural heritage, along with Indigenous agricultural knowledge and practices of Nepalese farming communities, is essential. Understanding climate change impacts, developing adaptation strategies, and promoting high-nutrient, climate-resilient agricultural genetic resources (AGRs) through local markets will help conserve native agrobiodiversity and cultural integrity. This approach strengthens community resilience to climate change, improves livelihoods, and deepens the connection between people and their land.

7.1 Conservation

1. **Establish Conservation Banks**: Develop and promote diverse conservation banks, such as agro-gene sanctuary, seed gene banks, field genebanks, forage field genebanks, school field genebanks, community genebanks, agro-insect field genebanks, crop-specific parks, agro-microbial field genebanks, livestock farm genebanks, and household genebanks.
2. **Raithane Nurseries and Agro-Plantation**: Establish Raithane (native) nurseries and organize agro-plantation initiatives to restore and conserve native species and strengthen agro-ecosystems not only in private areas but also in public area, fallow land in partnership with public institutes and farmers' groups.
3. **Document Agricultural Biodiversity**: Compile detailed profiles of all agricultural genetic resources at species, landrace, and genotype levels across households, villages, wards, and districts, alongside food biodiversity and climate change impact.
4. **Seed Fairs and Exchange Systems**: Regularly organize seed fairs and promote community-based seed exchange systems to enhance seed security, agrobiodiversity, and community resilience.
5. **Publish Landrace Catalogs**: Develop and distribute comprehensive catalogs and profiles of landraces covering all six components of agrobiodiversity, including their nutritional and health value profiles, to raise awareness and support conservation efforts.
6. **Create a Digital Genebank**: Establish a digital genebank or digital map of landraces to document, manage, and facilitate access to valuable genetic resources.
7. **Agro-Friendly Fields**: Promote agricultural practices that create agro-insect, agro-microbe, and agro-bird-friendly fields, fostering biodiversity within agricultural landscapes.
8. **Nature-Positive Practices**: Advocate for nature-positive agricultural practices, including the adoption of nature-positive storage systems, to align conservation with sustainable practices.
9. **Conserve Threatened Species, NUS and landraces**: Designate agrobiodiversity hotspots or conservation areas for threatened species and landraces and protect habitats of wild relatives along with ex-situ conservation.

10. **Promote Inclusive Agriculture**: Foster an inclusive agricultural approach that integrates crops, forages, livestock, agro-insects, agro-microbes and aquatic genetic resources with food, nutrition, health, business, and environmental objectives to address the diverse needs of communities as well as generating income while ensuring ecological sustainability.
11. **Conservation of CWR and Wild edible species**: Document, promote and domesticate CWR and wild edible species available around the project sites. Sustainable harvesting practices and in-situ conservation in possible sites would contribute to the conservation and management of of the valuable CWR genetic resources.
12. Ex-situ conservation of the existing germplasms of the target crops through GAP studies could be very effective way of efficiently utilizing the resources.

7.2 Utilization

1. **Participatory Landrace Enhancement**: Implement participatory landrace enhancement and conservation (LEC) programs to improve and utilize native genetic resources effectively.
2. **Evaluate Landraces on Ecological Yields**: Assess the performance of landraces based on their ecological yield rather than focusing solely on single traits. Incorporate the food health index of agricultural products to highlight their nutritional and health benefits.
3. **Promote Genetic Diversity**: Introduce evolutionary plant breeding, cultivar mixtures, and practices to enhance genetic diversity in fields, kitchens, and food systems to support resilience, nutrition and health.
4. **Domesticate Valuable Species**: Identify and domesticate high-value species with potential for agricultural, nutritional, and economic benefits.
5. **Climate-Resilient Crops**: Identify and promote climate-resilient crops, prioritizing ecological yield and Food Health Index parameters for sustainable production systems.
6. **Establish Diversity Blocks**: Create diversity blocks to support selection, natural adaptation, and the evolution of new genotypes suited to changing conditions as well as to improve the understanding of farming communities on genetic diversity through diversity field school.
7. **Reintroduce Lost Landraces**: Reintroduce lost landraces and repatriate them from national and global gene pools to restore local agrobiodiversity.
8. **Study Climate Change Impacts**: Conduct studies on the impact of climate change on native agrobiodiversity and monitor the evolution of new genotypes under shifting environmental conditions.
9. **Register Landraces**: Register native landraces as private goods to incentivize their conservation and utilization while ensuring community rights and benefits.
10. **Promote Ecological Pest Management**: Develop and implement ecological pest management strategies to address insect pest challenges in an environmentally sustainable manner.

11. **Value Addition and Market Linkages**: Enhance the value of agrobiodiversity through breeding and non-breeding approaches, and establish strong market linkages for these improved products. Study and identify the commodity for GI tag registration based on the guidelines of GI requirements.
12. **Product Diversification**: Diversify agricultural products to cater to various markets and enhance resilience to market fluctuations.
13. **Improve Local Tools and Mechanization**: Upgrade traditional tools and mechanization systems to make local agricultural practices more efficient and productive.
14. **Market guarantee of each product and promoting farmer's household as shop**: To ensure the sustainability and profitability of native agrobiodiversity, there must be a reliable market for each product. Empowering farmers as direct sellers can enhance profitability and reduce dependency on middlemen.
15. **Develop production practice from fallow land**: Utilizing fallow land for sustainable production of native crops can help improve soil health and biodiversity. Some practices are natural farming, root and tuber field genebank, agro gene sanctuary etc.

7.3 Cultural integrity

1. **Preserve Indigenous Knowledge and Practices**: Document, safeguard, and promote traditional agricultural practices that reflect the cultural and economic values.
2. **Support Traditional Festivals and Rituals**: Provide resources and support for agricultural festivals, rituals, and ceremonies that celebrate planting, harvesting, and other agrarian activities.
3. **Promote Culturally Significant Crops and other AGRs**: Identify and prioritize the conservation and promotion of crops and other AGRs with deep cultural connections to the local communities.
4. **Community-based Tourism**: Foster cultural tourism, such as agro-tourism and home-stays, to highlight the unique agricultural heritage and cultural values of the sites.
5. **Educate on Cultural Agrobiodiversity**: Develop community-based education programs to raise awareness about the importance of cultural integrity in agricultural practices, particularly for younger generations.
6. **Support IPR for Traditional Practices**: Protect traditional agricultural practices, knowledge, and products under intellectual property rights (IPR), ensuring their continued relevance and contribution to the community's cultural identity.
7. **Create Cultural Heritage Zones**: Designate certain agricultural landscapes or practices as cultural heritage zones to preserve and celebrate the unique agricultural legacy.

7.4 Awareness and capacity

1. **Training and Skill Development**: Conduct training programs and action research focused on adding value to native and local genetic diversity, enhancing community skills in utilizing and promoting these resources.

2. **Awareness on Value Addition**: Raise awareness about the importance of adding value to and promoting traditional and native genetic resources to strengthen their role in sustainable agriculture.
3. **Organize Community Events**: Regularly hold diversity field schools, food fairs, diversity fairs, seed exchange programs, exchange visits, traveling seminars, and workshops to engage communities and share knowledge.
4. **Document and Share Indigenous Practices**: Systematically document Indigenous agricultural practices and traditional knowledge, and ensure this information is widely shared to encourage adoption and preservation.
5. **Develop Accessible Materials**: Publish and distribute farmer-friendly materials in local languages and formats to make information on agrobiodiversity accessible and practical for end-users.
6. **Incorporate Agrobiodiversity into Education**: Integrate agrobiodiversity science into school curricula to build early awareness and foster a new generation of advocates for sustainable agricultural practices.

7.5 Policy actions

1. **Provide Incentives for Conservation and utilization**: Implement incentive mechanisms to support the conservation and utilization of native germplasm, ensuring they are aligned with broader strategies to promote sustainable agricultural practices.
2. **Integrate Native Genetic Resources into Formal Systems**: Ensure native genetic resources are automatically included in formal agricultural systems, with applicable incentive mechanisms to encourage their use and preservation.
3. **Increase Genetic Diversity**: Recognize the importance of genetic diversity in agricultural policies. Develop strategies to enhance genetic diversity at all levels, from local to national scales, as a cornerstone of resilient and sustainable agriculture.
4. **Protect Traditional Knowledge and Products**: Safeguard traditional practices, native products, and technologies under intellectual property rights (IPR), including geographical indications, to preserve cultural heritage and add value to local products.
5. **Support Local Packaging and Branding**: Allow and promote the packaging and branding of local products at the community level to improve marketability and economic benefits for producers.
6. **Promote Market Access for Agricultural Items**: Facilitate the marketing of all agricultural items through initiatives such as agro-tourism, home-stays, hat-bazar and the establishment of community and household genebanks, which also serve to strengthen community resilience and biodiversity conservation.
7. Strengthen germplasm sharing, and access and benefit sharing mechanism for agrobiodiversity: Need to develop germplasm sharing mechanism along with ABS separately for agrobiodiversity

8. Candidate Species for Project Inclusion

Based on the results of baseline survey (Household survey, FGD and KII) and wider consultation with stakeholders following crop species are added in the project.

S.N.	Added species	Justification
1	Mango	There exist a mango plant with unique taste, large fruit size, it is essential to conserve, propagate, and multiply this plant.
2	Spine gourd	This plant is traditionally used by the community as a natural remedy for blood pressure. It is found only in specific areas, particularly the lower belt of the project site, and is seasonally consumed by the local population.
3	Sipleegan	The plant is used for medicinal purposes and as a vegetable. The community has expressed strong interest in its propagation and multiplication
4.	Wild mushroom	project sites have a high diversity of wild edible mushrooms, which the local community consumes for up to 15 days each season. Therefore, it is important to include awareness and promotion programs to support their sustainable us

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Annexes

Annex 1: Name of the farmers of household survey

S.N.	Farmers Name	S.N.	Farmers Name
1	Bishnu maya rana magar	30	Daku Maya Gurung
2	Shova rana magar	31	lal Bahadur Gurung
3	Rekhu maya magar	32	Biba B K
4	Sita maya Rana	33	Ful maya joshi
5	Sansara B.K	34	Yau Maya Gurung
6	Bal kumar joshi	35	BaL Bahadur Sen Thakuri
7	Manju Thapa	36	Gyan Maya Neupane
8	Hari Maya Rana Magar	37	Santoshi Gurung
9	Manita Thapa magar	38	Devi Kumari Gurung
10	Maya Ale	39	Suk Maya Gurung
11	So maya Rana Magar	40	Sanu Maya Kami
12	Khu Maya Rana Magar	41	laxmi Sunar
13	Mina Thapa Magar	42	Susila Adhikari
14	Nirmala Ruwale	43	Til Kumari Gurung
15	Bimala Rana Magar	44	Indra Kumari Gurung
16	Halsari B K	45	Bina Gurung
17	Bimala Rana	46	Mayna Neupane
18	Ful Maya Magar	47	Man maya sunar
19	Durga Maya Thapa	48	Gau Maya B.K
20	Bishnu Rana magar	49	Mettar maya B.k
21	Shree Maya thapa Magar 53	50	Amrita Giri
22	Sarit Sunari Magar	51	Chija maya B.k.
23	Mankumri Parajuli	52	Lopson Gurung
24	Sita Maya Thapa Magar	53	Susila Neupane
25	Kumari Ruwale Magar	54	Yog maya Gurung
26	shree Maya Aale Magar	55	Bal kumari Uchhai
27	Laxmi Thapa Magar	56	Lekh Maya Gurung
28	Sanu Kumari Gurung	57	Parbari B.K.
29	Usha B K		

Annex 2: List of participants in focus group discussion at lafagaun

S.N.	Name	Address	Gender	Mobile no.
1.	Bimala Rana	Magar gaun	Female	9846496205
2.	Shova Rana	Magar gaun	Female	9846994342
3.	Nirmala Ruwale	Magar gaun	Female	9822182340
4.	Raj kumr Ruwale	Magar gaun	Male	9828791166
5.	Man Sing Rama	Magar gaun	Male	9846235512
6.	So Maya Rana	Magar gaun	Female	-
7.	Durga Rana	Magar gaum	Female	98691027626
8.	Hal Sari B. k	Magar gaum	Female	-
9.	Kho Maya Rana	Magar gaun	Female	-
10.	Manju Rana	Magar gaun	Female	9817155488
11.	Nanu Maya Rana magar	Magar gaun	Female	9846442289
12.	Bishnu Maya Rana	Magar Gaun	Female	9816251985
13.	Krishna Rana	Magar gaun	Female	9828280441
14.	Dil Bahadur Rana bhat	Magar gaun	Female	9748211975
15.	Maya Aale	Magar gaun	Female	9815153127
16.	Bimala Rana Magar	Magar gaun	Female	9846994219
17.	Manita thapa	Magar gaun	Female	9846516820
18.	Mangali Aale	Magar gaun	Female	9816970775
19	Thaman Bahadur Magar	Magar gaun	Male	-
20	Smasher thapa	Magar gaun	Male	-
21	Chakra Bahadur Thapa	Magar gaun	Male	9841329816
22	Bhim Bahadur Aale	Magar gaun	Male	9846542502
23	Dhan Bahadur Rana	Magar gaun	Male	-
24	Krishna Bahadur thapa	Magar gaun	Male	-

Annex 3: List of participants in focus group discussion at Amdanda

S,N.	Name	Address	Gender		Mobile no.
1.	Chija Maya B.k	Aamdada	Female		9818501225
2.	Lekha maya Gurung	Aamdada	female		9863505234
3	Jum kagi Gurung	Aamdada	Male		9802510298
4.	Som Bahadur Gurung	pokharithok	Male		9824156851
5.	Chij Bahadur Gurung	Aamdada	Male		-
6.	Dhan Bahadur Gurung	Aamdada	Male		9817156667
7.	Tula Ram B.K	Aamdada	Male		
8.	Bhim Bahadur Sunar	Aamdada	Male		9826157478
9.	Daku Maya Gurung	Aamdada	Famale		9846090357
10.	Bishnu Maya Gurung	Aamdada	Female		-
11.	Indra Kumari Gurung	Aamdada	Female		-
12.	Chija Maya B.K	Aamdada	Femail		-
13.	Shova Gurung	Aamdada	Female		98704367962
14.	Santoshi Gurung	Aamdada	Female		9826156693
15.	Parbati Gurung	Aamdada	Female		9821065224

S,N.	Name	Address	Gender		Mobile no.
16.	Sanu kumara Gurung	Aamdada	Female		9849024703
17.	Yog Maya Gurung	Aamdada	Female		9818718445
18.	Manu Maya Sunar	Aamdada	Female		9701916788
19.	Bina Gurung	Aamdada	Female		9806586932
20.	Gau Maya B k	Aamdada	Female		9816157937
21.	Usha B.K	Aamdada	Female		9819184824
22	Loveson Gurung	Aamdada	Female		9804133073
23.	Min Bahadur Gurung	Aamdada	Female		9863020222

Annex 4: The participant details of KII

S.N.	Name	Age/Gender	Organization/designation	Education	Contact No
1	Bal kumar Joshi	59, Male	Custodian farmer	SLC	9846461142
2	Om bir gurung	42, Male	Ward chairperson	BBS	9846461142
3	Harish Chandra Lamsal	50, Male	School principal	Masters' degree	9856046366
4	Min bahadur shahi	95, Male	Senior citizen	Literate	094631762

Annex 5: Recommended technology on mandated crops for Madhyanepal, Lamjung

The Government of Nepal recommends crop varieties for three major agro-ecozones—High Hill, Mid Hill, and Tarai—only after their registration and release by the National Seed Board. Madhyanepal falls within the Mid Hill zone, while Kohalpur is in the Tarai. Unlike crop varieties, other agricultural technologies do not have an established formal recommendation mechanism.

Below are some crop varieties suitable for the Mid Hill region, specifically for Madhyanepal, Lamjung

SN	Crop	Variety	Recom year	Days to maturity	Yield, t/ha
1.	Amaranth	Ramechhap Hariyo Latte	2018		8.68
2.	Finger millet	Okhale-1	1980	154-194	3.3
3.		Dalle-1	1980	125-151	3.3
4.		Kabre Kodo-2	2015	153	2.5
5.		Kabre Kodo-1	1990	167	2.3
6.	Proso millet	x			
7.	Sorghum	x			
8.	Little millet	x			
9.	Foxtail millet	Bariyo Kaguno	2021	170	2.20
10.	Pearl millet	x			
11.	Buckwheat	Mithe Phapar-1	2015	72	1.2
12.		Tite Phapar-1	2021	79	1.54
13.		Tite Phapar-2	2021	78	1.63
14.	Barley	Bonus	1974	162	3.6
15.	Naked barley	x			
16.	Black gram	Rampur Mas	2018	64	0.88
17.		Khajura Mas-1	2018	66	0.89
18.	Lentil	Sindur	1979	148	1.5
19.		Simrik	1979	143	1.5
20.		Sisir	1979	150	2.0
21.		Simal	1990	143	4.1
22.		Shikhar	1990	143	3.5
23.		Shital	2004	134	1.1
24.		Sagun	2007	98	1.3
25.		Maheshor Bharati	2007	111	1.4
26.		Khajura Musuro-3	2017	148	1.78
27.		Khajura Musuro-4	2018	136	1.08
28.		Shradha Kalo Musuro	2020)	142	1.21
29.	Horse gram	x			
30.	Faba bean	x			

Annex 6: Household survey questionnaire

Household survey

घरधुरी नम्बर:

मिति:

१. सामान्य जानकारी

1. जिल्ला
2. गाविस
3. गाउँ वा टोलको नाम
4. वडा नं
5. उत्तरदाताको नाम
6. लिङ्ग महिला ☐ पुरुष ☐
7. उमेर वर्ष
8. थर /जात
9. फोन नम्बर
10. कृषि सम्बन्धी कार्यको लागि निर्णय कसले कसले गर्नुहुन्छ
    महिला ☐ पुरुष ☐ दुवै ☐
11. तपाईंको परिवारमा कति जना सदस्य कृषि सम्बन्धी कार्यमा संलग्न हुनुहुन्छ। ☐
12. यो ठाउँमा बसोबास गर्न थाल्नुभएको कति वर्ष भयो ☐
13. तपाईंको परिवारमा कुनै सदस्य गाविस बाहिर काम गर्नुहुन्छ
    छ ☐ छैन ☐
14. तपाईंको परिवारको आम्दानीको मुख्य स्रोत के के हुन्

कृषि तथा पशुपालन ☐ व्यवसाय ☐ जागिर वा नोकरी ☐

कृषि श्रमिक ☐ गैर कृषि श्रमिक ☐ रेमिटेन्स ☐

जडीबुटी संकलन ☐ अन्य ☐

२. कृषि सम्बन्धी विवरण

15. आफ्नो कृषि उत्पादनले तपाईंको परिवारलाई कति वर्ष खान पुग्छ कति महिना

खाद्य प्रकार	**महिना**
मुख्य बाली अन्नबाली	
हरियो सागपात	
तरकारी बाली	
दलहन बाली	
जंगली बाली	
अन्य	

16. तपाईंले आफ्नो खेतबारीमा तल उल्लेखित कुन कुन बालीहरू लगाउनुहुन्छ?

बालीको नाम	**जात**	**बिउको स्रोत**	**क्षेत्रफल**		**जम्मा उत्पादन**	**उत्पादन बेच्नुहुन्छ**
			परिमाण	**एकाइ**		
लट्टे						
फापर						
कोदो						
मुसुरो						
उवा						
बकुला						

17. तपाईंले फापर लट्टे कोदो मुसुरो उवा र बकुलाका हराइसकेका पैथाने जातहरू मा कुनै लगाउन चाहनुहुन्छ

बालीको नाम	**जात**	**बिउको स्रोत**	**क्षेत्रफल**		**प्रयोग**	**खेती बढ्दो वा घट्दो छ**
			परिमाण	**एकाइ**		
लट्टे						
फापर						
कोदो						
मुसुरो						
उवा						
बकुला						

18. यी बालीहरूको जंगली प्रजातिहरू तपाईंको वरिपरि पाइन्छ

बालीको नाम	**जातको नाम**	**प्रयोग**	**स्थान**
धान			
लट्टे			
फापर			
कोदो			
मुसुरो			
उवा			
बकुला			

19. तपाईंले फापरको साग खानुहुन्छ

खान्छु ☐ खाँदिन ☐

20. लट्टेको साग खानुहुन्छ

खान्छु ☐ खाँदिन ☐

21. तपाईंले जङ्गली वा जङ्गलबाट के के खाद्य वस्तुहरू सङ्कलन गरी खानुहुन्छ

बालीको नाम	जातको नाम	प्रयोग	पाहिने स्थान

22. माथि उल्लेखित बालीहरूको खेती प्रविधि सम्बन्धी कुनै तालिम पाउनुभएको छ

छ ☐ छैन ☐

23. यी बाहेक यस स्थानमा हराउन लागेका एकदम महत्वपूर्ण तीन बालीहरू र तिनका जातहरू के के हुन्

बालीको नाम	जातको नाम	प्रयोग	हाल पाहिने स्थान

24. स्थानमा हराइसकेका रैथाने बालीहरू र तिनीहरूका जातहरू के के हुन्

बालीको नाम	जातको नाम	प्रयोग

25. तपाईंले कुनै रैथाने फलफुल बगैंचा, रैथानिक किरा पालेको छ

छ ☐ छैन ☐

26. तपाईंले स्थानीय बाली त रैथानी वा परम्परागत परिकारहरु बनाउनुहुन्छ

परिकार	**समय/ चाडपर्व**	**महत्व**

27. जिन बैंकको बारेमा जानकारी छ

छ ☐ छैन ☐

28. तपाईंको विचारमा यस ठाउँमा एकदम राम्रो रैथाने जातका कुन कुन बालीको के के जात छ

बालीको नाम	**जातको नाम**	**गुण**

३. परम्परागत ज्ञान को विवरण को विवरण

29. तपाईंले अरु रैथाने जातको बिउ कहाँबाट प्राप्त गर्नुहुन्छ ? मुख्य तीन स्रोत

सि.न	**श्रोत**
1	
2	
3	

30. रैथाने बिउ उत्पादन कसरी गर्नुहुन्छ बिउको लागि बिरुवाको छनोट कसरी गर्नुहुन्छ

31. घरमा बिउ कसरी भण्डारण गर्नुहुन्छ मुख्य तीन तरिका

सि.न	**तरीका**
1	
2	
3	

32. तपाईंले कृषि सम्बन्धित के के रैथाने तथा स्थानीय जातहरु को संरक्षण जातहरुको संरक्षण गर्नुभएको छ

वस्तु	**नाम**	**गुण**

33. अनिश्चित मौसमको कारण कृषि बालीमा कस्तो प्रभाव परेको छ? मुख्य तीन प्रभावहरु भन्नुहोला

सि.न	**प्रभाव**
1	
2	
3	

34. अनिश्चित मौसमको कारण परेको कृषि बालीमा परेको प्रभाव न्यूनीकरणको लागि के के उपाय गर्नुभएको छ

सि.न	**प्रभाव**	**उपाय**
1		
2		
3		

Annex 7: Check list for FGD

स्थान:
मिति:
सहभागी संख्या:

A. crop calendar

1. यस स्थानमा लगाउने बाली चक्र बनाउने
2. कोदो लट्टे मुसुरो वा बकुला म्यान्डेटरी क्रपको बाली चक्र बनाउने

B. Status of landraces cultivation and CWR identification

1. यहाँहरुले लगाउने बालीहरुमा रैथाने बालीहरुले कति जति प्रतिशत ठाउं ओगटेको छ?

2. यस स्थानमा हराउन लागेको बालीहरु रैथाने के के हुन्? (बाली र जात listing)

बालीको नाम	जातको नाम	प्रयोग	स्थान

3. यस स्थानमा हराइसकेका महत्त्वपूर्ण बालीहरु के के हुन्? (बाली र जात listing)

बालीको नाम	जातको नाम	प्रयोग	स्थान

4. यी बालीहरुको जंगली प्रजातिहरु तपाईंको वरिपरि पाइन्छ

बालीको नाम	जातको नाम	प्रयोग	स्थान

धान			
लट्टे			
फापर			
कोदो			
मुसुरो			
उवा			
बकुला			

5. रैथाने जात संरक्षणमा के कस्तो कामहरु भइरहेको छ (listing)

कामको विवरण	कसले गरेको	कहिले देखि गरेको

5. Traditional knowledge documentation and custodian farmer identification

1. यहाँ परम्परागत खानाहरु खाने चलन कतिको छ र के के छ
2. यस ठाउँमा कुनै सामुदायिक ब्यु बैंक सामुदायिक रैथाने बगैंचा बिउ सामुदायिक किरा पालेको रैथाने किरा पालेको कोही हुनुहुन्छ (listing)

विवरण	**कृषकको नाम**	**स्थान**	**प्रयोग**
किरा			
माछा			

3. यस ठाउँमा सबैभन्दा धेरै रैथाने जात लगाउनुहुने र परम्परागत ज्ञान भएको मानिसहरु वा व्यक्ति तपाईहरुले कोही चिन्नुभएको छ

कृषकको नाम	महिला/ पुरुष	कहिले देखि गरेको

4. अनिश्चित मौसमको कारण यस ठाउँमा कृषिमा बालीमा कस्तो प्रभाव परेको छ र यसलाई न्यूनीकरण कसरी गरिरहनु भएको छ

प्रभावको विवरण	कृषकको नाम	कृषकको तरिका वा बिधि	स्थान

6. Need identification and Sensitization

1. रैथाने जात संरक्षण किन आवश्यक छ
2. के के जात पाईदिए लगाऊछु (Listing)?
3. तपाईँहरुले यहाँ फापर लट्टे कोदो मुसुरो वा बकुला लगाउन चाहनुहुन्छ वा हुँदैन के के लगाउनु चाहनुहुन्छ ?
4. जिन बैंकको बारेमा जानकारी छ र के के छ

Annex 8: Check list for KIS

1. Name (नाम):	2. Age (उमेर):	3. Gender (लिंग):
4. Ethnicity (थर/जाति:	5. Occupation (पेशा):	6. Organization and designation (संस्था र पद):
7. Education (शिक्षा):	8. Address (ठेगाना)	9. GPS coordinates (भौगोलिक अवस्थिति):
10. Contact No (सम्पर्क न:)	11. Family members (परिवार सदस्य संख्या):	

12. How many members are directly involved in agriculture related activities? तपाईको परिवारका कतिजना सदस्य प्रतक्ष्य रुपमा कृषि पेशामा संलग्न छन्?
13. How many members are migrated from your family? तपाईको घरबाट कतिजना सदस्य बसाइसराई गरि अन्यन्त्र जानुभएको छ?
14. Who makes agriculture-related decisions in the household? तपाईको घरमा कृषि सम्बन्धिको कार्यहरुमा कसले निर्णय लिने गर्नुहुन्छ?
15. Total land area (जग्गाको कुल क्षेत्रफल): ..... Ropani(रोपनी)
16. यस स्थानमा कस्तो खालको बाली चक्र अपनाउने गरिन्छ ??
17. यस स्थानमा हराउन लागेको बालीहरु रैथाने के के हुन्? (बाली र जात listing)

बालीको नाम	जातको नाम	प्रयोग	स्थान

18. यस स्थानमा हराइसकेका महत्त्वपूर्ण बालीहरु के के हुन्? (बाली र जात listing)

बालीको नाम	**जातको नाम**	**प्रयोग**	**स्थान**

19. तपाइको क्षेत्रमा पाइने बालिका जंगली प्रजातिहरु के के हुन्?
20. तपाईको क्षेत्रमा रैथाने कृषि संरक्षणमा के कस्तो कामहरु भइरहेको छ (listing)

कामको विवरण	कसले गरेको	कहिले देखि गरेको

21. यहाँ परम्परागत खानाहरु खाने चलन कतिको छ ?? के के खाने गरिन्छ ?
22. यस ठाउँमा कुनै सामुदायिक बीउ बैंक अथवा सामुदायिक फिल्ड जिन बैंक छ?

23. यस ठाउँमा सबैभन्दा धेरै रैथाने जात लगाउनुहुने र परम्परागत ज्ञान भएको मानिसहरु वा व्यक्ति तपाईहरुले कोही चिन्नुभएको छ

कृषकको नाम	महिला/ पुरुष	कहिले देखि गरेको

24. अनिश्चित मौसमको कारण यस ठाउँमा कृषिमा बालीमा कस्तो प्रभाव परेको छ र यसलाई न्यूनीकरण कसरी गरिरहनु भएको छ ??
25. रैथाने जात संरक्षण किन आवश्यक छ
26. तपाइलाई जिन बैंकको बारेमा जानकारी छ??
27. यस ठाउमा रैथाने हाटबजार संचालनको सम्भावना के छ ??
28. यस स्थानमा रैथाने कृषिका मुख्य समस्या के के हुन् र तिनलाई समाधान गर्न तपाइको बिचारमा के गर्नुपर्ला ??

Annex 9: List of AGRs in project site

Genetic Resources	Name of Genetic Resource
Agro-insect	Honey bee (Pahadi Ghar Mauri, *Apis cerana*)
Livestock	Local cow, Khari goat, Sakani hen, khatikhuile hen, Pig,
Aquatic	Fish (Baam, Kane, Duduno, Raj Baam, Gaduyula, Gardhi)
Microorganisms	Mushroom (Wild, Patke, Dhudhe, Salle, Chamre, Dalle, Kaldhunge, Saleri)
Crops	Maize, Beans, Black gram, Horse gram, Masyang, Finger millet (Yellow millet), foxtail millet, Millete rice, Rice bean, Soyabeans Mustard greens, Taro, Turmeric, Ginger, Sugarcane, Radish, Pumpkin, Potato, Chilli, Garlic, Yam, Colocasia, Banana, mango, Amala,
Forage	Kutmero, Mulbarry, Bamboo, Siru, Kaas, Kamlo, Gidari, Khar, Salme, Katus, Badahar, Daghaway, Dhobini

Annex 10: Project brochure

Working Methodology

The project aims to collect and conserve farmers' varieties and PGRFA in national and Svalbard genebanks while strengthening community-based conservation initiatives. Farmers will be trained to register locally adapted varieties, and PGRFA will be reintroduced from genebanks. Promotional activities, capacity building, and participatory breeding approaches will support small-scale farmers. A public database will be maintained, and seed production will be enhanced through partnerships. Awareness of dietary diversity will be promoted, and PGRFA accessions will be made available through GLIS. Collaboration with policymakers and stakeholders will ensure effective conservation and policy development for sustainable PGRFA management.

Beneficiaries

The primary beneficiaries of this project are small-scale farmers, community genebank and seed bank members, students, and researchers, primarily from indigenous communities of the project sites. Farmers will receive training to enhance their capacity for on-farm conservation and variety registration. Funds will support conservation efforts and annual events like seed fairs, diversity fair, hat bazar. The initiative will promote a smart food value chain, facilitate germplasm exchange, and provide consumers with nutritious, healthy, locally available diverse food options while benefiting the global community.

OUTPUT 1: Adapted PGRFA managed or improved with farmers' participation.
SUB-OUTPUT 1.1. Use and conservation of farmers' varieties enhanced;
SUB-OUTPUT 1.2. New adapted varieties developed through participatory research
SUB-OUTPUT 1.3. Dynamic linkages strengthened between on-farm program and genebanks and others in the agricultural research systems
OUTPUT 2: Enhanced local value chains improve the production and consumption of adapted PGRFA
SUB-OUTPUT 2.1. Local seed value chains improved for dissemination of adapted varieties
SUB-OUTPUT 2.2. Use of adapted PGRFA and their products enhanced in the local food value chain;
OUTPUT 3: Mechanisms strengthened to enhance the sharing of PGRFA materials, data and knowledge.
SUB-OUTPUT 3.1. Linkages strengthened to ensure the dynamic flow of PGRFA materials and data from local to global through the MLS and GLIS
SUB-OUTPUT 3.2. Capacities of BSF partners enhanced to document and disseminate knowledge on innovations for PGRFA management;
SUB-OUTPUT 3.3. Knowledge-gained and lessons learned accessed and used by all regions through the community of practice
SUB-OUTPUT 3.4. Visibility on innovations for PGRFA management increased for evidence-based policy and planning

For further detail

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On-farm project: An introduction

Enhancing Conservation and Utilization of Plant Genetic Resources in Nepal for Food and Nutrition Security Under Unpredictable Climate

Rational

Agricultural plant genetic resources (APGRs) are vital for Nepalese livelihoods but have been severely compromised due to the loss of native landraces and overdependence on foreign germplasm. Since the introduction of exotic high-yielding varieties, approximately 50-100% of local genetic diversity has been lost. This, coupled with a narrow genetic base in the field and the loss of associated biodiversity, has reduced resilience to climate change and pests. Small-scale farmers face difficulties maintaining seed systems, relying on costly inputs, and lacking access to climate-resilient varieties. While the National Genebank has made strides in conservation, many genetic resources remain unexplored, uncharacterized, and underutilized.

This project aims to address these gaps by enhancing the conservation, characterization, and utilization of APGRs. By building capacity among farmers, researchers, extension officials and local communities, improving seed systems, and fostering collaboration, the project will ensure food, nutrition, health, business and environment security, strengthen agrobiodiversity, and create sustainable agricultural practices, addressing challenges posed by climate change and other stresses.

Objectives

The main objective of this project is to address the lack of comprehensive conservation of agricultural plant genetic resources (APGRs) in Nepal, which has led to the loss of native genetic diversity and heavy reliance on foreign germplasm.

Specific objectives

- To enhance conservation and utilization of plant genetic resources in Nepal for food and nutrition security under unpredictable climate
- To contribute in enhancing conservation through utilization of agriculture genetic resources for climate change preparation
- To build a robust germplasm access and exchange mechanism for the country
- To build the capacity

Crops and Sites

Base on the backdrop, this project is mainly implemented in Kohalpur, Lumbini, and Madhynepal, Lamjung and focusing on neglected and underutilized species ie Amaranths, buckwheat, millets, lentil, naked barley, faba bean and other crops based on gap analysis and farming communities' needs. There are many other secondary sites.

Stakeholders

The project brings together a diverse range of stakeholders, including community seed banks (CSBs) Community Genebank Network. Key partners also include local government bodies from various rural municipalities across different provinces. Several organizations and enterprises contribute to value chain development and market linkages, while academic and research institutions, along with multiple departments under the Nepal Agricultural Research Council (NARC), support research, conservation, and capacity-building efforts. Government agencies such as the Ministry of Agriculture and Livestock Development (MoALD), the Seed Quality Control Center (SQCC), and other specialized research centers play a vital role in policy formulation and implementation. Collectively, these stakeholders aim to enhance the conservation, utilization, and commercialization of PGRFA across Nepal. Many NGOs and relevant stakeholder will involve.

Funding agency and Period

The International Treaty's new Funding Strategy features the Benefit-sharing Fund (BSF, managed by FAO) as a key component, operating through global calls for proposals and a competitive selection process and partial in-kinds support from NARC. Project period is of 4 years (20 April 2024 to 20 April 2028).

Project management

The project envisions a Project Coordination Committee. Under this committee, the Project Execution Committee will be led by the Principal Investigator, who also serves as the Chief of the National Genebank. Four sub-committees will be formed to execute project activities, focusing on research, capacity building, knowledge management, and collaboration to enhance PGRFA innovation, management, and conservation. The Partnership and Collaboration Unit will oversee active participation and contributions from all partners.