Government of Nepal

Ministry of Agriculture and Livestock Development

Food and Nutrition Security Enhancement Project II (FANSEP II), Lalitpur, Nepal

Baseline Survey Report

FANSEP II

(NP-MOALD-438584-CS-QCBS BASELINE FANSEP2)

June 2025





GAFSP
ORIENTATION AND TRAINING TO ENUMERATORS
Food and Nutrition Security Enhancement Project II
(FANSEP II)

Survey Team

Baseline Survey of Food and Nutrition Enhancement Project II (FANSEP II)

A team of consultants from 3D Research and Development Solutions (3D) in close coordination with Food and Nutrition Security Enhancement Project II (FANSEP II) conducted this survey.

The core purpose of the survey was to compare the baseline and outcome database of FANSEP II and to establish the baseline database for measuring the project performance against the targeted result indicators of FANSEP II in Nepal.

The contents of the report aimed at reflecting the real picture of the baseline status of the direct project beneficiaries associated with FANSEP II as well as baseline scenario for those treated as comparison groups.

Declaration: This report is the product of 3D & its researchers. We, the consultant team, declare that the findings, analysis, and conclusions in this report are made with the utmost level of professionalism, integrity, and adherence to established research standards and methodologies. However, since the baseline survey was conducted based on the memory recall basis recalling a one-year-old status of the baseline scenario for some indicators, the consistency of figures for those may not represent the perfect accuracy. The findings, interpretations, and conclusions presented in this report do not necessarily reflect the views of FANSEP II project.

3D Research and Development Solutions
(An ISO 9001: 2015 certified company)
Lalitpur Metropolitan-20, Manbhawan, Lalitpur
Email: 3dsolutions21@gmail.com
Web site: https://3dsolutions.com.np/
Tel: +977-9858421240, 9824667975

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We are also very much thankful to our team of dedicated Sector Experts, Data Manager, Supervisors, Data Checker, Logistic Manager and enumerators of 3D.

Project Director of FANSEP II Dr. Arun Kafle provided a wonderful inspiration and guidance to the survey team. Likewise, the timely completion was not possible without an excellent facilitation of Dr. Tapendra Bahadur Shah, Senior Monitoring and Evaluation Officer of FANSEP II. Other FANSEP II staff - Mr. Deepak Poudel, Senior Planning Officer; Mr. Prakash Acharya, Accounts Officer; Mr. Tilak Raj B.C., Planning Officer; Mr. Sunil Joshi, Agriculture Officer; Mr. Aashish Shrestha, Agriculture Officer; Dr. Alisha Jha, Veterinary Officer; Mr. Dhruba Nepal, Procurement Specialist; Mr. Sitaram Karki, Financial Management Specialist and Mr. Sebak Khadka, Kharidar greatly contributed to the study.

Dr. Sabina Khatri Karki, Agricultural Economist at the World Bank Group, Nepal, extended exceptional support to the mission. Her insightful contributions and unwavering suggestions were instrumental to its success.

The FAO Technical Assistance team to the FANSEP II Central Office in Lalitpur—comprising Mr. Shyam Prasad Poudyal (Team Leader), Mr. Rudra Prasad Poudel (National Monitoring and Evaluation Specialist), Dr. Lok Nath Paudel (Livestock Specialist), Dr. Anil Chandra Neupane (Crop Production Specialist), Mr. Tek Prasad Luitel (Agribusiness and Market Linkage Specialist), Mr. Anup Thoker, Nutrition Specialist; Mr. Sahadev Prasad Humagain, Capacity Development Specialist; Mr. Shiva Prakash Acharya, Environment and Social Safeguard Specialist; along with Mr. Mahesh Sapkota and Mr. Sanjib Dhungel (Cluster M&E Specialists)—rendered invaluable support to the survey mission. 3D extends its profound gratitude to them for their steadfast cooperation and assistance throughout the survey period.

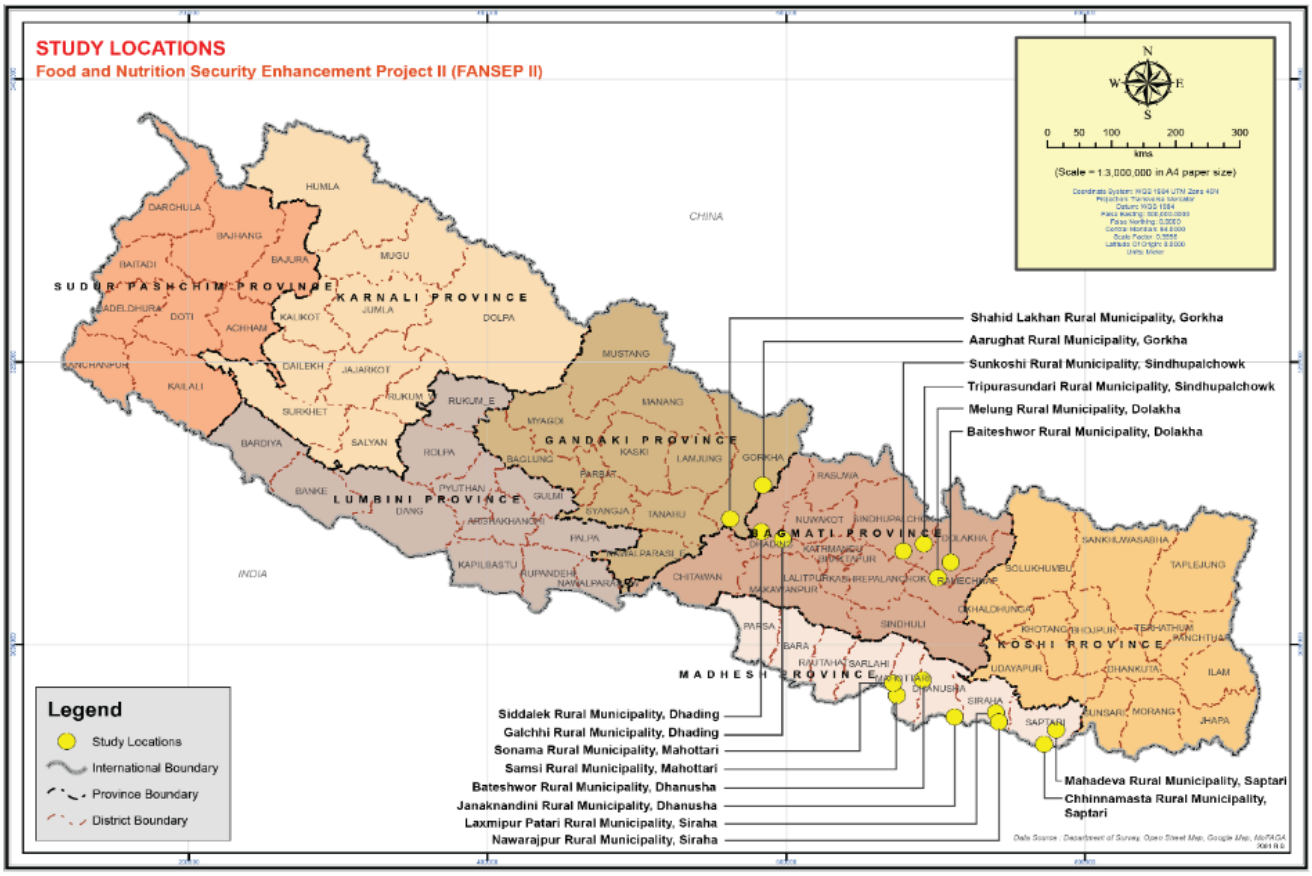
3D Research and Development Solutions

Manbhawan, Lalitpur, Nepal

June, 2025

Currency conversion rate as of June 11, 2025: US $ 1=NPR 136.85

BASELINE STUDY LOCATION IN THE MAP



SUMMARY OF BASELINE RESULTS

Baseline Indicators	Baseline Value Treatment	Baseline Value-comparison	Baseline Value (Average)
PDO Indicators			
PDO 1: Farmers Adopting Improved Agricultural Technologies (%)			
i) The share of PG members adopting at least one improved technology (%)	54.20	46.91	52.07
PDO 2: Crop and Animal Productivity by Direct Beneficiaries			
PDO: 2.a. Productivity of Crops (Food Grains, Mt/ha)	2.52	2.41	2.49
PDO: 2.b. Productivity of Crops (Vegetables, Mt/ha)	7.50	7.04	7.40
PDO: 2.c. Productivity of Livestock Meat (goat meat): live weight (kg/animal)	15.80	17.79	16.21
PDO: 2.d. Productivity of Milk (Ltr/animal/lactating period)	980.20	973.15	978.31
PDO 3: Household income (NPR/HH)	191,402.41 (US$ 1,398.63)	159,908.37 (US$1,168.49)	185,169.00 (US$ 1,353.08)
Male headed HH (NPR)	195,375.41 (US$ 1,427.66)	103,739.62 (US$ 758.05)	216,719.27 (US$ 1,583.63)
Female headed HH (NPR)	68,497.50 (US$ 500.43)	63,232.01 (US$ 462.05)	70,084.41 (US$ 512.13)
Farm Income (NPR)	50,261.78 (US$ 367.28)	40,446.83 (US$ 295.56	47,272.34 (US$ 345.43)
Non-farm income	141,140.63 (US$ 1,031.35)	119,461.54 (US$ 872.93)	137,896.66 (US$ 1,007.64)
PDO 4: Food Insecurity Experience Scale of HHs-Moderate or Severe (%)	57.00	53.64	56.02
PDO 5: Minimum Dietary Diversity Score of Pregnant and lactating women (%)	49.19	53.67	50.45
PDO 6: Minimum Dietary Diversity Score for Children (%)	41.40	35.90	40.31
Key Intermediate and other Indicators			
Household Dietary Diversity Score including nourishing mothers and children	7.60	7.44	7.55
Cropping intensity for crop sub-groups (%)	207	201	201
Months of Adequate Household Food Provisioning	9.44	9.40	9.42
Food Consumption score- borderline & poor (combined %)	30.01	31.45	30.50
Food Consumption Score-acceptance level (%)	69.89	68.55	69.50

EXECUTIVE SUMMARY

3D Research and Development Solutions (3D) conducted a Baseline Survey for the Food and Nutrition Security Enhancement Project II (FANSEP II) in Nepal, spanning Gorkha, Sindhupalchowk, Dhading, Dolakha, Saptari, Siraha, Dhanusha, and Mahottari districts. The project aims to directly benefit 55,000 individuals: 38,750 through Climate and Nutrition Smart Agriculture Technology Adaptation and Dissemination (Component A) and Income Generation and Diversification (Component B), with the remaining 16,250 benefiting from enhanced nutrition.

FANSEP II is actively underway in 16 Rural RMs across the previously mentioned districts. A core objective of this initiative was to meticulously establish a baseline of the current socio-economic and nutritional landscape (livelihoods situation, agricultural production and practices, knowledge on climate resilient agriculture systems among others). This foundational data is absolutely crucial for the effective monitoring of project achievements. By carefully tracking the pre-project status of beneficiaries against a set of key PDO indicators, the survey facilitates accurate progress tracking and optimizes resource allocation throughout the project's lifecycle.

The project selected 2500 households as the sample for the baseline survey -1750 from the treatment group representing about 5% of the 35,000 project households and 750 comparison households. The comparison group was selected randomly, while the treatment group used multistage sampling: stratified random sampling to select farmer groups by sector (crop, livestock, nutrition), then simple random sampling to select three households per group.

The survey encompassed 2,541 households, with 1,797 of these belonging to the treatment and 744 to comparison group. Complementing this quantitative data, a qualitative survey engaged 126 diverse project stakeholders to gather deeper insights.

Key findings indicate that 22.83% of households were female-headed. Household size varied significantly by geography, averaging 5.77 members in the Terai regions and 4.35 members in the Hill regions. Educational attainment among respondents showed that 27% lacked any formal education, while 4% held a Bachelor's degree or higher. Female asset ownership, specifically for land and housing, demonstrated regional disparities, ranging from 15% in the Saptari cluster to 30% in the Sindhupalchowk cluster. The primary occupation for the majority of households was agriculture (80%), followed by daily wage labor (6%). This aligns with the fact that 64% of household income originated from farming and animal husbandry.

Household landholding patterns show that most households own land, making up 80% with an average of 0.39 ha/HH. Sharecropping, renting, and joint ownership cover smaller shares. Land sizes vary by clusters, with Saptari having larger plots, while Gorkha and Sindhupalchowk have smaller ones.

The study identified a diverse range of crops cultivated throughout the year. Paddy, maize, and wheat were reported as the staple food grains grown across the communities during various seasons (spring, summer, and winter). Similarly, common vegetables cultivated included tomato, cabbage, cauliflower, and brinjal, highlighting the varied agricultural practices within these regions. Livestock rearing is another livelihood source of the project beneficiaries. Goat, buffalo and cattle were among the major livestock.

Regarding the PDO indicators, Farmers Adopting Improved Agricultural Technologies," the total baseline is 1323 farmers (52.07%), with 974 (54.20%) in the Treatment group. Under PDO 2, focusing

on "Crop and Animal Productivity by Direct Beneficiaries," the total baseline productivity for "Food Grains" (paddy, maize and wheat) is 2.49 Mt/ha, where the Treatment group is slightly higher at 2.52 Mt/ha. For "Vegetables," the total baseline productivity stands at 7.40 Mt/ha, with the Treatment group at 7.5 Mt/ha. In livestock, "Live Goat Meat" shows a total baseline productivity of 16.21 kg/animal, while "Ltr of Milk/lactating period" has a total baseline of 978.31 liters, with the Treatment group contributing 980.20 liters.

Regarding PDO 3 on household income, the overall baseline income is NPR 185,169.00 (US$ 1,353.08) per household, with the Treatment group showing a slightly higher average of NPR 191,402.41 (US$ 1,398.63). Among the immediate indicators, net farm income stands at NPR 47,272.34 (US$ 345.43) overall, increasing to NPR 50,261.78 (US$ 367.28) for the Treatment group. For PDO 4, the Food Insecurity Experience Scale shows a baseline of 56.02%, while the Minimum Dietary Diversity Score for women is 50.45%, and for children, it is 40.31%. The Household Dietary Diversity Score averages 7.55 overall, slightly higher in the Treatment group at 7.60. Similarly, the Months of Adequate Household Food Provisioning average 9.42 months overall and 9.44 months in the Treatment group. Finally, the Food Consumption Score (percentage of households with acceptable levels) stands at 69.50%.

The FANSEP II project is ideally positioned to improve the livelihoods of marginalized farmers where significant opportunities exist for intervention. A baseline survey gathered crucial data on demographics, agricultural production, and nutritional status. Key findings showed the existing baseline status of vulnerable farmers. While much of the data relied on memory recall, posing some collection challenges, the overall findings strongly advocate for robust and integrated interventions to enhance the well-being of the project's beneficiaries. The overall experience revealed that the cooperation between the project and the team of consultant is pivotal for successfully accomplishing such baseline studies as evidenced by this instance

The study team gleaned several key limitations during the survey. Meticulous preparation, timely finalization, and designing farmer-friendly study materials were among the limitations. Additionally, effectively addressing respondent reluctance proved vital for data collection.

Recommendations

Baseline related

- Set a strict timeline for finalizing the questionnaire, ensuring it is comprehensively reviewed and approved well in advance of enumerator training.
- Review the questionnaire for redundancy and necessity. Use skip logic to streamline the survey, ensuring respondents only see relevant questions. Divide the questionnaire into shorter sections for separate sittings if possible or consider phased data collection.
- Develop a thorough pre-survey data validation protocol, including multi-stage verification for sample lists and HH IDs. Train enumerators on resolving discrepancies and provide direct access to FANSEP II team for consultation on complex cases during fieldwork.
- Establish a rapid, proactive household replacement system with pre-approved lists based on defined criteria. Streamline approval processes, grant enumerators instant list access, and minimize travel time and schedule disruptions.

- Craft a clear narrative for enumerators on project benefits and data importance while stressing confidentiality and community impact. Optionally, provide a small token of appreciation for their time if possible.
- Organize the baseline prior to starting the project activities. Provide enumerators with enhanced training in memory recall-based interviewing techniques, including probing questions and triangulation methods, to help respondents accurately reconstruct past information

Program related

- Many farmers lack knowledge of improved pre- and post-production practices; FANSEP II should boost their skills in climate-smart agriculture and livestock to raise productivity.
- Empower women in agriculture for food and nutrition security through gender-responsive strategies, capacity building, and equitable resource allocation.
- FANSEP II needs to empower vegetable growers to transcend local markets. This means supporting aggregation, facilitating access to wider markets, providing better crop and livestock market information, and building connections between farmer groups and business organizations.
- Strengthen local nutrition education for women and girls, focusing on balanced diets, child feeding, and maternal health. Promote home gardening and livestock to enhance access to nutritious foods.
- Since some farmers with a Household ID are unaware of group distinctions, the project needs to offer a basic orientation about their engagement in the group when forming these groups.
- Many farmers face crop loss from climate and wildlife; insurance is needed in rural areas. FANSEP II can aid with localized insurance alongside government and partners.
- Product diversification, quality control, and stronger policy advocacy in agriculture and livestock are essential. Government school lunch programs don't yet include local agri-products, and subsidies meant for smallholders often reach only elite farmers. FANSEP II could address these gaps through policy lobbying and advocacy with rural municipalities.
- Promoting research and development can drive innovations in farming, nutrition, and disease control, boosting productivity, while training staff, farmers, and technicians is vital to strengthen skills and ensure project success.

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ABBREVIATION

3D	3D Research and Development Solutions
AI	Artificial Insemination
BFIs	Bank and Financial Institutions
DCCA	District Chambers of Commerce Association
FANSEP	Food and Nutrition Security Enhancement Project
FAO	Food and Agriculture Organization
FCHV	Female Community Health Volunteer
FCS	Food Consumption Score
FGD	Focus Group Discussion
FIES	Food Insecurity Experience Scale
FMD	Foot-and-mouth disease
GAFSP	Global Agriculture and Food Security Program
GBVS	Gender Based Violence Survivors
GESI	Gender Equality and Social Inclusion
GoN	Government of Nepal
GPS	Global Positioning System
Ha	Hectare
HDD	Household Dietary Diversity
HG	Home Garden
HHs	Households
Kg	Kilogram
KII	Key Informant Interview
MAHFP	Months of Adequate Household Food Provisioning
MDD-C	Minimum Dietary Diversity for Children
MDD-W	Minimum Dietary Diversity for Women
MoALD	Ministry of Agriculture and Livestock Development
MSNP	Multi-Sectoral Nutrition Plan
Mt	Metric Tons
NA	Not Applicable
NCD	Newcastle Disease Vaccines
No	Number
NPR	Nepalese Rupees

PDO	Project Development Objective
PPR	Peste des Petits Ruminants
PWD	Persons With Disabilities
QAP	Quality Assurance Plan (QAP)
RMs	Rural Municipalities
SDG	Sustainable Development Goals
ToR	Terms of Reference
WB	World Bank

1. INTRODUCTION

1.1. Global Context

Global food and nutrition security remains a critical concern, with the UN's Decade of Action on Nutrition aiming to achieve the Sustainable Development Goals of eradicating hunger and malnutrition by 2030. Despite these efforts, approximately 2.33 billion people, or 28.9% of the global population, still grapple with moderate to severe food insecurity, including 864 million facing severe conditions (WFP, 2022). This persistent challenge, a major obstacle to development, has been exacerbated by recent unprecedented shocks to the global food system. Supply chain disruptions, climate change, the COVID-19 pandemic, rising interest rates, and the war in Ukraine have all contributed to high food inflation and disproportionately affected vulnerable populations worldwide (World Bank, 2025). Global hunger, though plateaued post-COVID-19, remains significantly above pre-pandemic levels. The current crisis is immense; a mere 1% rise in global food prices pushes 10 million more people into extreme poverty (World Bank, 2025).

Malnutrition remains a serious global issue, impacting billions with both undernutrition and over nutrition. Despite strides in reducing childhood undernutrition, rising rates of overweight and obesity, even in children, are creating a dual burden of malnutrition in many countries.

In 2022, 2.5 billion adults were overweight, with 890 million categorized as obese and 390 million as underweight. Concurrently, among children under five, 149 million were stunted, 45 million wasted, and 37 million overweight or obese (WHO, 2025).

Food plants offer vital nutrients, but many fruit and vegetable species are threatened by land use and climate change (UN Summit, 2021). Their wild relatives, crucial for traits like heat tolerance and disease resistance, are severely underrepresented in gene banks; only 3% are well-conserved, with 39% needing urgent protection and 58% being a medium priority (AVRDC, 2025). Protecting these species is critical for nutrition, food security, livelihoods, ecosystem services, and cultural heritage.

Wild relatives of fruits and vegetables, crucial for traits like heat tolerance and disease resistance, are severely under-represented in gene banks; only 3% are well conserved, with 39% needing urgent protection and 58% being a medium priority (UN Summit, 2021). This highlights a critical link to nutrition security, directly affecting UN Sustainable Development Goals 2 (zero hunger), 3 (good health and well-being), and 6 (clean water and sanitation) (Adhikari et al., 2017).

About 12.6 million people (27% of the population) face food crisis or worse, with nearly 2 million in emergency (World Bank, 2025). This widespread need for humanitarian food aid is driven by a weakened economy, reduced humanitarian support, and frequent environmental disasters like droughts and floods. Compounding these issues are chronic poverty and limited employment, severely affecting certain provinces.

South Asia faces high malnutrition rates among children and women, including stunting, wasting, anemia, and nutrient deficiencies. Addressing this issue demands a comprehensive strategy involving health system enhancement, maternal nutrition improvement, and addressing the dual burden of malnutrition.

1.2. National Context

Despite recent improvements, Nepal, still a poor country, faces food insecurity exacerbated by natural disasters (droughts, floods, landslides, earthquakes), global price fluctuations, civil unrest, disease, and poor infrastructure, with COVID-19 further degrading daily life (Chemjong & KC, 2020). Western Nepal and the Terai region are particularly vulnerable. Currently, 4.6 million Nepalis are food-insecure (20% mildly, 22% moderately, 10% severely), highlighting the urgent need for clear policies and strategies that prioritize natural resource conservation.

National surveys, including the Nepal Demographic Health Survey (2022), consistently show high levels of child undernutrition. In Nepal, 2% of children under five are stunted and 8% are wasted. Additionally, anemia affects 43% of children aged 6-59 months and 34% of women aged 15-49. Nepal's food security shows an urban advantage over rural areas, and the Terai region fares better than hill and mountain regions. While still moderate, Nepal's 2022 Global Hunger Index (19.1) reflects a consistent trend since 2014, shifting from a serious to a moderate hunger status (Sapkota, 2022).

Nepal's economy and livelihoods heavily rely on its food and land-use systems, with over two-thirds of the population engaged in traditional, small-scale agriculture across diverse agro-ecological zones. While rice, maize, wheat, millet, and potatoes are staple crops, the country faces challenges like heavy reliance on subsistence farming and imported foods, especially in mountainous regions. Rice imports are crucial for food security, comprising over 75% of imported foods in 2020 alongside wheat, which has unfortunately decreased local production and farm profitability (Khatri et. al., 2023; Basnet, et. al., 2024). Increasingly, fruits and vegetables are recognized as valuable and regenerative food crops globally and nationally.

1.3. Contribution of Agricultural Sectors in Nepal

Agriculture remains Nepal's economic backbone, contributing 24.12% to GDP and employing 62% of the population. Despite its potential for socio-economic transformation, growth is hindered by poor economic opportunities, weak institutions, outdated technology, insufficient research, and limited market development. Within the agricultural GDP, agriculture itself contributes 65.81%, with livestock at 23.92%, forestry at 8.71%, and fisheries at 1.56%. Cereals, pulses, and oilseeds make up roughly 30% of agricultural GDP, followed by vegetables (22.74%), spices (5.66%), fruits (5.34%), cash crops (1.44%), plantation crops (0.18%), and flowers/ornamental plants (0.06%).

1.4. Agricultural and Livestock Production in Nepal

Nepal's agricultural landscape is diverse, categorized into cereals, cash crops, pulses, fruits, vegetables, and spices. Cereals like paddy, maize, and wheat are primary, cultivated across 3.34 million ha, yielding 10.91 million tons with a productivity of 3.26 Mt/ha. Pulses, including lentil and chickpea, cover 2.96 million ha of land, producing 3.4 million tons at 1.15 Mt/ha (MoALD, 2025). Vegetables rank second in production, with Nepal yielding 4.38 million tons from 0.32 ha at 14.48 Mt/ha, including valuable Cole crops, solanaceous, cucurbits, and root crops. Fruits hold the third position, producing 1.53 million tons from 0.14 million ha at 10.95 Mt/ha (MoALD, 2025), with tropical varieties like mango and banana, subtropical citrus, and temperate apples. Additionally, Nepal cultivates spices such as large cardamom and ginger, and cash crops like tobacco, sugarcane, potato, and jute.

Nepal's livestock production is primarily a smallholder, mixed crop-livestock system, vital to rural livelihoods and contributing significantly to the national agricultural GDP by providing meat, milk, and

income to about 70% of households (FAO, 2005; World Bank, 2025). Key livestock include cattle, buffaloes, goats, sheep, pigs, and poultry, with buffaloes and goats leading meat production and dairy gaining commercial interest. The sector faces challenges like low productivity, poor animal husbandry, limited veterinary access, and disease outbreaks (World Bank, 2025). Modernization efforts, including policy formulation, improved breeding, and stronger market links, aim to shift from subsistence to commercial production (World Bank, 2025).

1.5. Project Background

The Ministry of Agriculture and Livestock Development is executing the Food and Nutrition Security Enhancement Project II (FANSEP II) to bolster climate resilience, agricultural productivity, and nutrition among Nepal's smallholder communities. The project champions Climate Smart Agriculture practices to enhance production resilience and sustainability, thereby helping beneficiaries mitigate climate challenges such as droughts and excessive rainfall. By advocating for climate-smart farming, the cultivation of nutritious crops, and the diversification of income streams, FANSEP II endeavors to improve household food security, income, and dietary intake for vulnerable populations, including pregnant women and young children aged 6-24 months.

The project is supported by Global Agriculture and Food Security Program (GAFSP) Trust Fund (US$ 20 million) and Government of Nepal (US$ 2 million) and being implemented in 16 Rural Municipalities (RMs) from among eight FANSEP II districts, i.e. **Gorkha, Sindhupalchowk, Dhading, Dolakha, Saptari, Siraha, Dhanusha and Mahottari,** based on two RMs from each district. The primary beneficiaries of the project include the earthquake and flood affected communities, those facing acute food insecurity, smallholder farmers, female-headed households, landless workers, and marginalized groups.

The project will serve 55,000 new direct beneficiaries including 38,750 with Climate and Nutrition Smart Agriculture Technology Adaptation and Dissemination (Component A) and Income Generation and Diversification (Component B) whereas the remaining 16250 will be benefitted with improvement in nutrition.

The project has mainly three component for the interventions and one component for project management. Thus, there are four project components. The project components are presented in the Figure below:

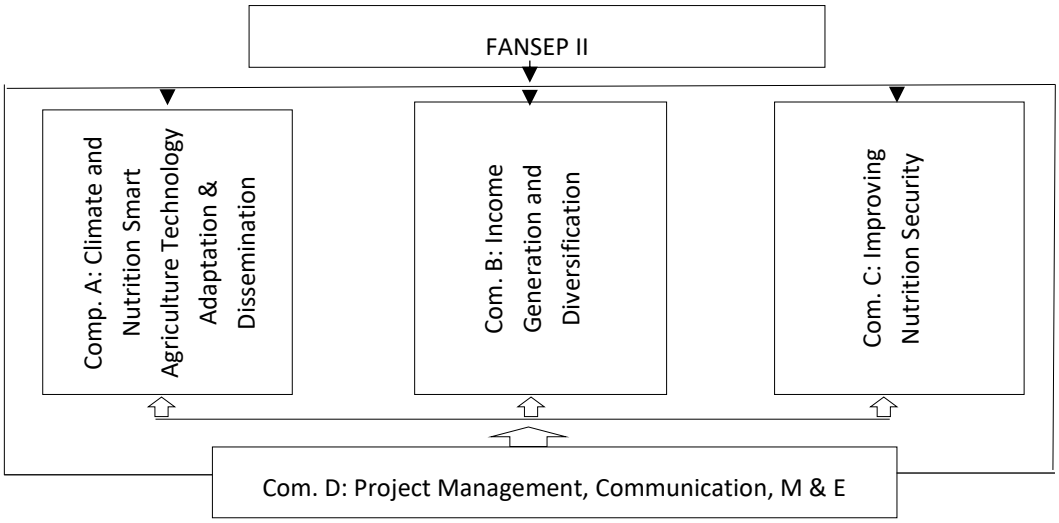

Figure 1: Project components

A glimpse on the 16 project RMs is detailed in Table 1 below:

Table 1: Project RMs at a glimpse

Region	Province	District	Rural Municipalities	Male*	Female*	Population of RM*	No. of wards	Area (sqkm)
Hill	Bagmati	Dhading	Galchhi	11,627	12,106	23,733	8	129.08
			Siddhalek	10,702	11,512	22,214	7	106.09
		Dolakha	Baiteshwor	8,533	9,363	17,896	8	80.41
			Melung	7,456	8,437	15,893	7	86.54
		Sindhupalchowk	Sunkoshi	7,311	7,865	15,176	7	158.68
			Tripurasundari	5,866	6,148	12,014	6	271.23
	Gandaki	Gorkha	Aarughat	10,145	11,427	21,572	10	154.56
			Sahid Lakhan	10,807	12,269	23,076	9	149.03
Terai	Madhesh	Dhanusha	Bateshwor	10,708	11,034	21,742	5	31.66
			Janaknandani	12,963	14,183	27,146	6	27.62
		Mahottari	Samsi	18,712	19,873	38,585	7	21.57
			Sonama	21,922	21,160	43,082	8	57.77
		Saptari	Chhinnamasta	15,100	14,846	29,946	7	38.72
			Mahadeva	15,225	15,090	30,315	6	34.97
		Siraha	Laxmipur Patari	15,068	16,050	31,118	6	42.33
			Nawarajpur	10,189	10,599	20,788	5	32.18
Total				**192,334**	**201,962**	**394,296**	**112**	**1,422.44**

*As per census of Nepal 2021 A.D.

1.6. Objectives and Scope of the Baseline Study

FANSEP II is currently being implemented in 16 Rural Municipalities (Mentioned in Table 1), two from each of the original FANSEP districts: **Gorkha, Sindhupalchowk, Dhading, Dolakha, Saptari, Siraha, Dhanusha, and Mahottari.** The project aimed to establish a comprehensive baseline of the current situation within these areas and among beneficiaries, aligning with the project's results framework. This baseline data is crucial for effectively managing and tracking project achievements. The assignment specifically sought to generate coherent baseline information at the output, outcome, and results indicator levels within the selected rural municipalities. This robust database will serve as a vital benchmark for subsequent midline and end-line surveys, enabling accurate measurement of the project's impact and performance throughout its intervention period.

The baseline survey's core objective was to meticulously document the pre-implementation status of project beneficiaries against key outcome and results indicators, thereby enabling accurate progress tracking.

The specific objectives of the study were

- Gather data on the status of operations of the beneficiaries whom the FANSEP II plans to reach through food and nutrition enhancement related activities.
- Provide robust data for the PDO indicators and other key measures: current productivity, production practices, climate change related practices, income, FIES, MDDW, MDDC, understanding and adaptation of climate smart agricultural and livestock practices among others.
- Feed baseline data to the established log frame of the project.

The baseline study encompassed 16 vulnerable Rural RMs across Nepal's hills and Terai regions. It surveyed 2,541 sample households from the precisely selected project beneficiaries, representing a coverage of 35,000 households. This sample included both treatment groups (project beneficiaries from producer and nutrition groups) and comparison groups (households not directly benefiting from FANSEP II or uninterested in participation, however who were eligible to participate in the FANSEP II groups).

For this scope, the consultant meticulously designed and executed the entire survey mechanism in the field, ensuring the highest quality data collection. This survey precisely assessed the pre-project status of beneficiaries against indicators aligned with the project objectives and results framework. Adhering to an established methodology, this baseline study established the foundation for all future FANSEP II assessments, guaranteeing data comparability across subsequent evaluations.

2. METHODOLOGY

2.1. Overall Approach

The approach of the study was participatory. The proposed overall methodological approach of the baseline survey was as follows:

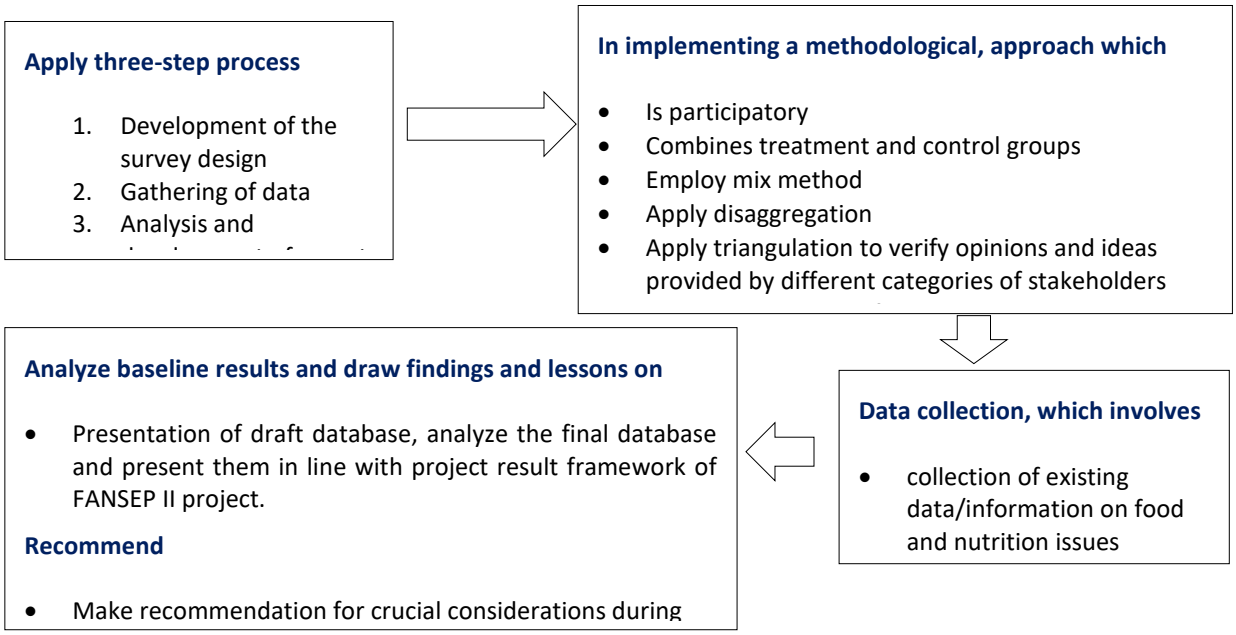

Figure 2: Overall methodological approach of the Outcome Survey

The consultant's team in coordination with FANSEP II designed and implemented the appropriate, relevant, and result-oriented research tools.

2.2. Operational Methodology

Adhering to the Terms of Reference (ToR), the consultant devised a mixed-methods research methodology for the Baseline Survey, integrating both quantitative and qualitative approaches to assess project beneficiaries. This comprehensive strategy enabled the capture of both measurable outcomes and the nuanced experiences of diverse stakeholders, thereby providing a holistic understanding of the beneficiaries' existing status.

FANSEP II equipped the consultant with survey questionnaires and sample specifics in ODK format, along with additional guidance. This study then established the prevailing context of the project's design indicators, aligning them with the results framework. The study evaluated how project activities, outputs, and objectives would contribute to achieving the project's intended results and broader goals, including national targets and the Sustainable Development Goals (SDGs). The project had already finalized the sampling approach, utilizing multistage stratified random sampling methods.

The study process was as follows:

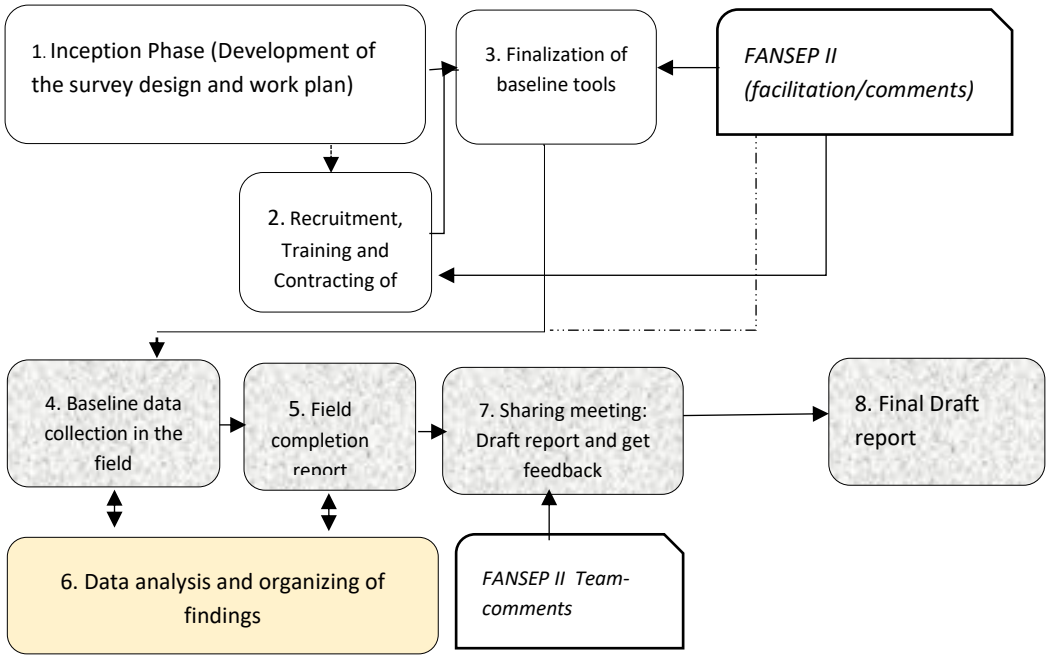

Figure 3: Baseline Study Process

This figure outlines a survey process of the data collection of FANSEP II. It followed a sequential, multi-phase approach, beginning with planning and ending with a final report and findings.

1. Inception Phase (Development of Survey Design and Work Plan): This initial stage involved laying the groundwork for the survey, defining its scope, methodology, and overall strategy.
2. Recruitment, Training, and Contracting of Staff: Once the design was set, the required enumerators and other team members were brought on board, trained for their roles, and formally contracted.
3. Finalization of Baseline Tools: This step involved preparing and refining the specific instruments (e.g., questionnaires, interview guides) that would be used for data collection.
4. Baseline Data Collection in the Field: With the tools ready and staff trained, the actual data gathering commenced in the field.
5. Field Completion Report: After data collection was finished, a report was generated to document the completion of the fieldwork.
6. Data Analysis and Organizing of Findings: The collected raw data was then processed, analyzed, and organized to extract meaningful insights. This step was highlighted, indicating its critical role in interpreting the information.
7. Sharing Meeting with Draft Report and Get Feedback: A preliminary draft of the report was prepared and presented in a meeting to gather feedback from FANSEP II.
8. Final Draft Report: Incorporating the feedback, the report was refined into its final draft.

2.2.1. Sampling Procedure

For this baseline survey, the project provided a total of 2,500 samples, consisting of 1,750 from the treatment group and 750 from the comparison group. As outlined in the Terms of Reference (ToR), the treatment group samples were drawn from approximately 5% of the 35,000 project households (HHs),

ensuring appropriate representation from all Rural Municipalities (RMs) covered by the project. In addition, 750 comparison group households were purposively selected to enable better comparability.

The treatment group samples were selected using a multistage sampling approach:

- First stage: The project applied stratified random sampling to select Farmer Groups, based on the actual proportion of sector-wise groups (crop, livestock, and nutrition) in each RM. Approximately 33% of the 2,000 FANSEP groups were selected at this stage to ensure sectoral and geographical representation.
- Second stage: From each selected group, three households were chosen through simple random sampling, resulting in 1,750 treatment samples. These households were part of either producer groups or nutrition groups.

For the comparison group, households were selected from non-participant but eligible households in the same treatment villages. These were households who were either not included due to quota limitations for beneficiary households for the producer and nutrition groups or who chose not to participate in the producer and nutrition groups. To ensure statistical validity and better comparability with the treatment group, the comparison group sample size was set to ensure at least 40 households per RM. Simple random sampling was used to select households from the sampling frame of eligible, non-participating households within each RM.

2.2.1.1. Household survey

Table 2 below provides an overview of household (HH) survey reach and response rates for various clusters: Dhanusha, Gorkha, Saptari, and Sindhupalchowk. The data is broken down by 'Treatment' and 'Comparison' groups, and includes the Total HH reached, HH reached (Yes responded), HH reached (No responded), and Required number of households. Key highlights of the HH survey are as follows:

a) Overall, the survey achieved a very high response rate. Out of 2620 Total HH reached, 2541 HH reached responded Yes, meaning only 79 households (No responded) declined or could not be surveyed.

b) The total HH reached (2620) slightly exceeded the required total (2500), indicating successful outreach efforts.

c) In Dhanusha cluster, 471 households were reached in Treatment areas and 210 in Comparison areas, totaling 681 households. Out of these, 461 Treatment households and 195 Comparison households responded yes, while 10 Treatment and 15 Comparison households did not respond.

d) Saptari cluster included 454 Treatment households and 196 Comparison households, for 650. Total 453 Treatment and 187 Comparison households participated in the survey. The cluster needed 453 Treatment and 186 Comparison households.

e) In Gorkha, 476 Treatment households and 188 Comparison households were reached, summing to 664. 472 Treatment and 172 Comparison households responded yes, while 4 Treatment and 16 Comparison households did not participate. The required figures were 463 for Treatment and 183 for Comparison.

f) Sindhupalchowk had 421 Treatment households and 204 Comparison households reached, making 625. 411 Treatment and 190 Comparison households responded yes, with 10 Treatment and 14

Comparison households not responding. This district required 372 Treatment and 192 Comparison households.

g) The number of 'No' responded households is consistently low across all rural municipalities, suggesting effective engagement of the target respondents. Eight respondents from the comparison group who left the interview from the half way are also counted under 'No responded'.

h) The detail breakdown of the surveyed HHs is provided in Table 4: Respondents by rural municipalities under the heading 'Baseline Findings.'

Table 2: Summary of sampling-HH survey

Clusters	Total HH reached			HH reached (Yes responded)			HH reached (No responded)			Required		
	Treatment	Comparison	Total	Treatment	Comparison	Total	Treatment	Comparison	Total	Treatment	Comparison	Total
Dhanusha	471	210	681	461	195	656	10	15	25	462	189	651
Saptari	454	196	650	453	187	640	1	9	10	453	186	639
Gorkha	476	188	664	472	172	644	4	16	20	463	183	646
Sindhupalchowk	421	204	625	411	190	601	10	14	24	372	192	564
Total	**1822**	**798**	**2620**	**1797**	**744**	**2541**	**25**	**54**	**79**	**1750**	**750**	**2500**

Source: Field Survey, 2025

2.2.1.2. Qualitative survey

The consultant convened 15 Focus Group Discussions (FGDs), thereby encompassing all designated clusters, a notable expansion from the initially proposed three clusters. This undertaking effectively incorporated an additional cluster and six further FGD sessions, involving a total of 126 participants with a significant majority of female (78%), while males accounted for 22%. Gender participation was highest among females in the Gorkha (93%), Sindhupalchowk (83%), and Saptari (81%) clusters. The Dhanusha cluster had relatively more balanced participation, with 61% female and 39% male participants.

In terms of ethnic composition, Madheshi participants formed the largest group, accounting for 56% of the total. Janajati participants followed at 23%, while Dalits and participants from other ethnicities each made up 2% and 19%, respectively. Ethnic participation was especially concentrated among Madheshi groups in Saptari, Dhanusha, and Siraha, whereas Janajati participants were more prominent in the Gorkha and Sindhupalchowk clusters. Dalit representation was minimal and primarily observed in Gorkha. Table 3 below presents the survey details:

Table 3: Summary of samples-FGD

Farmers groups and clusters	Total participants	Participants by Gender				Participants by ethnic groups							
		Female (N)	Female (%)	Male (N)	Male (%)	Dalit (N)	Dalit (%)	Janajati (N)	Janajati (%)	Madheshi (N)	Madheshi (%)	Others (N)	Others (%)
Tallo Gaun Krishak Samuha, Arughat-9, Gorkha (Agriculture)	9	8	89	1	11			9	100			0	
Jagriti Poshan Samuha, Arughat-10, Gorkha (Nutrition)	13	13	100					6	46			7	54
Bhanjyang Krishak Samuha, Arughat-9, Gorkha (Livestock)	6	5	83	1	17	2	33	3	50			1	17
Gorkha cluster (a)	**28**	**26**	**93**	**2**	**7**	**2**	**7**	**18**	**64**			**8**	**29**
Shridevi Nutrition Group, Sunkoshi-7, Sindhipalchowk	8	8	100					3	38			5	63
Archale Krishak Samuha (crop), Sunkoshi, Sindhupalchowk	9	6	67	3	33							9	100
Sayapatri Krishak Samuha, Sunkoshi, Sindhupalchowk (Livestock)	7	6	86	1	14	0		5	71			2	29
Sindhupalchowk cluster (b)	**24**	**20**	**83**	**4**	**17**	**0**		**8**	**33**			**16**	**67**
Radha Nutrition Group, Bateswor-2, Dhanusha	7	7	100							7	100	0	
Kabeer Chauk Agriculture Farmer Group, Bateswor-2, Dhanusha	16	6	38	10	62			2	13	14	88		
Shiva Goat Farming Farmer Group, Bateswor-2, Dhanusha (Livestock)	15	10	67	5	33			1	7	14	93		
Dhanusha Cluster (c)	**38**	**23**	**61**	**15**	**39**			**3**	**8**	**35**	**92**		
Sunaulo Nutrition Group, Laxmipur Patari-2, Siraha	5	5	100		0					5	100		
Shanti Agriculture Farmer Group, Laxmipur Patari-2, Siraha	4	1	25	3	75					4	100		
Sristi Livestock Farmer Group, Laxmipur Patari-2, Siraha (Livestock)	6	6	100		0					6	100		
Mayamaater Nutrition Group, Chhinnamasta-6, Saptari.	12	12	100		0					12	100		
Jankalyan Agriculture Farmer Group, Chhinnamasta-6, Saptari	4	2	50	2	50					4	100		
Purnima Livestock Farmer Group, Laxmipur Patari-2, Siraha (Livestock)	5	3	60	2	40					5	100		
Saptari Cluster (d)	**36**	**29**	**81**	**7**	**19**					**36**	**100**		
Total participants of all clusters (a+b+c+d)	126	98	78	28	22	2	2	29	23	71	56	24	19

Source: Field Survey, 2025

The bar graph (Figure 4) categorizes 16 Key Informant Interview (KII) participants by their professional roles, showing a balanced representation across various sectors. Notably, roles like Female Community Health Volunteer (FCHV), Nutrition Technicians, Agriculture and Livestock Technicians, and Chairpersons were equally represented, while Chairpersons of Livestock groups and Agriculture officers/experts had the largest share, indicating a focus on diverse perspectives, especially from agriculture and livestock sectors.

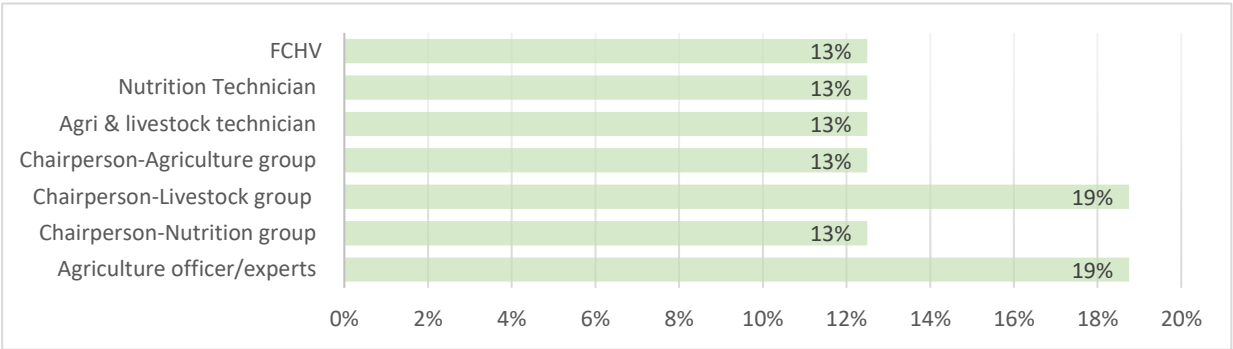

Figure 4: KII participants

The consultant also collected the verbatim of the respondents of the HHs survey and participants of the qualitative survey.

2.2.2. Survey Tools

In-depth review of documents: The expert team meticulously conducted the literature review, systematically abstracting pertinent findings from key documents. Primary sources included, but were not limited to, the Project Appraisal Document of FANSEP II, the Annual (Year 6) Outcome Survey of the Food and Nutrition Security Enhancement Project, the Agriculture Development Strategy 2015-2035, and the Multi-Sectoral Nutrition Plan (MSNP)-III (2023-2030).

Household survey questionnaire*:* The study dominantly applied a set of 387 unique HH survey questionnaire, which served as a crucial study tool, meticulously designed to systematically collect comprehensive information from individual households. Additional to the unique set of questionnaire were around 100 repeated questions for collecting the details of each type of crops planted for each season in each type of land.

This structured tool was developed to gather a wide array of data pertaining to household characteristics, demographic profiles, socio-economic conditions, agriculture and livestock farming practices and nutrition among others.

The questionnaire's design incorporated a variety of question formats, including single-choice, multiple-choice, and open-ended questions, to ensure the capture of both quantitative and qualitative insights. Key areas addressed within the questionnaire typically encompassed household composition, detailed demographics (such as age, gender, education etc.), socio-economic indicators (including income sources, assets, and consumption patterns).

Furthermore, the questionnaire was engineered with logical skip patterns to enhance efficiency during data collection and was codified to facilitate automated data entry. Its administration involved 36-trained enumerators including 58% females who conducted direct interviews with household representatives. The primary purpose of this tool was to generate accurate, reliable, and relevant

household-level data essential for the subsequent analysis and achievement of the intended baseline objectives.

Qualitative survey: The team of experts organized Focus Group Discussion (FGD) and Key Informant Interview (KII) even more than the proposed in the proposal. The findings are included in the relevant sections of the report as needed and annexed with the report (Annex XXVII).

2.2.3. Development of Online Platform

The consultant orchestrated data collection through the utilization of the KOBO Toolbox mobile application. Assessment data was meticulously entered directly into mobile devices and subsequently transmitted to the KOBO server. This server served as a robust and secure repository for the collected information, which was also expediently downloaded into Excel sheets for secure archival. The mobilization of local enumerators was executed under the direct aegis of the Database Manager and Supervisors. All team members underwent comprehensive training encompassing the requisite tools, techniques, and processes integral to effective data collection. A pivotal component of this training focused on ensuring the secure transfer of collected data from the application to the designated server.

2.2.4. Organizing Training for Enumerators and Supervisors

The consultant organized a five-day training program for the enumerators and supervisors. Among the key modules, the curriculum encompassed fundamental agricultural concepts, adherence to food and nutrition norms, and a comprehensive understanding of the questionnaires. Both FANSEP II and the consultant's team collaborated in facilitating these training sessions. The Data Manager, in particular, presided over the core technical aspects of the data collection process, including, but not limited to, methods for data entry, error correction, response handling, secure saving, and transmission of information.

The training was divided into four phase as detailed in Figure 5 below:

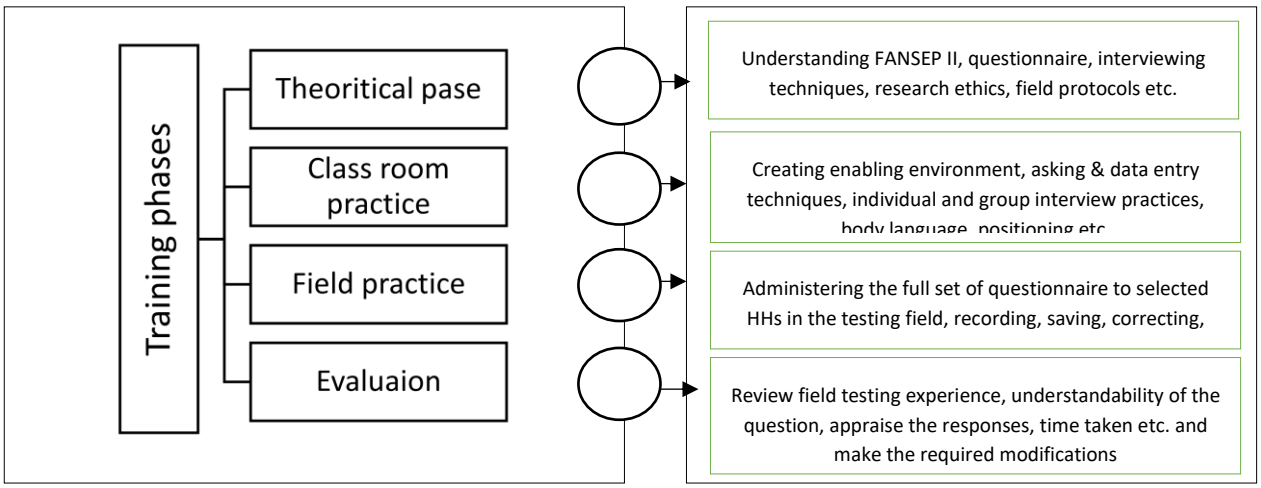

Figure 5: Training framework for enumerators plus

Piloting of the questionnaire/tools and learning evaluation

The consultant organized the piloting of the questionnaire and associated tools within Gajuri Rural Rural municipalities, Dhading district. This pilot phase involved a rigorous assessment of various critical elements, including the clarity of the questionnaire, the nature of respondent engagement, interview

duration, the efficacy of data recording mechanisms, and the precision of GPS location capture, among other factors. This comprehensive testing was conducted with a cohort exceeding 50 respondents. Each enumerator was tasked with surveying two households during this pilot exercise. All findings were meticulously documented, subsequently subjected to thorough discussion and review with the FANSEP II team, prior to the official commencement of the broader study.

2.2.5. Development of Online Data Tracking Mechanism

Before the deployment of enumerators to the field, an online Data Tracking Mechanism was meticulously established to facilitate the continuous monitoring of both the progress and the quality of data amassed. Enumerators to the KOBO server on a near-daily basis, ensuring timely transfer, and uploaded data collected on-site. This collected data within the KOBO server underwent real-time synchronization with the online spreadsheet platform, Zoho Sheets, where foundational data validation and visualization protocols were implemented to ascertain the immediate status of data acquisition.

For comprehensive visualization, the collected data was disaggregated, and a dedicated Dashboard was subsequently constructed within Zoho Sheets. Various essential tables were dynamically generated using the real-time data through pertinent spreadsheet formulae. These fundamental tables encompassed criteria such as household type (treatment/comparison), cluster, district, Rural Rural municipalities (RM), enumerator identification, consent status, and FANSEP II group affiliation. The precise number of households, disaggregated by these aforementioned criteria for each enumerator, was also computed and disseminated to individual enumerators to facilitate their progress tracking. Supervisors diligently reviewed the advancement of each enumerator and instigated immediate corrective actions as needed. Following the culmination of fieldwork, all data was then retrieved in Excel format, upon which requisite data cleaning and calculations were performed.

2.2.6. Quality Assurance Mechanism

The consultant implemented a detailed Quality Assurance Plan (QAP) to ensure the highest quality of data collection, covering adherence to measures, quantity, accuracy, and quality assurance mechanisms.

Before live data collection, questionnaires and tools were rigorously pretested and validated in a pilot with enumerators, then finalized and approved by FANSEP II.

Survey tools were prepared in English and Nepali, with specific coding for data entry ease. Questionnaires simplified responses with single or multiple-choice formats. Enumerators were trained on data formats including numbers, dates, and text.

Household GPS locations verified data origin. Questionnaires had skip patterns for efficiency. Cases of unidentified households or mismatches were replaced.

Throughout data collection, a team monitored errors and biases. A dedicated system was applied to identity inconsistencies and text errors. Regular quality checks were done through calls and visits to respondents and enumerators comprising 260 checks. The quality assurance, the following key aspects were implemented during the study:

- Development of questionnaire together with FANSEP II team in both Nepali and English language.

- Uploading of the questionnaire into smart mobile phones of the enumerators.
- Organization of a five days training for the enumerators and field supervisors including one day for field-testing.
- The questionnaire were pretested in the field, Gajuri RM, Dhading.
- Organized a review meeting with FANSEP II and made small corrections felt needed.
- Provision of survey guideline for enumerators and supervisors.
- Uploading of the collected data by enumerators on the same day of the enumerators whenever possible.
- Ensured back-check of he surveyed HHs at certain intervals.
- Maintained data storage and backup system properly.
- Regular data check by Data Manager from the central level and track both quality and progress.
- Regular online data checking by Data Checker.
- Shared comments and feedback through online platform-WhatsApp group.
- Crossed verified of the presence of the enumerators by supervisors in the field.

Efficiently handling data storage, backup, management, and sharing with strict confidentiality, minimized errors for a robust quality assurance process. Suspected outliers were cross-verified with the respective enumerators and farmers and corrections were made accordingly.

2.2.7. Workability of Study Tools

The consultant-maintained workability of the tools to the highest standard ensuring overall effectiveness in producing the meaningful and trustworthy insights for the collected data. The consultant applied the tools that were reliable, valid, user-friendly, and practical within the project context. Mainly the following features were taken into account to ensure the workability of the tools:

User-Friendly Tools and Administration

Tools were considered user-friendly as if the questionnaires and checklists were clear, concise, and easy for respondents to understand. Additionally, the tools were made simple to set up, use, and collect responses with.

Reliability

The reliability of the tools was assessed by determining if they consistently produced the same results under identical conditions. Measures such as recheck/monitoring reliability and internal consistency were used to evaluate this condition.

Validity

The validity of the tools was confirmed if they accurately functioned as intended and covered all relevant aspects of the project, they were designed to address.

Data quality and utility

Tools were deemed to have good data quality and utility if they generated data that were accurate, complete, suitable for intended analysis, and if the response options were appropriate and exhaustive. Furthermore, it was important that the tools respected the social culture of the society.

Feasibility and Practicality

Feasibility and practicality were evaluated by assessing if the tools were cost-effective to implement and if the collected data could be easily managed and analyzed.

2.2.8. Compliance to Research Ethics and Safeguarding Policy

The consultant's team adhered strictly to research ethics and principles to safeguard the dignity, rights, and welfare of all survey respondents, drawing guidance from sources like Crano, Brewer, and Lac (2015). Prior to each survey, informed consent was obtained from every respondent. This process involved a clear explanation of the survey's purpose, potential risks and benefits, the content and time commitment for the interview, and assurances regarding data confidentiality and privacy. For sensitive information, confidentiality was further guaranteed by refraining from using respondents' names or photographs without explicit permission.

In the case of interviewing children, consent from the parents or the carer or other appropriate adults was taken.

Thus, particularly, 3D team strictly followed the following principles during the assignments:

Principle 1: This principle underscored the paramount importance of respecting the rights of all respondents. It entailed acknowledging their right to autonomy and self-determination, ensuring they had the capacity to make informed decisions and choices. We committed to upholding the dignity and respect of every individual, and to honouring the community and local culture of respondents, irrespective of their caste or ethnicity.

Principle 2: Underpinning this principle was the team's responsibility for the physical, mental, and social well-being of the respondents throughout their participation in the survey. This involved a thorough assessment of both the benefits and risks to participants, and the team adhered strictly to the "Do No Harm" principle. The team prioritized protecting the well-being of all respondents and ensured confidentiality and privacy of their data, further reinforced by obtaining informed consent prior to their participation.

Principle 3: The principle of justice dictated that the risks and benefits of the survey were equitably shared among all participants. The team paid particular attention to the vulnerabilities of specific population groups, including but not limited to pregnant women, Persons with Disabilities (PWD), Gender Based Violence Survivors (GBVS), children, individuals with mental illness, and the impoverished. When engaging with these vulnerable groups, the team ensured an enabling and sensitive environment for interviews, always taking into account the tenets of Principle 1 (Respect for Persons) and Principle 2 (Beneficence).

Further, the consultant provided its organizational policies i.e., Gender Equality and Social Inclusion (GESI) policy, DO NO HARM Policy and Safe Guarding Policy to the enumerators for their consideration during the survey.

2.2.9. Team Mobilization

The consultant deployed a comprehensive team, comprising both subject matter experts and field enumerators. The expert contingent consisted of a Team Leader, an Agriculture Expert, a Livestock Expert, and a Nutrition Expert. Supporting this core group were additional team members, including a Data Manager, Supervisors, Data Checker, and the Enumerators themselves. Few glimpses of the team mobilization are presented in Annex XXIX of this report.

2.2.10. Data Recording, Management and Analysis Process

Cleaning and organizing data

The data, acquired via Kobo Toolbox, underwent a thorough cleaning process to eliminate redundancies, extraneous details, and to filter out unwanted outliers. Any missing information was also meticulously addressed. Most of the outliers were cleaned by verifying with the concerned enumerators and respondents. Subsequently, the cleaned data were transcribed and systematically categorized under relevant themes and sub-themes. These organized datasets were then integrated into a tabulated template and subjected to a comprehensive data verification and validation process, which incorporated triangulation, data saturation, and cross-verification.

Synthesizing qualitative data

Reports and notes from the Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) underwent a comprehensive synthesis through a consolidation exercise conducted by the expert team involved in the interviews. The synthesized findings were then exported into a unified text. To synchronize data and information, thematic categories and their respective content were meticulously crafted. The qualitative data were subsequently analyzed using both thematic and content analysis, facilitated by dedicated analysis sheets.

Analyzing data

The gathered qualitative data and information underwent rigorous content and narrative analysis, where recurring patterns were systematically grouped by concepts and themes. Concurrently, quantitative data derived from the HHs survey were exported to Excel for tabulation analysis. As required, descriptive statistics, including frequencies, percentages, and proportions, were applied to the quantitative findings.

Opinions and insights gleaned from diverse respondent categories, along with relevant documents, were triangulated to ascertain the findings' relevance, extract key lessons, and formulate recommendations. For the calculation and analysis of specific result indicators, the consultant adhered to the guidelines stipulated in the Terms of Reference (ToR). The foundational framework for these calculations and analyses was provided by FANSEP II.

3. BASELINE FINDINGS

3.1. Demographic Features

Table 4 below presents the distribution of households surveyed and required across selected rural municipalities in Dhanusha, Saptari, Gorkha, and Sindhupalchowk clusters. Total 2,541 households were surveyed, comprising 70.72% from treatment groups and 29.28% from comparison groups, closely aligning with the targeted sampling proportions of 70% treatment and 30% comparison as proposed by the project.

Table 4: Respondents by rural municipalities

Cluster	District	Rural Municipalities	HH Surveyed			Required		
			Treatment (N=1797)	Comparison (N-744)	Total (N=2541)	Treatment (1750)	Comparison (N=750)	Total (N=2541)
Dhanusha	Dhanusha	Bateshwor	93	46	139	93	47	140
		Janaknandani	97	54	151	99	46	145
	Mahottari	Samsi	121	49	170	123	47	170
		Sonama	150	46	196	147	49	196
Dhanusha Total			461	195	656	462	189	651
Saptari	Saptari	Chhinnamasta	102	48	150	102	47	149
		Mahadeva	129	48	177	129	46	175
	Siraha	Laxmipur Patari	126	51	177	126	47	173
		Nawarajpur	96	40	136	96	46	142
Saptari Total			453	187	640	453	186	639
Gorkha	Dhading	Galchhi	120	41	161	120	46	166
		Siddhalek	114	40	154	109	45	154
	Gorkha	Aarughat	125	45	170	123	45	168
		Sahid Lakhan	113	46	159	111	47	158
Gorkha Total			472	172	644	463	183	646
Sindhupalchowk	Dolakha	Baiteshwor	102	48	150	99	48	147
		Melung	94	47	141	93	47	140
	Sindhupalchowk	Sunkoshi	129	52	181	96	51	147
		Tripurasundari	86	43	129	84	46	130
Sindhupalchowk Total			411	190	601	372	192	564
Total surveyed samples in %			70.72	29.28		70.00	30.00	

Source: Field Survey, 2025

At the district and rural municipality level, the numbers show consistent efforts to meet required samples, with most areas achieving near or exact targets. For example, in Bateshwor (Dhanusha), 93 treatment and 46 comparison households were surveyed against a requirement of 93 and 47,

respectively. Similarly, Chhinnamasta (Saptari) surveyed 102 treatment and 48 comparison households, matching or slightly exceeding required numbers.

Overall, the survey effectively maintained the intended sampling balance between treatment and comparison groups, ensuring robust data for subsequent analysis.

3.1.1. Gender of Respondents by Rural Municipalities

Table 5 below shows the gender distribution of surveyed households across various rural municipalities. Overall, 23% of respondents were female, with some variation across locations.

- The highest proportion of female respondents was in Sunkoshi (Sindhupalchowk) at 46%, followed by Baiteshwor (Dolakha) at 29%, and Laxmipur Patari (Siraha) at 26%.
- In contrast, Nawarajpur (Siraha) had the lowest at just 7%, and Chhinnamasta (Saptari) also recorded a relatively low 11%.
- Most other municipalities ranged between 16% to 26% female respondents.
- Given that there was a majority of female membership in the project groups, the respondents are counted based on the availability of the HH member (male or female) during the survey.

Table 5: Gender of respondents by Rural Municipalities

District	RM	HHs	Male	Female	Other	Female Respondents (%)
Dhanusha	Bateshwor	139	107	32	0	23%
	Janaknandani	151	118	33	0	22%
Mahottari	Samsi	170	127	43	0	25%
	Sonama	196	155	41	0	21%
Saptari	Chhinnamasta	150	133	17	0	11%
	Mahadeva	177	132	45	0	25%
Siraha	Laxmipur Patari	177	131	46	0	26%
	Nawarajpur	136	126	10	0	7%
Dhading	Galchhi	161	134	27	0	17%
	Siddhalek	154	119	35	0	23%
Gorkha	Aarughat	170	125	45	0	26%
	Sahid Lakhan	159	126	32	1	20%
Dolakha	Baiteshwor	150	107	43	0	29%
	Melung	141	118	23	0	16%
Sindhupalchowk	Sunkoshi	181	97	83	1	46%
	Tripurasundari	129	104	25	0	19%
	Total	**2541**	**1959**	**580**	**2**	23%

Source: Field Survey, 2025

3.1.2. Distribution of Respondents by Target Group

Table 6 below provides a detailed distribution of households engaged in crop, livestock, and nutrition groups across various rural municipalities of the project-planned versus surveyed across four clusters with a focus on three key categories: Crop, Livestock, and Nutrition. For Crop activities, 645 HHs were planned in total, and 684 were taken. In the Livestock category, 540 HHs were planned and 510 were surveyed. For Nutrition, 565 HHs were planned, and 603 were ultimately surveyed. Overall, 1750 activities were planned, and 1797 were taken across all categories and clusters as stated below:

Table 6: Distribution of respondents by target groups

Cluster	Planned				Taken			
	Crop	Livestock	Nutrition	Total	Crop	Livestock	Nutrition	Total
Dhanusha	168	141	153	462	168	145	148	461
Saptari	168	138	147	453	179	140	134	453
Gorkha	162	153	148	463	184	136	152	472
Sindhupalchowk	147	108	117	372	153	89	169	411
Total	**645**	**540**	**565**	**1750**	**684**	**510**	**603**	**1797**

Source: Field Survey, 2025

There were some discrepancies between the planned and surveyed households because some households participated in multiple groups, others were unavailable during the survey, or a few listed households could not be identified. RMs wise details is presented in Annex II of this report.

3.1.3. Replacement Rate of Samples

Table 7 below presents the extent of sample replacements across rural municipalities, highlighting that out of the total 2,500 required samples, 150 households were replaced, resulting in an overall replacement rate of 6%. The replacement rate is calculated following the originally proposed samples. The replacement was notably higher in comparison groups (10%) than in treatment groups (4%). Certain areas experienced particularly elevated rates, such as Mahadeva with a total replacement rate of 17%, including a striking 46% among comparison households. Similarly, Melung showed a replacement rate of 17%, driven largely by 20% replacements in the treatment group. In contrast, municipalities like Siddhalek, Sunkoshi, and Tripurasundari required no replacements, reflecting stable sampling there. The reasons for the replacements varied. Some of the proposed households had migrated elsewhere, either to educate their children for livelihood opportunities or for business purposes. A few households were also found to be reluctant to participate in the survey.

Table 7: Replacement rate of the project beneficiaries

Rural Municipalities	Required samples			Replaced samples			Replacement rate		
	Treatment	Comparison	Total	Treatment	Comparison	Total	Treatment	Comparison	Total
Bateshwor	93	47	140	6	2	8	6%	4%	6%
Janaknandani	99	46	145	9	8	17	9%	17%	12%
Samsi	123	47	170	0	4	4	0%	9%	2%
Sonama	147	49	196	11	3	14	7%	6%	7%
Chhinnamasta	102	47	149	5	6	11	5%	13%	7%

Rural Municipalities	Required samples			Replaced samples			Replacement rate		
	Treatment	Comparison	Total	Treatment	Comparison	Total	Treatment	Comparison	Total
Mahadeva	129	46	175	9	21	30	7%	46%	17%
Laxmipur Patari	126	47	173	0	9	9	0%	19%	5%
Nawarajpur	96	46	142	4	0	4	4%	0%	3%
Galchhi	120	46	166	4	3	7	3%	7%	4%
Siddhalek	109	45	154	0	0	0	0%	0%	0%
Aarughat	123	45	168	0	3	3	0%	7%	2%
Sahid Lakhan	111	47	158	8	6	14	7%	13%	9%
Baiteshwor	99	48	147	2	3	5	2%	6%	3%
Melung	93	47	140	19	5	24	20%	11%	17%
Sunkoshi	96	51	147	0	0	0	0%	0%	0%
Tripurasundari	84	46	130	0	0	0	0%	0%	0%
	1750	750	2500	77	73	150	4%	10%	6%

Source: Field Survey, 2025

3.1.4. Consent of the Respondent

Table 8 below summarizes the response rates across four clusters. Out of 2,620 respondents approached, a high 96.98% (2,541 respondents) agreed to participate ("yes" respondents), while only 3.02% declined.

- Saptari had the highest acceptance rate, with 98.46% saying yes.
- Gorkha followed at 96.99%, then Dhanusha at 96.33% and Sindhupalchowk at 96.16%.

This consistently strong agreement across clusters underscores the overall willingness of households to engage with the survey.

Table 8: Consent of the respondents

Clusters	Total respondents approached	'Yes' respondents		'No' respondents	
		Number	%	Number	%
Dhanusha	681	656	96.33	25	3.67
Saptari	650	640	98.46	10	1.54
Gorkha	664	644	96.99	20	3.01
Sindhupalchowk	625	601	96.16	24	3.84
Grand Total	2620	2541	96.98	79	3.02

Source: Field Survey, 2025

3.1.5. HH Members of the Respondents by Age

Table 9 below summarizes the age distribution of household members across various clusters and respondent types: Treatment, Comparison, and an Overall summary. In the treatment group, Dhanusha has the highest number of household members with an average family size of 6.07, while Sindhupalchowk has the lowest average of 4.31. Saptari and Gorkha have average family sizes of 5.76 and 4.61, respectively.

In the comparison group, Dhanusha again leads with 1066 members and an average family size of 5.47, followed by Saptari (5.36), Gorkha (4.09), and Sindhupalchowk (4.00). Gorkha and Sindhupalchowk in the comparison group have a higher proportion of elderly people compared to other clusters.

Overall, Dhanusha has the highest total household members and largest average family size (5.89). Saptari follows with 3,614 members (average 5.65), while Gorkha and Sindhupalchowk have lower household sizes at 4.47 and 4.21, respectively. The largest age group across all areas is 15–49 years (around 52–57%), and the smallest is the 70+ age group. The average family size across all clusters is five as presented in the following table:

Table 9: Household members and family size of the respondents

Type of respondent	Cluster	Total HHs members	Cluster Total (N)	Average family size	Less than 5 years	5 - 14 years	15 - 49 years	50 - 69 years	More than 70 years	Total
Treatment	Dhanusha	9358	2800	6.07	10.5%	22.6%	51.5%	11.6%	3.8%	100%
	Saptari		2611	5.76	11.3%	19.2%	53.1%	12.8%	3.6%	100%
	Gorkha		2176	4.61	7.4%	14.3%	55.4%	16.5%	6.4%	100%
	Sindhupalchowk		1771	4.31	7.3%	16.1%	56.9%	14.5%	5.1%	100%
Comparison	Dhanusha	3533	1066	5.47	8.4%	22.6%	53.7%	12.5%	2.8%	100%
	Saptari		1003	5.36	9.0%	16.3%	57.6%	13.4%	3.8%	100%
	Gorkha		704	4.09	2.7%	12.5%	54.8%	22.0%	8.0%	100%
	Sindhupalchowk		760	4.00	2.6%	12.2%	55.7%	22.8%	6.7%	100%
Overall	Dhanusha	12891	3866	5.89	10.0%	22.6%	52.1%	11.9%	3.5%	100%
	Saptari		3614	5.65	10.7%	18.4%	54.3%	12.9%	3.7%	100%
	Gorkha		2880	4.47	6.3%	13.9%	55.2%	17.8%	6.8%	100%
	Sindhupalchowk		2531	4.21	5.9%	15.0%	56.5%	17.0%	5.6%	100%
Average family size				5.00						

Source: Field Survey, 2025

Details of the HH members by respondent types and RMs is presented in the Annex III and Annex IV.

3.1.6. Household Head by Gender

Table 10 below presents the gender distribution of household heads across the surveyed rural municipalities. In the treatment group, out of 1,797 households, 431 are female-headed, making up

23.98% of the total. In the comparison group, there are 149 female-headed households out of 744, accounting for 20.03% of the total.

Overall, combining both groups, there are 580 female-headed households out of 2,541, which constitutes 22.83% of all surveyed households. This shows that nearly one in four households is headed by a woman, with the treatment group showing a higher proportion than the comparison group as presented in the following table:

Table 10: Household head by gender.

Type of respondent	Cluster	HH Head (N)				HH Head (%)			
		Male	Female	Other	Total HHs	Male	Female	Other	Total
Treatment	Dhanusha	355	106	0	461	77.01%	22.99%		100.00%
	Saptari	359	94	0	453	79.25%	20.75%		100.00%
	Gorkha	367	105	0	472	77.75%	22.25%		100.00%
	Sindhupalchowk	285	126	0	411	69.34%	30.66%		100.00%
Treatment total		1366	431	0	1797	76.02%	23.98%		100.00%
Comparison	Dhanusha	152	43	0	195	77.95%	22.05%		100.00%
	Saptari	163	24	0	187	87.17%	12.83%		100.00%
	Gorkha	137	34	1	172	79.65%	19.77%	0.58%	100.00%
	Sindhupalchowk	141	48	1	190	74.21%	25.26%	0.53%	100.00%
Comparison total		593	149	2	744	79.70%	20.03%	0.27%	100.00%
Overall	Dhanusha	507	149	0	656	77.29%	22.71%		100.00%
	Saptari	522	118	0	640	81.56%	18.44%		100.00%
	Gorkha	504	139	1	644	78.26%	21.58%	0.16%	100.00%
	Sindhupalchowk	426	174	1	601	70.88%	28.95%	0.17%	100.00%
Overall total		1959	580	2	2541	77.10%	22.83%	0.08%	100.00%

Source: Field Survey, 2025

RM wise distribution is presented in Annex IV, Table 62.

3.1.7. Household Members of the Respondents by Education

Table 11 below outlines the educational attainment of individuals across different rural municipalities, revealing several key patterns. Dhanusha cluster has the highest proportion of individuals with no formal education at 46.1%, followed by Saptari (37.2%), Sindhupalchowk (29.9%), and Gorkha (26.9%). Secondary-level education (grade 9–12) is most common in Gorkha (32.2%) and Saptari (27.0%), while Dhanusha lags behind at 16.7%. Bachelor's level and above education remains relatively low across all clusters, with Gorkha and Sindhupalchowk having slightly higher shares at 4.9% and 4.8% respectively. Primary and basic level education is fairly consistent, contributing between 19.6% to 22.5% and 12.0% to 15.5% respectively. Notably, the share of respondents with unclear or no specified education level remains minimal in all clusters as presented in the Table in next page.

Table 11: HH members of the respondents by education

Type of respondent	Cluster	Cluster Total (N)	No any formal education	Primary level	Basic level Education (up to grade 8)	Secondary level (grade 9-12)	Bachelor and above	Other	No Level/ Level not clear	Don't know	Total (%)
Treatment	Dhanusha	2505	46.3%	23.0%	12.1%	16.2%	1.3%	0.9%	0.0%	0.1%	100.0%
	Saptari	2316	36.3%	21.3%	13.2%	26.0%	3.1%	0.1%	0.0%	0.0%	100.0%
	Gorkha	2015	25.3%	21.0%	15.5%	33.0%	4.9%	0.0%	0.3%	0.0%	100.0%
	Sindhupalchowk	1641	28.1%	20.6%	16.4%	29.1%	3.6%	0.1%	1.9%	0.3%	100.0%
Comparison	Dhanusha	976	45.7%	21.2%	11.9%	17.8%	2.9%	0.3%	0.1%	0.1%	100.0%
	Saptari	913	39.5%	15.1%	12.4%	29.5%	2.7%	0.8%	0.0%	0.0%	100.0%
	Gorkha	685	31.5%	19.3%	12.8%	30.1%	5.1%	0.0%	1.2%	0.0%	100.0%
	Sindhupalchowk	740	34.1%	18.0%	13.4%	25.1%	7.4%	0.0%	1.8%	0.3%	100.0%
Overall	Dhanusha	3481	46.1%	22.5%	12.0%	16.7%	1.8%	0.7%	0.1%	0.1%	100.0%
	Saptari	3229	37.2%	19.6%	12.9%	27.0%	3.0%	0.3%	0.0%	0.0%	100.0%
	Gorkha	2700	26.9%	20.6%	14.8%	32.2%	4.9%	0.0%	0.5%	0.0%	100.0%
	Sindhupalchowk	2381	29.9%	19.8%	15.5%	27.8%	4.8%	0.0%	1.8%	0.3%	100.0%

Source: Field Survey, 2025

RM wise details is presented in the Annex V of this report.

3.1.8. Affiliation of the Respondents with any Organization (Cooperatives etc.)

This stacked bar chart illustrates the varying levels of household involvement in community structures (cooperatives, groups, or both) across four clusters.

Overall, the majority of households (1673) are involved in a group, followed by 412 households not involved in any, 230 involved in both, 140 involved in a cooperative, and 86 who do not know their involvement status. Dhanusha has the highest percentage of households not involved in any (42%), with a significant portion (26%) involved in groups. Saptari stands out with no households involved in both and a high percentage (34%) of "Don't know" responses, alongside 33% not involved in any. Gorkha shows the highest percentage of "Don't know" responses at 44%, but also a relatively low 10% not involved in any. Sindhupalchowk demonstrates the strongest combined involvement, with 55% of households involved in both groups and cooperatives, and 56% involved in cooperatives, while having a low percentage (14%) not involved in any as presented in Figure 6 below:

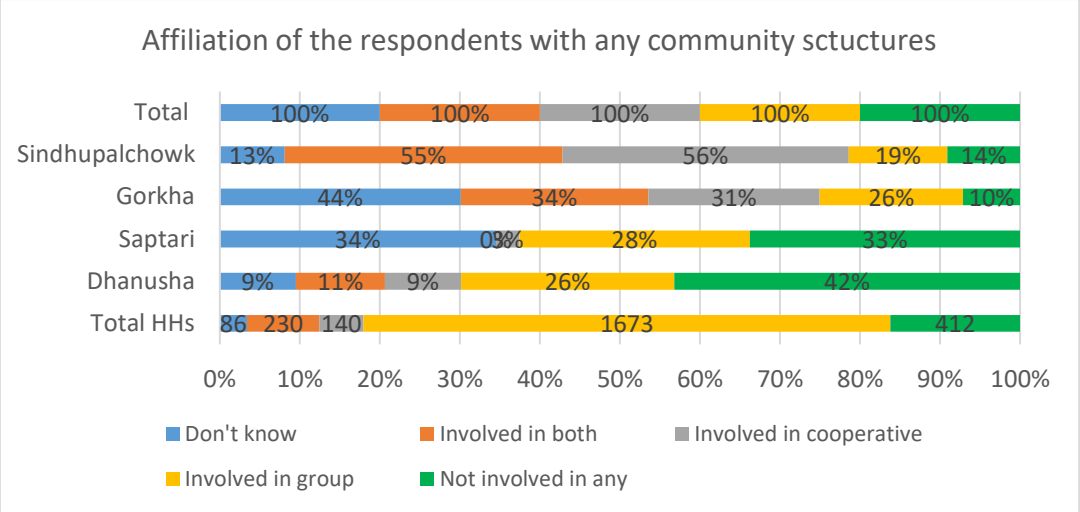

Figure 6: Affiliation of the respondents with any community structures

Source: Field Survey, 2025

3.2. Economic Characteristics

3.2.1. Major Occupation of the HHs in Percentage

Table 12 presents the primary occupations of households across the four surveyed clusters, highlighting both the percentages and the number of households (N) involved. The table shows that 80% of the 2,541 households rely mainly on agriculture followed by Daily wage work (6%) and Foreign Employment (4%). Only small shares engage in business, livestock, government or private jobs, and other activities, each making up 1–2% or less.

By project cluster wise, the dominant occupation is agriculture, engaging 58.99% in Dhanusha, 80.94% in Saptati, 91.30% in Gorkha and 90.02% in Sindhupalchowk. Daily wage labor is most prevalent in Dhanusha, involving 14.63% of households, whereas it is minimal in the other clusters (around 1%). Foreign employment—both in India and other countries—accounts for 7.16% and 9.15% of households respectively overall, with Dhanusha again showing higher reliance. Other occupations such as business, government jobs, livestock, and private employment collectively make up small proportions, each generally below 4%. For livestock, it was found that most farmers involved in this sector consider agriculture, including livestock, their main occupation. Notably, a small fraction across clusters reports having no work. This distribution underscores agriculture as the overwhelming source of livelihood, particularly in Saptari, Gorkha, and Sindhupalchowk, while Dhanusha reveals a more diversified economic profile with higher engagement in daily wages and foreign employment. Treatment and comparison details of the major occupation is presented in Annex VI of this report.

Table 12: Major occupation of the HHs in percentage

Major occupation of the HHs	HHs with major occupation	Share of HHs with occupation in percent	Dhanusha N=656	Saptari N=640	Gorkha N=644	Sindhupalchowk N=601
Agriculture	2034	80%	58.99%	80.94%	91.30%	90.02%
Agriculture and other enterprises	2	0%	0.15%			0.17%

Major occupation of the HHs	HHs with major occupation	Share of HHs with occupation in percent	Dhanusha N=656	Saptari N=640	Gorkha N=644	Sindhupalchowk N=601
Business	39	2%	1.98%	1.56%	1.24%	1.33%
Daily Wage	154	6%	14.63%	7.03%	1.09%	1.00%
Foreign Employment (India)	58	2%	7.16%	1.41%	0.31%	
Foreign Employment (Other country)	103	4%	9.15%	3.91%	1.71%	1.16%
Government Job	25	1%	0.91%	0.47%	1.09%	1.50%
Industry business	2	0%		0.16%		0.17%
Livestock	47	2%	3.51%	0.47%	0.31%	3.16%
Monthly Wage	18	1%	1.83%	0.31%	0.62%	
No work	33	1%	0.76%	2.34%	1.09%	1.00%
Non-government or Private job	12	0%	0.61%	0.31%	0.62%	0.33%
Other	14	1%	0.30%	1.09%	0.62%	0.17%
Total	2541	100%	100%	100%	100%	100%

Source: Field Survey, 2025

3.2.2. Major Income Sources of HHs

Table 13 presents the major income sources of households across four clusters, showing both the number of households surveyed (N) and the percentage distribution for each income type. Overall, the table shows that among 2,541 households, agriculture (including farming and animal husbandry) is the main income source for 64%, followed by remittance and foreign employment at 15%. Daily wage labor supports 11% of households, while employment or jobs and trade or business each account for about 4%. Only 1% rely on other sources

Cluster wise distribution show the variation in major income source. In Dhanusha (N=656), agriculture is the primary income source for 40.09% of households, followed by remittance and foreign employment at 30.18%, daily wage labor at 21.65%, and smaller shares from employment (3.35%), trade (4.27%), and other sources (0.46%). In Saptari (N=640), agriculture plays a larger role, supporting 54.69% of households, with 18.91% relying on remittances, 15.94% on daily wages, and the remaining on employment (4.84%), trade (3.75%), and other sources (1.88%). Moving to the hills, Gorkha (N=644) exhibits a striking dependence on agriculture, accounting for 77.95% of household incomes, while daily wages (2.48%) and remittances (9.01%) are much less common; employment (5.75%), trade (3.73%), and other activities (1.09%) make up minor portions. Similarly, in Sindhupalchowk (N=601), agriculture dominates even more at 86.19%, with very limited shares from remittances (1.50%), daily wages (3.66%), employment (2.83%), trade (4.83%), and other income sources (1.00%). Major income source by Treatment and comparison is presented in Annex VII of this report.

Table 13: Major income source of the HHs

Major income sources	Total HH N=2541	Total share of the HHs	Clusters			
			Dhanusha N=656	Saptari N=640	Gorkha N=644	Sindhupalchowk N=601
Agriculture (Farming and Animal Husbandry)	1633	64.26%	40.09%	54.69%	77.95%	86.19%
Daily Wage Labor	282	11.09%	21.65%	15.94%	2.48%	3.66%
Employment/Job	107	4.2%	3.35%	4.84%	5.75%	2.83%
Remittance/Foreign Employment	386	15.19%	30.18%	18.91%	9.01%	1.50%
Trade/Business	105	4.13%	4.27%	3.75%	3.73%	4.83%
Other	28	1.10%	0.46%	1.88%	1.09%	1.00%
		100%	100%	100%	100%	100%

Source: Field Survey, 2025

3.2.3. HH Having Bank Account in BFIs and Saving Groups

Table 14 below shows the distribution of households with savings in banks and financial institutions (BFIs) across clusters, along with the total surveyed in each. As presented, 74% of the total respondents (N=2541) had bank accounts in BFIs and saving groups. Cluster wise distribution of the respondents having the account varies. Out of 656 households in Dhanusha, 68.28% reported having savings, while 31.72% did not. In Saptari (N=640), 70.27% had savings and 29.73% did not. The proportion of households with savings rises further in the hill clusters: 75.00% in Gorkha (N=644) and 84.86% in Sindhupalchowk (N=601), with only 25.00% and 15.14% respectively lacking savings. Overall, out of 2,541 households, 1,891 (74.4%) reported having savings in BFIs, indicating strong financial inclusion across all clusters, particularly in Sindhupalchowk and Gorkha. Please refer Annex VIII for treatment and comparison details.

Table 14: HHs having bank accounts in any BFIs

Saving of any family members in BFIs	Total HHs (N=2541)	Total Share of respondents in percent	Clusters			
			Dhanusha N=656	Saptari N=640	Gorkha N=644	Sindhupalchowk N=601
No	650	26%	29.73%	31.72%	25.00%	15.14%
Yes	1891	74%	70.27%	68.28%	75.00%	84.86%

Source: Field Survey, 2025

3.2.4. HHs Doing Regular Savings at any BFIs

Table 15 below presents the status of regular savings among households already saving in banks and financial institutions (BFIs), overall and broken down by cluster. Out of these households (1891), the vast majority (92.5%) reported saving regularly. By cluster wise, 85.68% of households maintain regular savings in Dhanusha while 14.32% do not. In Saptari, the share of regular savers rises to 90.85%, with only 9.15% not saving consistently. Even higher rates are observed in the hill clusters: 95.86% of households in Gorkha and 96.86% in Sindhupalchowk save regularly, leaving very few without consistent saving habits. Please refer Annex VIII for treatment and comparison details.

Table 15: HHs doing savings in BFIs and groups

Status of regular saving at BFIs	HHs doing savings (N=1891)	Total share of respondent doing shaving in percent	Clusters			
			Dhanusha (N=461)	Saptari (N=437)	Gorkha (N=483)	Sindhupalchowk (N=510)
No	142	7.5%	14.32%	9.15%	4.14%	3.14%
Yes	1749	92.5	85.68%	90.85%	95.86%	96.86%

Source: Field Survey, 2025

3.2.4. Asset Ownership by Female

Table 16 below presents the distribution of household assets owned by female across the surveyed HHs (N=2518). Of the total 2541 HHs, 23 HHs had no female members. Overall, the data showed that only 17% of households reported females owning both a house and land, about 12% had female owning land only, and just 2% had house ownership alone. A large majority—nearly 70%—had neither house nor land owned by females.

Cluster-wise, ownership of both house and land by females was highest in Sindhupalchowk at 22%, followed by Gorkha (20%) and Dhanusha (17%), and lowest in Saptari (11%). Land-only ownership was more common in Saptari (16%) and Dhanusha (14%), while house-only ownership remained very low across all clusters. Most households in every cluster lacked any female-owned assets, with the highest proportion in Saptari (72%). Detail information on the distribution of asset ownership by treatment and comparison is annexed (Annex IX).

Table 16: Asset ownership by female

Assets	Total (N=2518)	**Overall %**	Dhanusha (N=656)	Saptari (N=633)	Gorkha (N=635)	Sindhupalchowk (N=594)
Both house and land	436	17.32%	17.23%	10.58%	19.84%	21.89%
House only	40	1.59%	2.74%	1.58%	1.10%	0.84%
Land only	293	11.64%	13.57%	15.80%	8.66%	8.25%
Neither house nor land	1749	69.46%	66.46%	72.04%	70.39%	69.02%
Total		100%	100%	100%	100%	100%

Source: Field Survey, 2025

The above figures show the significant disparities in asset ownership. However, the qualitative survey revealed the increasing trend on assets ownership. One of the Ward Chairs interviewed during the KII in Dhanusha noted that women's ownership of assets, such as houses and land, is on the rise, particularly at the time of purchase, since registering property in a woman's name incurs lower taxes.

Probability of increasing the asset ownership with women is also linked with their empowerment. FGD participants noted that it is gradually increasing. They attributed this positive trend to women's growing empowerment, which enables them to assert their entitlements both within their households and in public spheres. Women in the Gorkha and Sindhupalchowk clusters reported that they were able to influence decisions at both the household and rural municipality (RM) levels. Similarly, women in Dhanusha and Saptari indicated that approximately 67% of women were confident and outspoken,

and did not feel compelled to wear a veil as a sign of respect. "I don't own any assets myself, but my married daughter already owns both land and a house," shared a woman from Saptari.

3.2.5. Major Agricultural Assets of the HHs

Table 17 below highlights the distribution of major agricultural assets across the clusters, showing both the type and number of assets (N) relative to total surveyed households. In Dhanusha (N=713), the most prominent assets are electric motors (9.96%) and hand pumps (5.19%), followed by sprayers (2.66%). However, a significant 74.33% of households reported owning no agricultural equipment, indicating limited mechanization. In Saptari (N=871), ownership is more diversified and widespread: 18.03% have electric motors, 14.70% own grain storage bins, and 11.60% use hand pumps, with only 39.84% lacking equipment. In Gorkha (N=744), the leading assets are traditional implements such as ploughs (14.38%), hand tractors (12.50%), and a notable 20.03% reported owning various other local tools, while 40.59% have no equipment. Sindhupalchowk (N=617) shows the highest reliance on hand tractors (13.13%) and ploughs (10.05%), with modest shares using wheelbarrows (2.43%) and sprayers (0.49%), yet still 67.59% have no agricultural assets. The other equipment comprises sickles, garden shovel, however etc. The distribution of assets by treatment and cluster is presented in Annex X of this report.

Table 17: Major agricultural assets of the HHs

Major agriculture assets	Number of assets (N=2945)	Asset distribution in percent	Clusters			
			Dhanusha (N=656)	Saptari (N=640)	Gorkha (N=644)	Sindhupalchowk (N=601)
Tractor	22	0.9%	1.5%	1.1%	0.6%	0.2%
Plough	208	8.2%	1.1%	5.0%	16.6%	10.3%
Animal-drawn cart	17	0.7%	0.5%	2.2%	0.0%	0.0%
Thresher	20	0.8%	0.5%	0.9%	0.5%	1.3%
Wheel Barrow	28	1.1%	0.3%	0.0%	1.7%	2.5%
Hand Pump	148	5.8%	5.6%	15.8%	1.6%	0.0%
Sprayer	131	5.2%	2.9%	9.7%	7.3%	0.5%
Grain Storage Bin	137	5.4%	0.6%	20.0%	0.6%	0.2%
Hand Tractor	176	6.9%	0.0%	0.3%	14.4%	13.5%
Electric chaff-cutter	15	0.6%	1.7%	0.6%	0.0%	0.0%
Biogas plant	11	0.4%	0.0%	0.2%	1.6%	0.0%
Electric Motor	232	9.1%	10.8%	24.5%	0.6%	0.0%
Other	204	8.0%	2.4%	1.6%	23.1%	4.8%
No equipment	1596	62.8%	80.8%	54.2%	46.9%	69.4%

Source: Field Survey, 2025

3.3. Landholding and Crop Production System

3.3.1. Types of Landholdings

Table 18 below provides a detailed overview of household landholding patterns across different types of tenure arrangements. A majority of households (1,883) own land, with an average holding size of 0.39 ha/HH, covering 80% of the total cultivated area (725.82 ha). Households practicing sharecropping[1] form a significant group, accounting for 12% of the total area with an average holding of 0.34 ha/HH, followed by rented land (4%), joint ownership (3%), and smaller proportions under mortgage, government/unregistered land, and other categories. Notably, the average land area held by households varies across clusters: Saptari households generally operate larger plots, especially under ownership (0.53 ha) and mortgage (0.46 ha), while Gorkha and Sindhupalchowk households cultivate comparatively smaller holdings. Overall, the average landholding per household across all types is 0.36 ha, highlighting the predominance of smallholder farming systems in these clusters.

Table 18: Types of landholdings

Type of landholding	No. of HH	Average area (ha)	Total area (ha)	Proportion of area	Average land area of HHs by clusters (ha)			
					Dhanusha	Saptari	Gorkha	Sindhupalchowk
Own	1883	0.39	725.82	80%	0.40	0.53	0.30	0.33
Rent	118	0.29	34.29	4%	0.48	0.38	0.14	0.19
Mortgage	27	0.32	8.52	1%	0.26	0.46	0.26	0.22
Joint Ownership	80	0.34	26.88	3%	0.27	0.41	0.36	0.35
Sharecropping	319	0.34	109.01	12%	0.42	0.36	0.15	0.24
Government land/Unregistered land	43	0.10	4.35		0.06	0.02	0.25	0.20
Other	86	0.04	3.18			0.10	0.03	0.17
Total	**2556**		**912.07**		**0.36**	**0.46**	**0.28**	**0.32**
Average land holdings					**0.36**			

Source: Field Survey, 2025

Area of land holdings was also collected with local units as expressed by the surveyed respondents. Standardization of local units is presented in Annex XXVI of this report.

3.3.2. Average Size of Landholdings as per the RMs

Table 19 below illustrates the distribution of landholding types across various rural municipalities. As stated in the table, inside the bracket indicates the number of HHs with landholdings. The majority of farmers cultivate their own land, with 1,883 households holding an average of 0.39 ha each. Notably, Chhinnamasta stands out with the largest average owned holdings (0.79 ha by 100 farmers), followed

[1] Sharecropping is a system where a landowner allows a tenant to cultivate land in exchange for a portion of the harvest. Joint ownership, on the other hand, refers to a situation where multiple individuals legally own a piece of land together, with each having defined rights and responsibilities. Sharecropping is a tenancy arrangement, while joint ownership is a form of land title

by Baiteshwor (0.55 ha by 144) and Sonama (0.51 ha by 126). In contrast, Aarughat and Tripurasundari show smaller owned plots averaging 0.17 ha (120) and 0.19 ha (86), respectively.

Rented land is less common, involving 118 households averaging 0.29 ha. Siddhalek reports the highest average rental size (0.56 ha by 2 farmers), while Galchhi and Tripurasundari show much smaller rented plots (0.1 ha). Land under mortgage is held by only 27 households, with moderate average sizes around 0.32 ha overall; Baiteshwor (0.51 ha by 1 farmer) and Mahadeva (0.47 ha by 2) have comparatively larger areas.

Joint ownership is practiced by 80 households, averaging 0.34 ha, most notably in Melung (0.45 ha by 29 farmers). Sharecropping involves 319 households, also averaging 0.34 ha, with Samsi and Sonama reporting the highest average sharecropped areas at around 0.5 ha.

Meanwhile, government or unregistered land supports only 43 households at a small average of 0.1 ha, though Sonama, Nawarajpur, and Mahadeva have several farmers cultivating such lands. Other forms of landholding include the land of schools, temple etc.

Table 19: Average size of landholdings

Rural Municipality	Types of landholdings							
	Own	Rent	Mortgage	Joint Ownership	Sharecropping	Government land/Unregistered land	Other	Average
Galchhi	0.36 (155)	0.1 (2)			0.33 (2)		0.06 (2)	0.36 (161)
Siddhalek	0.38 (133)	0.56 (2)		0.39 (11)	0.17 (5)	0.25 (1)	0 (5)	0.36 (157)
Baiteshwor	0.55 (144)		0.51 (1)		0.29 (15)			0.52 (160)
Melung	0.3 (85)		0.15 (1)	0.45 (29)	0.26 (20)	0.2 (15)	0 (1)	0.31 (151)
Sunkoshi	0.23 (152)	0.2 (13)	0.16 (4)	0.24 (7)	0.18 (16)		0.52 (1)	0.22 (193)
Tripurasundari	0.19 (86)	0.1 (1)	0.21 (1)	0.22 (17)	0.14 (3)		0 (1)	0.19 (109)
Aarughat	0.17 (120)	0.11 (10)	0.1 (1)		0.12 (19)			0.16 (150)
Sahid Lakhan	0.29 (123)	0.12 (26)	0.29 (6)	0.05 (1)	0.16 (4)		0.1 (1)	0.25 (161)
Bateshwor	0.49 (110)	0.52 (9)	0.03 (1)	0.4 (6)	0.47 (8)	0.04 (9)	0 (1)	0.46 (144)
Janaknandani	0.25 (115)	0.52 (4)			0.23 (32)	0.34 (1)		0.25 (152)
Samsi	0.32 (99)	0.28 (2)		0.17 (8)	0.5 (46)	0.05 (2)	0 (22)	0.32 (179)
Sonama	0.51 (126)	0.46 (2)	0.34 (3)		0.51 (31)	0 (1)	0 (28)	0.43 (191)
Chhinnamasta	0.79 (100)	0.75 (3)	0.68 (1)		0.32 (45)		0.34 (1)	0.64 (150)
Mahadeva	0.49 (115)	0.4 (24)	0.47 (2)		0.44 (32)	0.02 (12)	0.32 (4)	0.44 (189)
Laxmipur Patari	0.4 (118)	0.23 (8)	0.42 (6)		0.33 (33)	0.07 (1)	0.08 (9)	0.36 (175)
Nawarajpur	0.46 (101)	0.35 (12)		0.41 (1)	0.33 (8)	0 (1)	0 (10)	0.4 (133)
Total	**0.39 (1883)**	**0.29 (118)**	**0.32 (27)**	**0.34 (80)**	**0.34 (319)**	**0.1 (43)**	**0.04 (86)**	**0.36 (2556)**

Source: Field Survey, 2025

3.3.3. Average Size of Cultivated Land Area

Table 20 below shows only the average size of cultivated land per household across different types of landholding in various rural municipalities with different crops throughout the year. This means the cultivated size of land area and the number of farmers may vary than the actual land holding and the number of farmers. Overall, households cultivate an average of 0.26 ha, with owned land being the most common at 0.26 ha (4,096 households). Among ownership, Chhinnamasta stands out with the largest average holding at 0.65 ha, followed by Sonama (0.40 ha) and Nawarajpur (0.47 ha), indicating relatively larger farm sizes. For rented land, the average size is 0.28 ha (216 households), notably highest in Sunkoshi (0.77 ha) despite few cases, reflecting dependence on leasing larger plots there. Land under mortgage averages 0.36 ha (51 households), with Sunkoshi again showing the highest at 0.89 ha.

Joint ownership is smaller on average at 0.18 ha (174 households), with Melung having relatively larger joint parcels (0.20 ha) compared to minimal sizes in Sahid Lakhan (0.05 ha). Sharecropping, averaging 0.31 ha (595 households), including Samsi (0.42 ha), Sonama (0.41 ha), and Mahadeva (0.37 ha). Meanwhile, cultivation on government or unregistered land is modest at 0.12 ha (65 households) overall. The "other" category which includes the land of school or other types averages 0.22 ha (95 households) as stated in the following table:

Table 20: Average size of cultivated land

Average size of cultivated land per HH in ha								
Rural Municipality	Own	Rent	Mortgage	Joint Ownership	Sharecropping	Government land/Unregistered land	Other	Average
Galchhi	0.21 (328)	0.07 (5)			0.25 (4)		0.06 (5)	0.21 (342)
Siddhalek	0.18 (219)	0.41 (3)		0.15 (23)	0.16 (9)	0.25 (1)		0.18 (260)
Baiteshwor	0.21 (512)		0.27 (4)		0.26 (29)			0.21 (545)
Melung	0.16 (209)		0.15 (2)	0.2 (70)	0.22 (27)	0.13 (33)		0.17 (342)
Sunkoshi	0.13 (271)	0.77 (13)	0.89 (5)	0.16 (11)	0.21 (18)		0.32 (1)	0.17 (319)
Tripurasundari	0.21 (210)	0.08 (2)	0.32 (1)	0.17 (43)	0.13 (7)		0.21 (2)	0.2 (265)
Aarughat	0.14 (219)	0.11 (13)			0.11 (31)			0.13 (263)
Sahid Lakhan	0.22 (277)	0.18 (46)	0.24 (10)	0.05 (3)	0.15 (8)		0.12 (3)	0.21 (347)
Bateshwor	0.32 (175)	0.38 (11)		0.28 (8)	0.35 (14)	0.03 (8)		0.32 (218)
Janaknandani	0.2 (294)	0.24 (14)			0.24 (73)	0.23 (4)		0.21 (385)
Samsi	0.33 (205)	0.28 (4)		0.19 (15)	0.42 (92)	0.05 (4)		0.35 (342)
Sonama	0.4 (296)	0.34 (3)	0.41 (5)		0.41 (74)			0.4 (406)
Chhinnamasta	0.65 (198)	0.67 (7)	0.64 (2)		0.35 (86)		0.34 (1)	0.56 (294)

Average size of cultivated land per HH in ha								
Rural Municipality	Own	Rent	Mortgage	Joint Ownership	Sharecropping	Government land/Unregistered land	Other	Average
Mahadeva	0.3 (321)	0.29 (65)	0.29 (6)		0.37 (59)	0.13 (12)	0.31 (9)	0.31 (472)
Laxmipur Patari	0.31 (246)	0.17 (18)	0.29 (15)		0.25 (56)	0.07 (1)	0.34 (8)	0.29 (344)
Nawarajpur	0.47 (116)	0.32 (12)		0.41 (1)	0.3 (8)	0 (1)		0.44 (148)
Total	**0.26 (4096)**	**0.28 (216)**	**0.36 (51)**	**0.18 (174)**	**0.31 (595)**	**0.12 (65)**	**0.22 (95)**	**0.26 (5046)**

Source: Field Survey, 2025

3.3.4. Major Crop Production Practices

The table 21 below presents seasonal crop cultivation practices and the proportion of unique households (HHs) cultivating various crops across four clusters—Dhanusha, Saptari, Gorkha, and Sindhupalchowk. In spring, the most widely cultivated crop was spring maize, grown by 14.3% of total households, particularly in Gorkha (42.9%) and Sindhupalchowk (13.5%). Mung bean was also notable, especially in Dhanusha (10.7%). Other vegetables like cucumber, lady's finger, and pumpkin were grown by fewer households (under 1%).

During the summer season, summer paddy dominated cultivation, with 67.3% of households growing it, especially in Saptari (88.8%) and Dhanusha (72.6%). Summer maize and millet were also significant, mainly in Sindhupalchowk and Gorkha. Other crops like summer potato, peas, and beans were cultivated by smaller percentages of households, often with district-specific variations.

In winter, wheat was the major crop, grown by 38.1% of households, particularly in Dhanusha (58.2%) and Saptari (63.8%). Lentils, winter potato, winter maize, and mustard also had notable coverage. A variety of vegetables such as cauliflower, cabbage, and tomato were cultivated by a smaller proportion of households across clusters. Overall, cropping patterns varied significantly by season and clusters, reflecting differences in agro-ecological conditions and farming preferences.

Crop production practices for treatment and comparison groups are presented in Annex XI; crop-wise production and productivity are detailed in Annex XII; and production and productivity by FANSEP groups are provided in Annex XIII of this report.

Table 21: Major crops grown in FANSEP II project areas

Season	Crops	Unique HHs cultivating crops					Proportion of HHs cultivating crops				
		Total	Dhanusha (N=656)	Saptari (N=640)	Gorkha (N=644)	Sindhupalchowk (N=601)	Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
Spring (Magh/Fa	Spring Paddy	87	57	12	12	6	3.4%	8.7%	1.9%	1.9%	1.0%
	Bitter gourd	8	7	-	-	1	0.3%	1.1%	0.0%	0.0%	0.2%
	Bottle gourd	18	11	5	2	-	0.7%	1.7%	0.8%	0.3%	0.0%

Season	Crops	Unique HHs cultivating crops					Proportion of HHs cultivating crops				
		Total	Dhanusha (N=656)	Saptari (N=640)	Gorkha (N=644)	Sindhupalchowk (N=601)	Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
	Sponge gourd	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%
	Pumpkin	11	5	3	3	-	0.4%	0.8%	0.5%	0.5%	0.0%
	Lady's finger	15	9	3	3	-	0.6%	1.4%	0.5%	0.5%	0.0%
	Cucumber	23	12	4	5	2	0.9%	1.8%	0.6%	0.8%	0.3%
	Millet	25	3	1	18	3	1.0%	0.5%	0.2%	2.8%	0.5%
	Spring maize	363	5	1	276	81	14.3%	0.8%	0.2%	42.9%	13.5%
	Radish	3	-	1	2	-	0.1%	0.0%	0.2%	0.3%	0.0%
	Carrot	1	-	1	-	-	0.0%	0.0%	0.2%	0.0%	0.0%
	Tomato	13	1	1	8	3	0.5%	0.2%	0.2%	1.2%	0.5%
	Beans	6	2	-	4	-	0.2%	0.3%	0.0%	0.6%	0.0%
	Peas	18	6	-	12	-	0.7%	0.9%	0.0%	1.9%	0.0%
	Mung bean	74	70	4	-	-	2.9%	10.7%	0.6%	0.0%	0.0%
	Other	60	47	3	9	1	2.4%	7.2%	0.5%	1.4%	0.2%
Summer (Jestha/Ashadh-Bhadra/Ashoj)	Summer paddy	1,711	476	568	318	349	67.3%	72.6%	88.8%	49.4%	58.1%
	Summer potato	100	6	9	7	78	3.9%	0.9%	1.4%	1.1%	13.0%
	Black gram	17	-	1	16	-	0.7%	0.0%	0.2%	2.5%	0.0%
	Soybean	8	-	-	3	5	0.3%	0.0%	0.0%	0.5%	0.8%
	Summer maize	478	-	-	152	326	18.8%	0.0%	0.0%	23.6%	54.2%
	Millet	337	-	-	100	237	13.3%	0.0%	0.0%	15.5%	39.4%
	Radish	6	1	1	1	3	0.2%	0.2%	0.2%	0.2%	0.5%
	Tomato	8	2	1	5	-	0.3%	0.3%	0.2%	0.8%	0.0%
	Beans	27	5	1	13	8	1.1%	0.8%	0.2%	2.0%	1.3%
	Peas	45	8	3	30	4	1.8%	1.2%	0.5%	4.7%	0.7%
	Other	62	17	18	9	18	2.4%	2.6%	2.8%	1.4%	3.0%
Winter (Ashoj/Kartik-Poush/Magh)	Wheat	969	382	408	28	151	38.1%	58.2%	63.8%	4.3%	25.1%
	Lentil	188	109	76	2	1	7.4%	16.6%	11.9%	0.3%	0.2%
	Winter potato	109	3	48	12	46	4.3%	0.5%	7.5%	1.9%	7.7%
	Cauliflower	15	8	2	3	2	0.6%	1.2%	0.3%	0.5%	0.3%
	Cabbage	7	2	1	3	1	0.3%	0.3%	0.2%	0.5%	0.2%
	Winter maize	110	3	12	59	36	4.3%	0.5%	1.9%	9.2%	6.0%
	Mustard	78	19	12	19	28	3.1%	2.9%	1.9%	3.0%	4.7%
	Brinjal	5	4	1	-	-	0.2%	0.6%	0.2%	0.0%	0.0%
	Buckwheat	3	-	-	-	3	0.1%	0.0%	0.0%	0.0%	0.5%
	Mustard leaf	10	-	1	1	8	0.4%	0.0%	0.2%	0.2%	1.3%
	Radish	4	-	1	1	2	0.2%	0.0%	0.2%	0.2%	0.3%
	Tomato	12	-	1	10	1	0.5%	0.0%	0.2%	1.6%	0.2%

Season	Crops	Unique HHs cultivating crops					Proportion of HHs cultivating crops				
		Total	Dhanusha (N=656)	Saptari (N=640)	Gorkha (N=644)	Sindhupalchowk (N=601)	Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
	Beans	19	-	-	16	3	0.7%	0.0%	0.0%	2.5%	0.5%
	Peas	9	3	1	3	2	0.4%	0.5%	0.2%	0.5%	0.3%
	Other	39	10	8	15	6	1.5%	1.5%	1.3%	2.3%	1.0%

Source: Field Survey, 2025

Farmers cultivate the above crops using different production practices. Most primarily grow food grains using traditional farming methods. In Sindhupalchowk, FGD participants noted that only a few farmers use tractors for land preparation, and some employ threshers for wheat harvesting. However, vegetable growers predominantly adopt modern technologies such as plastic houses for cultivation, micro-irrigation, hybrid seeds, plastic mulching, and grading for marketing purposes.

In the Gorkha cluster, traditional farming remains prevalent, but the adoption of advanced mechanized techniques is emerging. Some farmers have started using threshers for harvesting and drip irrigation systems. Additionally, new technologies like controlled environment farming, hybrid seeds, mulching, cleaning, sorting, grading, and integrated pest management (IPM) have been introduced. About 50 percent of the seeds used are hybrids.

Conversely, farmers in the Dhanusha and Saptari clusters commonly rent tractors for ploughing and utilize electric motors, corn shellers, threshers, organic fertilizers, insect traps, and line sowing techniques.

3.4. Livestock Production System

3.4.1. Number of Households Rearing Livestock

Table 22 below shows the distribution of households rearing various types of livestock across the FANSEP II clusters and treatment and comparison groups. Goats and sheep were the most common, kept by 1,133 households in treatment clusters and 400 in comparison clusters. Buffalo rearing followed, with 662 households in treatment and 223 in comparison areas. Cow keeping was reported by 405 households in treatment and 153 in comparison sites. Chicken rearing was notably higher in Gorkha and Sindhupalchowk, with 363 households in treatment and 90 in comparison areas. Overall, more households in treatment areas are engaged in livestock rearing across all animal types as presented in the following table:

Table 22: Number of households rearing livestock

Animal Types	Treatment					Comparison					Grand Total
	Dhanusha	Saptari	Gorkha	Sindhupalchowk	Sub Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk	Sub Total	
Buffalo	145	123	231	163	662	40	48	73	62	223	885
Cow	65	149	102	89	405	20	45	41	47	153	558
Goat/Sheep	239	227	365	302	1133	84	65	117	134	400	1533
Chicken	12	1	185	165	363	5	1	40	44	90	453
Other	4	6	20	7	37		3	13	2	18	55
Grand Total	**465**	**506**	**903**	**726**	**2600**	**149**	**162**	**284**	**289**	**884**	**3484**

Source: Field Survey, 2025

Although farmers were raising livestock as part of their livelihoods, the FGDs and KIIs revealed that they faced numerous challenges, including feed and forage shortages, high production costs relative to income, diseases, water scarcity, and limited market opportunities. Participants in Gorkha highlighted forage scarcity, persistent livestock diseases, and inadequate technical knowledge as their most pressing concerns. Meanwhile, farmers in Dhanusha and Saptari identified lack of space, insufficient feeding materials, and inadequate housing (folds) as their primary challenges in livestock farming. Highlighting the problem, one of the farmers in Dhanusha said, 'we have no space to build proper sheds for our buffalos in Terai as the normal shades are flooded away during the raining season.'

Livestock Herd possession

3.4.1.1. Livestock herd possession in past 12 months

Table 23 below illustrates the herd possession of different livestock types reared by households in past 12 months across the FANSEP II clusters. For cows, a total of 962 animals were kept by 561 households, averaging 1.71 cows per household. Gorkha had the largest average herd size at 1.92 cows per household, followed by Sindhupalchowk (1.74), Dhanusha (1.76), and Saptari (1.53).

In the case of buffaloes, there were 1,312 animals reared by 894 households, with an average of 1.47 buffaloes per household. Buffalo keeping was most prevalent in Gorkha, both in total numbers (490 buffaloes across 306 households) and average herd size of 1.60 buffaloes per household. Dhanusha also showed a slightly higher herd size (1.49), while Saptari had the smallest average (1.29).

Goat and sheep rearing stood out as the dominant small ruminant activity, with an impressive 9,980 animals kept by 1,551 households, resulting in an average of 6.43 goats or sheep per household. Gorkha and Sindhupalchowk clearly led in herd intensity, averaging over 8 animals per household, highlighting their reliance on these livestock for livelihood.

For poultry, a total of 4,812 chickens were raised by 440 households, with the highest average flock size among all livestock types at 10.94 birds per household. Dhanusha recorded the largest flocks with

13.47 chickens per household, despite fewer households being involved (17 HHs). Gorkha and Sindhupalchowk also showed substantial poultry holdings, maintaining average flocks of 11.38 and 10.36 per household, respectively. The Saptari cluster had only two households raising a very small number of laying chickens for egg production. Livestock herd possession in last 12 months by treatment and comparison is presented in Annex XIV of this report.

Table 23: Livestock herd possession in past 12 months

Livestock	Status details	Total	Project clusters			
			Dhanusha	Saptari	Gorkha	Sindhupal chowk
Cow	Total number of animals	962	150	300	276	236
	HHs rearing animals	561	85	196	144	136
	Average number of animals per HH	1.71	1.76	1.53	1.92	1.74
Buffalo	Total number of animals	1312	275	230	490	317
	HHs rearing animals	894	185	178	306	225
	Average number of animals per HH	1.47	1.49	1.29	1.60	1.41
Goat/Sheep	Total number of animals	9980	1514	958	3982	3526
	HHs rearing animals	1551	323	303	489	436
	Average number of animals per HH	6.43	4.69	3.16	8.14	8.09
Chicken	Total number of animals	4812	229	3	2435	2145
	HHs rearing animals	440	17	2	214	207
	Average number of animals per HH	10.94	13.47	1.50	11.38	10.36

Source: Field Survey, 2025

3.4.1.2. Current livestock herd possession

Table 24 in next page highlights livestock ownership across the FANSEP II clusters, detailing both the number of animals and the households (HHs) rearing them. For cows, there are 855 animals kept by 561 households, with Gorkha showing the largest average herd size at 1.81 cows per household, followed by Sindhupalchowk (1.53), Dhanusha (1.40), and Saptari (1.37).

In the case of buffaloes, 894 households own 1,174 animals, with Gorkha recording the highest average at 1.43 buffaloes per household, and Saptari having the lowest at 1.07, indicating more dispersed smallholdings.

Goat and sheep rearing is the most extensive, totaling 8,678 animals across 1,551 households. Gorkha and Sindhupalchowk lead with large average flocks—7.45 and 7.08 animals per household, respectively while Dhanusha (3.71) and Saptari (2.48) maintain smaller herds.

For poultry, there are 4,082 birds kept by 440 households, with Gorkha showing the highest average flock size at 10.18 chickens per household, closely followed by Dhanusha (9.88) and Sindhupalchowk (8.37), while Saptari reports minimal poultry keeping. Please refer Annex XV for current livestock herd possession.

Table 24: Current livestock herd possession

Livestock	Livestock details	Total	Cluster wise distribution of livestock			
			Dhanusha	Saptari	Gorkha	Sindhupalchowk
Cow	Total number of animals	855	119	268	260	208
	HHs rearing animals	561	85	196	144	136
	Average number of animals per HH	1.52	1.40	1.37	1.81	1.53
Buffalo	Total number of animals	1174	254	191	438	291
	HHs rearing animals	894	185	178	306	225
	Average number of animals per HH	1.31	1.37	1.07	1.43	1.29
Goat/Sheep	Total number of animals	8678	1199	751	3642	3086
	HHs rearing animals	1551	323	303	489	436
	Average number of animals per HH	5.60	3.71	2.48	7.45	7.08
Chicken	Total number of animals	4082	168	3	2178	1733
	HHs rearing animals	440	17	2	214	207
	Average number of animals per HH	9.28	9.88	1.50	10.18	8.37

Source: Field Survey, 2025

3.4.1.3. Breed types by cluster

Table 25 in next page details the distribution of livestock by breed type across four project clusters: Dhanusha, Saptari, Gorkha, and Sindhupalchowk.

For Cows, out of 856 animals, the majority (77.9%) are local breeds. Gorkha and Saptari have the highest proportions of local breed cows at 24.9% and 22.9% respectively, followed by Sindhupalchowk (20.8%) and Dhanusha (9.3%). Crossbreed cows constitute a small percentage (6.5% total), with Sindhupalchowk having the largest share at 2.6%.

Among Buffaloes, which total 1174 animals, local breeds make up the largest share at 80.1%.Gorkha leads in local breed buffaloes with 30.3%, followed by Sindhupalchowk (21.6%), Dhanusha (16.5%), and Saptari (11.6%). Cross-breed buffaloes are scarce, representing only 2.8% of the total, with Sindhupalchowk and Gorkha having minor contributions. A substantial 17.1% of buffaloes are of unknown breed as reported by the respondents.

While the data initially shows an absence of crossbreed buffaloes in Dhanusha, further investigation revealed a different picture. It appears that many farmers in the region consider their crossbreed buffaloes as local breeds, likely due to having reared them for several years. Further verification with farmers and local Livestock Technicians confirmed this, indicating that approximately 55-60% of buffalo-rearing farmers in Dhanusha actually own cross-breed buffaloes, despite referring to them as local. A similar situation is seen in Saptari for buffaloes, and in both Dhanusha and Saptari for goats and chickens.

'During an FGD in Bateshwor RM, participants revealed an interesting perspective on their livestock breed. They explained that even though they use AI technologies for breeding, they have been raising the same buffalo lines for three or four generations and now just call them "local breeds." "There are many such cases in our RM," one participant clarified, adding, "When asked, we simply responded as local breed during the interview."

The breed type of an animal has a direct influence on its milk productivity. Milk productivity of local breeds would have been lower if the crossbred buffaloes in Dhanusha—considered as local—had been categorized as crossbreeds. In that case, the average productivity for crossbreeds would have been slightly higher, assuming the total milk productivity remained the same.

Goat/Sheep are the most numerous livestock with 8691 animals. An overwhelming 82.9% are local breeds, highly concentrated in Gorkha (34.3%) and Sindhupalchowk (32.3%). Dhanusha and Saptari have smaller shares of local breeds at 10.6% and 5.7% respectively. Crossbreed goats/sheep are very rare, making up only 2.7% of the total, with Sindhupalchowk accounting for almost all of them (2.6%). Similar to other livestock, 14.4% are of unknown breed as reported by the respondents.

For Chickens, totaling 4415 birds, the distribution between local and crossbreed is more balanced compared to other livestock. Local breeds account for 49.8%, with Gorkha (23.0%) and Sindhupalchowk (23.7%) being the primary clusters. Crossbreed chickens are also substantial at 41.2%, with Gorkha (21.0%) and Sindhupalchowk (20.2%) showing a significant presence. Dhanusha and Saptari have minimal contributions to both local and crossbreed chickens.

Other livestock i.e., rabbit and pigs, comprising 167 animals, 71.3% are local breeds. Gorkha dominates this category with 50.3% of the local breeds, followed by Saptari (10.8%) and Sindhupalchowk (8.4%). Breed types of animals by comparison and treatment is presented in Annex XVI of this report.

Table 25: Breed types of livestock

No. of unique HH	Livestock	Breed of livestock	No. of livestock		Cluster wise distribution of livestock			
				Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
558	Cow	Local Breed	856	77.9%	9.3%	22.9%	24.9%	20.8%
		Cross Breed		6.5%	2.1%	1.3%	0.6%	2.6%
		Don't know		15.5%	2.5%	7.1%	4.9%	1.1%
885	Buffalo	Local Breed[2]	1174	80.1%	16.5%	11.6%	30.3%	21.6%
		Cross Breed		2.8%	0.0%	0.3%	1.1%	1.4%

[2] Most of the farmers have been raising the same buffalo lines for three or four generations and now just call them "local breeds'' given that they use AI technologies for breeding. Further verification with farmers and local Livestock Technicians confirmed this, indicating that approximately 55-60% of buffalo-rearing farmers in Dhanusha actually own cross-breed buffaloes, despite referring to them as local. A similar situation is seen in Saptari for buffaloes, and in both Dhanusha and Saptari for goats and chickens

No. of unique HH	Livestock	Breed of livestock	No. of livestock		Cluster wise distribution of livestock			
				Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
		Don't know		17.1%	5.1%	4.3%	5.9%	1.8%
1533	Goat/Sheep	Local Breed	8691	82.9%	10.6%	5.7%	34.3%	32.3%
		Cross Breed		2.7%	0.0%	0.0%	0.1%	2.6%
		Don't know		14.4%	3.2%	2.9%	7.5%	0.8%
453	Chicken	Local Breed	4415	49.8%	3.1%	0.0%	23.0%	23.7%
		Cross Breed		41.2%	0.0%	0.0%	21.0%	20.2%
		Don't know		9.0%	0.7%	0.0%	7.0%	1.2%
55	Other	Local Breed	167	71.3%	1.8%	10.8%	50.3%	8.4%
		Cross Breed		9.0%	0.6%	0.0%	0.0%	8.4%
		Don't know		19.8%	1.2%	11.4%	7.2%	0.0%

Source: Field Survey, 2025

4. KEY FINDINGS ON PDO RESULT INDICATORS

4.1. Farmers Adopting Climate Smart Agriculture Technologies and Improved Practices

4.1.1. Farmers Adopting Improved Agriculture and Livestock Technologies

Table 26 below highlights the adoption of agricultural technologies (both agriculture and livestock technologies) among surveyed households, distinguishing between treatment and comparison groups. Overall, out of the total households, 1,401 (55.1%) reported having ever adopted at least one of the technologies.[3] This adoption is higher in the treatment group, where 57.15% (1,027 out of 1,797) of households have adopted at least one technology, compared to 50.27% (374 out of 744) in the comparison group. Meanwhile, 1,140 households (44.9%) have not adopted any of these technologies, with a larger share in the comparison group (49.73%) than in the treatment group (42.85%).

Likewise, **1,323 households (52.1%)** have been using at least one of the technologies for over six months, which is taken as baseline adoption rate. This rate is higher among treatment households at **54.20%,** compared to **46.91%** in the comparison group. All technologies of agriculture and livestock sectors are presented in Annex XVII of this report.

Table 26: Farmers adopting agriculture technologies

Number of technologies being adopted	Total	Type of HH	
		Treatment	Comparison
Households using none of the technologies	1140 (44.86%)	770 (42.85%)	370 (49.73%)
Households using at least one of the technologies ever =	1401 (55.14%)	1027 (57.15%)	374 (50.27%)
Households that have been utilizing at least one of the technologies for over six months **(Baseline adoption rate)** =	**1323 (52.07%)**	**974 (54.20%)**	**349 (46.91%)**
Total HH (N)=		1797	744

Source: Field Survey, 2025

4.1.2. Farmers Adopting Improved Agriculture and Livestock Technologies by Clusters

Table 27 below presents the adoption of agricultural technologies across project clusters by showing how many technologies each household (HH) has adopted. Out of the total 2,541 households, 45% (1,140 HHs) have not adopted any technologies. The practice of not adopting the technologies is highest in Dhanusha (58.08%) and Saptari (54.22%), indicating limited technology use, while it is notably lower in Gorkha (29.19%) and Sindhupalchowk (37.27%).

Looking at households that have adopted at least one technology, 24% (613 HHs) have adopted one technology, with similar proportions across clusters, though slightly higher in Dhanusha (26.22%) and

[3] The list of technologies adopted are annexed with the report (Annex XVII)

Gorkha (27.02%). Adoption of two technologies is most common in Saptari (19.38%) compared to other clusters, contributing to the overall 13% (333 HHs). For households adopting three or four technologies (7% and 4% respectively), Sindhupalchowk stands out, especially with 9.65% adopting three and 8.82% adopting four technologies, higher than in other areas.

Households adopting six or more technologies are concentrated in Gorkha (18.63%), driving up the overall figure to 6% (155 HHs), while other clusters report very low rates as presented in table below.

Table 27: Farmers adopting agriculture and livestock technologies by clusters

No. of technologies adopted by HHs	Total No. of HH	Percentage	Distribution of agriculture and livestock technologies by clusters			
			Dhanusha (N=656)	Saptari (N=640)	Gorkha N=644)	Sindhupalchowk (N=601)
0	1140	45%	58.08%	54.22%	29.19%	37.27%
1	613	24%	26.22%	17.66%	27.02%	25.62%
2	333	13%	8.23%	19.38%	14.60%	10.15%
3	166	7%	4.73%	5.63%	6.37%	9.65%
4	103	4%	2.13%	2.66%	2.95%	8.82%
5	31	1%	0.30%	0.31%	1.24%	3.16%
6 or more	155	6%	0.30%	0.16%	18.63%	5.32%
	2541		**656**	**640**	**644**	**601**

Source: Field Survey, 2025

Qualitative observation

The above figures corresponded to the conclusion of qualitative survey. The agricultural clusters of Sindhupalchowk, Gorkha, and Saptari & Dhanusha showcase a mixed adoption of traditional and modern farming technologies. In Sindhupalchowk, cereal crop cultivation largely remains traditional, with limited use of tractors for tilling and threshers for wheat. However, vegetable farming in this cluster exhibits a strong embrace of modern technologies, including plastic houses for cultivation, micro-irrigation systems, hybrid seeds, plastic mulching, and even grading for marketing.

Gorkha cluster, while still dominated by traditional farming, is gradually integrating advanced mechanized practices. Farmers are utilizing threshers for harvesting, rice transplanters, and drip irrigation systems. The use of power tillers and tractors is also observed. Furthermore, controlled farming environments, the introduction of hybrid seeds (accounting for approximately 50% of seeds), mulching, cleaning, sorting, grading, and Integrated Pest Management (IPM) are newly adopted technologies in this region.

In the Saptari and Dhanusha clusters, the primary modern technology reported is the use of tractors for ploughing. Other agricultural practices in these clusters are predominantly traditional. Nevertheless, some farmers have started incorporating electric motors, corn sellers, threshers, sprayers, organic liquid fertilizers ("Jholmal"), insect traps, and line sowing into their farming methods.

Regarding adoption of improved livestock technologies, Farmers in the **Sindhupalchowk cluster** are aware of climate change's impact on livestock. They have observed a growing scarcity of feed and water, alongside a decline in goat growth rates. A particularly severe impact they've noted is the increased prevalence of disease over the past few years. While their knowledge of specific adaptation practices is limited, farmers in this area are eager for improvements in feed and breed quality, better water management, dependable insurance options, and readily available veterinary services.

In contrast, **Gorkha cluster** farmers possess minimal knowledge regarding climate change and its effects on livestock. However, some proactive farmers have independently adopted certain climate-smart technologies. These include housing livestock in improved sheds, providing nutritious fodder, ensuring regular veterinary check-ups and vaccinations for disease control, implementing castration technology, and maintaining sanitation practices. Participants in Saptari and Dhanusha cluster said being dependent on traditional practices.

4.1.2.1. Farmers adopting only agriculture technologies

Table 28 below presents the adoption status of agriculture technologies among households, disaggregated by treatment, comparison groups, and crop group (N=684). Overall, 1,069 households (42.1%) have adopted at least one agricultural technology, while 1,472 households (57.9%) have not adopted any. Adoption is slightly higher among the treatment group, where 43.63% (784 of 1,797) have ever adopted at least one technology, compared to 38.31% (285 of 744) in the comparison group. In terms of sustained use, the baseline adoption rate—defined as households using at least one technology for over six months—stands at 41.74% for both treatment and comparison groups, and is slightly higher in the crop-focused group at 42.69% (292 of 684). These findings indicate relatively low but consistent adoption rates, with marginally better uptake among households engaged in crop-related activities.

Table 28: Number of agriculture technologies adopted

Number of technologies being adopted	Total (N=2541)	Type of HH		Crop group (N=684)
		Treatment (N=1797)	Comparison (N=744)	
Households using none of the technologies =	1472 (57.93%)	1013 (56.37%)	459 (61.69%)	380 (55.56%)
Households using at least one of the technologies ever =	1069 (42.07%)	784 (43.63)	285 (38.31%)	304 (44.44%)
Households that have been utilizing at least one of the technologies for over six months **(Baseline adoption rate)** =	1019 (40.10%)	750 (41.74%)	269 (41.74%)	292 (42.69%)

Source: Field Survey, 2025

4.1.2.2. Farmers adopting agriculture technologies by gender

Table 29 shows the adoption status of agricultural technologies among households (HHs) surveyed. Overall, 58% of HHs reported not using any of the listed technologies, while 42% had ever adopted at least one, and 40% had been using at least one technology for over six months (baseline adoption rate). Adoption was slightly higher among the treatment group (N=1,797), where 44% had ever used

and 42% had used a technology for more than six months, compared to 38% and 36% respectively in the comparison group (N=744).

By household head, male-headed HHs (N=1,959) showed 43% ever adoption and 41% baseline adoption, whereas female-headed HHs (N=580) had slightly lower rates at 40% and 36%. Looking at crop groups (N=684), 44% of HHs had ever adopted at least one technology, with 43% maintaining use for over six months, and 56% not using any of the technologies.

Table 29: Adoption of agriculture technologies by gender

Status of the adoption of the technologies in number	Total adoption rate (N=2541)	Groups		Household head			Crop group (N=684)
		Treatment (N=1797)	Comparison (N=744)	Male headed (N=1959)	Female headed (N=580)	Other headed (N=2)	
Households using none of the technologies	58%	56%	62%	57%	60%	0%	56%
Households using at least one of the technologies ever =	42%	44%	38%	43%	40%	100%	44%
Households that have been utilizing at least one of the technologies for over six months **(Baseline adoption rate)** =	40%	42%	36%	41%	36%	50%	43%

Source: Field Survey, 2025

Farmers reported various challenges behind not adopting the technologies. Farmers in Sindhupalchowk cluster struggle with climate change adaptation due to limited knowledge about its impacts on agriculture. They also face challenges like poor technical skills, low investment capacity, and lack of community awareness. Access to crucial resources such as knowledge, technology, and financial aid is also restricted, worsened by inadequate infrastructure. Boosting their capacity for climate-smart practices requires improved education, resources, financial support, and technical training.

Similarly, Gorkha farmers contend with various factors hindering agriculture production and climate change adaptation. These include limited climate change understanding, a need for capacity building in farming, and insufficient technical expertise. Other obstacles are lack of loans/subsidies, inadequate agriculture inputs, limited infrastructure, and unclear local policies. Chronic diseases and pests further complicate matters. In Saptari and Dhanusha, some farmers rely on Agriculture Technicians and use traditional remedies like cow urine, garlic etc.

4.1.2.3. Farmers adopting livestock technologies

Table 30 below shows the adoption of livestock technologies specifically among households by type and within the livestock group (N=510). Overall, out of all surveyed households, 943 (37.1%) have ever adopted at least one technology, while a majority, 1,598 (62.9%), have not adopted any. Adoption is higher in the treatment group, with 39.18% (704 of 1,797) of households having adopted at least one technology, compared to 32.12% (239 of 744) in the comparison group. Among households engaged in livestock, adoption is even more pronounced, with 43.92% (224 of 510) using at least one technology. Regarding sustained use, 893 households (35.1%) have been utilizing at least one

technology for over six months. This sustained adoption is highest among the livestock group at 43.14%, compared to 37.51% in the treatment group and 29.44% in the comparison group as presented in the following table:

Table 30: Farmers adopting only livestock technologies

Number of technologies being adopted	Total (N=2541)	Type of HH		Livestock group (N=510)
		Treatment (N=1797)	Comparison (N=744)	
Households using none of the technologies =	1598 (62.88%)	1093 (60.82%)	505 (67.88%)	286 (56.08%)
Households using at least one of the technologies ever =	943 (37.11%)	704 (39.18%)	239 (32.12%)	224 (43.92%)
Households that have been utilizing at least one of the technologies for over six months	893 (35.14%)	674 (37.51%)	219 (29.44%)	220 (43.14%)

Source: Field Survey, 2025

4.1.2.4. Farmers adopting livestock technologies by gender

Table 31 below summarizes the adoption of technologies by gender, treatment status, and overall. Overall, 37% of households have ever adopted at least one technology, while 63% have not adopted any, with 35% using at least one technology for over six months (the baseline adoption rate). Adoption is slightly higher in treatment households, where 39% have ever adopted compared to 32% in the comparison group, and sustained use is 38% vs. 29% respectively. Looking at gender, male-headed households (N=1959) and female-headed households (N=580) show similar adoption patterns: 37% of male-headed and 38% of female-headed households have ever adopted at least one technology, with sustained use at 35% for both groups as presented in the following table:

Table 31: Adoption of livestock technologies by gender

Status of the adoption of the technologies in number	Total	Type of HH		Household head		
		Treatment (N=1797)	Comparison (N=744)	Male headed (N=1959)	Female headed (N=580)	Other headed (N=2)
Households using none of the technologies =	63%	61%	68%	63%	62%	100.00%
Households using at least one of the technologies ever =	37%	39%	32%	37%	38%	0.00%
Households that have been utilizing at least one of the technologies for over six months **(Baseline adoption rate)** =	35%	38%	29%	35%	35%	0.00%

Source: Field Survey, 2025

From among many HHs adopting the different practices, most of the livestock farmers seemed to be unaware about Good Manufacturing Practices (GMP). The qualitative survey revealed that Knowledge of Good Manufacturing Practices (GMP) in livestock farming is largely absent across the surveyed clusters. In the Sindhupalchowk cluster, no farmers reported any awareness of GMP. Similarly, farmers in Saptari and Dhanusha cluster had no knowledge on GMP. The Gorkha cluster showed only a slight improvement, with a few progressive farmers possessing a limited adoption of GMP principles.

4.2. Crop and Animal Productivity by Direct Beneficiaries

4.2.1. Productivity of Crops (Food Grains-Maize, Paddy and Wheat)

Table 32 below presents the productivity of major crops—paddy, maize, and wheat—measured in metric tons per hectare (Mt/ha), comparing treatment and comparison households, along with the overall average. Across all households, overall crop productivity stands at 2.49 Mt/ha, slightly higher in treatment areas (2.52 Mt/ha) than in comparison areas (2.41 Mt/ha). Looking at individual crops, paddy shows the highest productivity at 2.99 Mt/ha overall, with treatment households achieving 3.03 Mt/ha, marginally outperforming comparison households at 2.88 Mt/ha. Maize yields average 1.82 Mt/ha, slightly higher in treatment areas (1.84 Mt/ha) than in comparison (1.75 Mt/ha). Similarly, wheat productivity is 1.95 Mt/ha overall, again with better performance in treatment households (1.98 Mt/ha) compared to comparison households (1.84 Mt/ha) as presented in the following table:

Table 32: Crop productivity by direct beneficiaries

	Treatment		Comparison		Overall	
Indicators	No. of HH	Productivity (Mt/ha)	No. of HH	Productivity (Mt/ha)	No. of HH	Productivity(Mt/ha)
Crop		**2.52**		**2.41**		**2.49**
Paddy	1,274	3.03	525	2.88	1,799	2.99
Maize	685	1.84	266	1.75	951	1.82
Wheat	714	1.98	256	1.84	970	1.95

Source: Field Survey, 2025

4.2.1.1. Productivity of food grains by major crops

Table 33 below presents the current production status of key crops—maize, paddy, and wheat—by type of intervention (treatment and comparison groups). It shows the number of unique households cultivating each crop, total production, land area, and productivity.

Maize is grown by 951 households, producing 325.38 Mt on 179.16 ha, with an average productivity of 1.82 Mt/ha. Among maize types, winter maize stands out with the highest productivity of 3.70 Mt/ha, even though fewer households (110) grow it on limited land (15.76 ha).

Paddy is the most widely cultivated crop, with 1,799 households producing 1,827.87 Mt on 611.23 ha, achieving an average productivity of 2.99 Mt/ha. Interestingly, spring paddy records the highest paddy productivity at 3.21 Mt/ha, though it covers a much smaller area (12.43 ha) and involves only 87

households. Likewise, wheat is cultivated by 970 households, yielding 643.68 Mt on 330.66 ha, resulting in an average productivity of 1.95 Mt/ha.

When comparing intervention groups, treatment areas generally show slightly higher productivity across most crops. For example, paddy in treatment areas reaches 3.03 Mt/ha, compared to 2.88 Mt/ha in comparison areas. Similarly, while winter maize productivity is marginally higher in comparison areas (3.89 Mt/ha), it is grown on very limited land as mentioned in the following table:

Table 33: Productivity of major crops with land area and unique HHs

Type of crop		No. of unique HH	Total Production (Mt)	Total Land area (ha)	Productivity (Mt/ha)
TREATMENT	**Maize**	**685**	**246.50**	**134.02**	**1.84**
	Spring maize	272	93.83	58.91	1.59
	Summer maize	327	103.80	61.77	1.68
	Winter maize	86	48.87	13.34	3.66
	Paddy	**1,274**	**1,347.30**	**444.36**	**3.03**
	Spring Paddy	53	33.39	10.61	3.15
	Summer paddy	1,221	1,313.91	433.76	3.03
	Wheat	**714**	**490.31**	**247.48**	**1.98**
	Wheat	714	490.31	247.48	1.98
COMPARISON	**Maize**	**266**	**78.89**	**45.14**	**1.75**
	Spring maize	91	27.91	18.64	1.50
	Summer maize	151	41.58	24.08	1.73
	Winter maize	24	9.40	2.42	3.89
	Paddy	**525**	**480.56**	**166.87**	**2.88**
	Spring Paddy	34	6.50	1.83	3.56
	Summer paddy	491	474.06	165.04	2.87
	Wheat	**256**	**153.37**	**83.18**	**1.84**
	Wheat	256	153.37	83.18	1.84
TOTAL	**Maize**	**951**	**325.38**	**179.16**	**1.82**
	Spring maize	363	121.74	77.55	1.57
	Summer maize	478	145.38	85.85	1.69
	Winter maize	110	58.27	15.76	3.70
	Paddy	**1,799**	**1,827.87**	**611.23**	**2.99**
	Spring Paddy	87	39.89	12.43	3.21
	Summer paddy	1,712	1,787.98	598.80	2.99
	Wheat	**970**	**643.68**	**330.66**	**1.95**
	Wheat	970	643.68	330.66	1.95
Major Food Grains Total			**2796.93**	**1121.05**	**2.49**

Source: Field Survey, 2025

4.2.1.2. Production and productivity of major food grain crops by clusters

Table 34 illustrates the productivity of different crops across project clusters-Dhanusha, Saptari, Gorkha, and Sindhupalchowk, comparing treatment and comparison households, and highlighting the overall productivity (Mt/ha). Among the crops, winter maize stands out with the highest overall productivity at 3.70 Mt/ha. Paddy shows strong results, with an overall productivity of 2.99 Mt/ha, fairly consistent across both spring and summer paddy. Spring paddy has slightly higher yields at 3.21 Mt/ha, reflecting particularly good outcomes in Dhanusha (3.44 Mt/ha) and Gorkha (3.59 Mt/ha).

Maize varieties show moderate yields overall: winter maize at 1.82 Mt/ha, spring maize at 1.57 Mt/ha, and summer maize at 1.69 Mt/ha, with notable peaks in Dhanusha and Saptari for winter maize and spring maize. Meanwhile, wheat records the lowest overall productivity at 1.95 Mt/ha, with better results in Saptari (2.32 Mt/ha) and Dhanusha (1.82 Mt/ha), but relatively low yields in Sindhupalchowk (0.83 Mt/ha) as presented in Table below:

Table 34: Production and productivity of major crops with land area and unique HHs

Crops	Productivity Mt/ha (Treatment)					Productivity Mt/ha (Comparison)					Total productivity Mt/ha				
	Dhanusha	Saptari	Gorkha	Sindhupalchowk	Overall	Dhanusha	Saptari	Gorkha	Sindhupalchowk	Overall	Dhanusha	Saptari	Gorkha	Sindhupalchowk	Overall
Maize	**2.94**	**3.17**	**2.08**	**1.30**	**1.84**			**2.07**	**1.34**	**1.75**	**2.94**	**3.17**	**2.07**	**1.31**	**1.82**
Spring maize	3.63	2.96	1.59	1.37	**1.59**			1.50	1.47	**1.50**	3.63	2.96	1.57	1.40	**1.57**
Summer maize			2.35	1.22	**1.68**			2.48	1.30	**1.73**			2.38	1.24	**1.69**
Winter maize	2.54	3.18	4.56	2.40	**3.66**			4.72	1.57	**3.89**	2.54	3.18	4.59	2.22	**3.70**
Paddy	**3.09**	**3.24**	**2.90**	**2.28**	**3.03**	**2.61**	**3.56**	**2.33**	**2.14**	**2.88**	**2.99**	**3.33**	**2.76**	**2.23**	**2.99**
Spring Paddy	3.40	2.68	3.67	2.92	**3.15**	3.94	3.55	3.34		**3.56**	3.44	2.87	3.59	2.92	**3.21**
Summer paddy	3.08	3.26	2.88	2.28	**3.03**	2.60	3.56	2.30	2.14	**2.87**	2.98	3.34	2.73	2.22	**2.99**
Wheat	**1.88**	**2.36**	**1.69**	**0.82**	**1.98**	**1.59**	**2.19**	**1.65**	**0.87**	**1.84**	**1.82**	**2.32**	**1.68**	**0.83**	**1.95**
Wheat	1.88	2.36	1.69	0.82	**1.98**	1.59	2.19	1.65	0.87	**1.84**	1.82	2.32	1.68	0.83	**1.95**
Overall	**2.59**	**2.92**	**2.38**	**1.62**	**2.52**	**2.19**	**3.03**	**2.16**	**1.73**	**2.41**	**2.51**	**2.95**	**2.33**	**1.66**	**2.49**

Source: Field Survey, 2025

4.2.1.3. Productivity of crops- overall vs crop group

Table 35 below shows the overall productivity (Mt/ha) of key crops under treatment, comparison, and crop groups, along with the average by crop group. Across all data, winter maize stands out with the highest overall productivity at 3.70 Mt/ha, consistent across both the total and crop group averages. Paddy also performs well, averaging 2.99 Mt/ha overall, with little difference between spring (3.21

Mt/ha) and summer (2.99 Mt/ha) paddy, and showing a slightly higher crop group average of 3.06–3.07 Mt/ha.

Maize varieties have more moderate productivity: winter maize at 1.82 Mt/ha, spring maize at 1.57 Mt/ha, and summer maize at 1.69 Mt/ha, with the crop group average slightly lower at 1.49–1.71 Mt/ha. Wheat shows an overall productivity of 1.95 Mt/ha, matching closely with its crop group average of 2.03 Mt/ha. These figures highlight that across all comparisons, paddy and winter maize are the most productive crops, while other maize varieties and wheat have moderate yields as presented in the following table:

Table 35: Productivity of crops-overall vs crop group

Crops	TREATMENT	COMPARISON	TOTAL	Productivity (Mt/ha) Crop group
	Overall productivity (Mt/ha)	Overall productivity (Mt/ha)	Total productivity (Mt/ha)	
Winter maize	1.84	1.75	1.82	1.71
Spring maize	1.59	1.50	1.57	1.55
Summer maize	1.68	1.73	1.69	1.49
Winter maize	3.66	3.89	3.70	3.70
Paddy	3.03	2.88	2.99	3.06
Spring Paddy	3.15	3.56	3.21	3.05
Summer paddy	3.03	2.87	2.99	3.07
Wheat	1.98	1.84	1.95	2.03
Wheat	1.98	1.84	1.95	2.03

Source: Field Survey, 2025

4.2.2. Crop Production, Consumption and Sales of Food Grains

Table 36 shows the utilization patterns of food grains. Across all surveyed households, the total production was 1,395 kg. Of this, about 66% (924 kg) was consumed within the households, while 26% (362 kg) was sold. This indicates that the majority of the production is used for household consumption, with a smaller share entering the market. Cluster-wise distribution of production, consumption and sales pattern varied. In Dhanusha cluster, the total production reached 1,891 kg. Here, 64% (1,209 kg) was consumed at home, and 24% (463 kg) was sold. The Saptari cluster recorded the highest production at 2,187 kg. Of this, 56% (1,225 kg) was consumed and 36% (793 kg) was sold. Likewise, in Gorkha cluster, production was much lower at 744 kg. However, 91% (680 kg) was consumed within the households, and only 6% (43 kg) was sold whereas Sindhupalchowk cluster produced 735 kg, with 79% (583 kg) used for household consumption and 16% (114 kg) sold as mentioned in Table 35, next page.

Table 36: Food grain production, consumption and sales (average)

Utilization pattern[4]	Total (N=1977)	Dhanusha (N=408)	Saptari (N=570)	Gorkha (N=548)	Sindhupalchowk (N=451)
Production (kg)	1395	1891	2187	744	735
Consumption (kg)	924 (66%)	1209 (64%)	1225 (56%)	680 (91%)	583 (79%)
Sales (kg)	362 (26%)	463 (24%)	793 (36%)	43 (6%)	114 (16%)

4.2.3. Productivity of Crops (Vegetables)

Table 37 below presents the productivity of vegetable crops measured in metric tons per hectare (Mt/ha), comparing treatment and comparison households along with the overall average. It shows that unique 87 households in the treatment group achieved an average productivity of 7.50 Mt/ha, while that of 48 households in the comparison group had a slightly lower productivity of 7.04 Mt/ha. Combined, the overall productivity across 135 households stands at **7.40 Mt/ha**. This indicates that households under the treatment intervention experienced somewhat higher yields compared to those in the comparison group, suggesting a positive impact of the treatment on productivity levels.

Table 37: Production and productivity of vegetable crops

Treatment		Comparison		Overall	
No. of HH	Productivity (Mt/ha)	No. of HH	Productivity (Mt/ha)	No. of HH	Productivity (Mt/ha)
87	**7.50**	**48**	**7.04**	**135**	**7.40**

Source: Field Survey, 2025

4.2.3.1. Productivity of vegetables by crop types

Table 38 displays the productivity (Mt/ha) of various vegetable types under "Treatment" and "Comparison" groups, along with the "Total" productivity and number of households (HH) involved. For most vegetables, the "Treatment" group generally shows higher productivity compared to the "Comparison" group, such as for Cauliflower (13.42 Mt/ha vs. 8.70 Mt/ha) and Winter Potato (11.55 Mt/ha vs. 9.49 Mt/ha). However, there are exceptions where the "Comparison" group has higher productivity, like for Bitter Gourd (12.57 Mt/ha vs. 11.05 Mt/ha) and Brinjal (21.63 Mt/ha vs. 7.37 Mt/ha), although these involved a smaller number of households. Peas had a notable difference, with treatment group at 8.03 Mt/ha involving 54 households, vastly outperforming the Comparison productivity of 1.28 Mt/ha from 18 households, leading to a total productivity of 6.27 Mt/ha across 72 households. Overall, Summer Potato and Winter Potato have the highest total productivities at 10.23 Mt/ha and 11.12 Mt/ha respectively, involving the largest number of households (100 and 109) as mentioned in the following table:

[4] Individual crop details is annexed with the report

Table 38: Productivity of vegetables by crop types

Vegetable crops	Treatment		Comparison		Productivity of vegetable crops by HHs	
	No. of HH	Productivity (Mt/ha)	No. of HH	Productivity (Mt/ha)	No. of HH	Productivity (Mt/ha)
Beans	40	5.93	12	6.26	52	5.98
Bitter gourd	6	11.05	2	12.57	8	11.08
Bottle gourd	9	10.54	9	9.27	18	9.72
Brinjal	3	7.37	2	21.63	5	10.03
Cabbage	5	11.54	2	7.55	7	10.99
Cauliflower	9	13.42	6	8.70	15	12.16
Cucumber	14	11.52	9	8.64	23	10.54
Lady's finger	10	8.62	5	10.90	15	9.58
Mustard leaf	8	7.12	2	9.43	10	7.32
Peas	54	8.03	18	1.28	72	6.27
Pumpkins	9	10.38	2	7.87	11	9.88
Radish	12	3.42	1	5.89	13	3.53
Soybean	7	0.03	1	0.49	8	0.04
Sponge gourd	17	13.23	6	9.14	23	12.97
Summer potato	72	10.28	28	10.07	100	10.23
Tomato	28	11.67	5	12.73	33	11.73
Winter potato	85	11.55	24	9.49	109	11.12

Source: Field Survey, 2025

4.2.3.2. Productivity of vegetables by clusters

The data on vegetable productivity by cluster shows notable variations across crops, clusters, and between treatment and comparison areas. In the treatment clusters, Dhanusha stood out with exceptionally high productivity of peas (34.91), along with good yields for cabbage, cauliflower, radish, and tomato. Saptari performed well for cauliflower (15.47) and sponge gourd (13.99), while Gorkha showed relatively higher productivity in cucumber, sponge gourd, and cabbage. Sindhupalchowk excelled in cucumber (15.72) and winter potato (17.30). In comparison areas, productivity was more mixed; Dhanusha recorded remarkably high brinjal yields (21.63), while Gorkha had strong outputs for tomato and winter potato. Overall, across all clusters, the treatment groups generally demonstrated higher or more stable productivity, especially for crops like peas, cucumber, and tomato, indicating positive effects of the interventions as detailed in Table 39:

Table 39: Productivity of vegetables by clusters

Vegetables	TREATMENT					COMPARISON				
	Dhanusha	Saptari	Gorkha	Sindhupalc howk	Overall	Dhanusha	Saptari	Gorkha	Sindhupalc howk	Overall
Beans	5.92	5.92	6.19	5.40	**5.93**	6.46		6.34	6.17	**6.26**
Bitter gourd	10.88			11.84	**11.05**	12.57				**12.57**
Bottle gourd	8.93	10.88			**10.54**	9.34	8.28	9.31		**9.27**
Brinjal	7.37	7.40			**7.37**	21.63				**21.63**
Cabbage	14.79	10.85	11.35		**11.54**	8.88			7.47	**7.55**
Cauliflower	14.53	15.47	10.25	12.77	**13.42**	8.94			8.35	**8.70**
Cucumber	8.12	9.68	12.38	15.72	**11.52**	8.76		8.60		**8.64**
Lady's finger	9.97	8.07	7.07		**8.62**	11.51		10.81		**10.90**
Mustard leaf		4.44	9.43	9.80	**7.12**				9.43	**9.43**
Peas	34.91	6.64	1.67	0.18	**8.03**	1.03		1.32	0.63	**1.28**
Pumpkins	9.38	11.18	10.12		**10.38**	8.28		7.86		**7.87**
Radish	14.79	0.43	6.47	4.59	**3.42**			5.89		**5.89**
Soybean			0.39	0.01	**0.03**				0.49	**0.49**
Sponge gourd	9.91	13.99	13.88		**13.23**	8.22	9.47			**9.14**
Summer potato	13.40	9.11	9.16	10.25	**10.28**	10.36		10.48	10.06	**10.07**
Tomato	17.75	6.53	12.17	9.76	**11.67**	10.36		14.34	9.82	**12.73**
Winter potato	8.88	9.34	9.43	17.30	**11.55**		9.54	11.79	8.98	**9.49**

Source: Field Survey, 2025

Overall productivity of crops and vegetables by RMs is presented in Annex XVIII of this report.

4.2.4. Vegetable Production, Consumption and Sales

Table 40 shows the utilization pattern of vegetable crops across four project clusters, highlighting how production is divided between household consumption and sales. On average, each household produced 3,378 kg of vegetables, with production levels varying widely by clusters — the highest in Sindhupalchowk at 4,906 kg, followed by Gorkha (3,843 kg), while Dhanusha (1,446 kg) and Saptari (3,362 kg) had relatively lower averages. In terms of use, households consume on average 1,038 kg, indicating that a substantial portion of production goes toward meeting household food needs. Consumption is highest in Gorkha (1,416 kg) and fairly similar in Sindhupalchowk (1,260 kg) and Saptari (1,228 kg), but notably lower in Dhanusha (547 kg). Sales formed the largest share of utilization, averaging 2,233 kg sold per household. Sales are highest in Sindhupalchowk (3,409 kg) and Gorkha (2,587 kg), while Dhanusha records the lowest sales volume at 868 kg as mentioned in Table 40, next page.

Table 40: Vegetable production, consumption and sales by clusters (average)

Utilization pattern	Overall (N=135)	Dhanusha (N=44)	Saptari (N=15)	Gorkha (N=29)	Sindhupalchowk (N=47)
Production (kg)	3,378	1,446	3,362	3,843	4,906
Consumption (kg)	1,038 (31%)	547 (38%)	1,416 (42%)	1,228 (32%)	1,260 (26%)
Sales (kg)	2,233 (66%)	868 (60%)	1,871 (56%)	2,587 (67%)	3,409 (69%)

Source: Field Survey, 2025

4.2.5. Productivity of Livestock (Goat Meat)

Table 41 below presents data on live goat meat productivity of goat across 1,912 animals owned by the farmers. On average, the overall live weight meat productivity stands at **16.21** kg per animal based on weighted average calculation. Looking at goat types, bucks (intact male goats) show an average productivity of 14.48 kg, while castrated male goats yield a higher average live weight of 16.91 kg per animal. Households have kept about 2 bucks and 1.8 castrated goats each in different groups.

In treatment households, the average live weight is 15.80 kg per goat, slightly lower than in comparison households where it is 17.79 kg. Specifically, bucks have nearly identical productivity across groups—14.51 kg in treatment and 14.36 kg in comparison. However, castrated goats in treatment areas average 16.34 kg, notably less than 19.03 kg in comparison households. For households identified under the livestock group focus, the average live meat productivity is 14.83 kg for bucks and 17.35 kg for castrated goats. These figures are slightly above the overall averages as presented in the following table.

Table 41: Live goat meat productivity

Animals	Total animals	No. of HH	Animals per HH	Live goat meat productivity per animal			
				Total	Treatment (N=1459)	Comparison (N=453)	Livestock group (N=460)
Buck (Intact Male Goat)	750	374	2.01	14.48	14.51	14.36	14.30
Castrated Male Goat	1162	635	1.83	16.91	16.34	19.03	14.73
Overall productivity	1912			**16.21**	**15.80**	**17.79**	**14.63**

Source: Field Survey, 2025

4.2.5.1. Live goat meat productivity by project clusters

The table 42 presents live meat productivity per animal for bucks and castrated male goats across the project clusters under treatment and comparison groups. For bucks (intact male goats), live meat productivity in treatment clusters varies from 7.5 kg per animal in Dhanusha to 17.5 kg in Saptari, with an overall average of 14.51 kg. In comparison clusters, productivity ranges similarly, from 7.5 kg in Dhanusha to 20 kg in Saptari, averaging 14.36 kg overall.

For castrated male goats, live meat productivity is higher. In treatment clusters, it ranges from about 15.25 kg in Saptari to 17.69 kg in Gorkha, with an overall average of 16.34 kg. In comparison clusters, productivity is higher at 24.6 kg in Dhanusha and averaging 19.03 kg across all clusters as presented in the following table:

Table 42: Live goat meat productivity by clusters

Animals	Description	TREATMENT					COMPARISON				
		Dhanusha	Saptari	Gorkha	Sindhupalchowk	**Overall**	Dhanusha	Saptari	Gorkha	Sindhupalchowk	**Overall**
Buck (Intact Male Goat)	Age when sold (months)	12.00	18.00	12.57	11.70	**12.31**	12.00	12.00	10.67	10.31	**10.54**
	Live meat productivity per animal (Kg)	7.50	17.50	15.22	13.58	**14.51**	7.50	20.00	17.00	13.45	**14.36**
	No. of HH selling Buck	3	5	173	116	**297**	2	1	39	35	**77**
	Total no. of animals	4	4	357	215	**580**	1	-	87	82	**170**
Castrated Male Goat	Age when sold (months)	12.57	11.52	17.16	15.17	**14.78**	16.13	16.60	15.42	14.79	**15.35**
	Live meat productivity per animal (Kg)	15.51	15.25	17.69	15.91	**16.34**	24.60	17.60	17.42	17.36	**19.03**
	No. of HH selling goats	137	62	162	131	**492**	36	14	37	56	**143**
	Total no. of animals	207	77	304	291	**879**	63	19	80	121	**283**

4.2.6. Productivity of Livestock (Milk)

4.2.6.1. Productivity of Livestock (Milk) by group types

Overall, the total average milk productivity per lactating period across all lactating cows and buffaloes combined stands at **978.31 liters**.[5] This figure represents the typical volume of milk produced per animal during an average lactating cycle, which, when viewed across species, shows cows averaging a lactating period of about 230 days and buffaloes about 253 days. These results highlight with buffaloes contributing a larger share given their longer lactating period and higher individual milk yields.

When comparing households under the treatment group with those comparison, the total average milk productivity per lactating period is slightly higher among treatment households at 980.20 liters, compared to **973.15** liters for comparison households. For cows specifically, treatment households recorded **765.43** liters per lactation versus **821.85** liters among comparison households, while buffalo productivity favored the treatment group at 1,100.96 liters compared to 1,060.00 liters in comparison areas.

Analyzing milk productivity by breed type reveals clear differences. Local breeds across both cows and buffaloes produce an average of 961.70 liters per lactating period, while cross breeds yield significantly more at 1,182.19 liters, underlining the advantages of genetic improvement in milk productivity. Animals whose breed was not known to the farmers averaged around 960.67 liters, close to local breed levels. Specifically, crossbred cows show notably higher productivity at 995.44 liters compared to local cows at 742.14 liters, and crossbred buffaloes produce 1,635.71 liters, well above local buffaloes at

[5] The milk productivity is calculated as per the guideline provided by FANSEO, annexed with the report.

1,078.06 liters as presented in Table 43. Milk productivity per lactating period by RMs is presented in Annex XIX of this report.

Table 43: Milk productivity per animal per lactating period

Animals	No. of HH	No. of animal	Average lactating period	Milk productivity of cattle and buffalos: Ltr. per lactating period						
				Total milk productivity	Treatment	Comparison	Livestock group	Local Breed	Cross Breed	Don't know
Lactating Cow	232	281	229.93	780.70	N=211	N=70	N=66	N=213	N=37	N=31
					765.43	821.85	763.39	742.14	995.44	748.44
Lactating Buffalo	409	480	252.58	1090.04	N=347	N=133	N=103	N=369	N=27	N=84
					1100.96	1060.00	1100.91	1078.06	1635.71	1038.11
Total				**978.31**	**980.20**	**973.15**	970.18	961.70	1182.19	960.67

Source: Field Survey, 2025

4.2.6.2. Productivity of Livestock (Milk) by clusters

Table 44 presents the average milk productivity per lactating period per animal across four project clusters, distinguishing between cows and buffaloes. For lactating cows, which have an average lactating period of about 230 days, productivity varies notably by clusters. Dhanusha leads with 822.4 liters per lactating period per cow, followed by Saptari at 796.06 liters, Sindhupalchowk at 761.82 liters, and Gorkha with the lowest at 697.44 liters.

Similarly, buffaloes, with a longer average lactating period of about 253 days, show higher productivity across all clusters. Dhanusha again records the highest milk yield at 1,220.76 liters per lactating period per buffalo, closely followed by Saptari at 1,194.81 liters. Gorkha and Sindhupalchowk report comparatively lower figures of 972.81 liters and 1,036.07 liters, respectively. When combined, the overall average productivity across cattle and buffaloes shows Dhanusha leading at 1,073.22 liters, followed by Saptari (988.05 liters), Sindhupalchowk (944.65 liters), and Gorkha (918.75 liters), underscoring regional differences that could guide future targeted dairy development interventions. The cluster-wise data shows an average productivity of 978.31 liters per lactating period overall, with lactating cows producing 780.70 liters and lactating buffaloes yielding 1,090.04 liters, as presented in Table 44.

Table 44: Milk productivity of livestock per lactating period by clusters

Animals	Milk productivity of cattle and buffalo: Ltrs. per lactating period							Overall (average of all cluster)
	No. of HH	No. of animal	Average lactating period	Dhanusha	Saptari	Gorkha	Sindhupalchowk	
Lactating Cow	232	281	229.93	N=59	N=119	N=38	N=65	N=281
				822.40	796.06	697.44	761.82	780.70
Lactating Buffalo	409	480	252.58	N=101	N=109	N=162	N=108	N=480
				1220.76	1194.81	972.81	1036.07	1090.04
Total			244.39	1073.22	988.05	918.75	944.65	978.31

Source: Field Survey, 2025

4.2.6.3. Milk productivity per animal per day during different phases

Table 45 below shows the average daily milk yield of cows and buffaloes across different stages of the lactating period. For lactating cows, daily milk productivity starts at 3.78 liters per day during the first three months, then gradually declines to 2.81 liters per day between three to six months, and further drops to 1.70 liters per day after six months. This typical lactation curve reflects the natural decrease in milk production over time as cows progress through their lactation cycle.

Similarly, lactating buffaloes produce more milk than cows at each stage. Their daily yield averages 4.70 liters per day in the first three months, decreases to 3.50 liters per day during the three to six month period, and then reduces to 2.26 liters per day after six months.

Table 45: Milk productivity per animal per day per lactating period

Animals	Milk productivity of cattle and buffalo: Ltrs./day		
	First 3 months	3 to 6 months	After 6 months
Lactating Cow	3.78	2.81	1.70
Lactating Buffalo	4.70	3.50	2.26

Source: Field Survey, 2025

4.3. Household Income (farm and off farm)

4.3.1. Household Income/HHs

Table 46 presents overall annual household income disaggregated by gender of household head and study group (treatment vs. comparison), including total income figures. [6] The total annual income per household averages NPR 185,169 (US$ 1,353.08)[7], combining earnings from both agriculture/livestock and off farm sources.

Overall, Male-headed households earned an average of NPR 216,719.27 (US$1,583.63), while female-headed households earned NPR 70,084.41 (US$512.13).

[6] Expenditures incurred in agriculture and livestock inputs are deducted from the total income while analyzing the income
[7] Conversion rate: 1 US$= NRs. 136.85 dated June 11, 2025

Within the treatment group, male-headed households reported a total income of NPR 195,375.41 (US$1,427.66), and female-headed households NPR 68,497.50 (US$500.53). Likewise, among the comparison group, male-headed households earned NPR 103,739.62 (US$758.05), while female-headed households earned NPR 63,232.01 (US$462.05) as stated in the following table:

Table 46: Household income

Income sources	Treatment			Comparison				Overall			Total (N=2541)
	Male headed HHs (N=1366)	Female headed HHs (N=431)	Total treatment (N=1797)	Male headed HHs (N=593)	Female headed HHs (N=149)	Other (N=2)	Total comparison (N=744)	Male headed HHs (N=1959)	Female headed HHs (N=580)	Other (N=2)	
Farm income (agriculture and livestock sector)	58,962.49	33,411.22	50,261.78	51,319.02	17,747.26	3,537.50	40,446.83	54,777.45	28,512.82	3,537.50	47,272.34
Non-farm income	136,412.93	35,086.28	141,140.63	52,420.60	45,484.76		119,461.54	161,941.82	41,571.59		137,896.65
Total annual income NRs.	195,375.41	68,497.50	191,402.41	103,739.62	63,232.01	3,537.50	159,908.37	216,719.27	70,084.41	3,537.50	185,168.99
Total income US$	1,427.66	500.53	1,398.63	758.05	462.05	25.85	1,168.49	1,583.63	512.13	25.85	1,353.08

Source: Field Survey, 2025

The average annual household income appears relatively low compared to national statistics, likely because the surveyed households consist mainly of subsistence farmers whose earnings are lower than those of commercial farmers and other business operators. Even the average annual HH income of commercial vegetable farmers in Nepal was reported NPR 247,000.00 (US$ 1804.89) ranging from NPR 100,000.00 (US$ 730.72 to NPR 300,000.00 (US$ 2,192.18).[8] One study revealed that most of the farm HHs (70%) earn less than NPR 15,000.00 (US$ 109.6)/month in Saptari.[9] Another report published by China Economic Information Center (CEIC) revealed that the average monthly income of the HHs of whole kingdom-Agriculture, Livestock and Fishery was NPR 2,144.00 (US$ 15.66) in 2015, totaling annual income of NPR 25,728.00 (US$ 188).[10] However, these references are somewhat older; the baseline average annual HH income in FANSEP II communities seems to be representative, as

[8] The Geographical Journal of Nepal Vol. 14: 131-150, 2021 DOI: https://doi.org/10.3126/gjn.v14i0.35556 Central Department of Geography, Tribhuvan University, Kathmandu, Nepal

[9] https://spiralfarmhouse.co/saptari-farmers-report-2019/

[10] https://www.ceicdata.com/en/nepal/household-budget-survey-average-monthly-household-income/average-monthly-household-income-whole-kingdom-agriculture-livestock--fishery

agricultural modernization has yet to reach the target beneficiaries. This is further evidenced by the fact that 45% of farmers have not adopted any improved agricultural technologies and only 6% have applied six or more technologies (Table 27). The application of such technologies in the FANSEP II area could substantially increase household incomes within a relatively short timeframe.

Further, there is a gap of income between male and female-headed HHs. Female-headed households in the project communities have significantly less earning than male-headed ones due to several ingrained issues. The Nepal Country Inequality Report (2025) pinpoints the problem's roots in systemic gender inequalities, patriarchal norms, and limited access to resources and financial services. It also notes the undervaluation of women's economic contributions. Specifically, unequal inheritance rights restrict women's control over assets, while their limited mobility and decision-making power hinder their productivity and economic opportunities.

The Nepal Human Development Report (2020) also highlights these disparities. It highlights that male-headed households often benefit more from remittances and higher-paying jobs abroad, while women who migrate frequently face worse conditions and lower wages. Additionally, women encounter societal and institutional barriers like restricted movement, less influence in community decisions, and biased policies, all of which severely limit their access to income-generating opportunities. Intervention of FANSEP II could balance the gap with equally served benefits during the project period.

4.3.2. Net Farm Income

Table 47 shows that, on average, households earn a net farm income of about **NPR 47,272.34 (US$ 345.43)** per year from agriculture and livestock sectors. When broken down by the gender of household head, male-headed households have a notably higher net farm income, averaging NPR 54,777 (US$ 400) per household. This is based on their gross agriculture and livestock income of NPR 103,937, offset by expenses of NPR 49,159. In contrast, female-headed households report a much lower net farm income at NPR 28,513 (US$ 208), derived from a gross income of NPR 63,134 against expenses of NPR 34,621.

From among the treatment and comparison households, those under the treatment group has a higher net farm income of NPR 50,262 (US$ 367) per household. Meanwhile, comparison households earn a lower net farm income at NPR 40,447 (US$ 296) as mentioned in the following table:

Table 47: Net agriculture income

Income sources	Male headed HHs	Female headed HHs	Other	Treatment	Comparison	Total annual income/HH
Farm income (Agriculture and livestock)	103,936.89	63,134.20	14,937.50	98,079.64	77,141.57	91,702.32
Agriculture and livestock expense	49,159.44	34,621.38	11,400.00	47,817.86	36,694.74	44,429.98
Net farm income (NRs.)	54,777.45	28,512.82	3,537.50	50,261.78	40,446.83	47,272.34
Net farm income (US$)	400.27	208.35	25.85	**367.28**	**295.56**	**345.43**

Source: Field Survey, 2025

4.4. Food Insecurity Experience Scale

Food Insecurity Experience Scale (FIES) is a food insecurity severity experience matrix that relies on the immediate responses of respondents to questions about their ability to access adequate food. The FIES module is administered on a 12-month recall period. It consisted eight questions capturing a range of food insecurity severity, with yes/no responses.

The Food Insecurity Experience Scale (FIES) analysis shows that the overall prevalence of moderate or severe food insecurity among all surveyed households (N=2,541) is **56.02%,** with a margin of error (MoE) of ±3.09% and the results are reported at a 90% confidence level with a Rasch reliability score of 0.82, indicating acceptable internal consistency of the scale.

For the treatment group (N=1,797), the prevalence is slightly higher at **57.00**% (±3.66%), In contrast, the comparison group (N=744) shows a lower prevalence of **53.64%** (±5.77%). At the cluster level, Sindhupalchowk exhibits the highest prevalence of food insecurity at 62.59% (±6.58%). This is followed by Dhanusha at 59.81% (±5.87%). Gorkha reports 53.06% (±6.17%) prevalence while Saptari shows the lowest prevalence at 49.46% (±6.03%).

By household head gender, female-headed households (N=580) are more food insecure, with 62.11% (±6.36%) prevalence. Male-headed households (N=1,959), in comparison, report 54.29% (±3.53%) prevalence as described in Table 48, next page.

Table 48: FIES calculation

Prevalence rate of food insecurity (% of Households)	Moderate or Severe	Margin of Error	Severity	Margin of Error	Confidence level	Rasch Reliability
Overall Cluster/Group/ HH Headed						
All Households (N=2541)	56.02	3.09	6.62	1.19	0.90	0.82
Dhanusha (N=656)	59.81	5.87	7.78	2.46		
Gorkha (N=644)	53.06	6.17	4.85	2.03		
Saptari (N=640)	49.46	6.03	2.93	1.61		
Sindhupalchowk (N=601)	62.59	6.58	11.59	3.25		
Treatment Group (N=1797)	57	3.66	6.61	1.42		
Comparison group(N=744)	53.64	5.77	6.64	2.22		
Female (N=580)	62.11	6.36	8.37	2.83		
Male (N=1959)	54.29	3.53	6.13	1.31		

Prevalence rates of food insecurity segregated by gender across the Group Types (% of households)										
Type of Group	**Comparison Group (N=744)**				**Treatment Group (N=1797)**				**Confidence level**	**Rasch Reliability**
Household Type	**Moderate or Severe**	**MoE**	**Severity**	**MoE**	**Moderate or Severe**	**MoE**	**Severity**	**MoE**		
Female	69	12.1	9.25	5.66	59.66	7.46	7.87	3.22	0.90	0.82
Male	51.15	6.46	4.94	2.12	55.8	4.21	6.54	1.61		

Likewise, as stated in above table, 69% of female-headed and 51.15% of male-headed households faced moderate or severe food insecurity in the comparison group while 59.66% of female-headed and 55.8% of male-headed households experienced moderate or severe food insecurity in the treatment group. Severe food insecurity affected 9.25% of female-headed and 4.94% of male-headed households in the comparison group, while in the treatment group; it was 7.87% and 6.54%, respectively.

Infit by cluster, groups and HHs head is presented in Annex XX of this report.

4.5. Minimum Dietary Diversity for pregnant and nursing women

Table 49 presents the Minimum Dietary Diversity for Women (MDD-W) across different groups of women within the clusters, showing the proportion of women who consumed at least five out of ten defined food groups the previous day. Overall, about **50.45%** of women (955 out of 1,893) of reproductive age (WRA) were found consuming at least five food groups; observing the highest dietary diversity in Sindhupalchowk (74.35%) and the lowest in Dhanusha (39.19%).

In the treatment group, **49.19%** (670 out of 1362) of women achieved minimum dietary diversity, with the highest rate again in Sindhupalchowk (75.12%) and the lowest in Dhanusha (38.99%). Among all treatment categories, women of reproductive age not categorized under the other subgroups had the largest sample and contributed significantly to the total.

In contrast, the comparison group showed a slightly higher MDD-W at **53.67%** (285 out of 531), with Sindhupalchowk at 72.9%. Notably, comparison group pregnant women and lactating women in Sindhupalchowk also showed high dietary diversity, although with smaller sample sizes as presented in the following table:

Table 49: Minimum dietary diversity

	Type of women	Percent of women who achieved MDD-W				Grand Total
		Dhanusha	Gorkha	Saptari	Sindhupalchowk	
OVERALL (N=1893)	Lactating women	43.01% (40/93)	50% (18/36)	46.23% (49/106)	72% (18/25)	48.08% (125/260)
	Pregnant women	32.14% (9/28)	71.43% (5/7)	43.75% (7/16)	85.71% (6/7)	46.55% (27/58)
	Non-pregnant and non-lactating women	38.87% (192/494)	42.01% (163/388)	58.27% (243/417)	74.28% (205/276)	50.98% (803/1575)
	Total	**39.19% (241/615)**	**43.16% (186/431)**	**55.47% (299/539)**	**74.35% (229/308)**	**50.45% (955/1893)**
TREATMENT	Lactating women	43.59% (34/78)	48.48% (16/33)	46.51% (40/86)	62.5% (10/16)	46.95% (100/213)
	Pregnant women	29.41% (5/17)	60% (3/5)	42.86% (6/14)	100% (2/2)	42.11% (16/38)
	Non-pregnant and non-lactating women	38.42% (131/341)	39.8% (121/304)	57.6% (163/283)	75.96% (139/183)	49.86% (554/1111)
	Total	**38.99% (170/436)**	**40.94% (140/342)**	**54.57% (209/383)**	**75.12% (151/201)**	**49.19% (670/1362)**
COMPARISON	Lactating women	40% (6/15)	66.67% (2/3)	45% (9/20)	88.89% (8/9)	53.19% (25/47)
	Pregnant women	36.36% (4/11)	100% (2/2)	50% (1/2)	80% (4/5)	55% (11/20)
	Non-pregnant and non-lactating women	39.87% (61/153)	50% (42/84)	59.7% (80/134)	70.97% (66/93)	53.66% (249/464)
	Total	**39.66% (71/179)**	**51.69% (46/89)**	**57.69% (90/156)**	**72.9% (78/107)**	**53.67% (285/531)**

Source: Field Survey, 2025

Further, the qualitative survey revealed a mixed practice across the clusters. In the Sindhupalchowk cluster, the participants reported that there was a practice of consuming diversified foods, including sometimes meat, for pregnant and lactating women. Home gardens contribute vegetables, fruits, and spices to their diets. However, chicken and duck farming are not prioritized, with meat primarily sourced from markets.

In Gorkha, awareness of extra food consumption during pregnancy is present among some, but the consumption is a concern. However, some women consume fruits, eggs, pulses, greens, and fish during this period, largely sourced from home gardens and personal farms. The Saptari and Dhanusha cluster demonstrates practices (around 50%) prioritizing, milk, and fruits during pregnancy and lactation. Their common food patterns include combinations of rice, pulses, and vegetables, or bread and vegetables. Kitchen gardens, ranging from produce a wide array of vegetables. While chicken and duck farming are absent.

4.6. Minimum Dietary Diversity for children between 6-24 months

Table 50 presents the Minimum Dietary Diversity for Children (MDD-C) among surveyed households. Out of a total of 291children under 23 months, 196 were in the eligible age group of 6 to 23 months (183 to 730 days), for whom the MDD-C indicator is assessed. [11]

Overall, **40.31**% of children achieved minimum dietary diversity out of a total of 196 surveyed, with the highest MDD-C observed in Gorkha (64.52%) and Sindhupalchowk (60.00%), and the lowest in Saptari (27.14%).

In treatment areas, the overall MDD-C was slightly higher at **41.40%,** with 65 out of 157 children meeting the minimum dietary diversity. Among these clusters, Gorkha (60.71%) and Sindhupalchowk (61.54%) again showed higher dietary diversity compared to Dhanusha (39.68%) and Saptari (28.30%). In comparison areas, only **35.90%** of children met the MDD-C threshold, with just 14 out of 39 achieving the minimum dietary diversity. Interestingly, Gorkha reported 100% MDD-C in the comparison group, albeit with a very small sample size (n=3), while other clusters like Dhanusha (35.29%), Saptari (23.53%), and Sindhupalchowk (50.00%) showed lower diversity.

Table 50: Minimum dietary diversity of children

Group Type	MDD-C by categories	Dhanusha	Saptari	Gorkha	Sindhup alchowk	Total
Overall	Food group score>=5 (of defined age group)	31	19	20	9	79
	N	80	70	31	15	196
	MDD-C	**38.75%**	**27.14%**	**64.52%**	**60.00%**	**40.31%**
Treatment	Food group score>=5 (of defined age group)	25	15	17	8	65
	N	63	53	28	13	157

[11] Nepal census data: 15.06% of children , and surveyed 8.89%

Group Type	MDD-C by categories	Dhanusha	Saptari	Gorkha	Sindhupalchowk	Total
	MDD-C	**39.68%**	**28.30%**	**60.71%**	**61.54%**	**41.40%**
Comparison	Food group score>=5 (of defined age group)	6	4	3	1	14
	N	17	17	3	2	39
	MDD-C	**35.29%**	**23.53%**	**100.00%**	**50.00%**	**35.90%**

Source: Field Survey, 2025

The study investigated the reasons behind lower figure of MDD-C in different clusters. The qualitative survey revealed the nutritional practices for children varying significantly across the three clusters, highlighting a spectrum from traditional, albeit sometimes limited, diets to a concerning reliance on processed foods. In the Sindhupalchowk cluster, the emphasis is on homemade "lito" (a type of porridge), supplemented with eggs two to three times a week. The low priority given to meat suggests a potential protein gap or cultural preference. While "lito" offers some nutritional value, the overall variety appears somewhat restricted, which could impact the comprehensive intake of essential vitamins and minerals crucial for child development.

The participants of Saptari and Dhanusha cluster presented a worrying scenario where 100% of children are reported to be fed junk food such as noodles, chips, and sugary drinks. This overwhelming reliance on highly processed, nutrient-poor items like "Kurkure," "Cheese ball," "Fruity," and "Litchi Juice," even with the mention of "homemade simple food," is a significant public health concern. Such a diet is strongly associated with malnutrition, micronutrient deficiencies, and an increased risk of non-communicable diseases later in life. The Gorkha cluster falls somewhere in between, with "Dhido" being a staple, occasionally supplemented with a broader, though still optional, range of foods including "lito/cerelac," rice, pulses, fruits, vegetables, eggs, and meat. While "Dhido" provides energy, the occasional nature of other food groups suggests that dietary diversity might still be inconsistent. This pattern in Gorkha, while better than Saptari and Dhanusha, still points to potential gaps in consistent access to a wide variety of nutrient-dense foods.

4.7. Household Dietary Diversity

Table 51 below presents the Household Dietary Diversity (HDD) score, showing the average dietary diversity across project clusters, by household type (female-, male-, and other-headed), and treatment versus comparison groups.[12] Overall, the HDD score is slightly higher in treatment households (7.60) compared to comparison households (7.44). By gender, both male- and female-headed households show similar scores within each group, with female-headed households in the treatment group at 7.55 and male-headed at 7.62.

Looking across the clusters, Sindhupalchowk stands out with the highest average HDD score at 8.44, indicating more diverse diets, followed by Gorkha (7.59). Dhanusha and Saptari have somewhat lower scores at 7.13 and 7.12 respectively. Within clusters, treatment households consistently report slightly

[12] HDD scoring criteria is annexed with the report.

higher dietary diversity than comparison households, notably in Sindhupalchowk (8.57 vs. 8.17) and Gorkha (7.64 vs. 7.45) as mentioned in the following table:

Table 51: HHs dietary diversity score

Cluster	Comparison (N=744)				Treatment (N=1797)			Grand Total
	Female headed (N=149)	Male headed (N=593)	Other headed (N=2)	Total (N=744)	Female headed (N=431)	Male headed (N=1366)	Total (1797)	
Dhanusha	6.60	7.14		7.03	6.97	7.23	7.17	7.13
Gorkha	7.15	7.53	6.00	7.45	7.77	7.61	7.64	7.59
Saptari	6.96	7.15		7.12	7.18	7.10	7.12	7.12
Sindhupal chowk	8.27	8.13	8.00	8.17	8.14	8.76	8.57	8.44
Total	7.32	7.47	**7.00**	**7.44**	7.55	7.62	**7.60**	**7.55**

Source: Field Survey, 2025

4.8. Months of Adequate Household Food Provisioning for food security

Table 52 below presents the average Months of Adequate Household Food Provisioning (MAHFP) across all surveyed households (2541). An overall average MAHFP stands at 9.42 months in a year. Treatment households reported a slightly higher average (9.44 months) compared to comparison households (9.40 months). [13]

By clusters, Saptari shows the highest food security with an average of 10.28 months, followed by Dhanusha (9.81 months) and Gorkha (9.30 months), while Sindhupalchowk recorded the lowest at 8.22 months. Looking at household headship, male-headed households consistently reported slightly higher MAHFP than female-headed ones, though differences are not very large as presented in the following table:

Table 52: Months of adequate household food provisioning

Clusters	**Comparison (N=744)**				**Treatment (N=1797)**			**Average MAHFP (N=2511)**
	Female headed (N=149)	**Male headed (N=593)**	**Other headed (N=2)**	**Total N=744**	**Female headed (N=431)**	**Male headed (N=1336)**	**Total (N=1767)**	
Dhanusha	9.42	10.03		9.90	9.45	9.86	9.77	9.81
Gorkha	8.50	9.45	9.00	9.26	8.92	9.43	9.32	9.30
Saptari	9.13	10.58		10.39	10.23	10.24	10.24	10.28
Sindhupalchowk	7.08	8.42	0.00	8.04	7.66	8.59	8.30	8.22
Grand Total	**8.41**	**9.66**	**4.50**	**9.40**	**8.97**	**9.58**	**9.44**	**9.42**

Source: Field Survey, 2025

[13] Food security months: - Less than 3 months:12.99%, 3-6 months: 12.09%, 6-9 months: 16.37% and 9-12 months: 51.55%

4.9. Food Consumption Score

Table 53 shows the Food Consumption Score (FCS) categorized into acceptable, borderline, and poor categories across treatment and comparison groups, along with project cluster details. Overall, across all households (2,541), about 69.5% have an acceptable FCS, indicating adequate dietary diversity and frequency. Another 27% fall into the borderline category, while 3.5% are in the poor category, reflecting inadequate food consumption (30.5%).

Looking by intervention, treatment households (1,797) perform slightly better, with 69.9% in the acceptable range, compared to 68.6% among comparison households (744). Borderline food consumption is somewhat lower in the treatment group (26.4%) than in the comparison group (28.5%). The proportion of households with poor food consumption is similar, around 3–4% in both groups. By clusters, Saptari stands out with the highest share of acceptable FCS in both groups (over 75% in comparison and 78% in treatment), while Sindhupalchowk has the lowest acceptable scores (about 59–65%) and the highest poor category levels, reaching 7% in the treatment group.

The overall mean FCS is 57.49. The comparison group has a mean FCS of 57.10, with cluster wise scores of Dhanusha at 58.11, Gorkha at 57.24, Saptari at 58.49, and Sindhupalchowk at 54.56. The treatment group has a slightly higher mean FCS of 57.89, with Dhanusha at 61.30, Gorkha at 57.82, Saptari at 59.21, and Sindhupalchowk at 53.24, as detailed in the table below:

Table 53: Food consumption score

Category[14]	Comparison (N=744)					Treatment (N=1797)					Grand Total (N=2541)
	Dhanusha (N=195)	Gorkha (N=172)	Saptari (N=187)	Sindhupalchowk (N=190)	Total	Dhanusha (N=461)	Gorkha	Saptari (N=453)	Sindhupalcho	Total	
Acceptable	65.64%	68.02%	75.94%	64.74%	68.55%	73.10%	68.22%	78.15%	59.12%	69.89%	69.50%
Borderline	31.79%	28.49%	22.46%	31.05%	28.49%	23.64%	29.24%	19.65%	33.82%	26.43%	27.04%
Poor	2.56%	3.49%	1.60%	4.21%	2.96%	3.25%	2.54%	2.21%	7.06%	3.67%	3.46%
Mean FCS	**58.11**	**57.24**	**58.49**	**54.56**	**57.10**	**61.30**	**57.82**	**59.21**	**53.24**	**57.89**	**57.49**

Source: Field Survey, 2025

4.10. Technological options and perception about their knowledge

4.10.1. Technological Options and Perceived Knowledge on Agriculture Sector

The following narratives present insights into the perceived knowledge regarding various agricultural technologies among farmers from treatment and comparison clusters across four project clusters—Dhanusha, Saptari, Gorkha, and Sindhupalchowk. The responses show a strong trend of limited awareness or understanding of improved agricultural practices across both groups, as evidenced by high "Don't know" responses on most questions. The detail finding by treatment and comparison and project clusters is annexed with the report (Annex XXI).

[14] Raised Threshold: 0-28 = Poor; 28.5-42 = Borderline; >42= Acceptable

Greenhouse Gas Emissions from Paddy Farming: A majority of respondents (67%) were unaware of methods to reduce greenhouse gas emissions in paddy farming. Only 20% identified reducing chemical fertilizer use as the most important method, while very few mentioned alternatives like reduced pesticide use (7%) or no-plough cultivation (6%). "Don't know" responses were consistently high across all clusters, indicating a significant knowledge gap in climate-smart practices.

Panicle Initiation Stage in Rice Cultivation: For rice crop management, 41% of farmers did not know the key task during the panicle initiation stage. Irrigation (28%) and applying nitrogen fertilizer (22%) were common answers, especially in Gorkha and Dhanusha. Mixing was the least selected (9%). The treatment group had relatively better awareness compared to the comparison group.

Understanding of "Quality Seed": Only 32% correctly identified "quality seed" as genetically pure, vigorous, and disease-resistant. About 42% responded "Don't know," while others misidentified it as seeds from shops (15%) or just any seed used for planting (12%). Misconceptions were prevalent across all clusters.

Importance of Crop Rotation: A significant 62% of respondents were unaware of the benefits of crop rotation. Only 20% correctly noted its role in reducing weeds, disease spread, and improving nutrient use. **Animal Urine Use:** 60% of respondents lacked knowledge on the role of animal urine in farming. However, 24% acknowledged its value when used properly as an alternative to top dressing in vegetables. The belief that animal urine has no role or is impractical was held by 16% overall.

Farmyard Manure Improvement: While 39% knew that farmyard manure should be protected from sun, rain, and water, 45% still had no idea. Practices like drying in the sun (12%) or avoiding urine use (4%) were cited incorrectly. The treatment group showed relatively better understanding.

Timing for Potato Digging: A large portion (40%) of farmers did not know the best time to dig potatoes. Among correct responses, 27% identified the early tuber stage and 13% linked it with flowering. Some (15%) assumed digging could occur anytime, and 5% said whenever the farmer was free, indicating inconsistent knowledge.

Potato Blight Management: Most farmers (70%) were unaware of how to manage potato blight. Only 17% suggested cultivating blight-tolerant varieties. A smaller portion mistakenly believed shade (9%) or that nothing could be done (5%) were solutions. Misunderstanding was uniformly spread.

Drought-Tolerant Paddy Varieties: Awareness of drought-tolerant paddy was very low, with 79% of farmers unable to name any. Only 10% cited Hardinath 3, followed by Sukha dhan 3 (6%), 6 (3%), and 4 (3%). The treatment group had a slight edge in recognition over the comparison group.

Disease-Resistant Potato Varieties: A staggering 87% could not identify any disease-resistant potato variety. Cardinal, Janakdev, and Khumal Bikas were only mentioned by around 3–4% each, indicating a poor understanding of varietal resistance across regions.

Importance of Top Dressing with Nitrogenous Fertilizers: Nearly 69% lacked knowledge about the purpose of top dressing. Only 9% recognized that all reasons were valid. A small number understood the mismatch between mineralization and plant uptake. The lack of knowledge was higher in comparison clusters.

Soil with High Water Holding Capacity: One-third (33%) did not know which soil retains more water. Only 24% correctly identified loamy soil with organic matter. Others mistakenly chose pinched soil (27%) or sandy loam (16%). Knowledge was slightly better in treatment areas.

Conditions Requiring Nitrogenous Fertilizer Top Dressing: Forty-six percent were unaware of when to apply nitrogen fertilizers. While 33% correctly identified rusting and cracking as an indicator, others were confused between rust only (13%) and low rainfall (7%). Gaps were noticeable across all clusters.

4.10.2. Technological Options and Perceived Knowledge on Livestock Sector

The following narratives presents farmers' knowledge and perceptions regarding key livestock management practices across treatment and comparison areas in four clusters—Dhanusha, Saptari, Gorkha, and Sindhupalchowk. Overall, the data highlights substantial gaps in awareness, with the majority of responses concentrated in the "Don't know" category, revealing limited understanding of livestock-related technologies and best practices among many farmers. The detail finding by treatment and comparison and project clusters is annexed with the report (Annex XXII).

Measures to Increase Milk Productivity: When asked about methods to increase cow milk productivity, over half of respondents (56%) correctly identified the inclusion of nutritious grasses in the animal diet as beneficial. However, a significant 33% said they didn't know. A small proportion (6% each) thought grazing cows in the same place or breeding calves early were effective, reflecting common misconceptions. Treatment clusters had higher awareness, particularly in Dhanusha and Saptari.

Technologies for Calf Productivity: Regarding technologies to boost the productivity of cow and buffalo calves, 58% were unaware of any method. Artificial insemination was recognized by only 18% of respondents, mostly from Dhanusha and Gorkha. Surprisingly, 17% believed using a local breed of bull would help, and 7% mentioned using a related bull—a practice generally discouraged due to inbreeding risks. Awareness was notably better in treatment areas.

Goat Nutrition before Breeding: Half of the respondents did not know why goats should be fed more nutritious food one month prior to breeding. Nevertheless, 39% correctly said it was to provide nutrients for the fetus. Other misconceptions included beliefs that it shortens gestation (4%) or accelerates offspring breeding (6%). Awareness levels were relatively better in Gorkha and Dhanusha.

Stall-Feeding System for Goats: When asked about the benefits of stall-feeding goats, 58% lacked awareness. Only 21% knew that stall-feeding results in stronger and heavier goats, and 15% noted disease prevention as a benefit. Misconceptions were evident, as 6% incorrectly believed it improves exercise. Treatment groups generally demonstrated slightly better understanding than comparison groups.

Feeding Urea Molasses Mineral Block (UMB): Knowledge about the proper feeding of UMB blocks was especially limited, with a high 83% reporting, "Don't know." Only 7% were aware that animals late in pregnancy should not be fed UMB blocks. Misbeliefs such as feeding based on animal preference (4%) or avoiding water during feeding (6%) were also noted. The treatment group had somewhat better recognition, particularly in Dhanusha.

Grass for Waterlogged Areas: When it came to selecting grasses suitable for waterlogged conditions, 69% did not know the answer. Around 23% correctly mentioned Napier grass, while a few named

Barseem (5%) or Paragrass (3%). Farmers from Dhanusha and Saptari were relatively more informed, particularly within the treatment group.

Benefits of Cattle Shed Improvement: Regarding the benefits of improving cattle sheds for excrement management, more than half (56%) had no knowledge. Only 22% rightly identified its role in preventing nutrient loss from dung and urine. A smaller portion linked it to faster calf growth (14%) or breeding (8%). This reinforces the need for more education on low-cost, impactful livestock housing improvements.

In addition to the above, there were other options and perceptions collected on livestock technologies. The most widely heard-of technology was castration of bucks at around three months of age, recognized by 35% of respondents (892 individuals), with the highest concentration in Dhanusha (435) and Saptari (250). Artificial insemination (AI) in animal breeding was also relatively well-known, reported by 33% (848 respondents), especially in Dhanusha (318) and Saptari (371), indicating higher penetration of reproductive technologies in these areas. Likewise, about 20% of respondents (509) had heard of including legumes with other green forages to enhance livestock performance, with Gorkha (177) and Saptari (131) showing the most awareness.

Awareness of teat dipping with Povidone Iodine to prevent mastitis was at 16% (395 respondents), highest in Sindhupalchowk (144) and Gorkha (116). Only 11% (289) of respondents had heard of vaccinations for major livestock diseases such as FMD, HS, and BQ, and 18% (465) knew about PPR vaccination in goats, with the highest awareness in Gorkha and Sindhupalchowk. Similarly, Knowledge of ivermectin use for parasite control was low, with only 10% (266) having heard of it, though slightly higher in Gorkha (95) and Sindhupalchowk (113). Recognition of rearing crossbred Boer goats was very limited (5%, 133 respondents), with moderate exposure in Dhanusha (54) and Sindhupalchowk (44).

4.10.3. Perceived Knowledge on Nutrition Sector

The following narratives presents insights into the perceived knowledge regarding various knowledge and perception among farmers from treatment and comparison clusters across four project clusters—Dhanusha, Saptari, Gorkha, and Sindhupalchowk. The findings indicate substantial gaps in nutrition knowledge across clusters, particularly regarding micronutrients and dietary diversity. The detail finding of the study by treatment and comparison and project clusters is annexed with the report (Annex XXIII).

Appropriate Age to Introduce Solid/Semi-Solid Foods to Infants: A significant majority of respondents (70%) identified 6 months as the right age to start giving solid or semi-solid foods to children. This was consistently high across all clusters, especially in Gorkha and Sindhupalchowk treatment areas. However, 17% mentioned 7 months and 9% said 9 months, showing moderate understanding. A small proportion (3%) incorrectly mentioned 12 months, and some respondents remained unsure.

Daily Food Group Requirements for Women: Only 31% of respondents correctly reported that women should consume four food groups daily to stay healthy, while 38% said, "Don't know," indicating major knowledge gaps. Responses varied widely across clusters, with lower awareness in comparison areas. A notable portion also mentioned higher numbers like five to seven food groups, showing partial understanding but some confusion.

Daily Food Group Requirements for Children: Just 27% of respondents stated that children need four food groups daily, with the rest either underestimating or overestimating the requirement. Similar to the women's dietary question, 37% responded, "Don't know," highlighting limited knowledge of child nutrition. Awareness appeared slightly better in treatment clusters but remained low overall.

Good Sources of Protein in the Diet: Knowledge of protein sources was mixed. Around 45% each identified eggs and meat and milk and milk products as good protein sources, while 34% mentioned pulses and legumes. However, 33% mistakenly thought fruits and vegetables are significant protein sources. About 16% did not know any protein source, with particularly high uncertainty in comparison clusters.

Nutrient That Prevents Anemia: Only 24% correctly identified iron as the nutrient that prevents anemia. Alarmingly, 62% said, "Don't know," reflecting a critical knowledge gap in all clusters. Some respondents incorrectly selected calcium (4%), carbohydrates (3%), or vitamin C (7%), showing a need for better nutrition education around micronutrients.

Food Sources of Iron: Knowledge of iron-rich foods was similarly low. Nearly half of respondents (49%) were unable to identify any food source of iron. Only 20% recognized spinach, a key iron source. Other responses like milk (14%), rice (10%), and orange (7%) were less relevant or incorrect. This again points to poor dietary literacy, especially concerning iron-rich foods crucial for preventing anemia.

4.11. Cropping Intensity of Farmers in the Project Area

The table 54 presents cropping intensity across four clusters—Dhanusha, Saptari, Gorkha, and Sindhupalchowk—disaggregated by treatment and comparison groups, along with overall averages. Cropping intensity is calculated dividing the gross cropped area by net cultivated area and multiplying by 100 to express it as a percentage.

Overall, households in the treatment group demonstrate higher agricultural activity and land use efficiency. The average number of crops planted per household annually in the treatment group is 2.12, compared to 1.78 in the comparison group. Similarly, the gross cropped area per household in the treatment group is 0.54 hectares, while it is 0.42 hectares in the comparison group. Although the net cultivated area is also slightly higher in the treatment group (0.26 hectares) than in the comparison group (0.21 hectares), the more significant difference lies in cropping intensity. Treatment households exhibit an average cropping intensity of 207%, indicating that, on average, their land is cropped more than twice a year. In contrast, the comparison group shows a cropping intensity of 201%.

Cluster-level comparisons reveal similar trends. Dhanusha cluster stands out with the highest cropping intensity across both groups—247% in the treatment group and 197% in the comparison group. Sindhupalchowk follows, with 235% in the treatment group and 205% in the comparison group. Saptari and Gorkha show relatively lower cropping intensities, with Gorkha recording the lowest values in both categories—183% for treatment and 174% for comparison—likely reflecting geographical or land use constraints.

Table 54: Cropping intensity by clusters

Groups	Cropping intensity indicators	Dhanusha	Saptari	Gorkha	Sindhupalchowk	Overall
TREATMENT	Total No. of crops planted per HH in a year	2.11	2.02	1.94	2.46	2.12
	Gross crop area planted per HH in a year	0.62	0.69	0.30	0.37	0.54
	Net cultivated area of HH	0.25	0.35	0.17	0.16	0.26
	Cropping intensity per HH	247%	195%	183%	235%	**207%**
COMPARISON	Total No. of crops planted per HH in a year	1.70	1.73	1.53	2.14	1.78
	Gross crop area planted per HH in a year	0.37	0.61	0.26	0.31	0.42
	Net cultivated area of HH	0.19	0.33	0.15	0.15	0.21
	Cropping intensity per HH	197%	185%	174%	205%	**201%**
TOTAL	Total No. of crops planted per HH in a year	1.98	1.94	1.83	2.35	2.02
	Gross crop area planted per HH in a year	0.62	0.69	0.30	0.37	0.51
	Net cultivated area of HH	0.25	0.35	0.17	0.16	0.25
	Cropping intensity per HH	247%	195%	183%	235%	**201%**

RM wise cropping intensity is presented in Annex XXIV.

4.12. Kitchen Garden and/Nutrition Garden Situation

4.12.1. Status of HH Having Home Garden

Table 55 summarizes the status of home gardens among households, categorized by whether they have home garden or not. The status of the home garden is described as follows:

Dhanusha cluster has more households without home gardens in both Treatment (346) and Comparison (164) groups, compared to those with gardens (115 in Treatment, 31 in Comparison). Saptari also shows more households without home gardens (303 in Treatment, 157 in Comparison) than with (150 in Treatment, 30 in Comparison). In Gorkha, while the Treatment group has more households with gardens (247) than without (225), the Comparison group reverses this trend (83 without, 89 with). Sindhupalchowk cluster reported more households with home gardens in the Treatment group (254) than without (157). In the Comparison group, a near equal number of households have (106) and do not have (84) home gardens.

Table 55: Status of the HHs having home garden

Home garden status	Percentage	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
No	60%	1519	346	303	225	157	164	157	83	84
Yes	40%	1022	115	150	247	254	31	30	89	106

Source: Field Survey, 2025

4.12.2. Summary of Crops Grown in Home Garden

Table 56 below provides a summary of crop types cultivated in home gardens, categorizing them into Vegetables, Spices, Fruits, and Other. Data is presented as overall percentages and total counts, further broken down by "Treatment" and "Comparison" groups across four clusters: Dhanusha, Saptari, Gorkha, and Sindhupalchowk.

Dominance of Vegetables in Home Gardens

Vegetables are overwhelmingly the most common crop type in home gardens, with 96% of households reporting their cultivation. A total of 983 households grow vegetables. Within the Treatment group, a significant number of households cultivate vegetables, with Gorkha (244 households) and Sindhupalchowk (238 households) showing particularly high engagement. Dhanusha (112 households) and Saptari (145 households) also have substantial vegetable cultivation. In the Comparison group, while fewer in number overall, vegetables remain dominant, with Sindhupalchowk (100 households) and Gorkha (88 households) leading. This widespread cultivation of vegetables highlights their importance for household consumption and potentially local markets. Crop details grown in the home garden is presented in Annex XXV.

Cultivation of Spices and Fruits

Spices are grown by 23% of households (231 total), indicating a moderate level of engagement (Table 57). In the Treatment group, Gorkha (94 households) and Sindhupalchowk (65 households) are notable for spice cultivation, while Dhanusha (7 households) and Saptari (11 households) have less. The Comparison group shows a lower overall prevalence, with Gorkha (28 households) and Sindhupalchowk (22 households) still leading. Fruits are cultivated by 20% of households (200 total). Gorkha (74 households) and Sindhupalchowk (39 households) also lead in fruit cultivation within the Treatment group. In the Comparison group, fruit cultivation is less common, with Gorkha (28 households) and Sindhupalchowk (16 households) having higher counts.

The "Other" crop type category is negligible, with only 5 total households (0%) reporting its cultivation, suggesting very specialized or rare crops. Across all crop types, Gorkha and Sindhupalchowk consistently show higher engagement in home garden cultivation in both Treatment and Comparison groups compared to Dhanusha and Saptari. The data implies that home gardens are primarily used for vegetable production, with a secondary focus on spices and fruits, varying by clusters and possibly influenced by intervention status. Crops being grown in the home garden are annexed.

Table 56: Crops types in home garden

Crops type summary in home garden	Percentage	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
Vegetables	96%	983	112	145	244	238	29	27	88	100
Spices	23%	231	7	11	94	65	2	2	28	22
Fruits	20%	200	22	9	74	39	9	3	28	16
Other	0%	5	0	2	1	1	0	1	0	0

Source: Field Survey, 2025

4.13. Gendered Time Use

4.13.1. Time Utilization of Women

Table 57 below shows how females allocate their time across a typical day, totaling 24 hours. Most time is spent on sleeping and resting (11 hours), followed by significant hours in farming, livestock, and fishing (3.2 hours). Other notable daily activities include domestic work (1.9 hours), cooking (1.6 hours), and caring for children or adults (0.8 hours). Less time is spent on personal care, shopping, and leisure activities such as watching TV or reading. Very minimal hours go to employment (0.1 hour), own business (0.1 hour), or schooling. This pattern reflects that women's days are primarily occupied by household responsibilities and agriculture, with limited time for income-generating work or personal leisure.

Table 57: Time use of women

SN	Activities	Average hours
1	Sleeping and resting	11.01
2	Eating and drinking	2.16
3	Personal care	0.98
4	School (incl. homework)	0.10
5	Work as employment	0.13
6	Own business work	0.11
7	Farming/livestock/fishing	3.21
8	Shopping/getting service (incl. health care)	0.32
9	Weaving/sewing/textile care	0.14
10	Cooking	1.64
11	Domestic work (incl. fetching wood and water)	1.86
12	Caring for children/adults/elderly	0.83
13	Travelling and commuting	0.29
14	watching TV/listening to radio/reading	0.56
15	Exercising	0.04
16	Social activities or hobbies	0.10
17	Religious activities	0.37
18	Other	0.15
Total hours		**24.00**

4.13.2. Workload Distribution and Recognition of the Work

Table 58 below summarizes female perceptions on three aspects: fair workload distribution between male and female members, feelings of being overburdened by daily work, and whether their contribution to the family is recognized, comparing treatment and comparison groups. Overall, about 67% of respondents feel the workload is fairly shared, with a slightly higher proportion in the comparison group (68%) than treatment (66%). Meanwhile, 24% overall feel overburdened by daily tasks, again similar across treatment and comparison groups. Recognition of contribution is reported by 68% overall, slightly higher in treatment households (69%) compared to comparison households (64%). Only a small fraction are uncertain on these issues as presented in the following table:

Table 58: Workload distribution in the family

	Response	Workload distributed fairly (male and female members)	Percentage	Feel overburdened by daily workload	Percentage	Feel contribution to family is recognized	Percentage
TOTAL (N) = 2541	Yes	1702	66.98%	600	23.61%	1720	67.69%
	No	741	29.16%	1894	74.54%	700	27.55%
	Not Sure	98	3.86%	47	1.85%	121	4.76%
TREATMENT (N) = 1797	Yes	1193	66.39%	422	23.48%	1246	69.34%
	No	528	29.38%	1335	74.29%	469	26.10%
	Not Sure	76	4.23%	40	2.23%	82	4.56%
COMPARISON (N) = 744	Yes	509	68.41%	178	23.92%	474	63.71%
	No	213	28.63%	559	75.13%	231	31.05%
	Not Sure	22	2.96%	7	0.94%	39	5.24%

Source: Field Survey, 2025

5. CONCLUSION AND RECOMMENDATIONS

5.1. Conclusion

The baseline status of FANSEP II area shows the appropriateness of FANSEP II intervention having many opportunities to improve the livelihoods of marginal farmers of four project clusters (8 districts and 16 rural municipalities). The baseline mission surveyed a total 2541 HHs with 23 % female respondents.

Baseline captured demographic features of the respondents, crop production and productivity, livestock production and productivity and nutritional aspects among others as background information to the PDO result indicators.

Regarding the PDO indicators, 52.07% of the Farmers Adopted Improved Agricultural Technologies (PDO 1) with 54.205 in the Treatment group. Under PDO 2, focusing on "Crop and Animal Productivity by Direct Beneficiaries," the total baseline productivity for "Food Grains" is 2.49 Tons/ha, where the Treatment group is slightly higher at 2.52 Tons/ha. For "Vegetables," the total baseline productivity stands at 7.40 Tons/ha, with the Treatment group at 7.50 Tons/ha.

In livestock, live weight of uncastrated bucks at sold out age (11.9 months) is 14.49 kg/animal whereas that of castrated bucks at sold out age (14.9 months) is 16.21/kg/animal. Likewise, the total baseline for “liters of milk per lactating period” is 978.31 liters, with the treatment group contributing slightly more at 980.20 liters.

Regarding PDO 3, "Household income," the total baseline is $1,353.08/HH, and the Treatment group's income is higher at $1,398.63/HH. Key immediate indicators also show baseline values, such as "Net Farm Income" at a total of $345.43, with the Treatment group's income at $367.28. "Household Dietary Diversity Score" is 7.55 overall, with the Treatment group at 7.62. "Months of Adequate Household Food Provisioning" is 9.42 overall, with the Treatment group at 9.44 months. Lastly, "Food Consumption score- % (Borderline & Poor)" indicates a total of 27.04% borderline and 3.46% poor food consumption, with the Treatment group showing 26.43% borderline and 3.67% poor. Likewise, the survey collected the baseline on additional indicators i.e. improved HH Dietary Diversity, months of adequate HH food provisioning, FCS, technological options and perception and home garden related baseline status.

Baselines of the most of the intervention assets were collected based on the memory recall methods. The study team tried to collect the reliable information from different sector given that there were challenges faced by the enumerators to get the response from the respondent asked. There were many such cases and the respondent had to consult with her/his other family members to recall the status, which took a longer time and efforts than expected.

Overall findings of the baseline suggest for a robust and integrated interventions to improve the lives of project beneficiaries.

5.2. Lessons Learnt

- The baseline survey highlighted that delays in the inception phase can disrupt the entire project timeline. It is crucial to plan carefully to avoid such delays and ensure that subsequent activities stay on schedule.
- When collecting data on past events, such as production and income from the previous year, expect that many households may struggle to recall accurate details, which may create inconsistencies in provided information.
- Some households may be hesitant to share income information. It is important to train enumerators to handle these situations sensitively and build trust to encourage honest responses, as many households were initially reluctant to disclose their earnings during consultations.
- When working with control groups, it is important to anticipate and address household reluctance due to feelings of being selected without prior consent by clearly explaining the broader community benefits of the project.

5.3. Limitations

The study team experienced some limitation during the course of the baseline study as presented below:

- The delayed finalization of the questionnaire led to initial confusion among enumerators, underscoring the critical need for timely preparation of study materials to avoid subsequent issues in training and questionnaire adjustments.
- The excessive length of the questionnaire, with many questions and some repetitions, led to respondent fatigue and reduced engagement, potentially compromising the quality of the data collected.
- Inconsistencies in sample and household IDs were encountered, which required extensive clarification with respondents and team consultations, indicating challenges in maintaining consistent identification throughout data collection.
- Delays in obtaining replacement households prolonged data collection and caused inefficient revisits and schedule setbacks, affecting the overall efficiency of the fieldwork.
- Some respondents were initially reluctant to respond, recalling a recent interview fatigue during the course, which took more time in data collection.
- When working with control groups, enumerators frequently encountered reluctance to participate from households who feel they were selected and surveyed without prior consent.
- Engagement of the HHs in irrelevant group caused confusion to collect the data. For instance, farmers without livestock in a Livestock Group or those in a Goat Group who culturally avoid goats will be hesitant.
- When collecting data on past events, such as a year prior, anticipate that most of the households may have difficulty accurately recalling details like production and income figures.
- Most of the households were reluctant to disclose their income or share accurate financial details in the beginning and even some of them had to ask other family members.

- Some farmers provided HH ID even did not know in which group they belong to who were identified by consulting other group members.

5.4. Recommendations

The findings were discussed by the survey team in the context of forming general recommendations for future reference. Thus, based on the experiences gained during the survey and findings presented in the preceding sections, the survey team puts forward the following recommendations to take forward in the days to come:

⇒ ***Baseline related***

- ***Delayed Questionnaire & Training Issues:***

  Implement a stringent timeline for questionnaire finalization, ensuring it is comprehensively reviewed and approved well in advance of enumerator training.

- ***Extensive Questionnaire Length & Respondent Fatigue:***

  Review the questionnaire for redundancy and necessity. Use skip logic to streamline the survey, ensuring respondents only see relevant questions. Divide the questionnaire into shorter sections for separate sittings if possible or consider phased data collection.

- ***Inconsistencies in Sample Names & HH ID:***

  Develop a thorough pre-survey data validation protocol, including multi-stage verification for sample lists and HH IDs. Train enumerators on resolving discrepancies and provide direct access to FANSEP II team for consultation on complex cases during fieldwork.

- ***Delayed Process on Replacement of Households:***

  Establish a rapid, proactive household replacement system with pre-approved lists based on defined criteria. Streamline approval processes, grant enumerators instant list access, and minimize travel time and schedule disruptions.

- ***Interview Fatigue in Groups:***

  Craft a clear narrative for enumerators on project benefits and data importance while stressing confidentiality and community impact. Optionally, provide a small token of appreciation for their time if possible.

- ***Difficulty Recalling Past Information:***

  Organize the baseline prior to starting the project activities. Provide enumerators with enhanced training in memory recall-based interviewing techniques, including probing questions and triangulation methods, to help respondents accurately reconstruct past information.

⇒ ***Program related***

- ***Empowerment of women***

  Empower women in agriculture for food and nutrition security through gender-responsive strategies, capacity building, and equitable resource allocation.

- ***Market enhancement***

  The vegetable growers are mostly limited to the local level consumers. The aggregation of vegetables, systematic sales beyond the local market are high priority of the producers. FANSEP II may include this approach together with producers, partners and local level governments. FANSEP II should facilitate enhancing access to market information and intelligence in both crop and

livestock sectors as it aids in making informed decisions and adapting to changing market dynamics. FANSEP II could link the farmers group with the business organizations i.e. District Chamber of Commerce Association (DCCA).

- ***Focus on improved agricultural technologies***

  Many farmers still do not know about the improved agriculture technologies along with pre and post production improvements in both agriculture and livestock sectors. FANSEP II should focus on enhancing their knowledge in the sectors to enhance productivity by improving climate smart technologies.

- ***Promote Nutrition education and behavior change***

  Strengthen community-based nutrition education targeting women, adolescent girls, and mothers through local health workers, mothers' groups, and schools. Emphasize balanced diets, proper infant and young child feeding practices, and the nutritional needs during pregnancy and adolescence to improve long-term health and dietary habits. Likewise, promote year-round home gardening and small livestock rearing to boost access to nutritious foods and improve dietary diversity for women and children in rural areas.

- ***Basic orientation to farmers***

  Some farmers having HH ID even do not know about the group types. The project should provide basic orientation to them during the group formation.

- ***Insurance of crops and livestock***

  Many farmers face crop loss from climate and wildlife; insurance is needed in rural areas. FANSEP II can aid with localized insurance alongside government and partners.

- ***Policy lobbying and advocacy***

  Achieving the market, product diversification and quality control, effective policy lobbying and advocacy in agriculture and livestock sector is needed. Additionally, the government runs a significant program to provide support to schools, but the agriculture products are currently not included in the scope of the school lunch program. Further, the government has provisioned subsided inputs for the smallholders, which is not known to most of the smallholders, and only the elite farmers had accessed these benefits. FANSEP II may do policy lobby and advocacy through RMs in future program.

- ***Research and Development***

  Promoting research and development is also essential and may lead to innovations in crop and animal farming, nutrition, and disease management. This can improve the overall productivity across the sector. Providing training and capacity-building programs for staffs, farmers and technicians is critically important to enhance their skills and knowledge, leading to better performance of the project intervention.

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7. ANNEXES

Annex I: Key output variables and analysis guidelines as per the ToR

Major indicators that need to be captured during Baseline survey are:

PDO 1: Farmers adopting improved agricultural technology (Number) (CRI)

The adoption number is measured as the product of (i) the share of PG members adopting at least one improved technology of the concerned value chain commodity (measured in the sample covered by the household survey) and (ii) the number of PG members surveyed within the value chain commodity.

$$Adoption\ rate = \frac{Number\ of\ Farmer's\ adopted\ at\ least\ one\ improved\ technologies}{Total\ number\ of\ Farmer's\ Surveyed} \times 100$$

PDO 2: Increased crop and animal productivity by direct beneficiaries (disaggregated by crop and animal species)

Crop Productivity (ton/ha)

Crop yield is calculated as Production (Mt per hectare). For each crop the amount produced is calculated in tonnes (1 ton = 1,000 Kg) per unit of land (hectare).

$$Crop\ Yield = \frac{Amount\ of\ crop\ produced\ in\ tonnes}{Total\ area\ of\ crop\ in\ hectares}$$

PDO: 2.a. Productivity of Crops (Food Grains): Measure improvements in production (Mt.) per ha stating average quantity of production and percentage of increment in unit of production of the major cereals by taking the weightage means of yields for the paddy, maize and wheat. It will be calculated only from the crop group samples.

PDO: 2.b. Productivity of Crops (Vegetables): Measure improvements in production (Mt.) per ha stating average quantity of production and percentage of increment in unit of production of the vegetables promoted by the project (potato, tomato, cauliflower, bitter gourd, cucumber, bottle gourd, sponge gourd, pumpkins, okra, peas and beans, cabbage, radish, carrot, and brinjal). It will be calculated only from the crop group samples.

PDO: 2.c. Productivity of Livestock (Meat): Measure improvements in meat production (kg/animal) stating average quantity of production and percentage of increment in unit of production. Project focuses to measure meat productivity of goat. The value for this indicator needs to be calculated by calculating average live weight of goats (adult doe, adult buck, female hogget and male hogget) regardless of breed and type. The meat productivity will be calculated from the data of goat promotion groups only.

PDO: 2.d. Productivity of Livestock (Milk): Measure improvements in production (Ltr/animal) stating average quantity of milk production and percentage of increment in unit of production.

Project focuses to measure milk productivity of cattle and buffalo. The value for this indicator will be calculated by 1) calculating average amount of milk produced per milking cow regardless of breed, 2) calculating average amount of milk produced per milking buffalo regardless of breed. 3) And finally calculating the mean value of 1) and 2) giving proportional weight to the production of milk from cow and buffalo. The milk productivity will be computed based on the data from the dairy promotion group.

PDO 3: Increased household income (farm and off-farm) disaggregated by gender:

Household income is accounted in a production-based approach (i.e., revenue minus cost), and home-produced food that is not sold but consumed at home is valued as income. Therefore, this indicator will be calculated by adding income from all sources of the household, additionally the value of household's self-cultivated and self-consumed crops will be imputed by multiplying the amount of crop produced by average sale price of same crop at household/RM/district levels. The household income should be measured as: Total HH income, HH income of male headed HHs, HH income of female headed HHS. HH income should also be disaggregated into farm income and non-farm income. For crop income and livestock income, costs of production such as cost of inputs, labor, veterinary services need to be subtracted from the total sales revenue of crops and livestock.

$$HH\ income = \frac{1}{n}\sum_{i=1}^{n} Income\ Sources_i$$

PDO 4: Reduced food insecurity experience scale score of direct beneficiaries (FIES) (GAFSP Tier 1 Indicator):

This indicator measures the percentage of households that experienced food insecurity at moderate and severe levels during the 12 months prior to data collection. The questions refer to the experiences of the individual respondent or of the respondent's household as a whole.

The FIES indicator based on 12-month recall period is the indicator recommended by FAO and GAFSP M&E guidelines. The indicator is based on an estimation of the probability that each household belongs to a specific category of food insecurity severity (moderate and severe), as determined by the household's position on the scale. It is calculated based on the standard set of 8 yes or no questions.

PDO 5. Minimum Dietary Diversity for Women (MDD-W) (GAFSP Tier 1 Indicator)

This indicator need to be restricted to women who are currently pregnant or nursing children, as stated in the Results Framework. The outcome variable of Minimum Dietary Diversity (MDD), which takes value of 1 if the woman consumed 5 out of 10 food groups specified by FAO the previous day or night of interview. The indicator is calculated as a share of women that meet MDD in the numerator, divided by total number of pregnant or nursing women in our sample. This is then multiplied by 100 to get the percentage.

$$MDD(W) = \frac{\textit{the number of pregnant and nursing women who consumed foods and beverages from at least (≥) five food groups during the previous day}}{\textit{the total number of pregnant and nursing women surveyed}} \times 100$$

The 10 food groups are:

1. grains, white roots and tubers
2. pulses (beans, peas and lentils)
3. nuts and seeds
4. dairy
5. meat, poultry and fish
6. eggs
7. dark green leafy vegetables
8. other vitamin A-rich fruits and vegetables
9. other vegetables
10. other fruits

PDO 6. Minimum Dietary Diversity for Children (MDD-C) Children between 6 and 24 months (GAFSP Tier 1 Indicator):

This indicator is measured as percentage of children 6–23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day.

Numerator: Total number of children 6–23 months of age who consumed foods and beverages from at least five out of eight defined food groups during the previous day. The eight food groups used for tabulation of this indicator are: 1) breast milk; 2) grains, roots, tubers and plantains; 3) pulses (beans, peas, lentils), nuts and seeds; 4) dairy products (milk, infant formula, yogurt, cheese); 5) flesh foods (meat, fish, poultry, organ meats); 6) eggs; 7) vitamin-A rich fruits and vegetables; and 8) other fruits and vegetables.

Denominator: Total number of children 6–23 months of age.

Key intermediate result indicators to be assessed during Baseline study are:

1. **Improved Seed Replacement Rate (SRR):** SRR is calculated using the formula

$$SRR = \frac{\text{Area under improved seed}}{\text{total area under crop}} \times 100$$

Area under improved seed is defined as area planted with hybrid or improved seed. Improved seeds are defined as truthfully labelled or certified seeds. Seeds distributed from Government Agency,

Agrovet, or purchased from seed cooperative will be considered improved. Area is calculated in hectares in both numerator and denominator. The final indicator is calculated as the average value of SRR across major crops: paddy, maize, and wheat.

2. **Increased Net farm income:**

This indicator measures the net farm income (total revenue- total cost) for beneficiaries receiving matching grants. Data will be gathered from a representative sample of members of the producer groups that are recipients of matching grants by administrating a questionnaire

3. **Improved Household Dietary diversity score including nursing mothers and children under two years (1000-day mother target):**

This indicator is described as the number of food groups consumed by a 'household' over a given reference period.

The 12 food groups used to calculate the HDDS indicator are: 1) Cereals; 2) Roots & Tubers; 3) Vegetables; 4) Fruits; 5) Meat, Poultry; 6) Eggs; 7) Fish & Seafood; 8) Pulses, legumes, nuts; 9) Milk/milk products; 10) Pils/Fats; 11) Sugar/honey; 12) Miscellaneous.

Each food group is assigned a score of 1 (if consumed over the previous 24 hours) or 0 (if not consumed in the last 24 hours). The household score will range from 0 to 12 and is equal to the total number of food groups consumed by the household:

HDDS = Sum (A + B + C + D + E + F + G + H + I + J + K + L)

The average household dietary diversity score for the population of study can be calculated as follows:

Sum (HDDS) / Total number of households surveyed

The source of data for the HDDS is based on a recall of food groups consumed by the household in the previous 24 hours, reported by the person primarily responsible for food preparation in the household. He/She would answer on behalf of the entire household. The food group, even if consumed by one person in the household, is considered as consumed. In the baseline, the measurement will come through sample survey among all beneficiary HHs of the project participating in the nutrition group.

Additional Indicators to be included in the FANSEP II:

1. **Increase in cropping intensity for crop sub-group; New:** This indicator indicates how intensively a land is being utilized for crop production within a year. This is more important for small and marginal farmers as they have to produce and earn more from the same small piece of land they cultivate. It is measured as a percentage of total area of land they have at their disposal to cultivate (denominator) to the cumulative area of land under different crops in different seasons within a year (Numerator).
2. **Months of Adequate Household Food Provisioning (MAHFP; for food security; New):** It is a proxy measure to assess household food access. : Data for this indicator are collected by first screening out those households that were able to provide for their household food needs throughout the

entire year. Those households that respond positively (i.e., were unable to adequately provide for the household) to the screening question are then asked to identify in which months (during the past 12 months) they did not have access to sufficient food to meet their household needs. The focus of these questions is the months in which there is limited access to food regardless of the source of the food (i.e., purchase, barter, or production). Although the response options start with the month of January, the respondent is asked to think back over the previous 12 months, starting with the current month. If needed, the interviewer may prompt the respondent to think about last month in order to start the process of recall. These questions should be asked of the person who is responsible for food preparation, or if that person is unavailable, of another adult (e.g., the head of the household). The questions refer to the household as a whole, not any single member of the household. It is administered with a standard set of questions.

3. **Food Consumption Score (Already one of the key indicators; has to be elaborated):** The FCS is a composite score based on dietary diversity, food frequency, and relative nutritional importance of different food groups. The FCS is the core indicator of consumption recommended by VAM. The frequency weighted diet diversity score or "Food consumption score" is a score calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey. According to the score obtained, the households and the population is categorized into poor or borderline or acceptable level of food consumption based on the specified threshold score.

Annex II: Details of the surveyed samples by FANSEP groups

Table 59: Details of the surveyed samples by FANSEP groups

Rural Municipalities	Crop group	Livestock group	Nutrition group	Total
Bateshwor	38	25	30	93
Janaknandani	36	30	31	97
Samsi	42	40	39	121
Sonama	52	50	48	150
Chhinnamasta	35	34	33	102
Mahadeva	45	39	45	129
Laxmipur Patari	62	37	27	126
Nawarajpur	37	30	29	96
Galchhi	55	31	34	120
Siddhalek	54	28	32	114
Aarughat	38	39	48	125
Sahid Lakhan	37	38	38	113
Baiteshwor	41	28	33	102
Melung	37	15	42	94
Sunkoshi	36	36	57	129
Tripurasundari	39	10	37	86
Total	684	510	603	1797
Percentage of farmers in groups	38.06	28.38	33.56	100.00

Source: Field Survey, 2025

Annex III: Details of the HHs members of surveyed HHs by respondent types

Table 60: Details of the HHs members of surveyed HHs by respondent types

Type of respondent	Cluster	Less than 5 years	5 - 14 years	15 - 49 years	50 - 69 years	More than 70 years	Cluster Total (N)	Grand Total
Treatment	Dhanusha	295	633	1441	326	105	2800	9358
	Saptari	295	502	1386	334	94	2611	
	Gorkha	161	311	1205	359	140	2176	
	Sindhupalchowk	130	286	1008	257	90	1771	
Comparison	Dhanusha	90	241	572	133	30	1066	3533
	Saptari	90	163	578	134	38	1003	
	Gorkha	19	88	386	155	56	704	
	Sindhupalchowk	20	93	423	173	51	760	
Overall	Dhanusha	385	874	2013	459	135	3866	12891
	Saptari	385	665	1964	468	132	3614	
	Gorkha	180	399	1591	514	196	2880	
	Sindhupalchowk	150	379	1431	430	141	2531	

Source: Field Survey, 2025

Annex IV: Details of the HHs members of surveyed HHs by RMs

Table 61: Details of the HHs members of surveyed HHs by age & RMs

Rural Municipalities	HHs	Less than 5 years	5 - 14 years	15 - 49 years	50 - 69 years	More than 70 years	Total	Family size
Bateshwor	139	66	143	391	118	36	754	5
Janaknandani	151	74	190	433	108	27	832	6
Samsi	170	139	282	577	105	29	1132	7
Sonama	196	106	259	612	128	43	1148	6
Chhinnamasta	150	101	146	475	93	24	839	6
Mahadeva	177	113	213	556	177	39	1098	6
Laxmipur Patari	177	130	162	562	129	53	1036	6
Nawarajpur	136	41	144	371	69	16	641	5
Galchhi	161	40	88	381	121	36	666	4
Siddhalek	154	49	101	444	110	43	747	5
Aarughat	170	45	108	328	143	54	678	4
Sahid Lakhan	159	46	102	438	140	63	789	5
Baiteshwor	150	26	81	313	117	50	587	4
Melung	141	49	116	402	121	37	725	5
Sunkoshi	181	34	97	438	113	29	711	4
Tripurasundari	129	41	85	278	79	25	508	4
Total family members		1100	2317	6999	1871	604	12891	**5**
Total percentage		8.50%	**18%**	**54.30%**	**14.50%**	**4.7%**	**100%**	

Table 62: Details of the HHs members of surveyed HHs by HH Head and RMs

Rural Municipalities	HHs	Male	Female	Other
Bateshwor	139	107	32	0
Janak Nandini	151	118	33	0
Samsi	170	127	43	0
Sonama	196	155	41	0
Chhinnamasta	150	133	17	0
Mahadeva	177	132	45	0
Laxmipur Patari	177	131	46	0
Nawarajpur	136	126	10	0
Galchhi	161	134	27	0
Siddhalek	154	119	35	0
Aarughat	170	125	45	0
Sahid Lakhan	159	126	32	1
Baiteshwor	150	107	43	0
Melung	141	118	23	0
Sunkoshi	181	97	83	1
Tripurasundari	129	104	25	0
Total	2541	1959	580	2
Percentage		77.10%	22.83%	0.08%

Annex V: RM wise education level of the surveyed HHs

Table 63: RM wise education level of the surveyed HHs

Rural Municipalities	Total	No any formal education	Primary level	Basic level Education (up to	Secondary level (grade 9-12)	Bachelor and above	Other	No Level/ Level not clear	Don't know	Total
Bateshwor	688	36%	21%	16%	22%	4%				100%
Janaknandani	758	36%	29%	16%	17%	3%				100%
Samsi	993	55%	19%	8%	14%	1%	2%			100%
Sonama	1042	52%	22%	10%	16%					100%
Chhinnamasta	738	55%	9%	11%	23%	3%				100%
Mahadeva	985	27%	27%	13%	29%	4%	1%			100%
Laxmipur Patari	906	24%	25%	15%	32%	4%				100%
Nawarajpur	600	52%	12%	13%	22%	1%				100%
Galchhi	626	27%	21%	15%	31%	4%		2%		100%
Siddhalek	698	23%	20%	15%	37%	5%				100%
Aarughat	633	35%	22%	15%	23%	4%				100%
Sahid Lakhan	743	23%	20%	14%	37%	6%				100%
Baiteshwor	561	28%	20%	14%	30%	6%		2%		100%
Melung	676	25%	16%	15%	33%	8%		3%		100%
Sunkoshi	677	34%	20%	15%	23%	4%		2%	1%	100%
Tripurasundari	467	33%	24%	20%	24%					100%

Source: Field Survey, 2025

Annex VI: Major occupation of the HHs by treatment and cluster

Table 64: Major occupation of the HHs by treatment and cluster

Major occupation	TREATMENT				
	Dhanusha (N=461)	Saptari (N=453)	Gorkha (N=472)	Sindhupalchowk (N=411)	Treatment Total (N=1797)
Agriculture	62.3%	83.4%	91.9%	91.5%	82.1%
Agriculture and other enterprises	0.0%	0.0%	0.0%	0.0%	0.0%
Business	1.7%	0.9%	1.1%	1.7%	1.3%
Daily Wage	13.4%	5.7%	1.1%	1.2%	5.5%
Foreign Employment (India)	6.7%	1.8%	0.4%	0.0%	2.3%
Foreign Employment (Other country)	8.5%	4.4%	2.1%	1.7%	4.2%
Government Job	0.7%	0.2%	1.1%	0.7%	0.7%
Industry business	0.0%	0.0%	0.0%	0.0%	0.0%
Livestock	3.9%	0.4%	0.2%	1.9%	1.6%
Monthly Wage	1.5%	0.0%	0.6%	0.0%	0.6%
No work	0.7%	2.0%	0.2%	1.0%	0.9%
Non-government or Private job	0.4%	0.4%	0.4%	0.2%	0.4%
Other	0.2%	0.7%	0.8%	0.0%	0.4%
Total	100%	100%	100%	100%	100%
	COMPARISON				
Major occupation	Dhanusha (N=195)	Saptari (N=187)	Gorkha (N=172)	Sindhupalchowk (N=190)	Comparison Total (N=744)
Agriculture	51.3%	74.9%	89.5%	86.8%	75.1%
Agriculture and other enterprises	0.5%	0.0%	0.0%	0.5%	0.3%
Business	2.6%	3.2%	1.7%	0.5%	2.0%
Daily Wage	17.4%	10.2%	1.2%	0.5%	7.5%
Foreign Employment (India)	8.2%	0.5%	0.0%	0.0%	2.3%
Foreign Employment (Other country)	10.8%	2.7%	0.6%	0.0%	3.6%
Government Job	1.5%	1.1%	1.2%	3.2%	1.7%
Industry business	0.0%	0.5%	0.0%	0.5%	0.3%
Livestock	2.6%	0.5%	0.6%	5.8%	2.4%
Monthly Wage	2.6%	1.1%	0.6%	0.0%	1.1%
No work	1.0%	3.2%	3.5%	1.1%	2.2%
Non-government or Private job	1.0%	0.0%	1.2%	0.5%	0.7%
Other	0.5%	2.1%	0.0%	0.5%	0.8%
Total	100%	100%	100%	100%	100%
	OVERALL				
Major occupation	Dhanusha (N=656)	Saptari (N=640)	Gorkha (N=644)	Sindhupalchowk (N=601)	Overall Total (N=2541)
Agriculture	59.0%	80.9%	91.3%	90.0%	80.0%

Agriculture and other enterprises	0.2%	0.0%	0.0%	0.2%	0.1%
Business	2.0%	1.6%	1.2%	1.3%	1.5%
Daily Wage	14.6%	7.0%	1.1%	1.0%	6.1%
Foreign Employment (India)	7.2%	1.4%	0.3%	0.0%	2.3%
Foreign Employment (Other country)	9.1%	3.9%	1.7%	1.2%	4.1%
Government Job	0.9%	0.5%	1.1%	1.5%	1.0%
Industry business	0.0%	0.2%	0.0%	0.2%	0.1%
Livestock	3.5%	0.5%	0.3%	3.2%	1.8%
Monthly Wage	1.8%	0.3%	0.6%	0.0%	0.7%
No work	0.8%	2.3%	1.1%	1.0%	1.3%
Non-government or Private job	0.6%	0.3%	0.6%	0.3%	0.5%
Other	0.3%	1.1%	0.6%	0.2%	0.6%
Total	100%	100%	100%	100%	100%

Source: Field Survey, 2025

Annex VII: Major income sources by treatment and comparison

Table 65: Major income sources by treatment and comparison

Major sources of income	TREATMENT				
	Dhanusha (N=461)	Saptari (N=453)	Gorkha (N=472)	Sindhupalchowk (N=411)	Treatment Total (N=1797)
Agriculture (Farming and Animal Husbandry)	42.1%	53.6%	76.1%	87.1%	64.2%
Daily Wage Labor	19.3%	15.0%	2.8%	3.6%	10.3%
Employment/Job	3.0%	5.3%	6.6%	2.7%	4.5%
Other	0.7%	1.5%	0.8%	0.7%	0.9%
Remittance/Foreign Employment	31.2%	22.1%	9.7%	2.2%	16.6%
Trade/Business	3.7%	2.4%	4.0%	3.6%	3.5%
Total	100%	100%	100%	100%	100%
Major sources of income	COMPARISON				
	Dhanusha (N=195)	Saptari (N=187)	Gorkha (N=172)	Sindhupalchowk (N=190)	Comparison Total (N=744)
Agriculture (Farming and Animal Husbandry)	35.4%	57.2%	83.1%	84.2%	64.4%
Daily Wage Labor	27.2%	18.2%	1.7%	3.7%	13.0%
Employment/Job	4.1%	3.7%	3.5%	3.2%	3.6%
Other	0.0%	2.7%	1.7%	1.6%	1.5%
Remittance/Foreign Employment	27.7%	11.2%	7.0%	0.0%	11.7%
Trade/Business	5.6%	7.0%	2.9%	7.4%	5.8%
Total	100%	100%	100%	100%	100%
	OVERALL				
Major sources of income	Dhanusha (N=656)	Saptari (N=640)	Gorkha (N=644)	Sindhupalchowk N=601)	Overall Total (N=2541)
Agriculture (Farming and Animal Husbandry)	40.1%	54.7%	78.0%	86.2%	64.3%
Daily Wage Labor	21.6%	15.9%	2.5%	3.7%	11.1%
Employment/Job	3.4%	4.8%	5.7%	2.8%	4.2%
Other	0.5%	1.9%	1.1%	1.0%	1.1%
Remittance/Foreign Employment	30.2%	18.9%	9.0%	1.5%	15.2%
Trade/Business	4.3%	3.8%	3.7%	4.8%	4.1%
Total	100%	100%	100%	100%	100%

Source: Field Survey, 2025

Annex VIII: HHs having bank accounts and doing regular savings in BFIs

Table 66: HHs having bank accounts in BFIs

	TREATMENT				
	Dhanusha	**Saptari**	**Gorkha**	**Sindhupalchowk**	**Treatment Total**
N=	**461**	**453**	**472**	**411**	**1797**
Yes	75.3%	72.2%	76.3%	84.7%	76.9%
No	24.7%	27.8%	23.7%	15.3%	23.1%
	COMPARISON				
N=	**195**	**187**	**172**	**190**	**744**
Yes	58.5%	58.8%	71.5%	85.3%	68.4%
No	41.5%	41.2%	28.5%	14.7%	31.6%
	OVERALL				
N=	**656**	**640**	**644**	**601**	**2541**
Yes	70.3%	68.3%	75.0%	84.9%	74.4%
No	29.7%	31.7%	25.0%	15.1%	25.6%

Source: Field Survey, 2025

Table 67: HHs doing regular savings in BFIs

	TREATMENT				
	Dhanusha	**Saptari**	**Gorkha**	**Sindhupalchowk**	**Treatment Total**
N=	**347**	**327**	**360**	**348**	**1382**
Yes	99.4%	98.8%	98.6%	98.9%	98.9%
No	0.6%	1.2%	1.4%	1.1%	1.1%
	COMPARISON				
N=	**114**	**110**	**123**	**162**	**509**
Yes	43.9%	67.3%	87.8%	92.6%	75.0%
No	56.1%	32.7%	12.2%	7.4%	25.0%
	OVERALL				
N=	**461**	**437**	**483**	**510**	**1891**
Yes	85.7%	90.8%	95.9%	96.9%	92.5%
No	14.3%	9.2%	4.1%	3.1%	7.5%

Source: Field Survey, 2025

Annex IX: HH assets with female ownership by treatment and comparison groups

Table 68: HH assets with female ownership by treatment and comparison groups

Assets types	Treatment				
	Dhanusha (N=461	Saptari (N=453)	Gorkha (N=472)	Sindhupalchowk (N=411)	Treatment Total (N=1797)
Both house and land	17.1%	10.8%	17.4%	21.7%	16.6%
House only	2.0%	1.8%	0.8%	1.2%	1.4%
Land only	15.8%	17.2%	9.7%	8.3%	12.9%
Neither house nor land	65.1%	69.1%	70.3%	67.6%	68.1%
	Comparison				
Assets types	Dhanusha (N=195)	Saptari (N=187)	Gorkha (N=172)	Sindhupalchowk (N=190)	Comparison Total (N=744)
Both house and land	17%	10%	26%	22%	18%
House only	5%	1%	2%	0%	2%
Land only	8%	12%	5%	8%	8%
Neither house nor land	70%	76%	67%	69%	71%
	Overall				
Assets types	Dhanusha (N=656)	Saptari (N=640)	Gorkha (N=644)	Sindhupalchowk (N=601)	Overall Total (N=2541)
Both house and land	17.2%	10.5%	19.6%	21.6%	17.2%
House only	2.7%	1.6%	1.1%	0.8%	1.6%
Land only	13.6%	15.6%	8.5%	8.2%	11.5%
Neither house nor land	66.5%	71.3%	69.4%	68.2%	68.8%

Source: Field Survey, 2025

Annex X: Agriculture assets by treatment and comparison groups

Table 69: Agriculture assets by treatment and comparison groups

Agriculture equipment	TREATMENT				
	Dhanusha (N=509)	Saptari (N=652)	Gorkha (N=555)	Sindhupalchowk (N=423)	Treatment Total (N=2139)
Tractor	1.6%	0.6%	0.5%	0.2%	0.7%
Plough	1.2%	4.4%	14.6%	10.6%	7.5%
Animal-drawn cart	0.6%	2.1%	0.0%	0.0%	0.8%
Thresher	0.4%	0.6%	0.5%	1.2%	0.7%
Wheel Barrow	0.4%	0.0%	1.4%	1.4%	0.7%
Hand Pump	6.3%	13.3%	1.6%	0.0%	6.0%
Sprayer	3.1%	8.1%	7.6%	0.7%	5.3%
Grain Storage Bin	0.8%	14.9%	0.7%	0.0%	4.9%
Hand Tractor	0.0%	0.2%	14.4%	13.2%	6.4%
Electric chaff-cutter	1.4%	0.2%	0.0%	0.0%	0.4%
Biogas plant	0.0%	0.2%	1.4%	0.0%	0.4%
Electric Motor	10.2%	19.6%	0.5%	0.0%	8.6%
Other	2.0%	1.2%	19.6%	4.7%	6.9%
No equipment	72.1%	34.5%	36.9%	67.8%	50.7%
Agriculture equipment	COMPARISON				
	Dhanusha (N=204)	Saptari (N=219)	Gorkha (N=189)	Sindhupalchowk (N=194)	Comparison Total (N=806)
Tractor	1.0%	1.4%	0.5%	0.0%	0.7%
Plough	0.5%	1.4%	13.8%	8.8%	5.8%
Animal-drawn cart	0.0%	0.0%	0.0%	0.0%	0.0%
Thresher	0.5%	0.9%	0.0%	1.5%	0.7%
Wheel Barrow	0.0%	0.0%	1.6%	4.6%	1.5%
Hand Pump	2.5%	6.4%	0.5%	0.0%	2.5%
Sprayer	1.5%	4.1%	2.6%	0.0%	2.1%
Grain Storage Bin	0.0%	14.2%	0.0%	0.5%	4.0%
Hand Tractor	0.0%	0.5%	6.9%	12.9%	4.8%
Electric chaff-cutter	2.0%	1.4%	0.0%	0.0%	0.9%
Biogas plant	0.0%	0.0%	1.1%	0.0%	0.2%
Electric Motor	9.3%	13.2%	0.5%	0.0%	6.1%
Other	2.9%	0.9%	21.2%	4.6%	7.1%
No equipment	79.9%	55.7%	51.3%	67.0%	63.5%
Agriculture equipment	OVERALL				
	Dhanusha (N=713)	Saptari (N=871)	Gorkha (N=744)	Sindhupalchowk (N=617)	Overall Total (N=2945)
Tractor	1.4%	0.8%	0.5%	0.2%	0.7%

Plough	1.0%	3.7%	14.4%	10.0%	7.1%
Animal-drawn cart	0.4%	1.6%	0.0%	0.0%	0.6%
Thresher	0.4%	0.7%	0.4%	1.3%	0.7%
Wheel Barrow	0.3%	0.0%	1.5%	2.4%	1.0%
Hand Pump	5.2%	11.6%	1.3%	0.0%	5.0%
Sprayer	2.7%	7.1%	6.3%	0.5%	4.4%
Grain Storage Bin	0.6%	14.7%	0.5%	0.2%	4.7%
Hand Tractor	0.0%	0.2%	12.5%	13.1%	6.0%
Electric chaff-cutter	1.5%	0.5%	0.0%	0.0%	0.5%
Biogas plant	0.0%	0.1%	1.3%	0.0%	0.4%
Electric Motor	10.0%	18.0%	0.5%	0.0%	7.9%
Other	2.2%	1.1%	20.0%	4.7%	6.9%
No equipment	74.3%	39.8%	40.6%	67.6%	54.2%

Source: Field Survey, 2025

Annex XI: Cultivated area, production & productivity-treatment and comparison groups

Table 70: Cultivated area, production and productivity by treatment and comparison groups

			Dhanusha	Gorkha	Saptari	Sindhupalchowk	Overall
TREATMENT	TOTAL	Production	1145.09	440.75	959.49	437.87	2983.20
		Cultivated Area (ha)	300.90	170.16	325.60	194.83	991.49
		Productivity (Mt/ha)	3.81	2.59	2.95	2.25	3.01
	Food Grains	Production	627.03	315.28	894.45	213.95	2050.71
		Cultivated Area (ha)	243.05	133.38	306.23	132.60	815.26
		Productivity (Mt/ha)	2.58	2.36	2.92	1.61	2.52
	Vegetables	Production	58.56	90.33	42.72	172.90	364.51
		Cultivated Area (ha)	4.91	15.40	6.10	22.20	48.60
		Productivity (Mt/ha)	11.94	5.87	7.00	7.79	7.50
COMPARISON	TOTAL	Production	278.57	121.09	365.92	182.84	948.41
		Cultivated Area (ha)	80.71	53.14	121.34	82.15	337.35
		Productivity (Mt/ha)	3.45	2.28	3.02	2.23	2.81
	Food Grains	Production	144.52	92.23	352.10	117.47	706.32
		Cultivated Area (ha)	66.12	42.93	116.54	67.78	293.37
		Productivity (Mt/ha)	2.19	2.15	3.02	1.73	2.41
	Vegetables	Production	5.07	21.12	7.71	57.67	91.56
		Cultivated Area (ha)	0.68	4.45	0.88	7.00	13.01
		Productivity (Mt/ha)	7.42	4.74	8.77	8.24	7.04
TOTAL	TOTAL	Production	1423.65	561.83	1325.40	620.71	3931.61
		Cultivated Area (ha)	381.61	223.30	446.94	276.99	1328.84
		Productivity (Mt/ha)	3.73	2.52	2.97	2.24	2.96
	Food Grains	Production	771.55	407.52	1246.55	331.42	2757.03
		Cultivated Area (ha)	309.16	176.31	422.78	200.37	1108.62
		Productivity (Mt/ha)	2.50	2.31	2.95	1.65	2.49
	Vegetables	Production	63.63	111.45	50.43	230.57	456.07
		Cultivated Area (ha)	5.59	19.85	6.98	29.19	61.61
		Productivity (Mt/ha)	11.38	5.61	7.22	7.90	7.40

Source: Field Survey, 2025

Annex XII: Production and productivity by various crops

Table 71: Production and productivity by various crops

Crops	No. of Unique HH	Total Production (Mt.)			Cultivated Area (ha)			Productivity (Mt/ha)		
		Total	Treatment	Comparison	Total	Treatment	Comparison	Total	Treatment	Comparison
Cereal crops										
Spring paddy	87	39.89	33.39	6.50	12.43	10.61	1.83	3.21	3.15	3.56
Summer paddy	1712	1787.98	1313.91	474.06	598.80	433.76	165.04	2.99	3.03	2.87
Wheat	970	643.68	490.31	153.37	330.66	247.48	83.18	1.95	1.98	1.84
Spring maize	363	121.74	93.83	27.91	77.55	58.91	18.64	1.57	1.59	1.50
Summer maize	478	145.38	103.80	41.58	85.85	61.77	24.08	1.69	1.68	1.73
Winter maize	110	58.27	48.87	9.40	15.76	13.34	2.42	3.70	3.66	3.89
Millet	362	56.51	46.48	10.04	55.97	45.87	10.10	1.01	1.01	0.99
Buckwheat	3	0.08	0.03	0.05	0.10	0.05	0.05	0.71	0.46	0.98
Pulses and Legume										
Bean	52	28.86	24.28	4.58	4.83	4.09	0.73	5.98	5.93	6.26
Black gram	17	1.39	1.19	0.21	2.56	2.00	0.56	0.54	0.59	0.37
Lentil	188	18.64	15.48	3.16	27.06	21.89	5.18	0.69	0.71	0.61
Mung bean	74	10.55	8.69	1.86	16.78	13.36	3.42	0.63	0.65	0.54
Peas	72	42.84	40.55	2.28	6.83	5.05	1.79	6.27	8.03	1.28
Soyabean	8	0.21	0.16	0.05	4.59	4.49	0.10	0.04	0.03	0.49
Oil Seed Crops										
Mustard	78	4.00	3.26	0.74	8.84	6.95	1.89	0.45	0.47	0.39
Vegetables										
Bitter gourd	8	3.59	3.50	0.09	0.32	0.32	0.01	11.08	11.05	12.57
Bottle gourd	18	15.69	6.04	9.65	1.61	0.57	1.04	9.72	10.54	9.27
Brinjal	5	3.82	2.28	1.54	0.38	0.31	0.07	10.03	7.37	21.63
Cabbage	7	4.32	3.91	0.41	0.39	0.34	0.05	10.99	11.54	7.55
Cauliflower	15	11.30	9.14	2.17	0.93	0.68	0.25	12.16	13.42	8.70
Cucumber	23	8.99	6.49	2.51	0.85	0.56	0.29	10.54	11.52	8.64
Lady's finger	15	2.65	1.37	1.28	0.28	0.16	0.12	9.58	8.62	10.90
Mustard leaf	10	1.10	0.98	0.12	0.15	0.14	0.01	7.32	7.12	9.43
Pumpkin	11	2.61	2.20	0.41	0.26	0.21	0.05	9.88	10.38	7.87
Radish	13	4.03	3.73	0.30	1.14	1.09	0.05	3.53	3.42	5.89
Sponge gourd	23	11.62	11.09	0.53	0.90	0.84	0.06	12.97	13.23	9.14
Tomato	33	30.45	28.42	2.03	2.60	2.44	0.16	11.73	11.67	12.73
Summer potato	100	193.93	146.51	47.42	18.95	14.25	4.71	10.23	10.28	10.07
Winter potato	109	86.09	70.62	15.47	7.74	6.11	1.63	11.12	11.55	9.49

Source: Field Survey, 2025

Annex XIII: Production and productivity by FANSEP II group

Table 72: Production and productivity by FANSEP II group

Crops	No. of Unique HH	Total Production (Mt)		Cultivated area (ha)		Productivity (Mt/Ha)	
		Total	Crop	Total	Crop	Total	Crop
Spring paddy	87	39.89	12.76	12.43	4.18	3.21	3.05
Summer paddy	1712	1787.98	605.33	598.80	197.85	2.99	3.06
Wheat	970	643.68	231.17	330.66	114.47	1.95	2.02
Spring maize	363	121.74	33.83	77.55	21.65	1.57	1.56
Summer maize	478	145.38	49.45	85.85	33.69	1.69	1.47
Winter maize	110	58.27	18.78	15.76	5.08	3.70	3.70
Millet	362	56.51	16.16	55.97	23.95	1.01	0.67
Buckwheat	3	0.08	0.00	0.10	0.00	0.71	-
Pulses and Legumes							
Bean	52	28.86	15.72	4.83	2.70	5.98	5.83
Black gram	17	1.39	0.19	2.56	0.32	0.54	0.57
Lentil	188	18.64	8.35	27.06	11.98	0.69	0.70
Mung bean	74	10.55	5.07	16.78	7.06	0.63	0.72
Peas	72	42.84	27.93	6.83	2.87	6.27	9.72
Soyabean	8	0.21	0.07	4.59	0.15	0.04	0.46
Oil Seed Crops							
Mustard	78	4.00	0.92	8.84	3.30	0.45	0.28
Vegetables							
Bitter gourd	8	3.59	2.85	0.32	0.26	11.08	10.88
Bottle gourd	18	15.69	1.37	1.61	0.16	9.72	8.44
Brinjal	5	3.82	2.25	0.38	0.30	10.03	7.40
Cabbage	7	4.32	0.00	0.39	0.00	10.99	-
Cauliflower	15	11.30	5.31	0.93	0.36	12.16	14.59
Cucumber	23	8.99	2.02	0.85	0.17	10.54	12.03
Lady's finger	15	2.65	1.12	0.28	0.13	9.58	8.84
Mustard leaf	10	1.10	0.53	0.15	0.09	7.32	5.90
Pumpkin	11	2.61	0.80	0.26	0.07	9.88	11.55
Radish	13	4.03	2.45	1.14	0.94	3.53	2.60
Sponge gourd	23	11.62	6.02	0.90	0.57	12.97	10.58
Tomato	33	30.45	10.15	2.60	1.00	11.73	10.14
Summer potato	100	193.93	72.41	18.95	7.71	10.23	9.39
Winter potato	109	86.09	29.05	7.74	3.12	11.12	9.30

Source: Field Survey, 2025

Annex XIV: Livestock herd possession in past 12 months

Table 73: Livestock herd possession in past 12 months

Groups	Animals	Description	Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
OVERALL	Cow	Total number of animals	962	150	300	276	236
		HHs rearing animals	561	85	196	144	136
		Average number of animals per HH	1.71	1.76	1.53	1.92	1.74
	Buffalo	Total number of animals	1312	275	230	490	317
		HHs rearing animals	894	185	178	306	225
		Average number of animals per HH	1.47	1.49	1.29	1.60	1.41
	Goat/ Sheep	Total number of animals	9980	1514	958	3982	3526
		HHs rearing animals	1551	323	303	489	436
		Average number of animals per HH	6.43	4.69	3.16	8.14	8.09
	Chicken	Total number of animals	4812	229	3	2435	2145
		HHs rearing animals	440	17	2	214	207
		Average number of animals per HH	10.94	13.47	1.50	11.38	10.36
TREATMENT	Cow	Total number of animals	713	119	233	202	159
		HHs rearing animals	407	65	150	103	89
		Average number of animals per HH	1.75	1.83	1.55	1.96	1.79
	Buffalo	Total number of animals	970	216	165	366	223
		HHs rearing animals	668	145	127	233	163
		Average number of animals per HH	1.45	1.49	1.30	1.57	1.37
	Goat/ Sheep	Total number of animals	7561	1170	745	3151	2495
		HHs rearing animals	1150	239	238	371	302
		Average number of animals per HH	6.57	4.90	3.13	8.49	8.26
	Chicken	Total number of animals	4033	193	2	2104	1734
		HHs rearing animals	354	12	1	178	163
		Average number of animals per HH	11.39	16.08	2.00	11.82	10.64
COMPARISON	Cow	Total number of animals	249	31	67	74	77
		HHs rearing animals	154	20	46	41	47
		Average number of animals per HH	1.62	1.55	1.46	1.80	1.64
	Buffalo	Total number of animals	342	59	65	124	94
		HHs rearing animals	226	40	51	73	62
		Average number of animals per HH	1.51	1.48	1.27	1.70	1.52
	Goat/ Sheep	Total number of animals	2419	344	213	831	1031
		HHs rearing animals	401	84	65	118	134
		Average number of animals per HH	6.03	4.10	3.28	7.04	7.69
	Chicken	Total number of animals	779	36	1	331	411
		HHs rearing animals	86	5	1	36	44
		Average number of animals per HH	9.06	7.20	1.00	9.19	9.34

Annex XV: Current livestock herd possession

Table 74: Current livestock herd possession

Groups	Animals	Description	Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
OVERALL	Cow	Total number of animals	855	119	268	260	208
		HHs rearing animals	561	85	196	144	136
		Average number of animals per HH	1.52	1.40	1.37	1.81	1.53
	Buffalo	Total number of animals	1174	254	191	438	291
		HHs rearing animals	894	185	178	306	225
		Average number of animals per HH	1.31	1.37	1.07	1.43	1.29
	Goat/Sheep	Total number of animals	8678	1199	751	3642	3086
		HHs rearing animals	1551	323	303	489	436
		Average number of animals per HH	5.60	3.71	2.48	7.45	7.08
	Chicken	Total number of animals	4082	168	3	2178	1733
		HHs rearing animals	440	17	2	214	207
		Average number of animals per HH	9.28	9.88	1.50	10.18	8.37
TREATMENT	Cow	Total number of animals	628	95	206	190	137
		HHs rearing animals	407	65	150	103	89
		Average number of animals per HH	1.54	1.46	1.37	1.84	1.54
	Buffalo	Total number of animals	872	201	135	331	205
		HHs rearing animals	668	145	127	233	163
		Average number of animals per HH	1.31	1.39	1.06	1.42	1.26
	Goat/Sheep	Total number of animals	6440	903	562	2799	2176
		HHs rearing animals	1150	239	238	371	302
		Average number of animals per HH	5.60	3.78	2.36	7.54	7.21
	Chicken	Total number of animals	3406	143	2	1850	1411
		HHs rearing animals	354	12	1	178	163
		Average number of animals per HH	9.62	11.92	2.00	10.39	8.66
COMPARISON	Cow	Total number of animals	227	24	62	70	71
		HHs rearing animals	154	20	46	41	47
		Average number of animals per HH	1.47	1.20	1.35	1.71	1.51
	Buffalo	Total number of animals	302	53	56	107	86
		HHs rearing animals	226	40	51	73	62
		Average number of animals per HH	1.34	1.33	1.10	1.47	1.39
	Goat/Sheep	Total number of animals	2238	296	189	843	910
		HHs rearing animals	401	84	65	118	134
		Average number of animals per HH	5.58	3.52	2.91	7.14	6.79
	Chicken	Total number of animals	676	25	1	328	322
		HHs rearing animals	86	5	1	36	44
		Average number of animals per HH	7.86	5.00	1.00	9.11	7.32

Annex XVI: Breed types of animals by treatment and comparison groups

Table 75: Breed types of animals by treatment and comparison groups

Groups	Animal	Breed of animal	Current Possession				
			Total	Dhanusha	Saptari	Gorkha	Sindhupalchowk
OVERALL	Cow	Local Breed	667	80	196	213	178
	Cow	Cross Breed	56	18	11	5	22
	Cow	Don't know	133	21	61	42	9
	Buffalo	Local Breed	940	194	136	356	254
	Buffalo	Cross Breed	33	0	4	13	16
	Buffalo	Don't know	201	60	51	69	21
	Goat/Sheep	Local Breed	7201	917	499	2982	2803
	Goat/Sheep	Cross Breed	235	1	0	9	225
	Goat/Sheep	Don't know	1255	281	252	651	71
	Chicken	Local Breed	2198	135	1	1016	1046
	Chicken	Cross Breed	1820	0	0	926	894
	Chicken	Don't know	397	33	2	311	51
TREATMENT	Cow	Local Breed	482	62	150	152	118
	Cow	Cross Breed	36	12	9	4	11
	Cow	Don't know	110	21	47	34	8
	Buffalo	Local Breed	693	155	97	262	179
	Buffalo	Cross Breed	23	0	0	13	10
	Buffalo	Don't know	156	46	38	56	16
	Goat/Sheep	Local Breed	5327	695	372	2319	1941
	Goat/Sheep	Cross Breed	195	1	0	4	190
	Goat/Sheep	Don't know	929	207	190	476	56
	Chicken	Local Breed	1734	110	0	813	811
	Chicken	Cross Breed	1585	0	0	796	789
	Chicken	Don't know	375	33	2	293	47
COMPARISON	Cow	Local Breed	185	18	46	61	60
	Cow	Cross Breed	20	6	2	1	11
	Cow	Don't know	23	0	14	8	1
	Buffalo	Local Breed	247	39	39	94	75
	Buffalo	Cross Breed	10	0	4	0	6
	Buffalo	Don't know	45	14	13	13	5
	Goat/Sheep	Local Breed	1874	222	127	663	862
	Goat/Sheep	Cross Breed	40	0	0	5	35
	Goat/Sheep	Don't know	326	74	62	175	15
	Chicken	Local Breed	464	25	1	203	235
	Chicken	Cross Breed	235	0	0	130	105
	Chicken	Don't know	22	0	0	18	4

Source: Field Survey, 2025

Annex XVII: Type of technologies with the number of HHs adopting

Table 76: Type of technologies with the number of HHs adopting

Type	Technology	No. of respondents (N)	No. of respondent adopted technology	Since 6 months ago (A)	Since 6 months to 1 year ago (B)	Since last 2 years (C)	Others (more than two yrs & don't know) (D)	Baseline adoption rate
Agriculture technology	Crop insurance	2541	0	0	0	0	0	0.00
	Mulching	2541	305	5	11	12	277	0.12
	Row/line planting	2541	370	14	16	16	324	0.14
	Crop diversification (intercrop/mixed crop etc.)	2541	237	0	6	7	224	0.09
	Conservation tillage/minimum tillage	2541	129	0	2	0	127	0.05
	Hermetic grain bag/tin/metal container storage	2541	127	1	11	23	92	0.05
	Pest/disease control during storage	2541	79	4	7	9	59	0.03
	Improved crop varieties	2541	448	3	21	26	398	0.18
	Botanical pesticide (liquid manure)	2541	33	1	3	6	23	0.01
	Bio pesticide	2541	19	0	2	4	13	0.01
	Improved composting/livestock urine use	2541	55	4	5	5	41	0.02
	Plastic house/tunnel farming	2541	68	4	2	19	43	0.03
	Insect traps (pheromone, food, electric)	2541	14	1	1	2	10	0.01
	Drought/flood resistant crops	2541	4	0	0	0	4	0.00
	Leaf Color Chart for urea application	2541	1	0	0	0	1	0.00
	Drip or sprinkler irrigation	2541	197	1	5	10	181	0.08
	Rainwater harvesting/use of excess water	2541	53	23	0	4	26	0.01
Livestock technology	Urea Molasses Mineral Block (UMMB) feeding in goat and dairy animals	2541	49	3	3	7	36	0.02
	Use of Ivermectin to control internal and external parasites of goat	2541	126	4	4	14	104	0.05
	Practice of rearing crossbred Boer goat at farmers' field condition	2541	3	0	0	0	3	0.00
	Inclusion of legumes with other green forages in feeding livestock for better performance	2541	226	3	11	10	202	0.09
	Teat dipping with the Povidone Iodine solution to prevent mastitis	2541	25	2	3	2	18	0.01
	Castration of bucks around three months of their age	2541	324	6	16	12	290	0.13
	Vaccination against Peste des Petits Ruminants (PPR) disease in goat	2541	183	29	32	37	85	0.06
	Vaccination against Foot and Mouth Disease (FMD), Haemorrhagic Septicaemia (HS) and Black Quarter (BQ) in dairy animals and goat	2541	38	2	10	10	16	0.01

	Vaccination against New Castle Disease (NCD) in chicken	2541	18	0	2	4	12	0.01
	Use of artificial insemination (AI) technique in animal breeding.	2541	123	8	17	4	94	0.05
	Improvement of animal shed with manure and urine management	2541	28	0	1	3	24	0.01
	Stall feeding practices in livestock farming	2541	208	4	3	4	197	0.08
	Feeding goats with additional concentrate during the breeding season (flushing)	2541	15	3	1	2	9	0.00

Source: Field Survey, 2025

Annex XVIII: Productivity of crops and vegetable by project RMs

Table 77: Productivity of crops and vegetable by project RMs

Rural Municipality	PRODUCTIVITY(Mt/Ha)								
	TREATMENT			COMPARISON			TOTAL		
	Total	Food Grains	Vegetables	Total	Food Grains	Vegetables	Total	Food Grains	Vegetables
Galchhi	2.88	2.38	6.15	2.39	2.23	5.55	2.77	2.34	6.09
Siddhalek	2.55	2.07	8.41	2.85	1.82	5.94	2.61	2.03	7.36
Baiteshwor	2.50	1.72	10.02	2.22	1.48	8.32	2.42	1.65	9.52
Melung	2.50	1.93	11.87	2.61	2.06	7.70	2.54	1.98	10.09
Sunkoshi	2.62	2.17	8.15	2.61	2.19	8.62	2.62	2.18	8.32
Tripurasundari	1.19	0.38	4.41	0.95	0.88	9.49	1.14	0.53	4.52
Aarughat	3.60	3.54	5.49	2.96	2.90	10.48	3.43	3.37	6.30
Sahid Lakhan	1.86	1.82	3.29	1.56	1.71	1.74	1.78	1.79	2.91
Bateshwor	3.72	1.86	23.93	2.72	1.96	7.80	3.38	1.90	21.09
Janaknandani	1.92	2.27	6.19	1.62	1.81	9.05	1.83	2.12	6.62
Samsi	2.54	2.05	2.97	1.64	1.70	0.12	2.41	1.99	2.87
Sonama	5.56	3.26	3.30	7.67	3.25	0.12	5.86	3.26	3.18
Chhinnamasta	3.33	3.34	6.71	3.35	3.34	8.14	3.34	3.34	6.85
Mahadeva	2.87	2.87	5.66	2.87	2.87	7.41	2.87	2.87	5.84
Laxmipur Patari	2.63	2.47	8.43	2.42	2.42	9.75	2.56	2.46	8.65
Nawarajpur	2.53	2.49	8.32	3.50	3.50		2.79	2.76	8.32
Overall Productivity	**3.01**	**2.52**	**7.50**	**2.81**	**2.41**	**7.04**	**2.96**	**2.49**	**7.40**

Source: Field Survey, 2025

Annex XIX: Milk productivity per lactating period by RMs

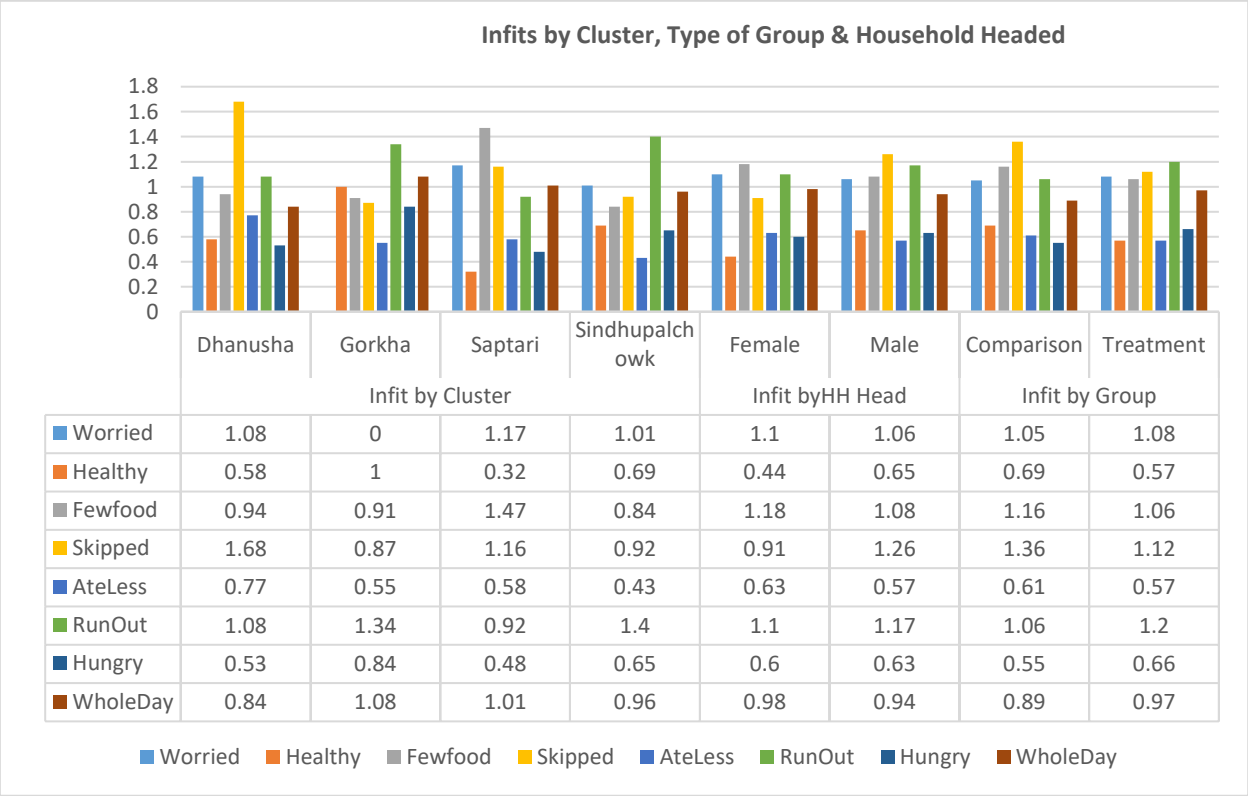
Table 78: Milk productivity per lactating period by RMs

Rural Municipality	TREATMENT			COMPARISON			TOTAL		
	Total	Lactating Cow	Lactating Buffalo	Total	Lactating Cow	Lactating Buffalo	Total	Lactating Cow	Lactating Buffalo
Galchhi	1,230.04	1,218.13	1,235.05	1,292.78	1,215.00	1,315.00	1,245.72	1,217.50	1,256.58
Siddhalek	1,025.56	630.00	1,138.57	887.50	420.00	1,043.33	983.08	560.00	1,110.00
Baiteshwor	1,057.80	592.50	1,204.74	944.23	855.00	983.89	1,018.95	697.50	1,133.75
Melung	846.68	653.89	954.41	1,125.36	1,005.45	1,202.94	943.01	782.80	1,037.25
Sunkoshi	1,281.67	1,580.00	1,182.22	722.00	560.00	762.50	1,117.06	1,325.00	1,053.08
Tripurasundari	492.50	336.67	586.00	276.67	280.00	270.00	433.64	314.00	533.33
Aarughat	584.64	434.30	650.00	816.25	535.00	835.00	660.27	443.45	723.03
Sahid Lakhan	895.29	442.50	941.73	944.44	135.00	1,045.63	903.80	381.00	959.41
Bateshwor	1,827.94	1,417.50	1,954.23	996.00	880.00	1,170.00	1,638.86	1,187.14	1,849.67
Janaknandani	709.68	680.87	792.50	522.22	457.50	574.00	667.50	647.78	708.46
Samsi	1,114.62	1,028.75	1,152.78	1,040.00	1,002.50	1,090.00	1,098.79	1,020.00	1,143.81
Sonama	1,142.73	770.00	1,194.14	1,165.71		1,165.71	1,146.75	770.00	1,188.61
Chhinnamasta	968.49	827.00	1,165.00	1,132.92	877.86	1,490.00	1,004.36	838.13	1,235.65
Mahadeva	905.03	653.93	1,174.72	1,019.20	872.06	1,331.88	940.27	734.54	1,210.64
Laxmipur Patari	1,006.90	838.89	1,132.92	1,018.00	750.00	1,085.00	1,009.04	830.00	1,120.94
Nawarajpur	1,193.06	986.25	1,358.50	847.78	607.50	916.43	1,077.96	910.50	1,176.47
Overall Productivity	**980.20**	**765.43**	**1,100.96**	**973.15**	**821.85**	**1,060.00**	**978.31**	**780.70**	**1,090.04**

Source: Field Survey, 2025

Annex XX: Food Insecurity Experience Scale

Infit by Cluster, Type of Group, RM, and Household Headed



	Dhanusha	Gorkha	Saptari	Sindhupalchowk	Female	Male	Comparison	Treatment
	Infit by Cluster				Infit byHH Head		Infit by Group	
Worried	1.08	0	1.17	1.01	1.1	1.06	1.05	1.08
Healthy	0.58	1	0.32	0.69	0.44	0.65	0.69	0.57
Fewfood	0.94	0.91	1.47	0.84	1.18	1.08	1.16	1.06
Skipped	1.68	0.87	1.16	0.92	0.91	1.26	1.36	1.12
AteLess	0.77	0.55	0.58	0.43	0.63	0.57	0.61	0.57
RunOut	1.08	1.34	0.92	1.4	1.1	1.17	1.06	1.2
Hungry	0.53	0.84	0.48	0.65	0.6	0.63	0.55	0.66
WholeDay	0.84	1.08	1.01	0.96	0.98	0.94	0.89	0.97

Figure 7: Infit by household head

Infit Table by cluster, HH head and comparison and treatment groups

Table 79: Infit Table by cluster, HH head, and comparison and treatment groups

FIES Parameters	Infit by Cluster				Infit by HH Head		Infit by Group	
	Dhanusha	Gorkha	Saptari	Sindhupalchowk	Female	Male	Comparison	Treatment
Worried	1.08	0	1.17	1.01	1.1	1.06	1.05	1.08
Healthy	0.58	1	0.32	0.69	0.44	0.65	0.69	0.57
Few food	0.94	0.91	1.47	0.84	1.18	1.08	1.16	1.06
Skipped	1.68	0.87	1.16	0.92	0.91	1.26	1.36	1.12
Ate Less	0.77	0.55	0.58	0.43	0.63	0.57	0.61	0.57
RunOut	1.08	1.34	0.92	1.4	1.1	1.17	1.06	1.2
Hungry	0.53	0.84	0.48	0.65	0.6	0.63	0.55	0.66
Whole Day	0.84	1.08	1.01	0.96	0.98	0.94	0.89	0.97

Annex XXI: Technological options and perceived knowledge on agriculture sector

Table 80: Technological options and knowledge of farmers-agriculture sector (T1)

Questions/options	Percentage of total share of the options for both treatment and comparison)	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalch owk	Dhanusha	Saptari	Gorkha	Sindhupalch
H.1.1 Which of the following is most important to reduce greenhouse gas emissions from paddy farming?										
cultivate paddy without ploughing the field	6%	140	11	13	46	26	3	14	15	12
Don't know	67%	1708	350	393	252	207	163	143	108	92
Reduce use of chemical fertilizers	20%	518	81	44	76	166	25	29	23	74
Reduce use of chemical pesticides for pest management	7%	175	19	3	98	12	4	1	26	12
H.1.2 What is the most important task to be done in the Panicle Initiation Stage of rice cultivation?										
Apply additional nitrogen fertilizer (top dressing)	22%	548	57	39	118	180	19	14	33	88
Don't Know	41%	1054	220	215	199	112	107	73	87	41
Irrigation	28%	720	156	175	96	82	53	90	27	41
Mixing	9%	219	28	24	59	37	16	10	25	20
H.1.3 What is meant by "quality seed"?										
Any seed obtained from a shop	15%	380	70	19	67	107	38	13	13	53
Any seeds used for planting	12%	301	27	26	107	63	12	8	26	32
Don't know	42%	1056	219	254	175	100	96	80	84	48
Genetically pure, vigorous, disease resistant seeds	32%	804	145	154	123	141	49	86	49	57
H.1.4 Why is crop rotation necessary?										
Don't know	62%	1579	326	358	248	170	152	140	106	79
It is easier for the farmer to harvest	11%	273	57	17	84	51	19	5	18	22
The crop will use less water	7%	170	18	37	59	14	9	14	13	6
To reduce weeds and disease spread and improve nutrient use	20%	519	60	41	81	176	15	28	35	83
H.1.5 Which of the following statements about animal urine is/are true?										
Don't know	60%	1527	355	338	189	174	166	144	76	85
The use of animal urine in the field is not practically feasible	11%	267	24	43	80	50	8	16	32	14
There is no relationship between animal urine and crop nutrients	5%	138	19	38	28	22	6	9	10	6
Urea can be a good alternative to top dressing if animal urine is used properly in vegetable crops	24%	609	63	34	175	165	15	18	54	85
H.1.6 What is meant by farmyard manure improvement?										
Do not use animal urine	4%	110	8	25	35	13	2	10	11	6
Don't know	45%	1135	239	315	121	106	126	127	60	41

Questions/options	Percentage of total share of the options for both treatment and comparison)	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalch owk	Dhanusha	Saptari	Gorkha	Sindhupalch
Let it dry in the sun	12%	312	73	32	75	30	31	14	26	31
Protect it from the sun, rain, and water	39%	984	141	81	241	262	36	36	75	112
H.1.7 What is the best time to dig for potatoes?										
Anytime while the potato tuber are growing	15%	381	90	37	93	69	40	8	20	24
As soon as the tuber start appearing on the potatoes	27%	684	108	152	96	140	32	61	35	60
Don't know	40%	1026	192	230	181	94	107	98	75	49
When the flowers begin to bloom	13%	327	61	29	50	90	11	17	27	42
Whenever the farmer has free time	5%	123	10	5	52	18	5	3	15	15
H.1.8 What should be done to reduce the problem of potato blight?										
Advanced varieties that can tolerate blight should be cultivated	17%	439	61	32	57	135	26	25	30	73
Don't know	70%	1767	367	391	315	196	159	146	109	84
Potatoes should be planted in the shade.	9%	220	26	20	49	61	8	11	22	23
There is nothing that can be done.	5%	115	7	10	51	19	2	5	11	10
H.1.9 Name a drought tolerant variety of paddy.										
Don't know	79%	1999	354	357	359	357	154	131	134	153
Hardinath 3	10%	258	44	57	57	20	14	39	17	10
Sukha dhan 3	6%	140	49	20	19	8	20	9	8	7
Sukha dhan 4	3%	64	11	7	16	11	2	3	4	10
Sukha dhan 6	3%	80	3	12	21	15	5	5	9	10
H.1.10 What is the variety of potato that is resistant to disease?										
Cardinal	4%	94	6	5	27	27	8	2	8	11
Don't know	87%	2213	433	426	381	326	176	179	142	150
Janakdev	4%	91	20	4	32	17	10	1	3	4
Khumal Bikas	3%	86	1	2	21	28	1	0	14	19
M.S. 42-3	2%	57	1	16	11	13	0	5	5	6
H.1.11 Why is it necessary to top dress nitrogenous fertilizers (such as urea) on crops?										
All of the above	9%	224	44	29	35	60	20	9	12	15
Don't know	69%	1759	375	398	282	179	166	164	112	83
Mineralization happens fast but the plant is slow to absorb it	13%	331	29	20	109	77	5	8	41	42
This nutrient is slow to mineralize but the plant needs to absorb it quickly	9%	227	13	6	46	95	4	6	7	50
H.1.12 Which of the following soil types has higher water holding capacity?										

Questions/options	Percentage of total share of the options for both treatment and comparison)	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalch owk	Dhanusha	Saptari	Gorkha	Sindhupalch
Don't know	33%	845	163	214	137	73	91	91	50	26
Loamy soil with abundant organic matter	24%	617	84	37	100	211	21	15	54	95
Pinched soil	27%	679	113	178	165	38	46	74	51	14
Sandy loam	16%	400	101	24	70	89	37	7	17	55
H.1.13 In which of the following conditions of paddy crop is it important to top dress with nitrogenous fertilizer?										
Don't know	46%	1178	227	267	206	125	114	100	82	57
In case of rusting and cracking	33%	836	180	72	156	176	57	60	53	82
Only in the case of rust	13%	340	38	80	66	71	9	18	25	33
When there is lower than normal rain	7%	187	16	34	44	39	15	9	12	18

Source: Field Survey, 2025

Annex XXII: Technological options and perceived knowledge on livestock sector

Table 81: Technological options and knowledge of farmers on livestock sector (T3)

Questions/options	Percentage of total share of the options for both treatment and comparison)	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
H.1.15 Which of the following measures is useful for increasing milk productivity of cows?										
Always graze the cows in the same place	6%	141	16	34	38	19	5	9	11	9
Breed calves at an early age	6%	147	10	20	39	22	9	10	19	18
Don't know	33%	842	190	154	158	84	112	56	56	32
Include nutritious grasses in the diet of animals	56%	1411	245	245	237	286	69	112	86	131
H.1.16 What technology can be used to increase productivity of cow and buffalo calves?										
Artificial insemination	18%	444	82	57	43	134	31	33	13	51
Don't know	58%	1447	305	323	261	145	139	133	78	63
Using a local breed of bull	17%	432	59	6	126	100	21	3	56	61
Using related bull	7%	178	9	44	42	32	4	8	24	15
H.1.17 Why should goats be fed more nutritious food one month before breeding?										
Don't know	50%	1271	224	262	232	162	126	117	79	69
To be able to breed the offspring at an earlier age	6%	165	15	41	36	33	2	10	15	13
To provide nutrients for the fetus	39%	1000	218	139	162	200	65	53	65	98
To reduce the average gestation period of mother goat	4%	105	4	11	42	16	2	7	13	10
H.1.18 What are the benefits of a stall-feeding goat-rearing system?										
Don't know	58%	1482	306	329	292	131	141	124	98	61
Goats are stronger and heavier	21%	525	70	98	80	126	28	51	25	47
Goats get plenty of physical exercise	6%	142	11	6	17	58	3	5	7	35
Protects goats from contagious diseases from mutual contact in grazing areas	15%	392	74	20	83	96	23	7	42	47
H.1.19 What should be considered while feeding urea molasses mineral block to animals?										
Animals that are close to calving (later stages of pregnancy) should not be fed	7%	175	12	26	33	59	4	3	15	23
Don't know	83%	2100	427	410	393	254	182	179	141	114
If the animal likes it, it can be fed completely	4%	106	12	15	34	19	5	5	11	5
Water should not be fed	6%	160	10	2	12	79	4	0	5	48

Questions/options	Percentage of total share of the options for both treatment and comparison)	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
while feeding UMB block										
H.1.20 What type of grass is suitable for planting in places where there is a problem of waterlogging in the soil?										
Barseem	5%	124	40	12	22	11	15	9	6	9
Don’t know	69%	1760	233	375	367	281	114	134	145	111
Napier	23%	576	167	57	64	112	54	39	17	66
Paragrass	3%	81	21	9	19	7	12	5	4	4
H.1.21 What are the issues to be considered for producing clean milk?										
Cleanliness and hygiene of the cowshed and animals	61%	1552	267	216	315	292	99	96	116	151
Cleanliness of the home kitchen garden	4%	96	8	27	15	19	7	11	3	6
Cleanliness of the neighborhood	3%	87	22	13	9	17	6	4	3	13
Don’t know	31%	778	157	191	122	82	83	74	49	20

H.1.14 What are the benefits of improvement of cattle sheds for the proper disposal of excrement?	**Percentage**	**Total**
Animals breed very fast	8%	196
Calves and kids grow fast	14%	358
Don't know	56%	1416
Helps to prevent loss of plant nutrients in dung and animal urine	22%	571

Source: Field Survey, 2025

Annex XXIII: Perceived knowledge on nutrition sector

Table 82: Perceived knowledge of farmers on nutrition

Questions/options	Percentage	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
H.1.22 After completion of which month after birth should a child be given solid/semi-solid foods?										
12 months	3%	69	24	4	2	16	8	3	1	11
6 months	70%	1615	179	310	322	308	82	144	120	150
6 months	1%	15	5	0	8	0	0	1	1	0
7 months	17%	398	100	84	76	31	44	19	31	13
9 months	9%	216	102	8	30	22	40	2	6	6
Don't know			51	47	34	34	21	18	13	10
H.1.23 How many food groups should you (woman) consume in a day to remain healthy?										
4	31%	783	146	97	78	234	65	36	28	99
5	18%	448	76	72	93	71	26	41	30	39
6	7%	173	7	8	95	15	3	0	40	5
7	6%	165	12	9	47	47	8	5	13	24
Don't know	38%	972	220	267	159	44	93	105	61	23
H.1.24 How many food groups should your child consume in a day to remain healthy?										
4	27%	687	116	105	79	194	47	35	25	86
5	16%	411	86	50	77	68	34	34	18	44
6	8%	192	9	21	81	25	8	3	40	5
7	12%	313	55	10	105	62	22	5	29	25
Don't know	37%	938	195	267	130	62	84	110	60	30
H.1.25 Which of the following are good sources of protein in your diet? [select all that is applicable]										
Fruits and vegetables	33%	832	21	15	27	14	10	2	8	9
Eggs and meat	45%	1137	44	56	66	35	19	34	31	31
Butter and Ghee	20%	515	0	21	26	27	0	3	7	9
Milk and milk products	45%	1135	90	50	36	40	32	21	7	16
Pulses and legumes	34%	875	47	79	20	27	24	19	7	9
Don’t know	16%	404	47	104	70	59	24	39	36	25
H.1.26 Which nutrient prevents anemia?										
Calcium	4%	95	7	6	31	25	7	3	7	9
Carbohydrates	3%	76	2	21	12	11	0	17	8	5
Don’t know	62%	1588	364	338	274	143	151	145	109	64
Iron	24%	604	62	56	115	192	28	17	34	100
Vitamin C	7%	178	26	32	40	40	9	5	14	12

Questions/options	Percentage	Total	Treatment				Comparison			
			Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
H.1.27 Which of the following foods is a good source of iron?										
Don't know	49%	1257	279	274	214	113	125	108	91	53
Milk	14%	362	65	45	97	47	28	15	29	36
Orange	7%	168	31	37	24	25	12	19	8	12
Rice	10%	243	49	21	40	73	17	9	12	22
Spinach	20%	511	37	76	97	153	13	36	32	67

Source: Field Survey, 2025

Annex XXIV: Cropping intensity by RMs

Table 83: Cropping intensity by RMs, treatment and comparison

	TREATMENT				COMPARISON				OVERALL			
Municipality	Total No. of crops planted per HH in a year	Gross crop area planted per HH in a year	Net cultivated area of HH	Cropping intensity per HH	Total No. of crops planted per HH in a year	Gross crop area planted per HH in a year	Net cultivated area of HH	Cropping intensity per HH	Total No. of crops planted per HH in a year	Gross crop area planted per HH in a year	Net cultivated area of HH	Cropping intensity per HH
Galchhi	2.31	0.30	0.14	206%	1.33	0.28	0.18	158%	2.02	0.29	0.15	190%
Siddhalek	1.68	0.31	0.19	165%	1.32	0.20	0.12	172%	1.58	0.28	0.17	166%
Baiteshwor	3.68	0.62	0.22	282%	3.46	0.49	0.18	268%	3.61	0.58	0.21	278%
Melung	2.48	0.39	0.15	259%	2.27	0.40	0.15	258%	2.41	0.39	0.15	258%
Sunkoshi	1.72	0.18	0.10	173%	1.33	0.20	0.16	123%	1.60	0.19	0.12	153%
Tripurasundari	2.14	0.33	0.17	201%	1.72	0.20	0.11	180%	1.99	0.29	0.15	195%
Aarughat	1.58	0.16	0.11	149%	1.47	0.17	0.11	153%	1.55	0.17	0.11	150%
Sahid Lakhan	2.23	0.45	0.23	200%	2.02	0.38	0.19	203%	2.17	0.43	0.21	201%
Bateshwor	1.56	0.42	0.24	174%	1.52	0.43	0.30	142%	1.55	0.43	0.26	161%
Janak Nandini	2.42	0.53	0.18	292%	2.08	0.38	0.15	252%	2.29	0.47	0.17	278%
Samsi	2.20	0.66	0.26	255%	1.45	0.27	0.15	179%	1.99	0.55	0.23	240%
Sonama	2.15	0.78	0.30	260%	1.65	0.41	0.17	248%	2.03	0.69	0.27	258%
Chhinnamasta	2.00	1.14	0.56	204%	1.88	0.89	0.43	205%	1.96	1.06	0.52	204%
Mahadeva	2.79	0.74	0.29	252%	2.27	0.75	0.33	227%	2.65	0.74	0.30	245%
Laxmipur Patari	1.98	0.47	0.23	204%	1.86	0.49	0.27	184%	1.94	0.47	0.24	197%
Nawarajpur	1.07	0.44	0.38	116%	0.92	0.31	0.28	109%	1.02	0.39	0.35	114%
Average	**2.12**	**0.54**	**0.26**	**207%**	**1.78**	**0.42**	**0.21**	**201%**	**2.02**	**0.51**	**0.25**	**201%**

Source: Field Survey, 2025

Annex XXV: Crops produced in home garden

Table 84: Crops produced in home garden

Vegetables planted in HG	HHs cultivating crops	Treatment				Comparison			
		Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
Rayo	660	44	53	200	197	9	14	58	85
Spinach	224	11	5	43	101	1	1	16	46
Chamsur	160	1	2	27	91	-	1	10	28
Karkalo	129	4	4	41	46	-	1	17	16
Fenugreek	58	3	4	21	17	-	-	8	5
Other green vegetables	169	21	16	32	58	10	3	11	18
Cauliflower	329	45	59	92	57	8	15	26	27
Cabbage	291	44	55	88	45	10	11	24	14
Broccoli	81	3	11	41	11	2	4	7	2
Cabbage	28	1	2	17	1	-	-	6	1
Beetroot	26	-	3	10	4	-	-	6	3
Radish	354	26	52	104	89	7	11	29	36
Carrot	170	2	19	39	67	1	7	12	23
Turnip	48	2	4	11	20	-	-	6	5
Potato	339	48	44	90	73	10	14	31	29
Sugarcane	43	-	4	16	11	-	-	10	2
Yellow-skinned sugarcane	30	1	1	16	3	-	-	7	2
Yam	115	3	4	48	32	-	1	14	13
Pindalu	184	4	7	61	67	-	2	18	25
Pumpkins	538	81	82	115	130	18	11	45	56
Gourd	487	97	89	108	90	24	13	36	30
Sponge gourd	461	96	93	98	80	24	13	34	23
Bitter gourd	278	30	45	91	38	9	7	36	22
Barela	113	3	12	32	36	1	2	11	16
Chichinda	167	1	5	88	36	-	-	26	11
Cucumber	362	29	42	113	100	3	5	32	38
Tomato	350	34	30	104	95	10	3	37	37
Lady's finger	369	80	61	78	59	21	11	35	24
Brinjal	337	68	45	76	57	24	9	29	29
Chilli	96	-	8	38	21	-	-	20	9

Vegetables planted in HG	HHs cultivating crops	Treatment				Comparison			
		Dhanusha	Saptari	Gorkha	Sindhupalchowk	Dhanusha	Saptari	Gorkha	Sindhupalchowk
Chilli	497	60	58	121	135	20	10	39	54
Peas	220	10	7	41	101	-	2	15	44
Beans	400	40	12	112	126	12	2	43	53
Peas	380	66	34	84	90	17	10	38	41
Bakula	171	22	1	29	74	2	-	13	30
Greensoy beans	66	2	1	26	18	-	-	10	9
Other vegetables	110	5	15	21	38	4	1	9	17

Source: Field Survey, 2025

Annex XXVI Standardization of local unit of area

Table 85: Standardization of local unit of area

Local Unit	Conversion value (in ropani)	Conversion value (in ha)
Ploughing Unit	1	0.0509
Dharni Unit	0.75	0.038175
Maana Unit	0.125	0.006363
Pathi Unit	1	0.0509

Source: Field Survey, 2025

Annex XXVII: Transcribed qualitative survey notes

Table 86: Transcribed qualitative survey notes

S.N.	Statement/questionnaire	Sindhupalchowk cluster	Gorkha Cluster	Dhanusha and Saptari Cluster
1.	Knowledge on key food groups required for good nutrition, eating at least three balanced meals per day (including cereals, pulses, fruits, vegetables, and proteins), sources of food, Food items and frequency of food they consumed	Yes, they know about key food groups and eat three-four balanced meals in a day. They get it mostly from their own farm i.e. soybean, lentils, cauliflower, cabbage, potato, mustard leaves.	No, most of the farmers are not aware about the balanced foods intake, however, they eat cereals as a rice and chapati, pulses (seldom), vegetables, and fruits (seldom). Due to the not availability and awareness, they do not follow this pattern of meals.	* 90% are known about Key food groups. They are food grain, pulse, vegetables, fruits. *They eat three balance food such as Rice, Pulse, Vegetables, Animal source. *Sources are cereal crops, Legume crops (Pigeon pea, Grass pea, Mung Beans, Chick pea, horse gram), Fruit plants, Animals. *Diversification on food with Rice, bread, different vegetables, Meat, Pickle, Milk, Curd.
2.	Eating extra or special foods During pregnancy or lactation, different food consumption pattern, management of home garden, size and crops grown, use of home garden products, availability of ducks, chicken etc.	Sindhupalchowk cluster: Yes, consumption of special foods for the women having pregnancy and or lactation is in practice. Diversified food including meat consumption is prioritized during this time. In any average, 0.067 Hector of land is used for managing traditional home gardening where vegetables, fruits, spices are mostly grown. Chickens and ducks are less prioritized for farming, rather they use to get the meat from the market.	Gorkha cluster Some members of the group are aware but some people are taking extra food item during pregnancy. Majority of the members are taking fruits, eggs, pulses, greens, and fishes during the time of pregnancy. Most of the sources of food is home garden and own farms.	Saptari and Dhanusha cluster: Yes, consumed Milk, Fruits, Meat with giving Priority found. *Common food pattern are Rice+Pulse+Vegetables. Rice+Vegetables. Bread+Vegetables *Around 50% Eat differently as giving priority on meat, milk, fruits. *Having Kitchen Garden with 7 dhur to 3 katha land size. *Production on kitchen garden are; Jute leaf, Beans, Broad leaf mustard, Cowpea, Bitter gourd, Brinjal, Cucumber, bottle gourds, Pumpkins, Bhindi, Sponge gourd, Chilly, Banana. *No chicken/Ducks *85% has goat keeping with 1 to 7 herd size.
3.	Hunting and gathering any food items regularly from wild or aquatic sources and using them often in their menu.	Mostly they buy chickens/chicken meat locally.	Honey and fishes are bought. Not often but seldom they use these items in their menu.	*30% goes for hunting & gathering wild food items such as; Colocasia leaf, Owl, Mushroom, Amala ,Drum stick. *Seasonal use in daily diet.

4.	Main problems of the most needed households, the neediest households for food and nutrition security support interventions, why they are being needy, percentage of households who are food insecure in this community, months of food and why?	Regular source of income and poverty are the main problems of the most needed HHs; climate change impacts affects occasionally (landslide, drought, excess rain); mostly Janajati and Dalits fall under this category who are food insecure for about 3-4 months during May to July/August.	Awareness on nutrition, food diversity, irrigation, food diversification, fruit plantation techniques, management of kitchen gardening, etc. are some problems of this group. Beside it, drought, high rainfall, low rainfall, hailstone prevalence, etc. are some natural disaster cause the climate change.	*Economic problem. ***70%** are needy. *Being needy due to low land holding. *Food insecure family in the community are 70%. *Deficit months commonly 4 to 6 months in a year. To overcome deficit takes loan from community @ Rs 3% per month *Commonly deficit months are Chaitra, Baisakh, Shrawan, Bhadra, Ashoj, Kartik, Magh, Falgun.
5.	Gaps of the existing project supporting the most vulnerable groups of people in the food and nutrition sector.	Not yet realized; but the group composition does not reflect the engagement of the neediest people on a need basis in few cases.	Not identified but some of them are improper coordination, weak linkages between government sector and FANSEP, not identified the needy supports, etc.	*Food availability, Training, Increase interest or awareness & incentives.
6.	Child breastfed within the first hour after birth	Yes, it is well known and practiced. Almost all are aware about balanced diet rich nutrients found in breastfeeding immediately after the birth.	Yes, 100% of the women are aware about the breast feeding at immediately after child birth.	*Breast feed 100%
7.	Child exclusively breastfed for the first 6 months.	Mixed practices found, based on the supply of breastfeeding.	Yes, first six months they do breastfeeding	*After 6 months
8.	Age to introduce complementary foods to the child	Most of the women introduced it after 5 months or so.	Most of the women started complementary foods after 6 months	*2 to 5 times daily
9.	Times feeding feed child solid/semi-solid food daily.	Four to five times after the breast feeding in a day.	Generally, they do it after 6 months and so on.	*Daily feedings are Khichadi (Rice+Mung or Horse gram) Pudding, Green vegetables. *Rice+Pulse+Vegetables, Rice+Milk. *Rice+pulse+vegetables, sweet bread. *Feeding with in few days' interval is; Meat, Fish, Eggs
10.	Feeding child with a variety of foods (grains, pulses, fruits, vegetables, eggs, meat, etc.).	Sindhupalchowk cluster: Feeding homemade lito, feeding eggs takes two or three times a week. Meat is not in the priority.	Gorkha cluster: Feeding Dhido in most of the time. Optionally locally made *lito/cerelac,* rice, pulses, fruits, vegetables, eggs, meat, etc.	Saptari and Dhanusha cluster: 100% feed junk food like; Noodles, Chips, Kurkure, Cheese ball, Breads, Biscuits, Fruity, Litchi Juice. Homemade simple food is provided.
11.	Feeding junk foods (chauchau, etc)	Almost rampant practice of feeding junk food. It was reported that the child liked it	Not so much but very few women feed the junk foods. Most of the	It is practiced widely across the project communities.

		the most than the lito and other foods.	women feed local and nutrition foods.	
	Health related			
12.	Percentage of malnutrition	Very rare cases reported through FCHVs	Very rare cases in the village level. Not seen.	*Simple malnutrition lean & thin 8%
13.	Frequency of screening the children	Yes, it is in practice on a mobile basis.	Yes, it is in practice on a mobile basis.	*Monthly regular
14.	MAM children are being addressed by the health posts	No	No	*No MAM children *Free distribution of Balvita
15.	Percentage of pregnant and postpartum mothers using regular antenatal and postnatal health services	Almost all as reported by relevant mothers	Very few (1-2) women are pregnant. The services of the antenatal and postnatal are accurately performed by the women.	*100%
16.	Policy of Palika for nutrition sector development	MSNP was said to be a guiding policy. It was reported that all FCHVs of palika were made aware on the fact.	Palika has formulated a nutrition policy at RM level to promote the food and nutrition.	*Not any policy known.
17.	Other questions related to women (General women as when met and consulted)			
18.	Women are extrovert in the community	All the women are empowered, can speak up and influence community and RM level decisions. They are able to claim for their rights and entitlements. They help each other in the society. Land and building ownership is increased due to awareness.	All the women are empowered, can speak up and influence community and RM level decisions. They are able to claim for their rights and entitlements. They help each other in the society.	*67% Extrovert freely *Using veil for respect, not necessary. *Speak freely with outer community. Assets ownership is increased; already owned by one of the married daughter.
19.	Observation about the women that the consultant observed during the consultation	Women are empowered for their rights and entitlements. They are much concerned about their children. They know about the balanced diet to feed the children and try to manage as they can.	Women are active and empowered for their rights and dignity. They are much concerned about their children. They know about the balanced diet to feed the children and try to manage as they can.	*67% Using veil just to cover the head *Speak freely with outer community. *Children not found taking junk food during field visit.
20.	Any organization supporting in nutrition, women empowerment etc.	NA	No	*CARE Nepal, Aasman Nepal in 30% area & no any organization in other area.
21.	**FGD/KII Questionnaires in agriculture (only to agriculture group)**			
22.	Local units used for area and standard conversion	Ropani	Ropani (20 ropani = 1 ha) Hall= 1 hall = 1 ropani	*Bigha, Kattha, Dhoor
23.	Local unit used for production and their standard conversion	Kg	Muri (100 kg= 1 Muri= quintal)	Man= 40 kg, Bora=80 kg Quantal=100 kg, Paseri=4 kg

24.	Commodity Price of 2080 for major agriculture commodity, milk and goat milk	Milk@ NRs. 90-100/lit Goat Meat @ NRs. 700/kg Chicken: 450/kg	Milk@ NRs. 110/lit Goat Meat @ NRs. 800/kg Chicken: 400/kg	Price of Urea Rs. 25, DAP Rs 50, Potash Rs 40, Zinc Rs. 100, Rice Rs. 18-20, Wheat Rs. 35, Maize Rs. 30-40, Sugarcane Rs. 5, Vegetables Rs. 7-80, Pulse Rs. 100-140 per kg & Milk Rs 50 per litter.
25.	Source of food related to FCS	Own farm, local markets	Most of the farmers produced the food items on their lands. Kitchen gardening, irrigated and non-irrigated lands, wild relatives, and buying from local markets.	Cereals, pulses, vegetables, fruits & animal sources
26.	Status of irrigation	Partial irrigation facilities is available, hill residents are dependent on rain fed irrigation.	Insufficient, about 70 percent of the lands have not facility of irrigation. Rainfed farming is dominant.	*Rainfed *Electric motor from well
27.	Use of labor for major cereals, labor rate, use of chemicals, fertilizers for crops.	Only a few cases were reported about labor use. Otherwise, they exchange the labor in the farm. The local labor rate ranges from Rs. 500-700; male and female are equally paid for the same work. They rarely use chemicals for the cereal crops, but for vegetables, they use different pesticides. They use farmyard manure for the cereal crops.	They sometimes use labor; Labor changes ranges NRs. 600-1000 depending the types of labor.	*2 labors per Kattha *Labor wages 700 per day (500+Breakfast+Lunch)
28.	Share of their total land which remains fallow and reason behind.	Few cases of elevated lands were reported to remain fallow during the dry season which accounts around 1/4th share of the total land available to the HH.	Here the land is fertile, and most of the time the lands are occupied by crops. Cultivated all times. Fallow and wasted lands are not reported. Some times in dry season the lands are remain fallow for 1-2 months.	*93% land is under cultivation. *A few land is fallow due to un irrigated & costly, low rainfall or flooding.
29.	Commonly grown crops in the community. Considering rice, maize, wheat, potato and vegetables, size of operation- 3 seasonal based!	Rainy season: Rice, maize, pulses, millets. Winter crops: wheat, potato, (some cases of buckwheat) Summer crops: Maize and pulses, lentils. Vegetables: Rainy season: leafy greens like spinach, amaranth, bitter gourd and bottle gourd etc. Winter: Cauliflower, Cabbage, Radish, Peas, Broad leaf mustard, Spinach and broccoli etc. Summer: lady's finger, squash, beans, tomatoes, brinjal, cucumber,	Rice, maize, wheat, mustard, fruits, vegetables, spices, etc. are the main crops. Cropping pattern: Rainy season: Rice, maize, pulses, millets, fruits, and vegetables Winter crops: wheat, potato, maize, mustard, fruits, vegetables Fruits and vegetables are growing in all season.	*Major growing crop is vegetables, then Rice, Wheat, Maize, Sugar cane under 5kattha to 1.5 Bigha of land under cultivation for three season.

		bottle gourd, onion, spinach, squash, beans. Volume of cultivation is for the family use in most cases. Few farmers residing the road corridor and market places grow vegetables for sales.	Vegetables are growing in 3-4 season but cereals are growing 2 times in a year.	
30.	Cultivation practices of crops these crops	Sindhupalchowk cluster: Most of the farmers use traditional approach to cultivate cereal crops. It was reported that there were few farmers who use tractors for tilling the land and some use thresher for wheat. But in the case of vegetables, majority of the farmers use modern technologies i.e., vegetable cultivation in plastic house, micro-irrigation technologies, hybrid seeds, plastic mulching and even grading for marketing etc.	Gorkha cluster: Traditional farming is seen in dominant, however, new and advance mechanized farming is also commenced. That means, some thresher for harvesting, rice transplanting, drip irrigation are started in the farming. Power tillers and tractors are used in farming. In addition, controlled farming, hybrid seed introduction, mulching, cleaning, sorting, grading, IPM, are some newly introduced technologies used in this area. About 50 percent of the seed come from hybrid source.	**Saptari and Dhanusha cluster: ***Using Tactor for ploughing (Rs.1500 to 2000 per hour with fuel). *****Other practices are traditional. ***** Other practices are electric motor, corn seller, thresher, Sprayer, using Jholmal, using insect trap, line sowing.
31.	General production situation and share of production they are utilizing for consumption, sale, etc., damage situation during the post-harvest.	As stated above, most of the cereal crops are produced for home consumption. Mostly the vegetable growers also grow for their own consumption. The FGDs revealed that only a handful of farmers who reside near by the road side or market grow vegetables for the market. In such cases, ¼ of their production is consumed at home in general. Post-harvest loss is not taken into account except the cases of feeding vegetables to the livestock if not sold.	The production system is seen in traditional. Some farmers sale their products to the markets. Rice, maize and vegetable are sold to the markets. Most of the farmers grow and eat their products. Postharvest losses are seen as alarming situation. About 20-50 percent postharvest losses are seen depending upon the crops. Mostly loss is seen is perishable crops like vegetables and fruits followed by cereals and pulses.	*****Paddy 83% home consumption, Wheat 60-70% home consumption & 30-40% for sale, Maize 88% & vegetables 98% in sale. *****Postharvest losses are 7 to 12%
32.	Sale of product in the market, marketing problems.	There were only a fewer cases of selling maize in the market. Other cereal products are generally not sold. Marketing of vegetables takes place at local level in most cases. Some exchange their vegetables. The commercial farmers sale their produces in the local markets, and sometime, the middlemen directly approach to them and collect the produces. Most of the	Only few progressive farmers sale their products in markets. Some products such as rice, maize, and vegetables are sold occasionally. They sale their products in local markets. Little aware about market and market price; weak linkages to the traders, lack of	They sale their product individually at local market, haatbazar & Dealers/collectors or traders.

		vegetable growers face marketing problem for rainy season vegetables. Vegetable market has not established in the village.	communication and not being collective marketing are some bottlenecks in marketing.	
33.	Cultivation of minor but diversified and nutritious crops, share of the diversified crops, its how and problem faced.	They grow diversified crops with high nutrition value. The participants during the interview/discussion shared that they grew cowpeas and soybean with maize, pea with wheat, mustard and pea, spinach with beans an radish etc. The problem they faced was during the tomato cultivation inside plastic house-diseases and pests.	The place is rich in crop diversity and some farmers grow the minor and nutritious crops such as buckwheat, millets, local vegetables for food consumption.	*Grown Horse gram as a minor crop. Its share is about 0.5 to 2%, used as a pulse & khichadi.
34.	Seed are being utilized for the main crop, their main source, how often they change the seeds.	Most of the farmers use the cereal seed of their own production for 1-2 years. They buy additional seeds from cooperatives. Vegetable seeds were reported to be purchased from the agro-vets seasonally and yearly.	Seed production system is not practicing here. All the crops are produced for consumption purposes not for seeds. However, locally, they conserve the seeds and uses for next year. Agrovets, coops, and dealers are the main source of seeds. Sometime, they exchange their seeds with their neighbors.	*Seeds purchased from agrovet. & India. *Paddy Indian variety Pansona, Wheat improved seed, *Maize Pinear Hybrid, *Vegetables mostly Hybrid. *Changed hybrid seed yearly 7 other seeds after 2 to 3 Years.
35.	Best climate resilient practices or technologies adopted by the smallholders in their enterprises if any, CSA practices for some specific crops.	Farmers use a mixed methods to adopt with climate change impacts. They have less knowledge on the adaptation practices, but unknowingly, change crop varieties, using improved seeds, and adopting intercropping systems everywhere though. They use chemical fertilizers and pesticides for vegetables with micro irrigation technologies. They use plastic mulching and vegetable production inside plastic house. The study team witnessed tomato production inside plastic house with drip irrigation in one of the farmer's garden.	Using resistant varieties, mulching, IPM, controlled farming, intercropping, multiple cropping, alley cropping, mixed cropping, crop rotation, micro-irrigation, cleaning, packaging, sorting, grading, etc. are some climate resilient agricultural practices used in this location.	*Mulching is in Practice. *Paddy seed broadcasting in heavy Rain. *Wood ash on onion to protect from cold.
36.	Knowledge about crop rotation, rotation practices, Season wise major crops with usual planting and harvesting date.	Cereals and vegetables are used as crop rotation. Some active farmers use crops of one variety followed other crops and next varieties of the same crop. Some of them have knowledge about.	Some farmers are aware in crop rotation but most of the farmers are not aware about crop rotation. Cereals and vegetables are used as crop rotation. Some progressive farmers use crops of one variety followed other crops and next varieties of the same crop.	*33% Rotation with Rice-wheat/chick pea/Lentil-Ground nut *33% Just heard. Paddy-Lentil/rape seed with mixing of vegetables. *Paddy-Wheat-Mung *34% Not known about crop rotation

37.	Average productivity of major crops	Not responded	Not satisfying productivity. But it is estimated Paddy: 3 t/ha Maize: 2.5 t/ha Wheat: 3.5 t/ha Vegetable: 12 t/ha Fruit: 10 t/ha	*Paddy-80 to 120 kg, Wheat-80 to 160kg, Maize-80 to 120 kg, Potato-200 to 1000 kg, Vegetables-200 to 800 kg per Kattha.
38.	Major source of seed, the popular variety for major crops (rice, wheat, maize, potato etc.), information on use of hybrid seed (trend, popular variety, percentage of land covered with hybrid, price per kg of seed etc.	Agro-vets, local market Local level for vegetable (sometimes)	Rice: Sukha-2. Ramdhan, Sankar Maize: Arun-2, Manakamana, Rampur Composite Wheat- BL 4341, BL 971 Mustard- Local Potato: Local, MS, Cardinal, Janakdev, Khumal Vegetable: So many varieties belonging to vegetables are growing such as tomato- Srijana, Nabin, Manisha, etc. Hybrid seed are used by some progressive farmers. About 50 percent of the total production is covered by hybrid seeds. The SRR is 50 percent. Price of seeds Paddy: 90 & 550/kg Maize: 100 & 500/kg Wheat: 100 & 400/kg Mustard: 250/kg Vegetable: 250-1500/kg	*Major source of seed is Agrovet, Local market, India Boarder *Maize 100% and Vegetables 95% Hybrid *Seed price was; Paddy- Rs 50 to 70, Wheat-Rs70 to 80 Maize-Rs.300 to 1100, Vegetables 20000 to 135000 per kg
39.	Influencing or constraining factors in the adoption/ application of the best practices and technologies (production, post-harvest, agro -processing and marketing practices/technologies), postharvest handling, training, infrastructure, policies, and technical services are some influencing factors that hinder the production level of crops	Farmers face several factors influencing or constraining their ability to adapt to the adverse effects of climate change. While they receive support from private sectors, NGOs, and government agencies, the support is often limited in scope compared to the commitments made by these agencies. Furthermore, the quality of inputs provided is sometimes subpar, and the illegal introduction of seeds has created additional problems. Limited technical know-how in handling postharvest loss is unknown to most of the farmers i.e proper	Farmers facing several constraints that limit the production of crops. Some of the limiting factors are unavailability of seeds, manure, fertilizers, chemicals, and equipment, inadequate of irrigation facility; limited new and innovative mechanical tools/machines; weak linkages and coordination with traders and markets; lack of infrastructure facility such as cold store, cellar store, rustic store,	*Economic problem. *Costly seed & fertilizers, all machinery package of practices, *Occurrence of diseases. *Labor & maintenance cost is high. *Marketing problem, Un availability of fertilizers, *Marketing problem, Un availability of fertilizers, Irrigation facility is not available, less knowledge on

		harvesting, grading, storage etc. Even the homemade fertilizer is simply used without protecting from the rain and sunlight. Limited technical knowledge poses a significant challenge for farmers in adopting climate-smart technologies effectively. Other influencing factors include a lack of local investment capacity, unavailability of materials, and insufficient awareness of climate change issues within their communities. These constraints negatively impact farmers' ability to implement adaptive strategies. On the positive side, the continued support from various stakeholders and the potential for improved technical knowledge and resource availability could enhance their capacity to apply climate-smart practices. Addressing these barriers will be crucial to strengthening the resilience to climate change.	etc.; improper postharvest handling such as sorting, grading, transportation, harvesting, packaging and storage; lack of policies at RM level, etc. are some limiting factors that hinder the production and productivity of the many crops at village level.	improved agriculture practices.
40.	An understanding and awareness of climate change and the effects on agricultural production/ enterprises, main four crops severely affected by the impact of the climate change.	Understanding on the climate change and its effects is highly concerned but know-how is very limited among the farmers given that they are applying some modern technologies. Farmers reported that rice, wheat, maize and potato have less production yield in the later years.	Farmers have little knowledge and information about the climate change and its effects. However, some of the climate-smart-approaches are already landed to cultivation such as organic and inorganic mulching, fertigation, micro irrigation, agroforestry, grading, etc. Currently, some of the climatic disasters are fall to cause the negative effects of climate change such as early raining, low and high rainfall, frost severity, drought, hailstone, etc. that hinder the overall production and productivity of the crops.	*Unknown about climate change but temperature is changing, pattern of rainfall is lightly disturbed. water table is going down & wells are becoming dry, situation of flooding causing different diseases, sterility on mustard was seen.
41.	Irrigation system for farming different crops, types and source of irrigation, irrigation practices	Almost all the reported that they have not managed irrigation system. Available irrigation systems are mostly conventional. Some farmers have no-conventional systems for vegetable production as well. Elevated residents mostly depend on the rain-fed irrigation.	Lower land has facility of irrigation but up-land has not facility of irrigation and that areas are totally depend on rainfall. Some of the areas are rainfed condition whereas some areas are round irrigated. Low land has facility of	*Electric mortar pumps water from well & boring irrigate field by pipe system. *80% lands are rainfed.

			cannels i.e. surface irrigation which is rice-based farming system is prevailed. The source of irrigation is small rivers.	
42.	Types of agricultural commodities produced, main source of income, average income.	Rice, wheat, maize, potato, lentils are major commodities produced. In the case of vegetables, mostly grow seasonal vegetables. Major source of income of most of the farmers is employment/job or remittance. The farmers reported that their average income ranges from Rs. 20,000 to Rs. 600,000 per year.	Paddy, wheat, maize, mustard, vegetables, spices and fruits are main products of this area. Main source of income of the farmers is agriculture. An average income of the farmers is ranged from NRs. 15000-500,000 per year.	*Cereals, Pulses are produced mainly for home consumption & vegetables are produced for both home consumption & marketing.
	Livestock group			
43.	Common livestock reared, average size, production, and expenditure	Cow, buffalo, goat, and in some cases, chicken are the common livestock reared. Average size ranges from one to 3 cows or buffalo. In the case of goat, the size ranges from five to 15. As discussed with the farmers, the expenditure could be around 1-2/3 of the total revenue.	Cow, buffalo, goat, pig, and poultry are the main livestock. Out of them, goat is main livestock and herd size is 15-20 per HH. Cow and buffalo are reared as 1-2 in each HH. In case of poultry, 2-3 to 200 per HH. The production of goat meat is 375 kg per HH and expenditure is NRs. 20-30,000 per HH.	*41% has Buffalo, 39% has 1 to 5 cows, 100% has one to 10 goats in a herd. Expenditure is Rs.60 to 70 thousand per year. * Few members of Yadav & Mahato families of Bateshwor -2, Dhanusha does not touch the goat traditionally but they are in Goat rearing group.
44.	Common types of feed and forage they use, rearing practice like free range or stall feeding.	Most of the farmers dependent on tree fodder, grasses, legumes, rice straw, and locally-made Kundo from kitchen waste and maize flour mixed with rice bran. Rearing practices vary, with some animals being free-ranged, while some others are stall-fed, depending on factors like availability of grazing land and the farmer's preferences.	Farmers are depending on fodder and stalls feeding is practiced. Grazing to the natural land is rare. Major fodder species are kimu, kutmiro, makai/Sudan grass, Napier, jai gans, etc.	Rice straw, Bran, wheat husk, free range with long rope, cultivated grass (Sudan, Barshim, Teo maize, Bajra) is fed.
45.	Major practices utilized in rearing the livestock. Common ones	Some farmers apply a combination of different practices, with grazing in rangelands, fallow fields, and forests. For cattle and buffalo, they mostly use cow-shed (Goth) system as a common practice, with the use of tree fodders and crop residues.	Some of the practices they applied are stall feeding, seldom in natural range lands; feeder, improved shed; nutritious fodder plantation; free range grazing; castration; vaccination; etc.	*Semi stall feeding.
46.	Any organization supporting in improvement of livestock rearing practices in the community.	NA	No, there is no any organization supporting this group. However, regular monitoring, support and follow up are done by livestock section of RM.	None

47.	Challenges faced by the community while rearing the livestock	Farmers reported that they face feed and forage scarcity, high cost of production compared to the income, disease, water scarcity, less investment or in-accessibility to easy loan, and market at local level.	Farmers facing challenges on foraging to animals as forage scarcity; chronic diseases and insects; technical know-how; and marketing.	*Lack of space, *Lack of feeding materials. *Lack of irrigation, Dry, less vegetation *Shed become flooded during Rainy season.
48.	Coping strategy with these problems, expected support cope up with those problems/challenges	The farmers expected community led supporting mechanism through local government, support to improve cow shed (Goth), clear local level policy, practical insurance system, improved veterinary care, access to markets, and sustainable farming practices. Most of the farmers need capacity building in producing quality feed, provision of loan and linkages with the markets.	Some of the strategies to cope with these problems are building mechanism of matching the activities with local government, RM; application of improved shed for goat and other livestock; fodder and pasture development; management of diseases and parasites; provision for loan and subsidies; regular technical support, etc.	*Having not any plan, adjusting animals with the family members. * Call Rural municipalities technicians & private agrovet technicians. *Irrigate land by electric motor & Pipe.
49.	Selling animal and animal products	They sell animals on their need basis. Some of the farmers sell milk in the local communities whereas farmers residing the market centers and road corridor sell milk in the local market. The goat are sold mostly during Dashain and Tihar season.	Farmer sell on demand basis and sometimes, they sell their livestock in regular basis. They sell milk and milk products; meat, and wool. Large quantities of goats are sold in festival period.	*Milk is collected from the home @ Rs. 50, now it is Rs.70 to 80 per liter. *Buffalo Rs. one lakh to 1.5 lakh, heifer Rs. 15000 to 20000 per piece, She goat Rs. 3000 per piece (after weaning), Buck Rs. 3000 to 7000 & he goat Rs. 15000 to 20000 per piece.
50.	Knowledge about the impact of climate change in livestock production, best climate resilient practices or technologies adopted in livestock production.	Sindhupalchowk cluster: The farmers had somehow knowledge on the impact of climate change in livestock production. They reported increased shortage of feed and water resources in the communities. They also reported the decreased growth rate of goats. The prevalence of disease for a couple of years was shard as a worse impact. Farmers didn't know much about the adoption practices. However, they urged for improved feed and breed, management of water, reliable insurance mechanism and prompt veterinary services.	Gorkha cluster Farmers have very little knowledge and information about the climate change and its effects in livestock production. However, some progressive farmers adopted few climates smart technologies such as rearing in improved shed, feeding nutritious fodders; regular checkup of livestock and vaccination to control diseases; castration technology; sanitation, etc.	**Saptari and Dhanusha cluster:** Not known.
51.	Knowledge about GMP, If yes, source of knowledge.	Sindhupalchowk cluster: None of the farmers were aware about GMP.	Gorkha cluster: Some progressive farmers have little knowledge and information about GMP.	Saptari and Dhanusha cluster: Not known
52.	Factors influencing or constraints facing the	Sindhupalchowk cluster: The adaptation of farmers to the	Gorkha cluster: The influencing factors that	**Saptari and Dhanusha cluster:** Not known.

	farmers in adaptation to the adverse effect of climate change, what could be negatively or positively influencing their capabilities and abilities to apply the climate smart practices in livestock.	adverse effects of climate change is influenced by several factors and constraints. A significant limitation is the farmers' limited knowledge about climate change and its impacts, making it difficult for them to fully comprehend and share their experiences. Other influencing factors include limited technical know-how, low investment capacity, and a lack of awareness among the broader community about the effects of climate change. Additionally, access to knowledge, resources, technology, and financial support is constrained, with inadequate infrastructure and financial limitations being key challenges. In conclusion, improving farmers' access to climate change education, resources, and financial support, alongside enhancing their technical capacity, is essential to boosting their ability to adapt and apply climate-smart practices effectively.	limiting the production and in adapting to the adverse effects of climate change are limited knowledge on climate change and its effect on livestock; capacity building to the farmers in livestock management; inadequate technical know-how; lack of provision of loan and subsidies; insufficient of fodders and pasture lands and species; inadequate of infrastructure for livestock; limited of policies at local level; influence of chronic disease and pests; etc. some possible interventions to be applied to improve the livestock sector at local level.	*When animal become sick calling to vet technicians. *Fed garlic & ginger during sick period & fed Sakhhar during cold season.
53.	Average selling age, and selling weight of castrated/uncastrated buck	Most of the farmers reported that they sell at the age from nine months to 16 months. The average weight ranges from 25 to 30 kg for both castrated and uncastrated buck. Price per Kg of live animal was Rs. 500.	Average selling age of goat/buck/castrated buck is 1-1.5 years. Average selling age of broiler is 45-50 days. Average selling age of cow and buffalo is 3-4 years. Average selling weigh of buck is 25-30 kg and price of live buck is 500/kg.	*Selling age of non-castrated is 6 month to 1 year with weight of 8 to 10 kg, castrated he goat of 1 year age weight is 20 kg & 1.5 years old he goat is of 26 kg weight.
54.	Herd composition of Dairy animals (percentage of cattle and buffalo), their breed type, average milk production, average lactation period etc.	The project cluster constitute a significant portion of cattle compared to buffalo. Most of the farmers are reared the 1-3 cow and 1-2 buffalo. Cattle and buffalo are 1:1 ratio. For goat, she goat and buck are 7/10-1/2	Herd composition is seen complex. Most of the farmers are reared the 1-2 cow and 1-2 buffalo. Cattle and buffalo are 1:1 ratio. For goat, she goat and buck are 10:1. Most of the farmers rear local breed of cattle, however, some farmers rear Holstein and Jersey cows. Likewise, farmers rear local buffaloes but some rear Murrah buffalo. Local goat and Khari are reared by farmers. In case of poultry, local and Giriraj are dominant.	*Herd composition Buffalo single & goats are single to 10 per herd. On an average 4 to 6 goat per herd. *Breeds of buffalo & goats are local. *Milk production of buffalo is 5 to 6 liters per day with lactating period of 8 months. *Milk production of cow is 4 liters per day with lactating period of 6 months.

55.	Types of livestock raised.	Cattle, buffalo, goat, poultry (some cases)	Cattle, buffalo, goat, and poultry	*Local buffalo & goats. *Jersey cross breed of cow.
56.	Main source of income	Job/employment/labor work was major source of income. Only few farmers reported livestock to be the main source of income.	Main source of income of this group is livestock and agriculture. Few farmers are dependent on remittance.	*Main Agriculture, 2nd foreign service, 3rd labor.
57.	Market for livestock selling	Local market. For goats, outside buyers buy the goats during the festival season.	Local market. Sometime, sold to Kathmandu through night bus in case of goat. Poultry are sold at local markets.	*At home, *Nearest market.
58.	Average income of the farmers by selling livestock/Dairy products	The income ranges case by case. Cattle farmers earn around Rs. 40,000/cattle and buffalo Rs. 60,000 per buffalo as net income.	An average income of cattle is NRs. 50,000 for milking cow. NRs. 80,000 for milking buffalo. Likewise, an average selling income from goat is NRs. 30,000/HH. In overall, an average income of farmers is NRs. 40,000 per HH by selling livestock and its products.	Rs.12000 to 15000 monthly from milk per HH Rs 15000 to 20000 from the goat per annum per HH Rs. 15000 to 20000 from heifer per annum per

Source: Field Survey, 2025

Annex XXVIII: Name of the enumerators

Table 87: Name of the enumerators

S.No.	RM	Enumerators
1.	Aarughat	Bipin Pant (9848485111)
2.	Aarughat	Sajin Sunar (9804162461)
3.	Baiteshwor	Gautam Bahadur Khadka (9861247850)
4.	Baiteshwor	Niroj Pandey (9849623988)
5.	Bateshwor	Santu Kumari Sah (9808390226)
6.	Bateshwor	Simran Shah (9849652652)
7.	Chhinnamasta	Niraj Kumar Mandal (9814786829)
8.	Chhinnamasta	Rajkumar Mandal (9829705575)
9.	Galchhi	Roshika Adhikari (9861240743)
10.	Galchhi	Sunita Dulal (9861761115)
11.	Galchhi	Bigyan Dulal (9869181311)
12.	Galchhi	Rabin Kumar Pandit (9803266739)
13.	Janaknandani	Aashu Kumari Yadav (9817822007)
14.	Janaknandani	Sajita Kumari Mandal (9810382798)
15.	Laxmipur Patari	Jayram Yadav (9807794236)
16.	Laxmipur Patari	Pratibha Sah (9811715211)
17.	Mahadeva	Pankaj Kumar Yadav (9800966995)
18.	Mahadeva	Swastika Chaudhary (9813446947)
19.	Melung	Rasmi Yogi (9766901192)
20.	Melung	Sangita Magar (9741862006)
21.	Nawarajpur	Prabesh Paswan (9844554933)
22.	Nawarajpur	Rujuwal Kumar Sah (9867983310)
23.	Sahid Lakhan	Sadhana Shrestha (9840044868)
24.	Sahid Lakhan	Subheksha Shrestha (9840497810)
25.	Samsi	Kamal Dev Yadav (9842434616)
26.	Samsi	Udit Narayan Yadav (9821828782)
27.	Siddhalek	Akanksha Gautam (9841662505)
28.	Siddhalek	Bibek Lamsal (9863666446)
29.	Sonama	Binita Kumari Yadav (9864143205)
30.	Sonama	Sanju Kumari Yadav (9824870126)
31.	Sunkoshi	Mandira Shiwakoti (9864003312)
32.	Sunkoshi	Rashmi Shrestha (9865707916)
33.	Sunkoshi	Kalpana Sapkota (9861603363)
34.	Sunkoshi	Sandhya Nepal (9866415117)
35.	Tripurasundari	Sajina Khadka (9749338663)
36.	Tripurasundari	Sangita khadka (9860910585)

Source: 3D Research and Development Solutions, Field survey, 2025

Annex XXIX: Survey activities

Figure 8: Survey activities in photographs