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SCALING UP CLIMATE RESILIENT AGRICULTURE FOR SUSTAINABLE LIVELIHOOD OF SMALLHOLDER FARMERS IN NEPAL

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Anita Gautam, Parshuram Bishwakarma and Indra Prasad Poudel

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Authors Anita Gautam, Parshuram Bishwakarma and Indra Prasad Poudel

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Abbreviations

BftW	Bread for the World
FYM	Farm Yard Manure
LAPA	Local Adaptation Plans of Action
LDCRP	Local Disaster and Climate Resilient Plan
NAPA	National Adaptation Programme of Action
OIO	Outcome Impact Orientation
PGS	Participatory Guarantee Systems
VDC	Village Development Committee

EXECUTIVE SUMMARY

Scaling up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal (CRA) is being implemented from October 2018 to September 2021 by Local Initiatives for Biodiversity, Research and Development (LI-BIRD) in Sindhupalchok and Kaski districts of Nepal with funding support from Bread for the World (BftW), Germany. The project aims to achieve three objectives: i) diversify food and income sources of target groups, particularly women-led and socially marginalized households, ii) increase adaptive capacity and resilience of vulnerable communities to climate and disaster risks, and iii) contribute to create favourable policy environment for mainstreaming climate-resilient agriculture in the government policies and plans with especial emphasis at the local level.

Household survey was carried out in the project sites in April 2019 for fulfilling the first objective. For second and third objectives, key informant interview and policies/plans were reviewed. The main objective of the study was to establish benchmark information for the implementation of project activities. The household survey was mainly focused on agriculture biodiversity, on-farm income and agroecological practices.

The members of the group identified from the project sites were considered as sampling unit for the survey. The proportionate random sampling method was applied to identify households for interview from each ward. In total, 351 households were selected for the household interview from the total 2,119 households. Structured questionnaire was administered to gather the information.

Out of 351 household surveyed, 84% of the respondents were women and 16% were men. The result suggests that the target groups are smallholders with an average landholding of 0.40 ha. In 39% of total households surveyed, sole decision of woman on overall household matters whereas in the 22% of the households, decisions are taken jointly by man and woman in the household. Which suggests that more than one third of the households are women-led within target groups. It was found that crop and livestock integrated farming system was common within the respondent. 94% of the households reported to have livestock in their homestead.

The study further suggests that around 61% and 51% of households in all project sites cultivate less than five crops (cereals and vegetables) in their lowland (Khet) and upland (Bari), respectively. The respondents reported higher crop diversity in their home garden where they cultivated seasonal vegetables and fruit/fodder for household consumption. To fulfill the food demand for remaining year, they purchase vegetable and fruit from the local market. The study suggests that the average spending on vegetable and fruit purchase per household were NPR 7,236.9 and NPR 6,166.27, respectively.

The findings indicate that the households have multiple source of on-farm income sources. Live animals (NPR 31,178±55,714) and livestock products (NPR 24,384±28,597) provide better income than vegetables and cereals. The average annual income in cash of the total respondents from on-farm sources was found to be NPR 44,378.

The findings on agroecological farming practices suggest that those pest management practices that have their roots in farming traditions are common amongst the respondents. They include intercropping, maintaining field sanitation and application of wood ash. Alternative practices such as use of biological pesticides (19.65%), disease and resistant crop varieties (2.5%), green manuring (1.70%) and use of insect traps (1.42%) were not common among the responding households. On an average, 64% of total respondents have been cultivating legume crops in average land of 0.08 ha. The use of sprinkler to irrigate the crops was found in all the study sites. The study shows that, on an average, around 28% of respondents were using sprinkler to irrigate their land. Drip irrigation method was practiced by only 2.75% of the overall respondents. The use of chemical fertilizers and pesticides was common in all responding households (98%) of Sindhupalchok district while

55% of the households of Kaski district reported the use of chemical fertilizers and pesticides.

Improved cattle shed was only found in study sites of Kaski district. 67% of respondents of Annapurna Rural Municipality and 58% of respondents of Pokhara Metropolitan have improved cattle shed. The application of chemical fertilizers and pesticides was found higher in all the study sites of Sindhupalchok district. All surveyed households of Sunkoshi Rural Municipality applied chemical fertilizers and pesticides in their crops. Whereas, application of chemical fertilizers and pesticides were found least (33%) in Annapurna Rural Municipality.

The baseline of second objective suggests that Local Disaster and Climate Resilient Plan (LDCRP) of three wards of Lisankhupakhar Municipality i.e. Ward No 1 Thulodhading, Ward No 5 Jethal and Ward No 6 Petku have been formulated and endorsed by the local government. But activities identified in the plans have not been implemented. In case of project sites of Tripurasundari Rural Municipality and Sunkoshi Rural Municipality, LDCRPs have not been formulated.

The indicator of this third objective is set to number of event organized and participants attending events such as policy dialogue, seminar, training and travelling seminar to enhance capacity of stakeholders. The details of the events and the participants will be maintained in a table and will be summed during each reporting period.

The following recommendations have been proposed based on the study:

- Ensure the participation of women in capacity building programmes and activities
- Conduct a study to identify potential ecological products and support the target groups for production of marketable volume and link them to the markets
- Establish branding and certification of ecological products through Participatory Guarantee System
- Establish model ecological villages to pilot and demonstrate different agroecological farming practices and technologies
- Revise project activities to effectively meet the indicators especially the activities focused for central government (trainings, workshops, meetings targeted for national government stakeholders)

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CHAPTER I

Introduction

1.1 Background

As a result of the "Green revolution", agriculture sector was able to produce large amount of food grains worldwide. Application of chemical fertilizer, agrochemicals, irrigation and use of improved seed were the key factors contributing to the increase in agriculture production (Hazell, 1985). The continuous and excessive and/or injustice use of agrochemicals have been negatively affecting human health and the surrounding environment. It is not only poisoning the environment and food but have posed a significant threat to the food production system itself (Gyawali, 2018). Indiscriminatory use of chemical pesticides had led to development of resistance in many pest species (Mahmood et al., 2016). The problems have been further elevated by rapidly changing climate.

The traditional system of agriculture in Nepal was organic but with the change in time, the practices changed more towards inorganic especially in accessible area. Haphazard use of inorganic fertilizers has decreased the soil fertility and productivity (Carson, 1992). Similarly, injudicious application of harmful chemical on crops has polluted the environment, water sources and soil as well (Aktar et al., 2009). It is also the biggest driver of biodiversity loss (PAN, 2010). Many useful insects are disappearing and emerges harmful insect/disease in our farm land (Altieri and Nicholls, 2004).

In order to promote or maintain ecological health, produce safe food and protect environment, ecological agriculture is becoming popular globally (TWN and SOCLA, 2015). The ecological agriculture is an integrated approach that simultaneously applies ecological and social concepts and principles to the design and management of food and agricultural systems. An agroecological approach includes a number of agricultural practices, such as polycultures, integration of agroforestry and livestock, use of organic manures and application of biological/botanical pest control measures (Altieri, 1995). It seeks to optimize the interactions between plants, animals, humans and the environment while taking into consideration the social aspects that need to be addressed for a suitable and fair food system (FAO, 2018).

LI-BIRD has been implementing "Scaling Up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal" project in Nepal from October 2018 with financial support from Bread for the World (BftW), Germany. This project is designed to build on the outcomes of Rebuilding Family Farming (RFF) Programme implemented in Tripurasundari, Balephi, Lisankhupakhar, Sunkoshi and Bhotekoshi Rural Municipalities, and Barabise and Chautara Sangachowkgadi Municipalities of Sindhupalchok district after the Nepal earthquake 2015, and Seed of Survival (SoS) Programme implemented in Annapurna Rural Municipality of Kaski district focusing on promotion of agroecological farming for building resilience of the smallholder farmers. The development goal of the project is to contribute to sustainable livelihood of smallholder farmers through promotion of climate-resilient agriculture in Nepal. The project aims to achieve three objectives for target groups during project period:

1. Diversify food and income sources of target groups, particularly women-led and socially marginalized households
2. Increase adaptive capacities and resilience of vulnerable communities to climate and disaster risks
3. Contribute to create favourable policy environment for mainstreaming climate-resilient agriculture in government (federal, provincial and local) policies and plans.

The target group of the project are smallholder farmers (farmers having <0.5 ha are categorized as small holder households in Nepal) from marginalized households, particularly women and youths. Altogether, the project will reach 2,100 target households in two districts – 1,800 HHs in Sindhupalchok and 300 HHs in Kaski.

Three main outcome level indicators to be used to monitor the achievements against project objectives are as follows.

- 1,800 households (1,500 in Sindhupalchok and 300 in Kaski) of which, 900 are women-led, practice agroecological farming methods for

increasing household dietary diversity and farm income.

- The capacity of eight community groups are enhanced to develop and implement local agriculture plans by integrating Local Disaster Risk Management and Climate Change Adaptation Plan in Sindhupalchok supporting at least 1,050 households to adopt CRA technologies and practices
- At least four national and 27 local/regional events (such as policy dialogue, meetings, trainings and travelling seminars) are organized for enhancing capacity of 250 municipal, provincial and federal level leaders, policy makers, like minded CSOs, and representatives of target groups.

1.2 About the Study Site

The Scaling Up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal is implemented by LI-BIRD in Sindhupalchok and Kaski districts of Nepal. Sindhupalchok district lies in Bagmati Province of Nepal, which was highly affected by the devastating Nepal Earthquakes 2015. The population of Sindhupalchok is 287,798 with population density of 113 per square kilometre. The district ranks among one of the poorest districts in Nepal with 45% of the population living under national poverty line which is NPR 19,261 per capita per year (OSOCC, 2015). The district is dominated by Tamang ethnic community, which is historically regarded as disadvantaged ethnic group in Nepal. The project is implemented in three Rural Municipalities of Sindhupalchok district viz Lisankhupakhar, Sunkoshi and Tripurasundari (Figure 2). Lisankhupakhar Rural Municipality covers 98.69 km^2 area with total population of 15,143 (CBS, 2011). It is dominated by Tamang and Newar ethnic groups. Agriculture and foreign labour are major source of income of the residents of Lisankhupakhar Rural Municipality. Total area coverage of Sunkoshi Rural Municipality is 72.48 km^2 and is dominated by Brahmin, Chettri and Tamang ethnic communities. According to CBS 2011, the total population of Sunkoshi Rural municipality is 19,976. Agriculture, animal husbandry and business are the major sources of income for people residing in the Rural Municipality. Tripurasundari Rural Municipality is home to diverse ethnic communities such as Brahman, Chettri, Thami, Pahari, Tamang, Newar, Magar and Sherpa with total area of 94.28 km^2. Total population of Tripurasundari Rural Municipality is 13,225 (CBS, 2011).

Kaski district lies in Gandaki Province of Nepal which is well known for its natural beauties and tourist destinations. Kaski has a population of 492,098 with population density of 966 per square kilometre. The district is relatively better off in term of per capita income (USD 966) and poverty status (11.1% population under poverty line and HPI value of 16.5). The district is home to people of different casts such as Brahmin, Gurung, Magar, Newar and hill Dalits. The project is implemented in Annapurna Rural Municipality and Ward No 28 of Pokhara Metropolitan (Figure 1). The total area of the Annapurna Rural Municipality is 417.74 km^2 and the total population of the municipality is 23,565, according to 2011 (2068 BS) Nepal census. The major economic sources of this Rural Municipality are tourism, agriculture and animal husbandry. The direct target population in Kaski are mix of Dalits, Janajati and other castes, which are smallholder farmers who are struggling to continue agroecological agriculture in the region. There is huge potential for marketing the agroecological products to Pokhara market, which makes this site unique.

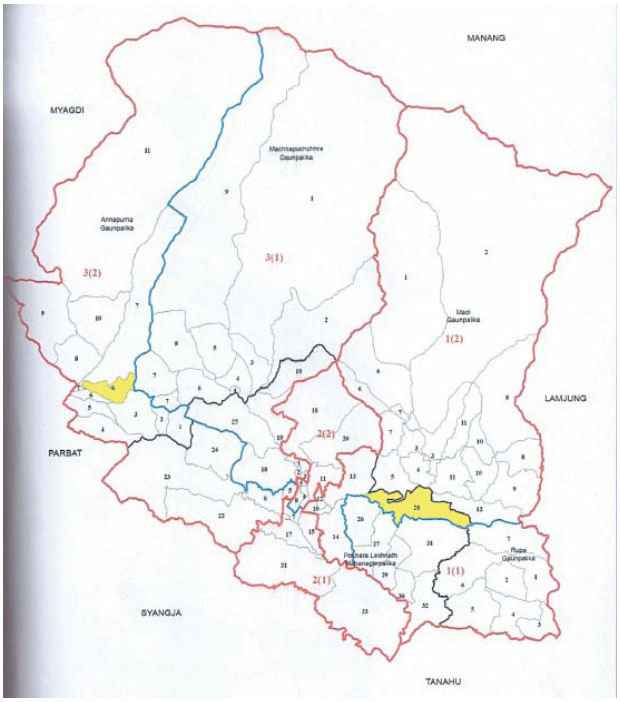

Figure 1 : Project sites of Kaski district

Figure 2 : Project sites of Sindhupalchok district

1.3 Objective of the Study

- To understand the socio-economic context of the target groups
- To assess existing knowledge and information and status of adoption of climate resilient agriculture practices/ agro-ecological farming practices
- To assess current situation of climate and disaster risk management at community level
- To provide guideline for future project intervention and create basis for reporting against the agreed outcome indicators.

CHAPTER II

Methodology

The study followed following methodology to collect the information from the field.

2.1 Questionnaire Development

Project team and in-house technical experts with consultation from Ms. Anke Schuermann during Outcome Impact Orientation (OIO) Workshop had detail discussion on baseline study. Guided by the outcome indicators of the project, the team discussed on various information required for the study. By the end of the event, a set of questions were formulated. The project team then drafted structured questionnaire based on the exercise of OIO workshop. The questionnaire was reviewed by the in-house experts and also by the consultant of BftW for the inputs. After incorporating the feedback and comments received from the experts and the consultant, the questionnaire was finalized (Annex 1). In addition to the household survey, project team also reviewed existing plan, policies at local level, prepared checklist and conducted key informant interview (KII) for Objective 2.

2.2 Sampling Strategy

The project team visited the Ward Offices of the project sites to collect information on different groups and cooperatives functioning within the respective wards. The representative of the Ward Offices recommended the groups and cooperatives working actively in the wards. The project team then selected the groups and the cooperatives based on the project's criteria. To make the beneficiary selection transparent and make the local authority accountable, a mass gathering was organized in each ward where the groups and cooperatives identified to implement project's activities were shared. Those groups and their members were then endorsed by the local authorities. Each beneficiary household of the farmers group from project area were considered as the population (sampling framework) for the study. Proportionate random sampling by former Village Development Committee (VDC) was applied to select 351 households (5% margin of error and 95% confidence level) out of 2,119 households. The details of beneficiaries' population and sample size is given Table 1 below.

Table 1: Total member households and sample size

District	Municipality/Rural Municipality	Ward#	Village	Beneficiary HHs	Sample size
Sindhupalchok	Lisankhupakhar Rural Municipality	1	Thulo Dhading	210	35
		5	Jethal	240	40
		6	Petku	180	30
	Tripurasundari Rural Municipality	3	Dhuskun	270	45
		6	Tekanpur	210	35
	Sunkoshi Rural Municipality	2	Thokarpa	171	27
		5	Sunkhani	174	29
		6	Thumpakhar	153	25
		7	Pangretar	211	35
Kaski	Annapurna Rural Municipality	4	Bhadaure Tamagi	150	25
	Pokhara Metropolitan City	28	Majhathana	150	25
Total	5	11	11	2119	351

2.3 Administering the Field Survey

Six agriculture graduates from Himalayan College of Agriculture Science and Technology (HICAST) were hired to conduct the household interview. Two-day orientation was organized to have common understanding on the survey questionnaire at the site office of LI-BIRD. A pretesting of the questionnaire was conducted before the actual survey. The data was collected under the supervision of technical staffs of the respective site. The filled questionnaires were thoroughly checked by the project staffs to ensure the quality of the formation and data collected.

2.4 Data Analysis and Report Writing

Collected data was cross checked, verified and coding was done before entering into the computer application. The quantitative data was entered into Microsoft Excel and qualitative data was manually summarized, and then scrutinized, categorized and tabulated as per the requirements of the study. The pictorial presentation i.e. pie chart, bar/line graph was prepared using MS-Excel and descriptive statistics i.e. mean, proportion, count, minimum and maximum values were produced using SPSS.

2.5 Limitation of the study

The study was carried within the geographical boundary identified for implementing Scaling Up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal project. Therefore, the conclusion drawn from this study can not be generalized exactly in the same manner for other geographical locations. Since the project is working with smallholder and marginalized famers in the identified communities of four Rural Municipalities and one Metropolitan, views expressed by the respondents may or may not represent the scenarios of the whole Rural Municipalities and Metropolitan.

CHAPTER III

Results and Discussions

The findings of the study and discussion have been organized objective wise in three major sections. In section 3.1, findings on household characteristics including profile of respondents, situation of land and animal holdings, gender disaggregated response on household level decision-making, farm/crop diversity, food and vegetable sufficiency, on-farm income diversity, and status of agroecological farming practices are discussed. In section 3.2 and 3.3, information on policies, plans and practices for adaptive capacities, and resilience building of vulnerable groups and possible capacity bridging interventions are discussed, respectively.

3.1 Diversify Food and Income Sources of Target Groups, Particularly for Women-led and Socially Marginalized Households

3.1.1 Household Characteristics

3.1.1.1 Profile of Respondents

Out of 351 household surveyed, 82.05% of the respondents were female and 17.95% were male (Table 2). Majority of the respondents were Janajati (48.43%) followed by Brahmin/Chhetri (37.61%) and Dalit (13.96%). More than half (52.42%) of the respondents were literate, 34.19% were illiterate and only 1.42% have completed higher secondary education.

Table 2: Respondent by Sex (F/M)

District	Rural Municipality/ Metropolitan	Female	Male	Total
Kaski	Annapurna	12 (50)	12 (50)	24(100)
	Pokhara	22 (85)	4 (15)	26(100)
Sindhupalchok	Lisankhupakhar	86 (82)	19 (18)	105(100)
	Sunkoshi	108 (93)	8 (7)	116(100)
	Tripurasundari	60 (75)	20 (25)	80(100)
Total		288 (82.05)	63 (17.95)	351(100)

Note: Figures in parenthesis indicate the percentage of responding households

Table 3: Ethnicity of the Respondents

District	Rural Municipality/ Metropolitan	Dalit	Janajati	B/C	Total
Kaski	Annapurna	2 (8)	6 (25)	16 (67)	24(100)
	Pokhara	0 (0)	7 (27)	19 (73)	26(100)
Sindhupalchok	Lisankhupakhar	11 (10)	89 (85)	5 (5)	105(100)
	Sunkoshi	33 (28)	38 (33)	45 (39)	116(100)
	Tripurasundari	3 (4)	30 (37)	47 (59)	80(100)
Total		49 (13.96)	170 (48.43)	132 (37.61)	351(100)

Note: Figures in parenthesis indicate the percentage of responding households

Table 4: Education of the Respondents

District	Rural Municipality/ Metropolitan	Higher Secondary & Above	Secondary	Primary	Literate	Illiterate	Total
Kaski	Annapurna	0(0)	2(8)	2(8)	16 (67)	4(17)	24(100)
	Pokhara	4 (15)	9(35)	3(11)	10 (39)	0(0)	26(100)
Sindhupalchok	Lisankhupakhar	0(0)	4 (4)	7(7)	40 (38)	54(51)	105(100)
	Sunkoshi	0 (0)	0(0)	0(0)	69 (59)	47(41)	116(100)
	Tripurasundari	1 (1)	13(16)	2(3)	49 (61)	15(19)	80(100)
Total	5(1.42)	28(7.98)	14(3.99)	184(52.42)	120(34.19)	351(100)	

Note: Figures in parenthesis indicate the percentage of responding households

3.1.1.2 Land Holding

Household landholding is categorized as cultivated land and uncultivated land based on agricultural land use system. The cultivated land is further categorized as lowland (Khet) and upland (Bari). Lowland is understood as land suitable for paddy cultivation with irrigation facility. Upland is that land which is not suitable for paddy cultivation and lacks proper irrigation facility. Such land where tillage and intercultural operations are challenging and are considered unproductive by farmers is understood as uncultivated land. Smallholders cultivate on farms that are often much smaller than one hectare. In Nepal, on an average, smallholders farm is 0.52 ha (FAO). The result below in table 5 suggests that on an average, each household owns 0.40 ha of total land in targeted project's study sites. The respondents have low land holding in comparison with national average of 0.7 ha (CBS, 2011). The average cultivated land holding of respondents of Kaski and Sindhupalchok is 0.35 and 0.31, respectively. Table 6 shows that, on an average, the respondents own 0.30 ha of lowland and 0.17 ha of upland. However, it is found that 107 households (30.48%) do not own any lowland.

Table 5: Average Land Holding Area (ha) of Responding HHs

	Cultivated Land (ha)	Uncultivated Land (ha)	Total (ha)
Kaski (n=50)	0.35±0.29(50)	0.23±0.25(41)	0.53±0.43(50)
Annapurna (n=24)	0.43±0.37(24)	0.28±0.29(21)	0.70±0.53(24)
Pokhara (n=26)	0.27±0.18(26)	0.18±0.20(20)	0.45±0.27(26)
Sindhupalchok (n=301)	0.31± 0.25(301)	0.17±0.24(109)	0.38±0.32(301)
Lisankhupakhar (n=105)	0.32±0.25(105)	0.20±0.27(45)	0.52±0.36(105)
Sunkoshi (n=116)	0.32±0.27(80)	0.21±0.30(23)	0.53±0.35(80)
Tripurasundari (n=80)	0.32±0.25(116)	0.12±0.14(241)	0.44±0.24(116)
Total (n=351)	0.32±0.25(351)	0.22±0.25(150)	0.40±0.35(351)

Note: Figures in parenthesis indicate the number of responding households

Table 6: Average Ccultivated Lland Hholding Aarea (ha) of Rresponding HHs

Rural Municipality/Metropolitan	Lowland (ha)	Upland (ha)
Kaski (n=50)	0.28±0.23(n=40)	0.12±0.17(n=38)
Annapurna (n=24)	0.30±0.28 (21)	0.17±0.23(24)
Pokhara (n=26)	0.27±0.17 (19)	0.08±0.06(25)
Sindhupalchok (n=301)	0.20±0.13(204)	0.17±0.18(266)
Lisankhupakhar (n=105)	0.15±0.14(44)	0.25±0.28(105)
Sunkoshi (n=116)	0.19±0.19(90)	0.15±0.14(113)
Tripurasundari (n=80)	0.26±0.19(70)	0.09±0.09(76)
Total (n=351)	0.30±0.19(244)	0.17±0.18(343)

Note: Figures in parenthesis indicate the number of responding households

3.1.1.3 Decision Makers in the Households

In Nepal's context, though the involvement of women in household activities is predominant, they are generally not in decision-making position. This is applicable in agriculture sector as well. Through this baseline survey, the project tries to understand the level of involvement of women in decision-making process. The study shows that no difference was found in overall decision-makings on household affairs by men and women in both districts. In 39% of total households surveyed, women make sole decision on overall household matters whereas 22% of the respondents decides jointly. The study further suggests that the higher percentage of women make decision on planting of crops (60%), crop sale (43%) and expenses on education (36%) in the Rural Municipalities/Metropolitan. Education, empowerment of women and outmigration of male members can be the potential reasons behind their higher involvement in above-mentioned activities. However, men usually take decisions on major issues such as selling and buying properties or livestock.

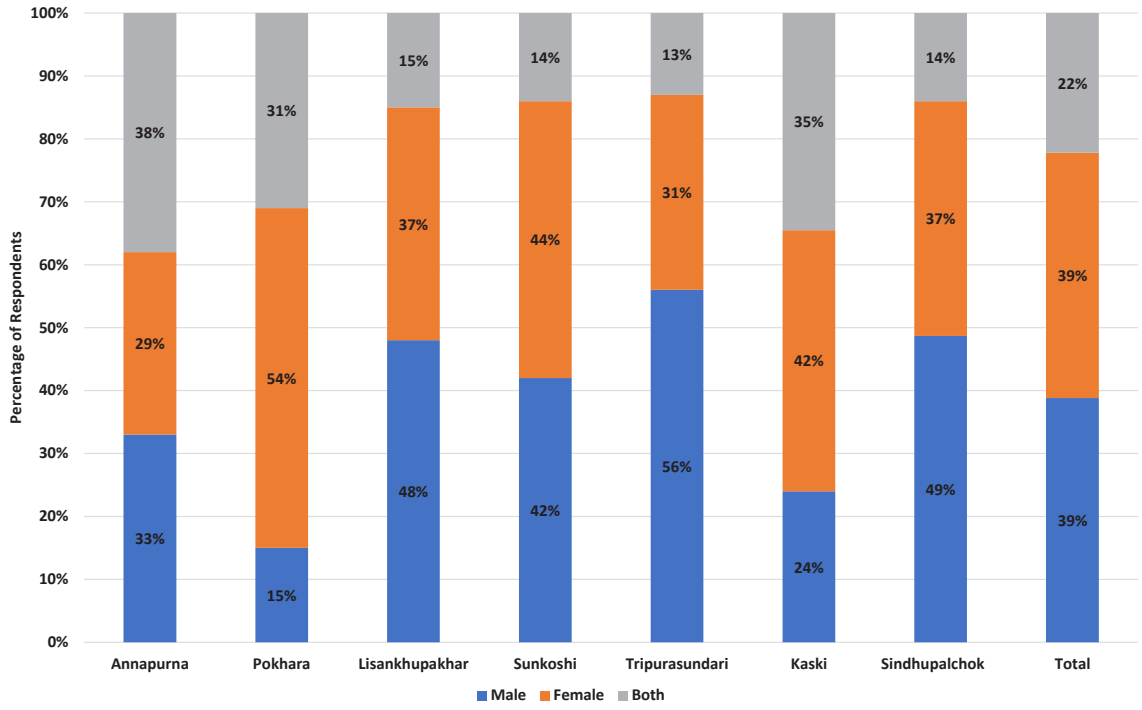

Figure 3: Overall household decision by gender

3.1.1.4 Livestock Holding

Diversified crop-livestock systems are considered to be more productive, sustainable and provide base for climate resilient agricultural systems. Incorporating livestock can benefit soil organic matter, diversify the product and provide new source of farm income. It is found that the majority of the responding households (94%) have livestock at their homestead. This is a good indication of climate resilient agriculture system. In terms of households involved in rearing animals, goat (86.89%) is the dominant species followed by chicken (56.12%), buffalo (44.15%) and cattle (41.59%) in an average. Only 2.27% of the respondents have pigs in their homestead. It is found that the farmers are rearing local breeds of livestock in their homestead. However, the respondents reported keeping improved breed of chicken. It is found that buffalo (76%) was dominating species in Kaski whereas goat (89.70%) dominated in Sindhupalchok. Cattle/Buffalo manure are major components of farm yard manure (FYM) and play crucial role in maintaining soil fertility and soil organic matter content. However, the percentage of respondents rearing buffalo and cattle is 44.15% and 41.59%, respectively. There is the possibility to encourage farmers to rear cattle/buffalo to enhance the quality and quantity of FYM. The table 7 suggests that the average number of buffalo and cattle owned by the respondents were 1.48 and 1.87, respectively.

Table 7: Average Number of Livestock Holding

District	Rural Municipality/ Metropolitan	Buffalo (No.)	Cattle (No.)	Goat (No.)	Chicken (No.)	Pig (No.)	Total
Kaski	Annapurna	1.35±0.6(17)	2.1±1.9(10)	5.07±6(15)	80.43±185.1(7)	0	32.5±107.9 (21)
	Pokhara	1.67±0.7(21)	1.33±0.7(12)	6.85±5.2(20)	28.91±70.32 (11)	0	21.1±52.35 (24)
Sindhupalchok	Lisankhupakhar	1.59±0.6(34)	2.16±1.1(50)	6.64±4.3(91)	7.16±12.83(63)	1.33±0.6 (3)	12.6±12.2 (97)
	Sunkoshi	1.47±0.6(47)	1.69±0.8(36)	6.07±3.2(104)	142.1±621.1(73)	2±1.2(4)	99.5±505.4 (112)
	Tripurasundari	1.36±0.5(36)	1.76±0.9(38)	6.56±3.1(75)	7.53±8.77(43)	1(1)	11.8±7.2 (79)
Total		1.48±0.6 (155)	1.87±1.1 (146)	6.36± 3.8 (305)	61.06±383.6 (197)	1.63±0.9(8)	43.5±296.6 (333)

Note: Figures in parenthesis indicate the number of responding households

3.1.2 Crop Diversity

Diversification is key to agroecological transitions to ensure food security and nutrition while conserving, protecting and enhancing natural resources (FAO, 2018). Increasing biodiversity contributes to a range of production, socio-economy, nutrition and environmental benefits. Crop and animal diversity reduce the risk of failure in the face of climate change especially among smallholders. Crop species diversity among the target groups was studied in lowland, upland and home garden. In lowland, major crops grown by famers were rice, wheat, maize, mustard, potato, tomato, cucumber, cauliflower, cabbage, brinjal, soybean, bean, ladies' finger, pea, mustard, radish, coriander, etc. The study reveals that on an average, 60.96% of households cultivate one to four crops, 10.25% households cultivate up to eight crops in their lowland, while 27.35% of households do not have lowland (Table 8). Three respondents of Sunkoshi and two respondents of Tripurasundari grew up to 12 types of crops in their lowland. The finding further suggests that there is the possibility of increasing crop diversity in lowland of project area.

Table 8: Crop Species in Lowland

District	Rural Municipality/ Metropolitan	Range of crops				Total
		0 (no any crops)	1 to 4 crops	5 to 8 crops	9 to 12 crops	
Kaski	Annapurna	3(12.5)	19(79.17)	2(8.33)	0	24(100)
	Pokhara	7(29.92)	15(57.7)	4(15.38)	0	26(100)
Sindhupalchok	Lisankhupakhar	58(55.24)	46(43.81)	1(0.95)	0	105(100)
	Sunkoshi	22(18.97)	82(70.69)	9(7.76)	3(2.59)	116(100)
	Tripurasundari	6(7.50)	52(65)	20(25)	2(2.50)	80(100)
Total		96(27.35)	214 (60.96)	36 (10.25)	5 (1.44)	351 (100)

Note: Figures in parenthesis indicate the percentage of responding households

The situation of crop diversity in upland of study sites is better than in lowland. The findings of the study reveals that, on an average, 29.64% and 11.11% of the respondents grow up to eight and up to 12 varieties of crops in their upland (Table 9), respectively. The highest number of respondents cultivating nine to 12 varieties of crops is observed in Lisankhupakhar (20%). Number of respondents (56.69 %) growing up to four crops in their upland is found to be higher in all the study sites. The major crops grown in upland of study area are maize, finger millet, black gram and potato as major crops followed by mustard and vegetables such as onion, garlics, cauliflower, peas, tomato and radish.

Table 9: Crop Species in Upland

District	Rural Municipality/ Metropolitan	Range of crops				Total
		0 (no any crops)	1 to 4 crops	5 to 8 crops	9 to 12 crops	
Kaski	Annapurna	0	17(70.83)	5(20.83)	2(8.33)	24(100)
	Pokhara	1(29.92)	13(50)	12(46.15)	0	26(100)
Sindhupalchok	Lisankhupakhar	0	47(44.81)	37(35.24)	21 (20)	105(100)
	Sunkoshi	3(2.59)	80(68.97)	22(18.97)	11(9.48)	116(100)
	Tripurasundari	5(6.25)	42(52.50)	28(35)	5(6.25)	80(100)
Total		9(2.5)	199 (56.69)	104 (29.62)	39 (11.11)	351 (100)

Note: Figures in parenthesis indicate the percentage of responding households

Table 10 suggests that all the respondents of study sites have been growing crops in their home garden. The majority (46.15%) of the respondents have been cultivating more than 13 crop species in their home garden. Because it is easier to concentrate and take care of crops in their homestead, there is more diversity of crops found in their home garden. The crops grown in home garden consists of seasonal vegetables, fruits and fodder trees. Home garden plays crucial role in maintaining the dietary diversity of the households. Crops in home garden are especially grown for household consumption and provide great opportunity to promote and demonstrate agroecological farming practices and technologies.

Table 10: Crop Species in Home Garden

District	Rural Municipality/ Metropolitan	Range of crops				Total
		1 to 4 crops	5 to 8 crops	9 to 12 crops	13+ crops	
Kaski	Annapurna	0(0)	4(16.67)	4(16.67)	16(66.67)	24(100)
	Pokhara	0(0)	0(0)	1(3.85)	25(96.15)	26(100)
Sindhupalchok	Lisankhupakhar	24(22.86)	26(24.76)	29(27.62)	26 (24.76)	105(100)
	Sunkoshi	7(6.03)	15(12.93)	33(28.45)	61(52.59)	116(100)
	Tripurasundari	4(5)	13(16.25)	29(36.25)	34(42.5)	80(100)
Total		35(9.97)	58(16.52)	96(27.35)	162(46.15)	351 (100)

Note: Figures in parenthesis indicate the percentage of responding households

3.1.3 Food and Vegetable Sufficiency

The study suggests that sufficiency of staple food and vegetables from self-production on an average is 7.1 months and 7.5 months, respectively, in study sites. Figure 4 suggests that there is no significant difference on food sufficiency months among all the study sites. However, the respondents of Kaski have comparatively higher vegetable sufficiency months than the respondents of Sindhupalchok.

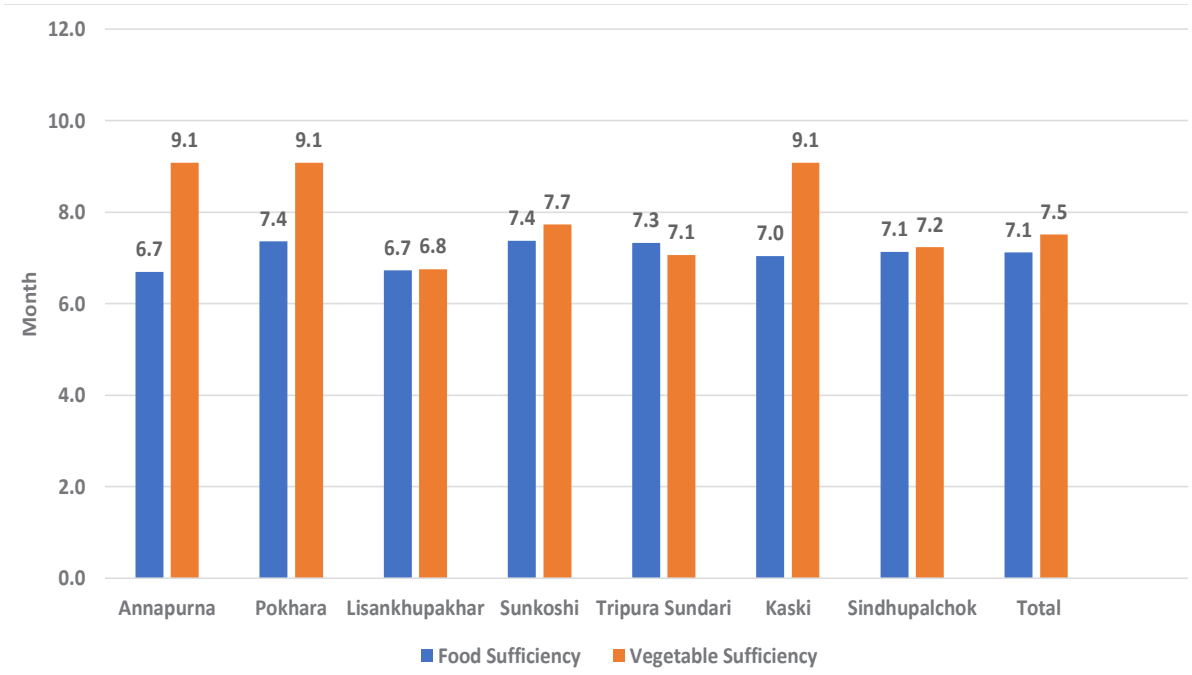

Figure 4: Food and Vegetable sufficient months

Table 11 below shows that for 58% of the respondents, food produced by them is sufficient for up to six months. This suggests that the majority of households are dependent on other sources to meet their annual food demand. The finding further suggests the need to support the beneficiaries to strengthen their purchasing capacity through diversification of on-farm income sources. On an average, 26.5% of the respondents reported that the food produced by them is sufficient for 10 to 12 months.

Table 11: Food Sufficiency Months of Households

District	Rural Municipality/ Metropolitan	Food Sufficiency months			
		Below 3 Months	4-6 Months	7-9 Months	10-12 Months
Kaski	Annapurna	7(29.2)	9(37.5)	2(8.3)	6(25)
	Pokhara	7(28)	5(20)	4(16)	9(36)
Sindhupalchok	Lisankhupakhar	18(17.3)	47(45.2)	20(19.2)	19(18)
	Sunkoshi	17(14.9)	41(36)	24(21.1)	32(28.1)
	Tripurasundari	12(15.8)	36(47.4)	3(3.9)	25(32.9)
	Total	61(17.8)	138(40.2)	53(15.5)	91(26.5)

Note: Figures in parenthesis indicate the percentage of responding households

Similarly, vegetable sufficiency from self-production is below three months for 20.7%, 4-6 months for 27.6%, 7-9 months for 19.3% and 10-12 months for 32.5% of the overall respondents. 50% households of Pokhara and 58.3% households of Annapurna reported that the vegetables produced by them is enough for almost a year for household consumption. The table 12 suggests that the respondents of Sunkoshi (38.3%) have highest households with vegetable sufficient for 10-12 months followed by Tripurasundari (26.9%).

Table 12: Vegetable Sufficiency Months

District	Rural Municipality/ Metropolitan	Vegetable Sufficiency Months			
		Below 3 Months	4-6 Months	7-9 Months	10-12 Months
Kaski	Annapurna	1(4.2)	4(16.7)	5(20.8)	14(58.3)
	Pokhara	0	8(30.8)	5(19.2)	13(50)
Sindhupalchok	Lisankhupakhar	33(31.4)	28(26.7)	23(21.9)	21(20)
	Sunkoshi	22(19.1)	32(27.8)	17(14.8)	44(38.3)
	Tripurasundari	16(20.5)	24(30.8)	17(21.8)	21(26.9)
	Total	72(20.7)	96(27.6)	67(19.3)	113(32.5)

Note: Figures in parenthesis indicate the percentage of responding households

3.1.4 Spending on Vegetable and Fruit Purchase

The study suggests that the respondent of all study sites of Kaski and Sindhupalchok purchase vegetables for household consumption. On an average, 58% of total respondents purchased vegetables for household consumption. Comparatively all the households of targeted Rural Municiplaities of Sindhupalchok (79%) purchased more vegetables than the study sites of Kaski (36%). The respondents reported that the purchase of vegetables is more during lean period. The data presented in figure 5 shows that 97%, 75% and 66% households of Tripurasnudari, Sunkoshi and Lisankhupakhar, respectively, purchase vegetables. While only 42% and 29% households of Pokhara and Annapurna, respectively, purchase vegetables for their household consumption.

Although, households purchasing vegetables is highest in Tripurasundari, the highest spending (NPR 6,170) on the purchase of vegetables is found in Lisankhupakhar. This may be attributed to geographical location as majority of the project sites lies in high hills with strict cropping pattern. Lowest spending (NPR 533) on vegetables was recorded in Annapurna (Figure 5).

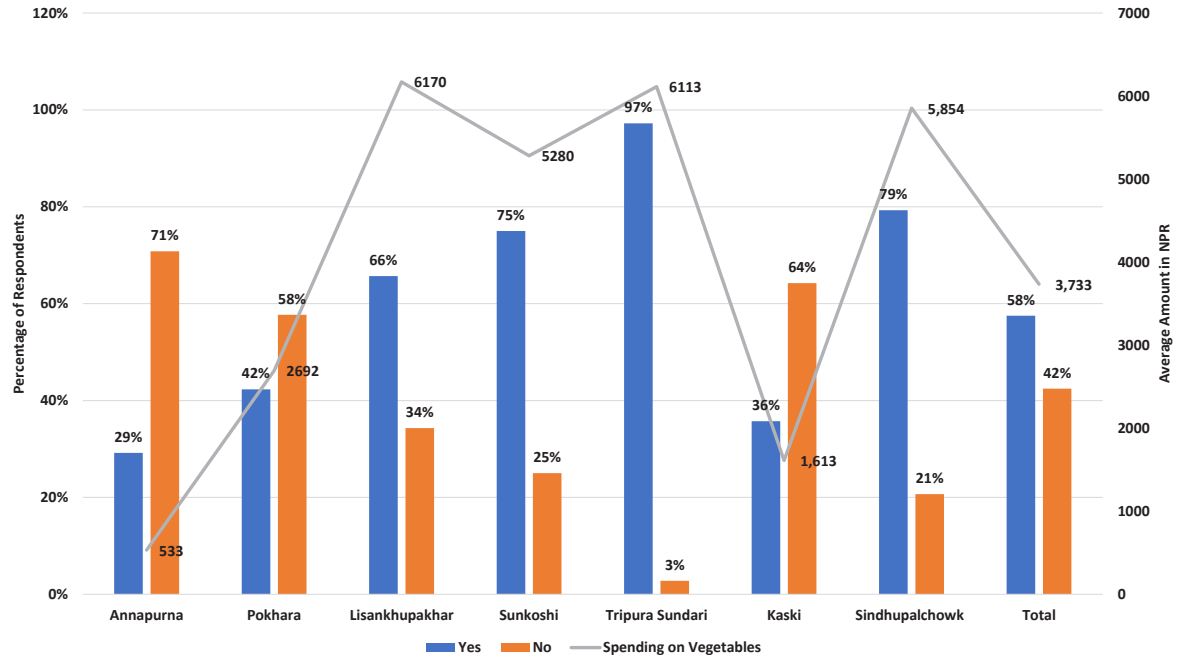

Figure 5: Average Spending on Vegetable Purchase

Similarly, figure 6 shows that 83% of total respondents purchased fruits for household consumption. Highest purchase was made by the respondents of Tripurasundari Rural Municipality (96 %) followed by Pokhara Metropolitan (85 %) whereas lowest purchase was made by the respondents of Annapurna Rural Municipality (75 %). Highest spending on purchasing of fruit was recorded in Pokhara (NPR 6,865) followed by Lisankhupakhar (NPR 5,759). The finding suggests that the fruit diversity in their homestead and farm is less.

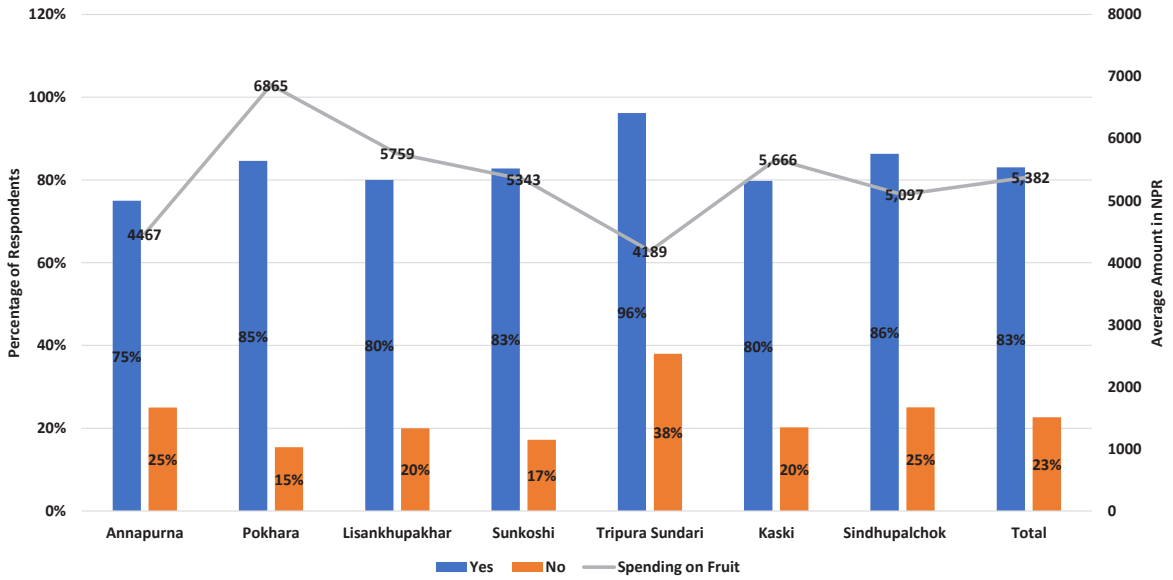

Figure 6: Average Spending on Purchase of Fruits

3.1.4 On-Farm Income Sources

The study suggests that the average on-farm income is highest in Annapurna Rural Municipality (NPR 62,650) followed by Pokhara Metropolitan (NPR 56,533) whereas the least on-farm income was recorded in Tripurasundari Rural Municipality (NPR 27,035). Highest average value of annual income of NPR 45,769 and NPR 24,384 was offered by livestock products in Annapurna and Tripurasundari, respectively. Similarly, live animals fetched the highest average income for Pokhara (NPR 42,500) and Sunkoshi (NPR 45,084) while potato fetched the highest income in Lisankhupakhar (NPR 34,843). These data further suggests the need of location specific interventions to support diversity of on-farm income sources. Majority of the respondents agreed that the return from live animal is higher than other on-farm income sources. When the respondents were asked if they were willing to increase the livestock farming in their homestead, they showed hesitation due to their lack of technical knowhow (especially disease management and quality breeding buck).

Table 13: Average Annual Income (NPR) from Different On-farm Sources

Particulars	Annapurna (NPR)	Pokhara (NPR)	Lisankhu-pakhar	Sunkoshi	Tripura-sundari	Total
Cereals	8940±6381(5)	7386±7978(7)	3489±2034(9)	11667±7638(3)	4731±4751(10)	6180±5832(34)
Vegetables	21303±37916 (17)	11500±12049(12)	19844±19877(18)	3821±4501(19)	8700±11342(12)	13261±21907(78)
Legumes	1667±577 (3)	5000±4243(2)	10000 (1)	1200±985(3)	2933±2272(3)	3117±3058(12)
Fruits		9000±5657(2)	3333±2082(3)	2500±1803(3)	500(2)	3650±3779(10)
Oil seeds						
Spices		2000(1)	8500±9192(2)	2750±1768(2)	1400±367(5)	3150±4247(10)
Potato	2775±1898(4)	1250±71(2)	34843±42435(58)	3700±3899(5)		29754±40611(69)
Root crops	3000±1414 (2)		1425±1135(4)			1950±1355(6)
Live animal	25172±15710(9)	42500±34660(18)	22599±17175(79)	45084±90089(90)	20691±16400(69)	31178±55714(265)
L/S product	45769±40639(13)	18750±13625(8)	15222±11840(9)	18112±16991(25)	24869±38386(13)	24384±28597(68)
Value added	1250±1061(2)					1250±1061(2)
Others		50000(1)		5000±2000(3)		16259±22559(4)
Total Income	62650±57499(20)	56533±45731(21)	47038±46946(93)	48125±87403(97)	27035±28167(71)	44378±61257(302)

Note: Figures in parenthesis indicates the responding HHs

3.1.5 Agroecological Farming Practices

3.1.5.1 Integrated Pest Management

Maintenance of crop health is essential for successful farming for both yield and quality of the produce. The project has identified specific measures such as cultural practices, application of bio pesticides, disease and stress tolerant crops, use of insect traps and green manuring as alternatives to chemical pesticides for management of insect and pests. The most common integrated pest management practice followed by the majority of the households in all the project sites was cultural methods. 96% of respondents followed cultural practices such as maintaining sanitation of the field, application of ash, pruning and destroying the infested part and application of cattle urine. On an average, around 20% of respondents used bio pesticides for pest management, while 2.85% and 2.56% respondents used disease and stress tolerant, respectively. Only 1.42% of respondents are using insect traps and 1.70% followed green manuring. It is observed that the respondents of Annapurna followed all six integrated pest management practices. However, the percentage of respondents following insect traps (4.17%) and green manure (4.17%) are very insignificant. Due to the lack of information on different pest management practices, it is observed that limited respondents of Sindhupalchok followed integrated pest management practices.

Table 14: Average Number of Respondents Following Integrated Pest Management Practices

District	Rural Municipality/ Metropolitan	Cultural Practices	Biopesticides	Disease Tolerant	Stress Tolerant	Insect Traps	Green Manure
Kaski	Annapurna	24(100)	16(66.67)	2(8.33)	3(12.5)	1(4.17)	1(4.17)
	Pokhara	26(100)	12(46.15)	1(3.85)	4(15.38)	0	1(8.84)
Sindhupalchok	Lisankhupakhar	105(100)	8(7.62)	1(0.95)	1(0.95)	0	2(1.90)
	Sunkoshi	113(97.41)	16(13.80)	4(3.45)	0	0	0
	Tripurasundari	69(86.25)	16(20)	4(5)	0	4(5)	0
Total		337(96)	69(19.65)	10(2.85)	9(2.56)	5(1.42)	6(1.70)

Note: Figures in parenthesis indicate the percentage of responding households

3.1.5.2 Water Use Management

To tackle the challenges of water scarcity, necessary measures should be undertaken for effective water management in rain-fed regions. The project has identified an integrated approach which needs to be adopted for agricultural water management through adoption of technologies such as drip irrigation, sprinkler, rain water harvesting and grey water collection. The study suggests that, on an average, around 28% of respondents were using sprinkler to irrigate their land. The use of sprinkler was found in all the study sites. Drip irrigation method was practiced by only 2.75% of the overall respondents. Improved irrigation method such as drip irrigation and sprinkler irrigation can help in increasing water-use efficiency. However their use was limited among the respondents as these technologies require initial investment, thus, were considered unaffordable measures by them. Grey water collection was observed among the respondents of the study sites of Sindhupalchok. Majority of respondents using grey water to irrigate their crops was recorded in Tripurasundari (27.5%). Rainwater harvest method was practiced by 6.42% of the respondents and this method was observed in Pokhara (26.92%), Lisankhupakhar (2.86%) and Sunkoshi (9.48%). 7.65% of the overall respondents used pipes (others) to irrigate their crops. Highest number of the respondents using pipe was recorded in Tripurasundari.

Table 15: Average Number of Respondents Following Efficient Water Management Practices

District	Rural Municipality/ Metropolitan	Drip	Sprinkler	Rainwater Harvest	Grey Water	Others
Kaski	Annapurna	2(8.33)	10(41.67)	0	0	0
	Pokhara	5(19.23)	3(11.54)	7(26.92)	0	3(11.54)
Sindhupalchok	Lisankhupakhar	2(1.90)	30(28.57)	3(2.86)	19(18.1)	0
	Sunkoshi	0	33(28.45)	11(9.48)	26(22.41)	0
	Tripurasundari	0	17(21.25)	0	22(27.5)	22(27.5)
Total		9(2.75)	93(28.44)	21(6.42)	67(20.49)	25(7.65)

Note: Figures in parenthesis indicate the percentage of responding households

3.1.5.3 Legume Integration

Legumes fix atmospheric nitrogen with the help of rhizobium nodules on their roots, and enhance soil fertility and health. They can tolerate harsh conditions, survive in limited amounts of water and have a low carbon foot print which make them an important component of climate resilient agriculture system (ICARDA, 2018) The study suggests that the respondents of all study sites have been cultivating legume crops (sole or mixed) in their lands. On an average, 64% of total respondents have been cultivating legume crops in average land of 0.08 ha. Highest respondents integrating legumes in their cropping system were found in Lisankhupakhar Rural Municipality (77%) followed by Sunkoshi Rural Municipality (67%) while the lowest was observed in Tripurasundari Rural Municipality (41%). Beans and cowpea were leading species cultivated by the respondents followed by pea and soybean. The respondents chose to cultivate these legume species because they can be used as vegetables when green as well as dried grain (Daal) when fully matured.

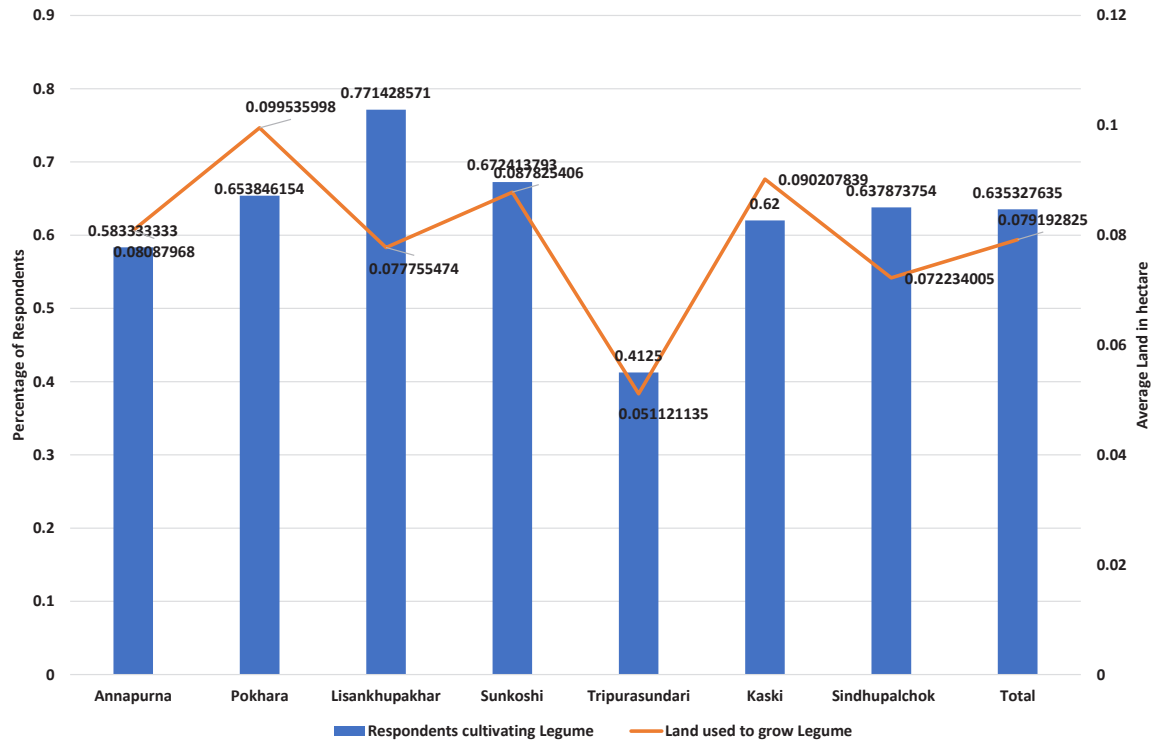

Figure 7: Respondents Cultivating Legume

3.1.5.4 Improved Cattle Shed and Farm Yard Manure Management

Nitrogen is the most important nutrient for proper growth and development of plants. Nitrogen is also the most limiting nutrient in farms across Nepal's midhills (ICIMOD, 2008). Moreover, increasing cultivation of more nutrient demanding crops, for example, local varieties are replaced by hybrids and are leading towards declining soil fertility and nutrient mining if it is not compensated by organic or mineral fertilization. Cattle urine is a viable alternative to mineral fertilizer. Improved cattle sheds not only create hygienic environment for livestock but also prevent the wastage of rich resources like urine and dung. Farm Yard Manure (FYM) is an integral part of soil fertility management in Nepal. A study carried by HELVETAS Swiss Intercooperation Nepal suggests that with improved management of FYM and improved cattle shed with systematic and efficient collection of urine, a pair of cattle can provide around 100 kg of urea in a year. The findings of the study reveal that only 9% of the respondents, on an average, had improved cattle shed and 7% of the respondents had properly managed their FYM. Improved cattle shed was found only in the study sites of Kaski. 67% of respondents of Annapurna Rural Municipality and 58% of respondents of Pokhara Metropolitan have improved cattle shed. Whereas, improved cattle shed was not found in any of the responding households of Sindhupalchok. Similarly, Improved FYM was recorded highest in the study site of Annapurna followed by Pokhara. Very few respondents of Sindhupalchok have improved their FYM. Quality FYM being one of the major components of agroecological farming system, the project needs to focus on raising awareness on the need to improve cattle shed and properly manage FYM and also encourage and support the target groups to establish improved cattle shed especially in Sindhupalchok.

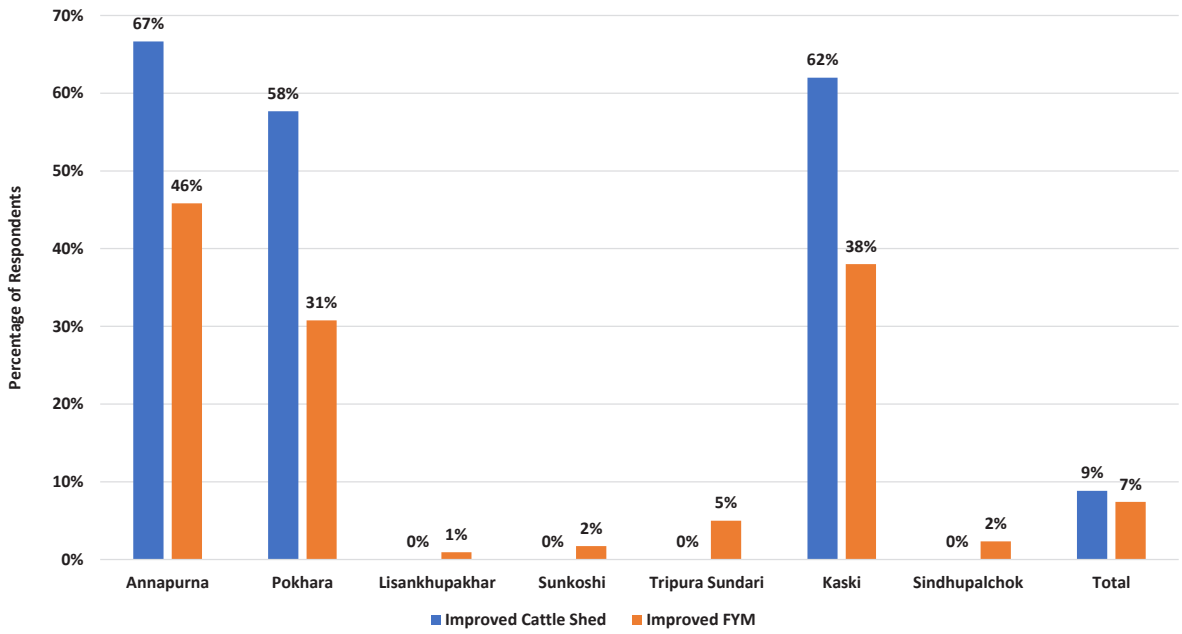

Figure 8: Respondents with Improved Cattle Shed and FYM

3.1.5.5 Use and Spending on Agro Chemicals

The report suggests that application of chemical fertilizer and pesticide in crops was common in all study sites but the highest use was found among the respondents of Sindhupalchok. On an average, 76% of the respondents applied chemical fertilizer and pesticides in their crops. It was found that the application of agrochemical was higher in Sindhupalchok as 98% of the respondents applied agrochemicals in their crops. Similarly, highest annual average spending on chemical fertilizer was observed in Sunkoshi (NPR 2,420), followed by Lisankhupakhar (NPR 1,888) and Tripurasundari (NPR 1,851). Lowest average spending on chemical fertilizer was recorded in Annapurna (NPR 119) of Kaski. Purchased chemical fertilizers were commonly applied in cereal crops especially rice, maize and finger millet in all study sites. Other than these crops, chemical fertilizers were applied in potato in the study sites of Sindhupalchok and vegetables in the study sites of Kaski. Urea, Diammonium Phosphate (DAP) and Muriate of Potash (MoP) were most commonly applied chemical fertilizers in both study districts. Highest annual average spending on the chemical pesticides was found in Lisankhupakhar (NPR 654) and lowest spending was recorded in Annapurna (NPR 13). The application of chemical pesticides was found common in vegetable crops especially tomato, cauliflower, cucumber, brinjal and chilly than in cereal crops. The respondents were not able to specify the name of the pesticides they used. Due to lack of awareness on harmful impacts of agrochemicals, unavailability of alternative measures to chemicals and lack of technical know-how for preparation of bio pesticides and fertilizers, the use of chemicals in crops prevails. The project needs to prioritize awareness and capacity-bridging activities to promote the use and application of FYM, composting and bio/botanical pesticides so that they can reduce spending on purchase of agrochemicals.

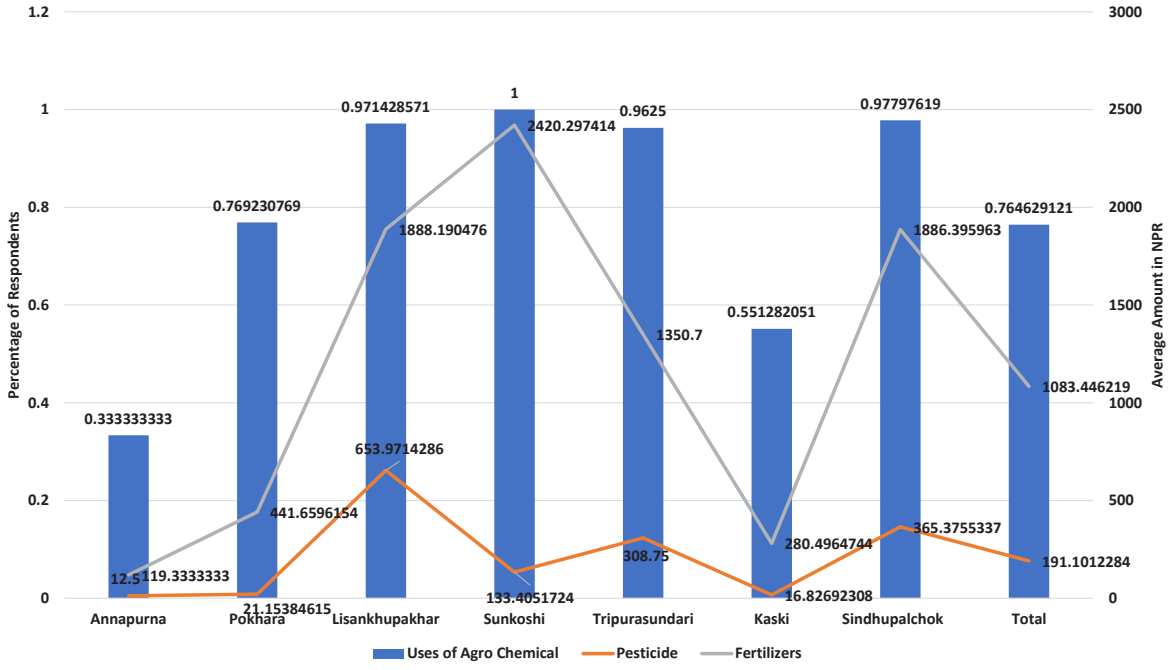

Figure 9: Use and Average Spending on Chemical Fertilizers and Pesticides

3.1.5.6 Bee Keeping

Bee keeping holds crucial place in agroecological farming system. Bee provides numerous benefits to the agriculture and have critical role in its sustainability. Moreover, beekeeping is a useful means for strengthening livelihoods of small holders. Through this baseline, the project team studied the status of bee farming within project sites in Sindhupalchok and Kaski. The findings show that only 5% of the respondents have beehive in their homestead. Bee keeping was reported by 24% of respondents of Kaski. In rural communities where access to income is limited, small-scale beekeeping can contribute significantly to livelihood security (FAO, 2009). The team should explore possibilities to encourage bee farming among the target groups as on-farm income source.

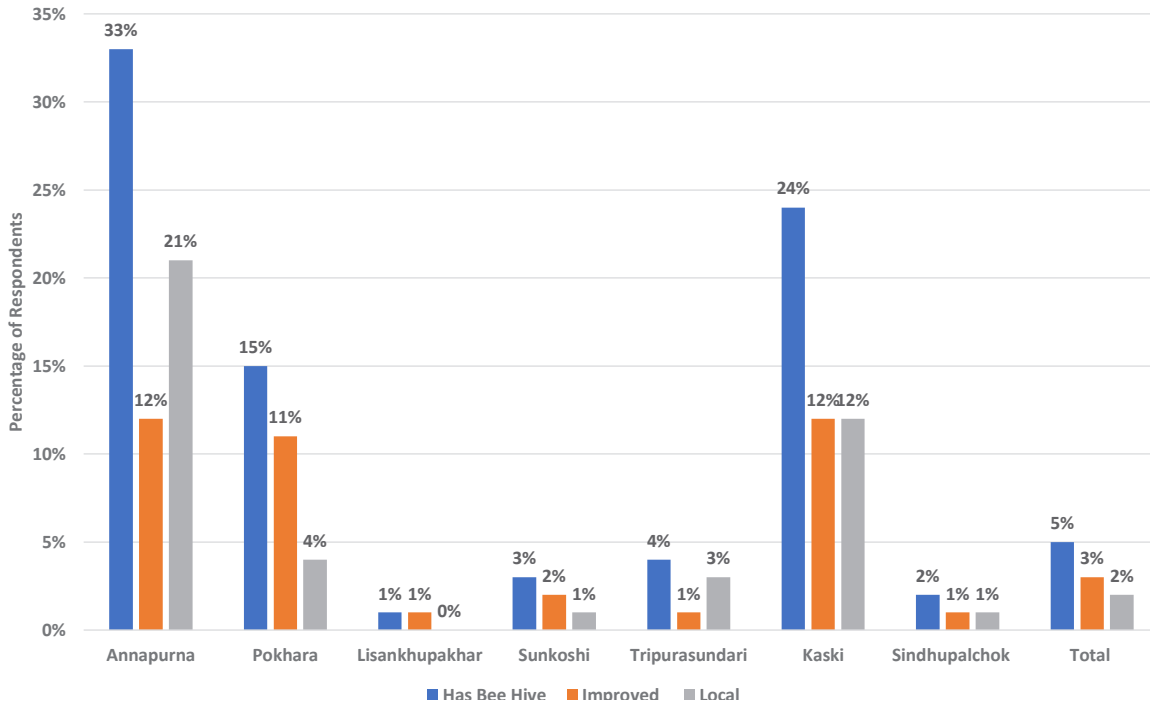

Figure 10: Bee Keeping in Study Sites

3.2 Objective 2: Increase Adaptive Capacities and Resilience of Vulnerable Communities to Climate and Disaster Risks

For a society to be resilient to climate change and disaster, communities should be able to monitor climate change and hazards; assess risk; plan and implement adaptation, mitigation and preparedness activities. Communities should have mechanisms in place that will support increased access to resources for implementing such plans. Local Disaster and Climate Resilient Plan (LDCRP) addresses climatic and non-climatic risk. There are five steps to the LDCRP process: Coordination, Vulnerability and Capacity Assessment, Local Disaster and Climate Resilient Plan preparation including identification of activities, Implementation, and Monitoring and Evaluation. Key Informant Interview was carried out to collect the information required for this objective. LI-BIRD in collaboration with Community Development and Environment Conservation Forum and Lisankhupakhar Rural Municipality recently prepared LDCRPs of all the wards of Lisankhupakhar. It suggests that LDCRP of three wards of Lisankhupakhar i.e. Ward No 1 Thulodhading, Ward No 5 Jethal and Ward No 6 Petku have been formulated and endorsed by the local government. But activities identified in the plans have not been implemented yet. While, in case of project sites of Tripurasundari and Sunkoshi, LDCRPs have not

been formulated. However, it is found that these Rural Municipalities have initiated the first step of LDCRP process and formed local disaster and climate resilient committee. The project will facilitate and provide technical support for completing remaining steps for formulating LDCRPs including Vulnerability and Capacity Assessment, and Local Disaster and Climate Resilient Plan preparation including identification of activities.

3.3 Objective 3: Contribute to Create Favourable Policy Environment for Mainstreaming Climate-resilient Agriculture in Government (federal, provincial and local) Policies and Plans.

Climate Change Policy 2019 (revision of climate change policy 2011), National Environment Policy 2019, Agriculture Development Strategy 2015, National Adaptation Programme of Action (NAPA), and Local Adaptation Plans of Action (LAPA) are some of plans, policies and strategies that are developed by the Government of Nepal for agriculture related to climate change. The third objective is about creating favourable policy environment for climate resilient agriculture and agroecological farming. The number of events organized and participants attending those events such as policy dialogue, seminar, training and travelling seminar to enhance capacity of stakeholders are set as the indicators of the objectives. The details of the events and the participants will be maintained in a table during each reporting period.

Recommendations

The finding of the study suggests that more than one third of women are in the household decision-making roles. Hence, the project needs to ensure their participation in capacity building programmes and activities for effective adoption of agroecological farming practices and technologies.

Fresh vegetables and livestock are identified as major source of income for majority of the respondents. However, small volume of production (for both vegetable and livestock) is the key constraint for the market development. Therefore, the project should conduct a study, and identify potential commodities and coordinate with farmers to come up with a sizable quantity of identified agroecological products and link them with the markets.

As the project focuses on production and marketing of safe food grown following agroecological farming practices, branding or certification of such products will be win-win situation for both producers and consumers. Participatory Guarantee Systems (PGS) can be one of the viable options for certification of the products. The project should facilitate developing the capacity of its staffs for assisting in the target groups for the certification process.

The concept of agroecological farming is new to the target Rural Municipalities of Sindhupalchok district. There is a need of mass awareness and support activities for promotion and adoption of agroecological farming technologies. Currently only few households are following selected agroecological practices. The project can demonstrate efficiency and effectiveness of other practices and encourage more farmers to adopt them by establishing model ecological villages.

There is a need to revise activities of the project to meet the indicators of the project. After the restructuring of Nepal, now there is a three-tier government (central, provincial and local level) system. Hence, policy lobbying and advocacy activities through meetings, trainings and workshops/seminars targeted for national government should be changed to reach the government agencies at provincial and local level as they now have full authority to formulate policies and develop plans which fits best for their context. Similarly, there are few other activities that require revision.

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Annex I

Scaling up Climate Resilient Agriculture for Sustainable Livelihood of Smallholder Farmers in Nepal

Baseline Survey, 2019

Date: .....

Name of Enumerator: .....

Interview started time: .....

Name of respondent: ....

(Respondent' must be someone with decision making power in agriculture or household matters)

Contact number: ....

Caste/Ethnicity: ..... (1=Dalits, 2=Janajati, 3=Others)

Education of respondent: .....

Occupation of respondent: .....

Address:

District: ..... Rural municipality: ..... Ward#: .....

Settlement/tole: .....

Review by Supervisor

Reviewed by: .....

Questions to be re-done: .... or Okay: .....

Q.1 Who is the major decision maker in you households for the following activities?

Particulars	She decides	They decide jointly	He decides
Planting crops (Crops selection/Season)			
Expenditure on education and health			
Sale of crops and livestock			

Supplement question

Q.2 Who makes the decision on overall household expenditure? (Male/Female)?: .....

Q.3 Do you own farm land (Yes/No): .....

Q.4 How much Khet area are you cultivating (including rented/shared-in)? .....Ropani

Q.5 What is the area of cultivated Bari land? : ..... Ropani

Q.6 How much uncultivated land do you have? ..... Ropani

Q.7 Could you please, list out the name of crops/varieties that you are growing in your farm land?

8a. Name of crops grown in *Khet* land last year

SN	Name of crops	Varieties
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

8b. Name of crops grown in *Bari* land last year

SN	Name of crops	Varieties
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Q.9 How many months do you have food sufficiency from your own production?

..... (months) [This is the cross question for Q19]

Q.10 Could you please, list out the crops that were grown in your Home Garden?

SN	Name of crops grown on winter season	Name of crops grown on summer seasons?	Fruits/Fodder/other perennial
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

11. For how many months do the vegetable from your home garden contribute to the HH diet?

..... (months)

Q.12 Do you buy fruits for family consumption? (Yes/No): .....

Q.13 If yes, how much did you spend on buying fruits in last 12 months? Rs. .....

Q.14 Do you buy vegetables for family consumption? (Yes/No): .....

Q.15 If yes, how much did you spend on buying vegetables in last 12 months? Rs. .....

Q.16 How many livestock do you have?

SN	Name of livestock	Improved number	Local number	Total number
1	Buffaloes			
2	Cows/oxen			
3	Sheep/goats			
4	Chicken/Ducks/Pigeon			
5	Pigs			
6	Others (Specify).....			
7				
8				
9				
10				

Q.17 Did you sell any livestock or livestock product in last 12 months (Yes/No): .....

[This is the cross question for Q19]

Q.18 Are you practicing any of the following agro-ecological practices?

18a Integrated Pest Management (Yes/No): .....

18b If yes, provide the following information in details on:

SN	IPM Technologies (Repellent crops, Insect traps, Bio-pesticide, ...)	Name of crops
1		
2		
3		
4		

18c Use of Bio-pesticide

SN	Name of crops	Pest	Type of bio-pesticides (1=Home made, 2= Get it from market, 3=Both)
1	Cauliflower	Aphid	1
2			
3			
4			

18d Use of disease/pest resistant crop/varieties

SN	Name of crops	Varieties	Resistant to
1	Potato	Axona	Late blight
2			
3			
4			

18e Use of stress tolerant crop/varieties

SN	Name of crops	Varieties	Type of stress
1	Rice	Sukkha-1	Drought
2			
3			
4			

18f Using green manuring (cut and carry)

SN	Name of crops	Name of green manures
1	Potato	Asuro
2		
3		
4		

18g Multiple/ Efficient Use Water System (MUS) [Tick on appropriate options]

SN	Technology/tools used	Name of crops that MUS applied
1	Drip irrigation	
2	Sprinkler	
3	Rain water harvesting	
4	Gray water collection and use	
5	Others (specify if any)	

18h Do you grow legume crops in your farm land (as a sole or mixed crop) [Do not include the legume grown in the bond or home garden]

SN	Name of legume crops	Area (Ropani)
1	Soyabean	3
2		
3		
4		

18i Do you have improved livestock shed (Yes/No)?:

- If yes, is floor is maintained well? (observed by enumerators) Yes/No: .....
- Is urine collected and use (Yes/No): .....

18j Is your farm yard manure management traditional or improved? .....

- If improved, maintained roof on the FYM (Yes/No): .....
- Is pit well dig out (Yes/No): .....

18k Do you have bee hives (Yes/No) .....

18l If yes, how many do you have? Improved: ..... Local: .....

18m Do you have fodder/other/fruit trees in your farmland (except home garden)?

SN	Name of fodder species	
1		
2		
3		
4		

18m Do you cultivate forage in your farmland?

SN	Name of forage species	5.
1		6.
2		7.
3		8.

Supporting questions:

18n Do you use chemical pesticides (Yes/No)?: .....

(This question is applied who use chemical pesticides on farm crops rather than home garden)

18o If yes, give the following information in details-

SN	Name of the crops	Pest/Disease	Total spending in NPR	Frequency of application
1				
2				
3				
4				

18p Do you use of chemical fertilizer (Yes/No)?: .....

(This question is applied who use chemical fertilizer on farm crops rather than home garden)

18q If yes, give the following information in details-

SN	Name of crops	Name of fertilizer	Amount applied (KG)	Total spending (NPR)
1	Potato	Urea	50	2500
2	Potato	DAP	100	5000
3	Potato	MoP	30	1800
4	Maize			
5				
6				
7				

Q.19 How much did you earn from on-farm in last 12 months?

(Questions associate with crop/livestock diversity – if sold or not, amount sold, average price?)

SN	Particulars	Crops sold	Total Amount (NPR)
1	Cereals	Rice, Maize, Millet, wheat	5000
2	Vegetables		
4	Legumes		
5	Fruits		
6	Oil Seed		
7	Spices		
8	Potato		
9	Other root and tuber		
10	Live Animal		
11	Animal Products		
12	Processed Products (Sinki, Gundruk...)		
13	Others (if any).....		

Q.20 Are you associated with any farmers group or cooperatives (Yes/No): .....

Q.21 If yes, name the group or cooperative that you associated:

....

Q.22 Did you receive any training (Yes/No): .....

Q.23 If yes, please tick the following

a) Nursery management
b) Vegetable production
c) Fruit farming
d) Seed production
e) IPM or disease/pest management
f) Cattle-shed improvement
g) Mushroom production
h) Bee keeping
i) Others (Specify).....

Thank you for your valuable time and information!

End of the questionnaire

For more information

Local Initiatives for Biodiversity, Research and Development (LI-BIRD)

Head Office
PO Box 324, Pokhara, Nepal
Phone: +977 61 526834, 535357 | Fax: +977 61 539956
Email: info@libird.org | Web: www.libird.org

Programme Coordination Office
Sanepa, Lalitpur
Phone: +977 01 5540330

9 789937 075084