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Small Irrigation Programme II

Baseline Report

Small Irrigation Programme

Programme Management and Implementation Support Consultant (PMISC)

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Baseline Report

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Abbreviations & Acronyms

BCTN	:	Brahmin, Chhetri, Thakuri and Newar
COVID-19	:	Corona Virus Disease 2019
DAG	:	Disadvantaged Group
FGDs	:	Focused Group Discussions
Ha	:	Hectare (1 Ha = 20 ropani; 1 ropani = 508 square meters)
HHs	:	Households
Kg	:	Kilogram
KIIs	:	Key Informants Interviews
LGs	:	Local Governments
Msl	:	Mean Sea Level
Mt	:	Metric ton
MPI	:	Multidimensional Poverty Index
mVAM		Mobile Vulnerability Analysis and Mapping
MoALD	:	Ministry of Agriculture and Livestock Development
NGO	:	Non-governmental Organisation
NRs	:	Nepalese Rupees
SIP-II	:	Small Irrigation Programme, Phase II
SPSS	:	Statistical Package for Social Sciences
WUAs	:	Water Users' Associations

Table of Contents

Acknowledgements	ii
Abbreviations & Acronyms	iii
Executive summary	vi
1 Introduction and Background.....	1
1.1 Programme Context.....	1
1.2 Objectives of the Baseline Study.....	1
2 Methodology	3
2.1 Study Areas	3
2.2 Study Design	4
2.2.1 Household survey	4
2.2.2 Focused group discussion and key informant interview	5
2.3 Analysis and Interpretation.....	6
2.4 Limitations	7
3. Findings	8
3.1 General Features of Surveyed Households.....	8
3.2 Types of Farmers by Gender of Household's Head.....	8
3.3 Land Use and Land Holding.....	9
3.4 Winter Fallow	9
3.5 Land Use Under Different Major Crops	10
3.6 Different Crops Grown in Surveyed Areas	11
3.6.1 Vegetables, spices and fruits grown.....	11
3.6.2 Production and productivity.....	12
3.7 Access to Markets.....	13
3.7.1 Major trading places.....	14
3.7.2 Trade volume.....	15
3.7.3 Access to market information.....	16
3.7.4 Marketing challenges	16
3.8 Annual Income of the Surveyed Households.....	17
3.9 Own-Farm Food Sufficiency Status.....	18
3.10 Local Level Policy Environment	19
3.11 Poverty Prevalence.....	21
3.12 Migration.....	21

3.12.1 Purposes of migration	22
3.13 Challenges to Agriculture Commercialisation	23
4. Conclusion	25
References	26
Annexes	27
Annex I: Indicator wise baseline values of the project results	27
Annex II: Number of schemes selected by district	37
Annex III: Participants in FGDs & KIIs	38
Annex IV: FGDs and KIIs checklist	49
Annex V: Households and population data of the surveyed Palikas	58

List of Tables

Table 1: Total number of households surveyed by various categories	4
Table 2: Distribution of FGDs and KIIs	5
Table 3: MPI dimensions, indicators and their weights for analysis	7
Table 4: Farmers types by gender of household's head	8
Table 5: Land holding size of the surveyed households	9
Table 6: Status of winter fallow land	9
Table 7: Reasons behind keeping land fallow (multiple choices)	10
Table 8: Average areas per household under major crops in different ecological zones	11
Table 9: Productivity of major crops	12
Table 10: Area, production and productivity of winter vegetables	13
Table 11: Selling places for major crops and vegetables	14
Table 12: Farmers selling vegetables disaggregated by ethnicity and gender of HH head	15
Table 13: Volume of main crops sold by the farmers annually	15
Table 14: Average annual household income by ethnicity and household headship	17
Table 15: Own-farm food sufficiency status by disaggregated by ethnicity	19
Table 16: Various services received by the farmers (multiple choices)	20

List of Figures

Figure 1: Percentage of HHs cultivating different crops	11
Figure 2: Percentage of surveyed HHs growing different vegetables and fruits	12
Figure 3: Percentage of farmers growing and selling different crops and vegetables	14
Figure 4: Households receiving information from various sources	16
Figure 5: Average income from various sources among the surveyed households	18
Figure 6: Own-farm food sufficiency status	18
Figure 7: Multidimensional Headcount Ratio	21
Figure 8: Major purposes behind migration	22
Figure 9: Challenges of agriculture commercialisation by types of farmers	23
Figure 10: Challenges for agriculture commercialisation by ecological zone	24

Executive summary

Introduction and background

Small Irrigation Programme (SIP) Phase II has been implemented collaboratively by the Government of Nepal and the Government of Switzerland in 57 Palikas (municipalities) of eight districts in Province One. SIP-II aims to provide year-round irrigation to 20,000 hectares of land through 1,300 small scale irrigation schemes managed by community driven process benefiting 65,000 farmer households (HHs). The programme was started from July 2020 and will complete in December 2024. The key expected outcomes of the programme are to achieve: (i) Local governments (LGs) respond effectively to needs of small farmers for irrigated agriculture; (ii) Small farmers, especially from disadvantaged groups (DAGs), increase agricultural productivity; and (iii) Market actors offer innovative supports and products to farmers under the irrigated schemes.

The baseline study was carried out during the period of January to April 2022 in 59 irrigation schemes of 16 LGs of eight districts. The survey has intended to establish detailed baseline values on key programme indicators to help measure the results of the programme during the course of its implementation, and to report changes occurred in the life of small farmers associated with Water Users Associations (WUAs) in SIP-II working municipalities.

The study followed a mixed-method of study using both quantitative and qualitative approaches of data collection. The study surveyed a total of 1,770 HHs using structured questionnaire, conducted 57 key informant interviews (KIIs) with LG officials (16), representatives of ward offices (16), officials from municipalities' agriculture development section (16), input suppliers (4), municipal level chamber of commerce and industry (3) and representatives of municipalities' economic development committee (2). Similarly, a total of 12 focused group discussions (FGDs) were conducted with WUAs (6), farmers' groups (3) and returnee migrants' youth in groups (3). Locally hired field researchers were trained and deployed for HH survey using KoBO toolbox. KIIs and FGDs were largely facilitated by the study Team Leader and expert members of the study team. The surveyed data were analysed using SPSS to present descriptive statistics of the findings. As much as possible and appropriate, the quantitative data were disaggregated by gender, caste/ethnicity, ecological zones (High-hills, Mid-hills and Foot-hills), and the type of farmer (commercial, semi-commercial and subsistence).

The surveyed HHs composed of 16% female and 84% male from 22% female-headed and 78% male-headed HHs. Among these, 2% were commercial farmers, 17% semi-commercial farmers, and 81% subsistence farmers. The average family size of the surveyed HHs was 5.2 with economically active population of 3.71. The surveyed HHs belong to Janajatis (55.4%), Brahmin, Chhetri, Thakuri and Newar (BCTN) (35.7%) and Dalits (8.9%).

Findings

The major findings of the baseline study are summarized as follows:

1. Among the total surveyed HHs, 83% cultivated their own land; 15% were partial shared cropper' and 2% were 'only shared cropper'. The average land holding of the surveyed HHs was 0.85 hectare (ha) with minimum holding of 0.03 ha to the maximum of 5.0 ha. The proportion of HHs with less than 0.5 ha land holding was 39% while HHs having more than 3 ha of land was only 2%. Compared to other caste/ethnic groups, the average land holding of HHs belonging to Dalit community was found to be relatively smaller. Average area of maize, paddy, wheat, and potato

in the study locations was 0.33, 0.38, 0.25, and 0.04 ha per HH respectively. The productivity of major crops among survey HHs are: maize (4.38 metric ton (Mt)), monsoon paddy (3.56 Mt), wheat (2.09 Mt) and Potato (15.59 Mt) and the cropping intensity was 160%.

2. In addition to the major crops mentioned above, the farmers also cultivated different crops such as millet, buckwheat, vegetables (cabbage, cauliflower, radish, carrot, onion, green vegetables, potato), fruits (orange, lime), and spices (cardamom, garlic, chilli, ginger).
3. Winter vegetable was found to be one of the most prominent commodities cultivated by 29% of the total HHs surveyed. Average productivity of the winter vegetables was 3.84 Mt per ha.
4. Agriculture alone contributes nearly 57% of the total income of the surveyed HHs. Remittance constitutes 22% of the HH income and other sources 21%. The remittance earning HHs have relatively better economic status than other HHs. The average annual income of the surveyed HHs was Nepalese rupees (NRs) 132,735. Remittance-receiving HHs have an average income of NRs 382,661, whereas other HHs have an average income of only NRs 113,452. When average annual income is disaggregated by caste/ethnicity, the BCTN ranks higher (NRs 181,503) than Janajati (NRs 106,771) and Dalit HHs (NRs 99,077).
5. In the surveyed HHs, 74% HHs found 'own-farm food deficit' at least for three months. Only 3% are producing surplus foods. The proportion of HHs belonging to food deficit category are largely from Dalit community. None of the HH from Dalit community surveyed found 'own farm food sufficient'.
6. Among the surveyed HHs, 46.6% found selling at least one agriculture product. Among them, the largest proportion was of fresh vegetable sellers (44.7%) followed by potato (25.5%), and paddy (6%) sellers. Farmers generally sell their agriculture products to local markets, hat-bazaar (weekend market), collection centres, collectors and whole sellers. The commonly sold vegetable are cabbage, tomato, cauliflower, radish, carrots, onion and leafy green vegetables. The average volume of vegetable sold per annum was 1.6 Mt per HH.
7. The farmers are getting information on agriculture from various sources agro-vets, cooperatives, and local traders (61%), vendors (48%), municipality (18%) and other sources such as radio, television, and cooperatives.
8. Most of the surveyed municipalities have periodic plans as their guiding policy document. Suryodaya, Municipality and Sandakpur Rural Municipality in Ilam, Dhankuta Municipality, Dhankuta and Chaudandigadhi and Belaka Municipalities of Udayapur districts have developed plans for commercial production of high value agriculture integrating small irrigation programme.
9. The farmers revealed that they have received agriculture related advisory services and subsidies from the local and provincial governments (14%) and from non-governmental organisations (NGOs) (15%). Farmers responding whether they have received training and technical support at least once from agriculture technicians under the local government was 82%.
10. The survey revealed that 28% HHs have at least a member in migration. Among the total number of migrants reported, 84% are in foreign countries and 16% in different cities of Nepal. The main purposes of migration were labour employment (82%), professional jobs (11%), education (6%) and other (1%). Although the foreign migration has positively impacted on local economy it has adversely affected the agriculture creating labour shortage.
11. There are some impeding factors revealed from the survey that contribute to hinder the commercialisation of agriculture are lack of market (56%), high cost of inputs (50%), expensive transportation cost (47%), high cost of labour (47%), poor agriculture advisory services (38%), difficult to get credit (37%), and high interest rate (37%) among others.

12. Other pertinent issues of agriculture sector of the study areas, in priority order, are: i) lack of adequate infrastructure facilities and services such as irrigation, storage and market facilities, ii) lack of effective technical advisory services, iii) lack of quality inputs, iv) lack of proper policy on land and other resources use at local government level, and v) adverse weather and climate.
13. In the winter season, nearly 34% farmers leave up to 22% of their total cultivable land fallow because of lack of irrigation, labour shortage and inaccessibility (remoteness).

Conclusion

The programme has reached to and targeted disadvantaged small farmers in the programme areas. Agriculture commercialisation is still a challenge due to smaller land holding size, poor market accessibility and weak extension services. Winter fallow is a pertinent issue, relatively more with subsistence farmers, resulting lower cropping intensity. However, with increased access to year-round irrigation facilities, there is an immense opportunity to increase cropping intensity, overall production and productivity of agriculture sector in the programme areas contributing to poverty alleviation.

Since a large proportion of farmers in SIP-II areas are at subsistence level and food insecure, agriculture commercialisation is possible only when food insecurity issues are addressed. Therefore, to transform the subsistence farming to semi-commercial and then commercial agriculture farming, it is essential to intensify the technical services and develop a context-specific local strategy on agriculture. Considering food security as a major issue of the local communities is imperative to increase production and productivity.

1 Introduction and Background

1.1 Programme Context

The Government of Nepal, in collaboration with the Government of Switzerland, has been implementing Small Irrigation Programme (SIP) since February 2015. The first phase of the programme contributed to avail year-round irrigation, increase in crops yield and cropping intensity in the programme areas. This will result in an increase in production and productivity of major cereal crops (maize, paddy and wheat) by 50% (Pro-Doc SIP 2020).

The second phase of the programme (SIP-II) aims to reduce poverty of small farmers especially from the disadvantaged groups (DAGs) by about 40% by increasing their agricultural income. The programme has three key outcomes to achieve: (i) Local Governments (LGs) respond effectively to needs of small farmers for irrigated agriculture; (ii) small farmers especially from DAGs increase agricultural productivity; and (iii) market actors offer innovative supports and products to farmers in irrigated schemes.

SIP-II works in four areas: 1) Institutional strengthening and capacity development of local governments, 2) Improving irrigation infrastructures, 3) Strengthening water users' association (WUA) managed irrigation systems; and 4) Agricultural marketing.

SIP-II is implemented in 57 LGs of Ilam, Panchthar, Dhankuta, Tehrathum, Bhojpur, Khotang, Okhaldhunga, and Udayapur districts of Province One. It aims to provide year-round irrigation to 20,000 hectares (ha)¹ of land through 1,300 small-scale irrigation systems managed by local communities benefiting approximately 65,000 farmer HHs. SIP-II is implemented by LGs. As the mandate to implement small irrigation programs lies with Rural Municipalities and Municipalities as per the Constitution of Nepal, 2015, the LGs have the overall responsibility for planning, managing and implementing the programme. Each LG appoints technical personnel as a focal person to ensure quality. The provincial Water Resource and Irrigation Development Division under the Ministry of Water Supply, Irrigation and Energy is responsible for oversight of the programme from the higher level.

1.2 Objectives of the Baseline Study

The baseline study of SIP-II intended to establish detailed baseline values on key indicators to measure the results in working locations during the course of programme implementation. This will enable the programme to report changes occurred in the lives of small farmers associated with WUAs in the SIP-II working municipalities.

The specific objectives of the baseline study were to:

- Review and compile relevant information from secondary sources (federal and provincial data on agriculture income and poverty).
- Verify existing baseline data from secondary sources reported in the programme document.

¹ Irrigation Masterplan, Water Resource Programme Preparation Facility, 2019.

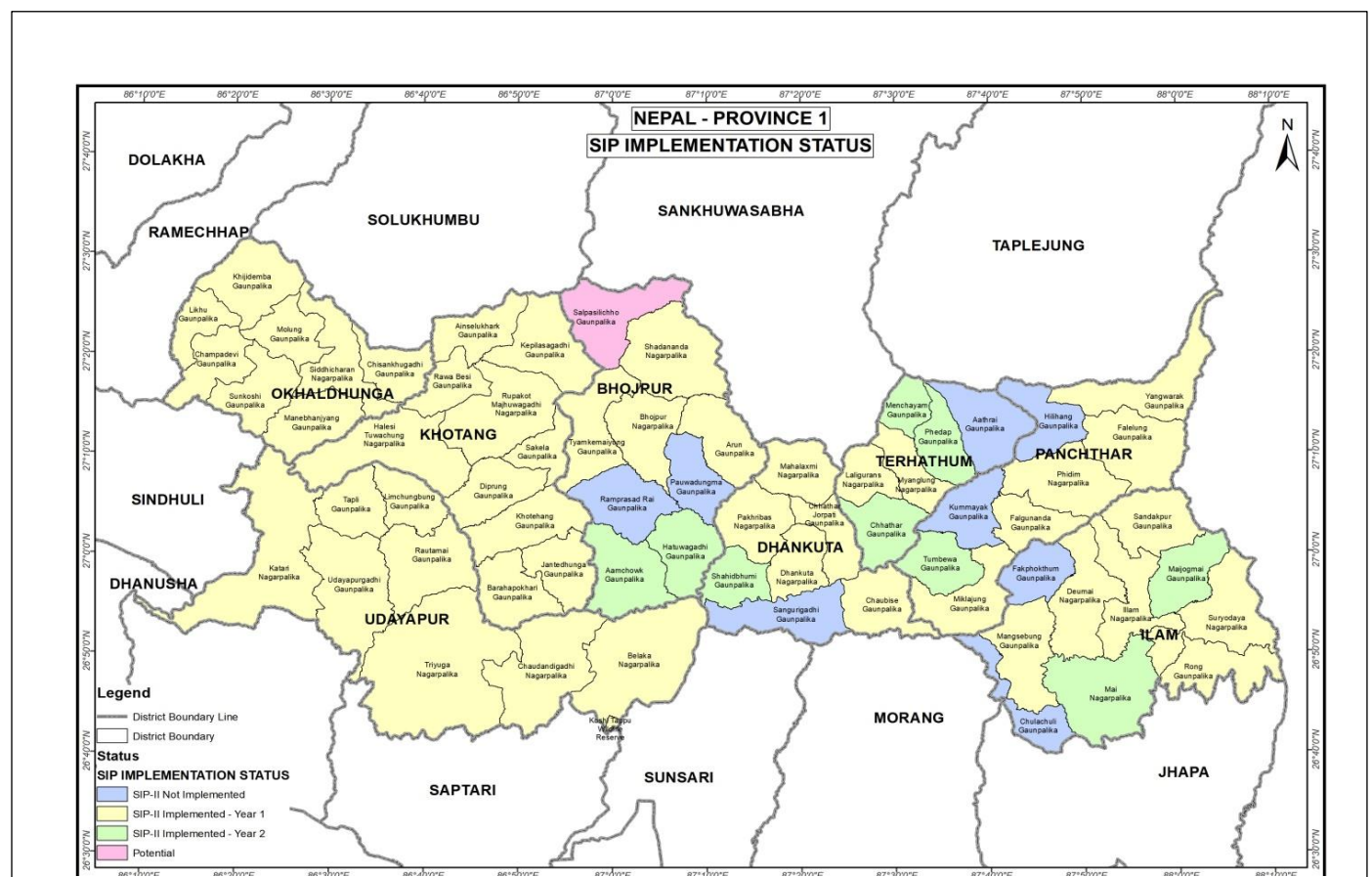
- Collect quantitative HH information pertaining to the Impact and Outcome Indicators of SIP-II Logframe.
- Assess the levels of attitude and practice on commercial agriculture, more specifically the incentives and challenges for it.
- Explore the migration trend and its impact on agriculture.

2 Methodology

2.1 Study Areas

This study was conducted in the selected municipalities and rural municipalities of Province One, namely Suryodaya municipality, and Sandakpur rural municipality of Ilam; Falgunanda rural municipality and Phidim municipality of Panchthar; Chaubise rural municipality and Dhankuta municipality of Dhankuta; Bhojpur municipality and Tyamke Maiyum rural municipality of Bhojpur; Laligurans rural municipality and Myanglung municipality of Tehrathum; Dibrung Chuichumma rural municipality and Diktal Rupakot Majhuwadgaadhi municipality of Khotang; Molung rural municipality and Siddicharan municipality of Okhaldhunga; and Belaka municipality and Chaudandigadhi municipality of Udayapur district.

The study area expanded across three ecological zones namely Foot-hills (below 1,000-metre altitude), Mid-hills (1,000-1,500 metre) and High-hills (above 1,500 metre). From each district two rural/municipalities were selected representing commercial, semi-commercial and subsistence farming communities based on the proximity to the major highways.



Map showing programme locations

2.2 Study Design

The baseline study used mixed research methods by combining desk review, quantitative and qualitative approaches of information collection. Programme beneficiaries i.e. farmers benefitting from the irrigation schemes supported by SIP-II were the primary sources of information. Study team also collected information from secondary sources like review of relevant documents, reports, and information from the stakeholders.

2.2.1 Household survey

To ensure proportionate representation of irrigation schemes from different ecological zones (high-hills, mid-hills and foot-hills), and accessibility to major road networks of the programme districts, a total of 59 irrigation schemes, benefiting at least 30 HHs, from the 16 municipalities were selected for the study. From each scheme, 30 HHs representing users from head, middle and lower/tail section of irrigation canal were interviewed. From each of the selected municipalities, two to five irrigation schemes benefiting at least 30 HHs were randomly selected. Schemes benefiting less than 30 HHs were not included in sampling frame; because schemes were taken as sampling population and not HHs; as per the general 'rule of thumb' the minimum sampling population for research is 30².

In total, 59 schemes covering 1,770 HHs (Table 1) at the rate of 30 HHs per scheme were selected. For the purpose of sampling, a list of irrigation scheme with number of beneficiaries' HHs was received from programme. The HH survey was conducted by mobilising eight experienced enumerators using KoBO Toolbox, after a two-day orientation.

During the entire HH survey, fair participation of DAGs was ensured by prioritising the disadvantaged groups for HH and qualitative surveys.

The district wise number of irrigation schemes selected for baseline study given in annex II.

Table 1: Total number of households surveyed by various categories

	Frequency	Percent
Gender of the respondents		
▪ Female	286	16.2
▪ Male	1,484	83.8
▪ Total	1,770	100
Household head		
▪ Female	397	22.4
▪ Male	1,373	77.6
▪ Total	1,770	100
Caste/Ethnicity		

² <https://towardsdatascience.com/is-n-30-really-enough-a-popular-inductive-fallacy-among-data-analysts-95661669dd98>

▪ BCTN	632	35.7
▪ Dalit	158	8.9
▪ Janajati	980	55.4
▪ Total	1,770	100

2.2.2 Focused group discussion and key informant interview

Besides the HH survey, 12 focused group discussions (FGDs) and 57 key informant interviews (KIIs) were carried out (participants details are in annex III) with wide range of stakeholders and beneficiary communities (Table 2) to collect primary information to substantiate the findings from HH survey. The key informants were technical staff of LGs, farmers, WUAs, Mayor/Chair and Deputy Mayor/Chair of municipalities, Ward chairs, local market management committees, local chamber of commerce and industries (CCI), etc. FGDs were conducted with farmers' groups/ WUAs. Separate sets of check lists for each group of participants were developed based on the study objectives and indicators of SIP-II (Annex IV).

Local governments' policies, plans and programs on irrigation and agriculture development were collected from available documents and key informant interviews.

Table 2: Distribution of FGDs and KIIs

Focused Group Discussions	No	Key Informant Interviews	No
Farmers' Group (one in each agro ecological zone) • Ilam-1 • Terhathum-1 • Udayapur-1	3	Chairperson (7), vice chairperson (7) and chief executive (2) of the selected 16 Palikas	16
Water Users Association (2 high-hill, 3 mid-hill and 1 foot-hill) Okhaldhunga-2, Khatang-2, Tehrthum-1, Udayapur-1	6	Ward Chair One from each municipality	16
Youth groups (migration related agenda: one in each agro-ecological zone) • Udayapur-1 • Okhaldhunga-1 • Khotang-1	3	Agriculture Development section staff of municipalities	16
		Economic Development Committee	2
		Value chain actors (inputs suppliers, outputs buyers/middleperson, at least one from each cluster) • Ilam-1 (agro-vet) • Panchthar-1 (agro-vet) • Dhankuta-1 (collector) • Tehrathum-1 (collector)	4

		Local FNCCI representative • Bhojpur-1 • Dhankuta-1 • Udayapur-1	3
Total	12	Total	57

Selection and orientation to enumerators: Once the tools were finalised, enumerators were oriented for two days on data collection method and tools. The objective of the orientation was not just limited to familiarising the study team with data collection method and tools, but also to brief them on: data collection/research ethics, quality control mechanisms, accountability and reporting, child safeguard policy and code of conduct of the small irrigation programme and consultancy firm-Quest for Development Initiatives.

Pre-test: Adopting security measure against COVID-19, field test was conducted for all enumerators to practice data collection techniques and pre-test the questionnaire. Based on the field test, required changes were made on the tools. The piloting of questionnaire test was done in non-sampled areas to confirm the logical flow and consistency of the questionnaire. After piloting the questionnaire, some orders were rearranged and options were amended.

2.3 Analysis and Interpretation

The information collected from the HH survey were tabulated and analysed by using excel spread sheet and statistical package of the social sciences (SPSS) tool.

All the qualitative data received from desk review, FGDs, KIIs, were synthesised and summarized based on indicators using comparative excel information sheet and triangulated with the quantitative data obtained from the HH survey. Processed data were further analysed to meet the study objectives and presented in the subsequent and relevant sections of the report using graphs, tables, and figures. Data were also triangulated and where possible the findings were compared with existing national, provincial and district level average values available in the reports. In this study, productivity of agriculture crops is calculated dividing total volume of production by the total cultivated area of each crop, and converted into Mt per ha.

To help establish impact level indicators of the programme, **Multidimensional Poverty Index (MPI)** was used. MPI is used to estimate the poverty situation of the study locations (Impact indicator 3). MPI estimation was carried out by using original method given by Alkire and Foster, 2022. It identifies how people are being left behind across **three key dimensions: health, education and standard of living**, comprising 10 indicators (Table 3). People who experience deprivation in at least one third of these weighted indicators fall into the category of multidimensional poor. It is well accepted by the Government of Nepal and is used by the National Planning Commission. The following are the dimensions, indicators and their weight for the analysis.

Table 3: MPI dimensions, indicators and their weights for analysis

Dimensions of Poverty	Indicator	Deprived if living in the household where...	Weight
Health	Nutrition	An adult under 70 years of age or a child is undernourished.	1/6
	Child mortality	Any child has died in the family in the five-year period preceding the survey.	1/6
Education	Years of schooling	No household member aged 10 years or older has completed six years of schooling.	1/6
	School attendance	Any school-aged child is not attending school up to the age at which he/she would complete class 8.	1/6
Standard of living	Cooking Fuel	The household cooks with dung, wood, charcoal or coal.	1/18
	Sanitation	The household's sanitation facility is not improved (according to SDG guidelines) or it is improved but shared with other households.	1/18
	Drinking Water	The household does not have access to improved drinking water (according to SDG guidelines) or safe drinking water is at least a 30-minute walk from home, round trip.	1/18
	Electricity	The household has no electricity.	1/18
	Housing	Housing materials for at least one of roof, walls and floor are inadequate: the floor is of natural materials and/or the roof and/or walls are of natural or rudimentary materials.	1/18
	Assets	The household does not own more than one of these assets: radio, TV, telephone, computer, animal cart, bicycle, motorbike or refrigerator, and does not own a car or truck.	1/18

2.4 Limitations

The HH survey and interview technique are generally subject to personal bias. To avoid personal biasness and data collection errors, structured questionnaire was designed and tested prior to actual administration. However, there are always possibilities of personal biasness in such type of survey where responses are largely based on the individual's memory. The survey was designed to capture the women headed, Dalits, Janajatis and poor HHs proportionately, however, most of the DAG HH heads were found to have migrated for seasonal work. Unavailability of HH heads, particularly from the sampled schemes during the survey have also impacted on the data quality as interviews were taken with another member of the HHs. Unavailability of agriculture production and productivity data at the local government level is another limitation of the study.

3. Findings

This section presents the overall findings of the baseline study under different headings and sub-heading as appropriate to the objective of the study. The initial part of this section covers demographic and social-economic characteristics of study population and communities, and gradually agriculture production, productivity, market and services related information are subsequently analysed and presented. The overall 'base values' for results indicators are presented in annex I.

3.1 General Features of Surveyed Households

The sample included 1,770 randomly selected HHs from selected WUA in the SIP-II catchment areas. The surveyed HH composed of 16% female and 84% male respondents. The headships of 22% of surveyed HHs are females and 78% are males.

Out of the total surveyed HHs 26% are from foot-hills (less than 1,000 msl); 36% from mid-hills (1,000 to 1,500 msl) and 38% from high-hills (above 1500 msl). Overall, the percentage of respondent by caste/ethnicity were: Janajatis (55.4%), BCTN (35.7%) and Dalits (8.9%). The population of Dalits is small in the selected schemes, despite of the effort of the survey team to prioritise Dalits and other disadvantaged HHs.

According to the recent census report (2021), there are 120,420 HHs in the eight SIP-II implemented districts (Annex V) with total population 554,444, out of which 308,550 are females and 245,894 are males. Average size of the surveyed HHs is 5.20, which is higher than both national average (4.3) and provincial average (4.13)³. Average economically active population size in the surveyed HHs found to be 3.71.

3.2 Types of Farmers by Gender of Household's Head

Commercial farmers, who grow vegetables and other cash crops primarily for commercial purposes, account for 1.9% of the total surveyed HHs; semi-commercial farmers, who sell parts of their products, account for 16.9%; and subsistence farmers are 81.2%. Among the commercial farmer's category, the proportion of female-headed HHs is only 18.2%, while it is 24% in the case of subsistence farmers (Table 4). The finding suggests a disproportionate domination of male-headed HHs in agricultural commercialisation.

Table 4: Farmers types by gender of household's head

Household head		Commercial farmer	Semi-Commercial farmer	Subsistence farmer	Total
Female	Number	6	46	345	397
	%	18.2%	15.3%	24.0%	22.4%
Male	Number	27	254	1092	1,373
	%	81.8%	84.7%	76.0%	77.6%
Total	Number	33	300	1,437	1,770
	%	100%	100%	100%	100%

³Central Bureau of Statistics (CBS), 2021

As majority (81%) farmers from the surveyed areas are practicing subsistence farming, there is immense scope to introducing improved farming practices along with irrigation to scale them up to semi-commercial and commercial levels.

3.3 Land Use and Land Holding

The survey findings showed that 83% HHs cultivate the land they own, while only 2% are share-croppers (cultivating others' land only), and the remaining 15% are both land owners and share-croppers. With this, 17% survey HHs grow crops as shared croppers. Land leasing or sharing farm products along with cost of cultivation are already in practice, which is done as an informal/ tradition practice. Some of the respondents in FGDs shared that they are facing difficulties on leasing (acquiring) land for farming due to lack of proper land leasing regulation and guidelines at local level. Due to lack of legal frameworks, present informal land leasing practices (contract or shared cropping) are not motivating for the farmers.

Among the surveyed HHs, average land holding size is 0.85 hectares with a minimum of 0.03 ha to the maximum of 5.00 ha. Percentage of farmers with less than 0.5 ha of land is 39.1% (Table 5). Among the surveyed HHs, 74% have less than one ha of land.

Table 5: Land holding size of the surveyed households

Land holding size	Frequency	Percent	Cumulative Percent	Average (ha)
Less than 0.5 ha	692	39.1	39.1	0.31
0.5 to 1 ha	617	34.9	74.0	0.77
1 to 3 ha	433	24.5	98.4	1.63
More than 3 ha	28	1.6	100.0	3.65
Total	1,770	100		0.85

BCTN (0.87 ha) and Janajati (0.89 ha) communities hold relatively larger size of land compared to the HHs belonging to Dalit communities. 82% of Dalits, 5% of Janajatis and 35% of BCTN have less than 0.5 ha of land holding. On the other hand, farmers with more than 5 hectares of land are Janajati (1.5%) and BCTN (2%) HHs. Landlessness is disproportionately prevalent among Dalits; none of the HHs included in the survey from Dalit community has more than 0.5 ha of land. The average landholding size of Dalit (0.42 ha) HHs is less than half of BCTN and Janajatis. Above 90% commercial farmers have more than 0.5 ha of land. Only few smallholder HHs with less than 0.5 ha land are practicing commercial farming.

3.4 Winter Fallow

The study revealed that 28% of the total surveyed HHs in the project location areas leave part of their cultivable land fallow in any season. Thirty-four percent farmers leave 30.5% of their arable land fallow during winter (Table 6).

Table 6: Status of winter fallow land

Seasons	Average Area cultivated (Ha)	Fallow-land		
		Number of HHs	%	Average Area (Ha)
Monsoon	0.55 (89.9%)	288	16%	0.06 (10.1%)
Winter	0.43 (69.5%)	472	34%	0.19 (30.5%)
Plantation area ⁴	0.23	NA		

The main reason for leaving land fallow is ‘lack of irrigation’ (85.50%) during winter season. However, it was also noted that 16% of the HHs leave the land fallow even during monsoon season. The reasons mentioned during the HH survey, which was also substantiated during FGDs with farmers’ groups, were insufficient family labour (46.7%), distance from farm land and home (30.50%), high cost of production (31.7%), lack of market (19.50%) among others (Table 7). In case of migrant HH’s insufficient family labour has been prominently (55.0%) mentioned.

Table 7:: Reasons behind keeping land fallow (multiple choices)

Reasons for leaving land fallow	HH types		HH headship		Land ownership		
	Non-migrant (n=332)	Migrant (n=160)	Women (n=104)	Male (n=388)	Shared cropper only (n=3)	Land owner (n=282)	Both (n=107)
Lack of irrigation facility	85.8%	85.0%	85.6%	85.6%	100.00%	83.5%	92.50%
In sufficient family labour	42.8%	55.0%	48.1%	46.4%	66.70%	53.9%	20.60%
Inaccessibility (far from house)	30.4%	30.6%	28.8%	30.9%		35.9%	12.10%
High cost of production (lack of economic incentives)	31.70%	34.4%	26.9%	33.0%		37.4%	12.10%
Lack of market	19.50%	20.6%	21.2%	19.1%		21.7%	12.10%
Other-unspecified	13.40%	14.4%	5.8%	15.5%		14.9%	8.40%

As shared by representatives of the respective local governments at Sandakpur of Ilam, Myanglung and Laligurans of Tehrathum, and Belaka of Udayapur districts, local governments have developed land management policy to ensure no arable land is left fallow within the territory of their municipalities. However, the findings from the HHs survey does not substantiate this information.

3.5 Land Use Under Different Major Crops

Maize, paddy, wheat and potato are major crops cultivated in the SIP-II working areas. Maize is dominant crop in the foot- and high-hills whereas paddy is leading crop in the mid-hills. Area of potato cultivation was found to be relatively small among surveyed HHs (Table 8).

⁴ Included of *Khabari*, agro-forest, fodder/forage etc.

Table 8: Average areas (in Ropani) per household under major crops in different ecological zones

Ecological range (altitude)		Maize	Paddy	Wheat	Potato
Foot-hills (<1,000 msl)	n	436	400	36	457
	Average Area	8.5	6.98	3.9	0.4
Mid-hills (1,000 to 1,500 msl)	n	519	478	118	635
	Average Area	5.6	7.83	4.5	0.7
High-hills (> 1,500 msl)	n	631	337	202	678
	Average Area	5.6	7.54	5.4	0.8
Total (N)		1,586	1,215	356	965
Total Average Area		6.4	7.47	5.0	0.7

n = number of farmers growing particular crop

3.6 Different Crops Grown in Surveyed Areas

The farmers in the programme areas grow different types of crops such as cereals, vegetables, pulses, spices, legume and oil seed crops. The main cereal crops are paddy, maize, wheat, finger millet and potato. In the high-hills and mountain regions potato is also considered as staple food crop.

Almost all surveyed HHs grow maize, followed by monsoon paddy, potato and millet. Similarly, farmers growing wheat, legume and oil seeds are relatively lower in percentage (Fig 1) which is primarily due to lack of year-round irrigation facilities. SIP-II districts cover 21%, 65% and 40% of the total paddy, maize and wheat areas respectively of the Province One (MoALD, 2020).

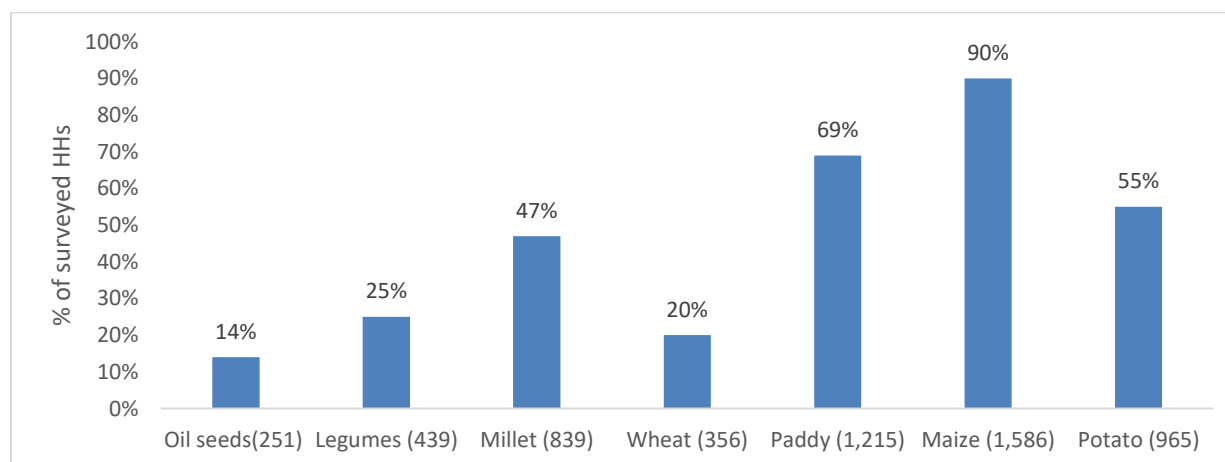


Figure 1: Percentage of HHs cultivating different crops (values in parentheses indicate no. of persons cultivating the crop)

3.6.1 Vegetables, spices and fruits grown

Cauliflower, cabbage and broccoli, spices and citrus are common vegetables and fruits grown in SIP-II areas. Cauliflower (8%), cabbage (13%), onion (17%), potato (55%); spices like ginger (10%), chilli (8%), cardamom (23%) and fruits such as orange (5%), lime (1%), are commonly grown by the

farmers (Figure 2). All surveyed HHs grow potato, however, only 55% of them said that they grow potato in winter season as vegetable crop.

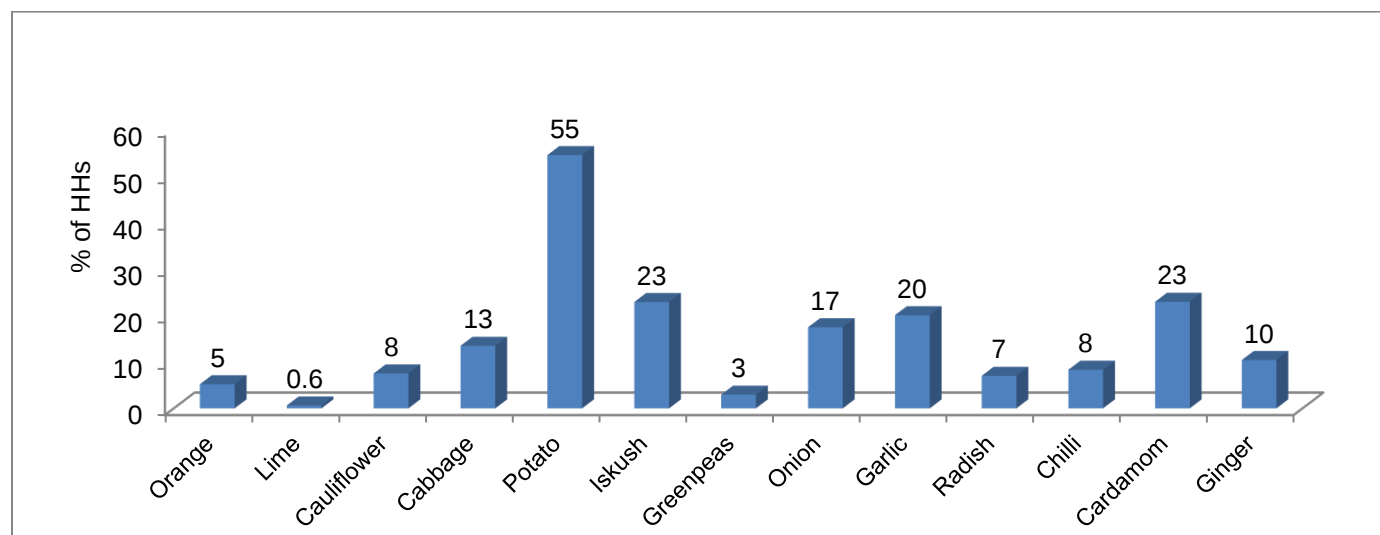


Figure 2: Percentage of surveyed HHs growing different vegetables and fruits

3.6.2 Production and productivity

Based on the data from crop-cut survey of SIP, the aggregated productivity of major crops (paddy, wheat, maize and potato) of the programme areas is given in table 9. The productivity of paddy, wheat and potato in the programme areas are slightly lower than that of national and provincial average but productivity of maize is almost double than that of the national and provincial level.

Table 9: Productivity of major crops

SN	Crop	Programme site ⁵ (Mt/ha)	National Average (Mt/ha)	Province Average (Mt/ha)
1	Monsoon Paddy	3.56	3.80	3.85
2	Wheat	2.09	3.09	2.82
3	Spring Maize	4.38	2.96	2.99
4	Winter Potato	15.59	16.65	16.73
5	Vegetables	3.84	13.79	NA
	Cropping Intensity	160%		

(National and Provincial Data Source: MoALD, 2021)

Out of the total surveyed HHs, only 29% HHs produce winter vegetables. Commonly grown winter vegetables in the study areas are cauliflower, cabbage, green pea, onion, garlic and radish. The average area of vegetable cultivation was 0.057 hectare with an average productivity of 191 Kg per

⁵ Crop cutting data from SIP-II

ropani (equivalent to 3.84 metric ton per hectare), which is extremely lower than potential productivity⁶ and the average national productivity of 13.79 Mt/ha in 2017/18 (MoALD, 2021). As stated by the surveyed respondents, the reasons behind the low level productivity of winter vegetables in the surveyed areas are: i) lack of irrigation (85.5%), ii) lack of adequate extension services (80%), iii) poor knowledge on production technologies (55%), iv) poor quality of seeds and inputs (50%), v) shortage of agriculture labour force (50%), vi) lack of established market (30%), vi) adverse weather and climate (25%), and vii) lack of investment and credit services (25%) for smallholder farmers. The findings from the HH survey have also been substantiated by the information received from FGDs and KIIs. The low level of productivity resulted smaller volume of production which is not motivating for traders to buy vegetable from smallholder farmers.

The area under winter vegetables cultivation was found highest among BCTN HHs followed by Janajatis and Dalits (Table 10).

Table 10 : Area, production and productivity of winter vegetables

Caste/Ethnicity	Area (ropani)	Production (Kg)	Yield (Kg/Ha)
BCTN	1.23	312	3,339
Dalit	0.78	111	2,563
Janajati	1.08	240	4,686
Household Head			
Female	0.81	163	3,451
Male	1.21	291	3,947
Total	1.12	263	3,837

3.7 Access to Markets

Among the total HHs surveyed, the percentage of HHs who sell part of their product⁷ is 46.6% wherein, the largest proportion (44.7%) is of vegetable sellers. Potato as staple crop is common in high-hills, where nearly 26% growers sell part of their products. The percentage of HHs selling major cereals like paddy, wheat and maize is still significantly lower (Figure 3) which is still less than 10% of the total growers.

⁶ For example- potential productivity of cabbage: 35 to 60 Mt/ha, Cauliflower 15-40 Mt/ha & Radish: 26-43 Mt/ha (NARC, 2013/14)

⁷ Selling of livestock or its product is not taken into consideration; only crops and vegetables are considered.

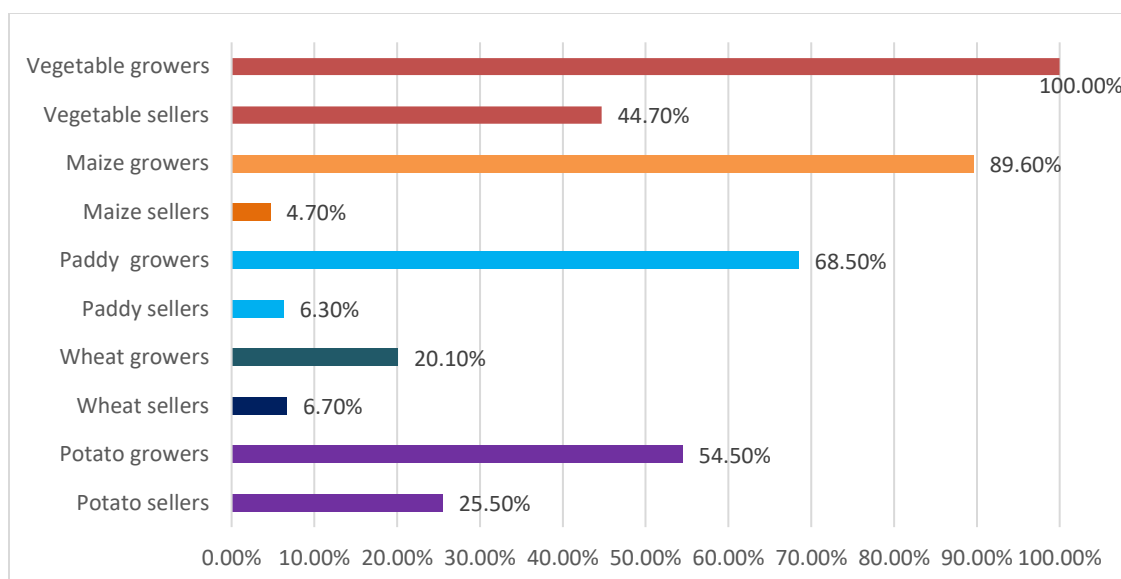


Figure 3: Percentage of farmers growing and selling different crops and vegetables

3.7.1 Major trading places

Farmers sell their agriculture products mostly in local market or local *haat bazaar* (weekend market). The nearest markets are district /municipal headquarters where farmers can sell their products on regular basis. Common agriculture produces sold in the local markets, district /municipal headquarter and local *haat bazaars* are vegetables such as cauliflower, cabbage and leafy vegetables. Potato is mostly sold in bulk to the vendors/collectors in local markets. A significant proportion of vegetable growers are also found to be selling their products in collection centres. The survey found that nearly 50% vegetables growers sell part of their products to collection centres as well (Table 11). As shared in FGDs by farmers groups, in the recent days, number of farmers selling their agriculture products at collection centres is also increasing due to proximate location and institutional dealing on paddy.

Table 11: Selling places for major crops and vegetables

Parameters	Paddy		Wheat		Maize		Potato		Vegetables	
	n	%	n	%	n	%	n	%	n	%
Growers (N= 1,770)	1,213	68.5%	356	20.1%	1,586	89.6%	965	54.5%	1,770	100.0%
Sellers	77	6.3%	24	6.7%	74	4.7%	246	25.5%	792	44.7%
Selling places	Multiple choices									
Local market	71	92.2%	24	100%	71	95.9%	205	83.3%	246	31%
Haat bazaar (Weekend market)	40	51.9%	14	58.3%	48	64.9%	177	72.0%	161	20%
Collector	19	24.7%	10	41.7%	28	37.8%	95	38.6%	12	2.0%
Wholesalers	5	6.5%			1	1.4%	64	26.0%	3	0.4%
Collection centre	4	5.2%							381	48.5%
Others									334	42.5%

Participants in FGDs with WUA members and farmers' groups and KIs with agriculture development section, agro-vets and chamber of commerce and industry opined that almost all of the commercial

and semi-commercial farmers sell major crops and vegetables in significant quantity and some subsistence farmers are also selling small quantity of vegetables and other crops in local haat bazaar.

When compared to BCTN and Janajati, percentage of farmers selling vegetables from Dalit community found to be relatively lower (Table 12). The main reasons behind this difference could be due to smaller size of land holding and the poor quality of land they own. FGDs respondents from Dalitbasti Tallotar irrigation scheme of Molung (Okhaldhunga) and Jaljale Namuna small irrigation, Dorpa Diktel (Khotang), where majority of irrigation users belong to Dalit community, shared that Dalits HHs have very small landholding and the land is less fertile with low productivity. They further added that technical services and other subsidies in agriculture hardly reach to this community. Owing to those facts, vegetables production in Dalit community is still very small in quantity that is mainly used for own consumption.

When data on vegetable sellers disaggregated by gender of the HH head, representation of male-headed HHs is fairly larger than that of female-headed HHs (Table 12).

Table 12: Farmers selling vegetables disaggregated by caste/ethnicity and gender of the household head

Caste/Ethnic group	Vegetable sellers	Household head	
		Female	Male
BCTN	257	48	209
	40.7%	18.7%	81.3%
Dalit	44	16	28
	27.8%	36.4%	63.6%
Janajati	491	105	386
	50.1%	21.4%	78.6%
Total	792	169	623
	44.7%	21.3%	78.7%

3.7.2 Trade volume

The average volume of vegetables sales per year per HH is much higher than that of cereal crops like paddy, maize, and wheat. Potato stands second after vegetables. However, variation in trade volume across all crops is very wide (Table 13).

Table 13: Volume of main crops sold by the farmers annually

Crops	Number of farmers	Average quantity of crop sold per year (KG)	Minimum (KG)	Maximum (KG)
Maize	74	272	50	1,750
Paddy	77	579	28	2,520
Wheat	24	196	75	450
Potato	246	402	30	3,200
Vegetables	792	1,600	8	18,000

3.7.3 Access to market information

During the qualitative survey, members of the WUAs reported that they have access to agriculture related general information from different sources like radio, TV, internet, municipality and ward office staffs. However, information about crop health, diseases and pest management, irrigation management; and information about agriculture market, agriculture subsidy and training etc. are not easily accessible to them. This information is substantiated by the HH survey data. Almost all of the WUA members interacted in the FGD said that they don't have knowledge about where to buy quality seeds and fertilizer; stating “availability of inputs” as one of the most common constraint to improve their farm. The common market actors in the programme areas are agro-vets, cooperatives, and local vendors and traders which provide different services to the farmers. Among the total respondents, 61% receive market information from traders, collectors and wholesalers. Agro-vets also provide technical advice to the farmers while selling agricultural inputs but their coverage is very small. Only 8% of the total respondents mentioned that they have received technical advice from agro-vets (Figure 4).

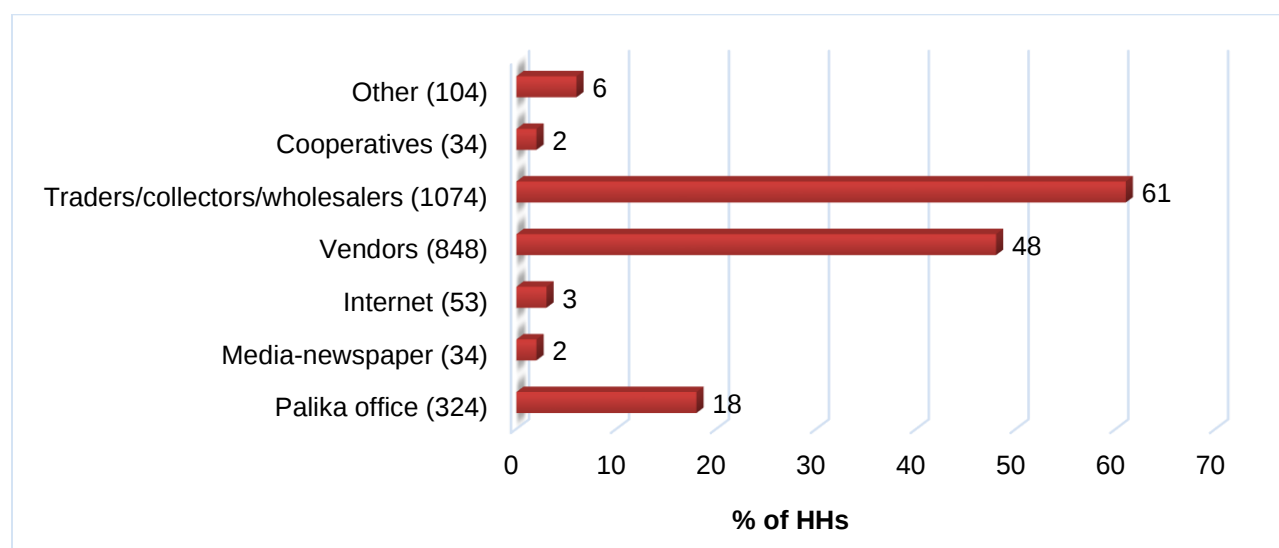


Figure 4: Households receiving information from various sources

3.7.4 Marketing challenges

Most of the traders interviewed reported that despite increased demands for fresh vegetables at local market, quality and quantity of local produces for regular supply remains a challenge. The quality of the produces (cleaning, grading, and sorting) has not been considered by the producers. However, the farmers opined that they faced problems on getting quality seeds, planting materials, fertilisers and irrigation facilities for producing quality products demanded by the markets. Farmers viewed that the market is influenced by seasonality, i.e. when they have products, the market demand is generally low and during off season market demands are relatively high and paddy of products is also fair. However, cost of production and technology required is expensive and beyond the access of smallholder farmers.

Institutional arrangement to ensure market for inputs and outputs is a challenge to small scale producers. However, in some instances, such as in Ilam, local milk traders have formal agreement with farmers in advance to purchase fixed volume of milk at agreed price. During the FGD and KIIs,

it was found that input suppliers such as agro-vet, fruits and vegetable traders are established and functioning well in the district and municipal headquarters.

The market infrastructure and services are partially developed for the local agriculture produces. In most the surveyed area, collection centres and warehouse facilities are not developed. Because of low volume of production and seasonal transport facilities, agriculture production system has not been commercialised yet in many locations where programme is already implemented. Specifically, Okhaldhunga, Khotang and Bhojpur districts are still behind on this aspect.

Farmers groups during FGDs and agriculture development section of municipalities during KIIs informed that the farmers from Suryodaya municipality and Sandakpur rural municipality, Dhankuta municipality, Myanglung municipality, Belaka and Chandaigadhi municipalities sell vegetables such as cabbage and radish to the wholesale market on contract bases.

3.8 Annual Income of the Surveyed Households

The major sources of HH incomes are grouped into four categories viz. agriculture, livestock, remittance and other. The other category of income included wage labour, skill labour, small business, trivial contract work, social security allowances and regular jobs in different sectors. The total income from the other category is very small, hence the categorisation as others. The share of the three major sources in the total income accounted to 57%, 22% and 21% respectively.

Among the surveyed HHs, about 28% receive remittance from abroad. Average annual income of remittance receiving HHs is NRs. 382,661 which is higher than the non-remittance receiving HHs by 237% that is NRs. 113,452.

The average annual income of BCTN family was found to be the highest (NRs. 181,503) followed by Janajatis (NRs. 106,711) and Dalit (NRs. 99,077). In all categories of income sources, BCTN outweigh the other ethnic groups. Female-headed HHs receive more remittance than male-headed HHs whereas income from agriculture is higher in male-headed HHs (Table 14). Contribution of other sources, as mentioned above, in total annual income was relatively higher in Dalit community. When the annual average income from agriculture is disaggregated into livestock and agriculture, the income from livestock was found to be significantly higher.

Table 14: Average annual household income by ethnicity and household headship

Sources of income	Caste/Ethnicity			HH headship		Total average income (NRs)
	BCTN	Dalit	Janajatis	Female	Male	
Agricultural Income	27,730	6,997	26,222	18,145	27,039	25,044
Livestock Income	50,609	32,106	48,197	45,796	48,150	47,622
Remittance	52,797	23,797	18,533	40,227	28,638	31,237
Other	50,367	36,177	13,759	25,762	29,719	28,832
Total income NRs	181,503	99,077	106,711	129,930	133,546	132,735

Agriculture and livestock contribute to nearly 55% of the total HH income (Figure 5) of the surveyed HHs. Despite major contribution of agriculture and livestock in the HH income, the overall production and productivity of the agriculture is low among the surveyed HHs. For example, among the surveyed HHs' productivity of winter vegetable is only 3.84 Mt/ha which is far below than their production potential.

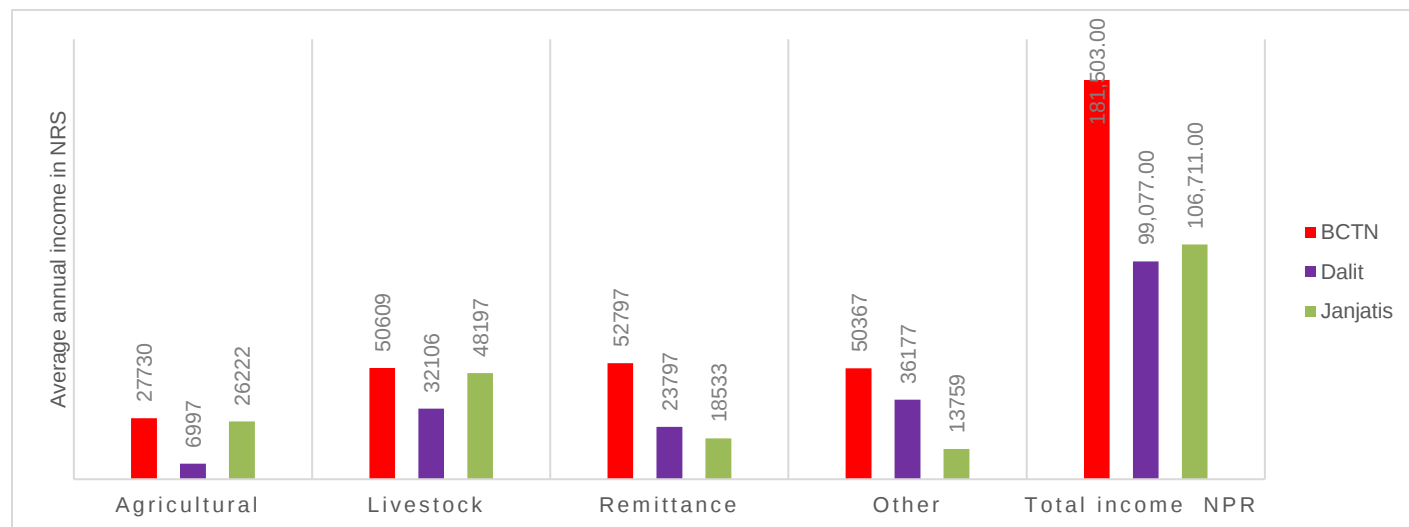


Figure 5: Average income from various sources among the surveyed households

3.9 Own-Farm Food Sufficiency Status

Among the surveyed HHs, only 58% produce enough food (at least cereals) for 6 to 12 months from their own farm production, while 42% are food deficit for six months or more months. Very few HHs (3%) have surplus production (Figure 6).

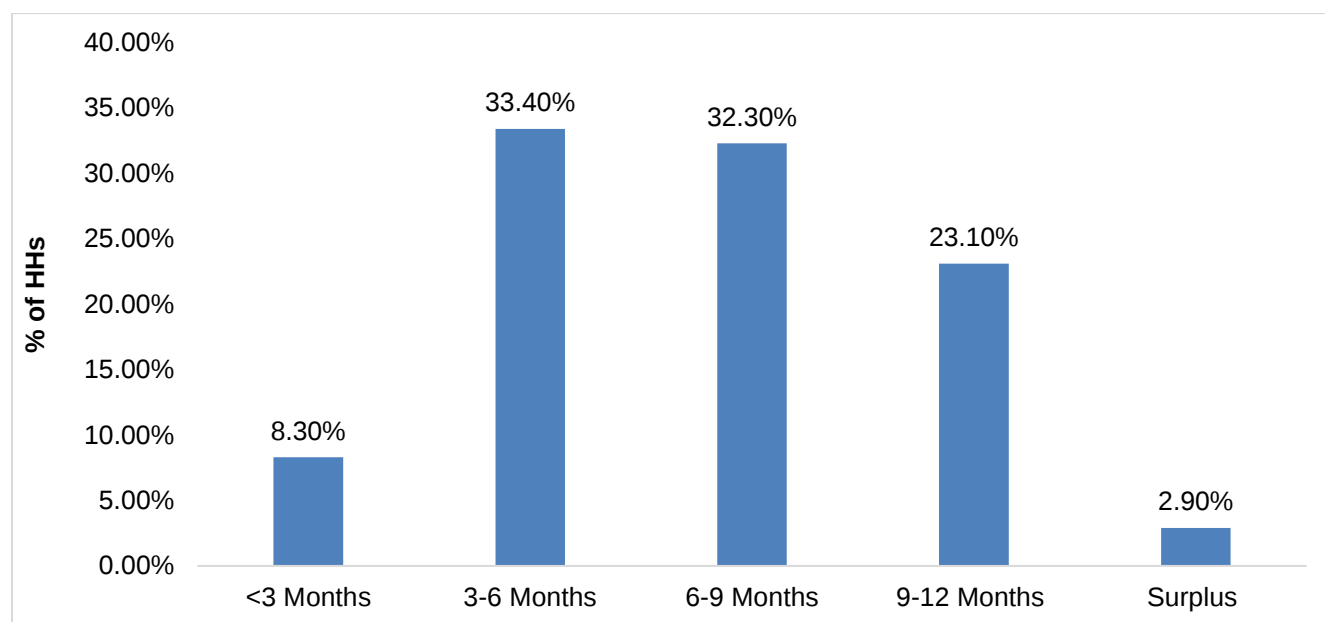


Figure 6: Own-farm food sufficiency status

When food sufficiency status is disaggregated by caste/ethnicity, Dalit HHs are the least food sufficient from the production from their own farm. Above 50 percent of HHs from Dalit community are food deficit for more than six months. None of the HHs from Dalit community included in the survey have surplus food production (Table 15).

Table 15: Own-farm food sufficiency status by disaggregated by caste/ethnicity

Food sufficiency period	BCTN	Dalit	Janajati	Total
3 months or less	26	15	106	147
	4.10%	9.50%	10.80%	8.30%
3 to 6 months	139	67	386	592
	22.00%	42.40%	39.40%	33.40%
6 to 9 months	218	54	299	571
	34.50%	34.20%	30.50%	32.30%
9 to 12 months	215	22	171	408
	34.00%	13.90%	17.40%	23.10%
Surplus production	34	0	18	52
	5.40%	0.00%	1.80%	2.90%
Total	632	158	980	1,770
	100%	100%	100%	100%

3.10 Local Level Policy Environment

The study revealed that out of the 16 municipalities visited, nine municipalities have formulated various policies and plans on natural resources management, which included water resources management, small irrigation promotion and water sources conservation. During the FGDs and KIIs, farmers and other stakeholders explained about the multiple use of water resources as an important priority area of intervention in all municipalities covered by SIP-II. Municipalities are taking responsibilities of overall management, planning, implementation, training, rehabilitation and improvement of the small irrigation schemes. In many instances, municipalities have integrated small irrigation support programme as an essential component of their periodic and annual development plans. Water sources protection and conservation is another priority of their plans.

Suryodaya municipality and Sandakpur rural municipality of Ilam, Dhankuta municipality of Dhankuta and Chaudandigadhi and Belaka municipalities of Udayapur are supporting the commercial production of high value crops integrating small irrigation supporting programme. Most of the municipalities have small irrigation as one of the key components of the land use and self-reliant policies.

All the surveyed municipalities have plans to register farmers group and provide institutionalised support to the groups to create synergy between agriculture extension programme and irrigation

programme. A five-year agriculture plan has been developed and executed by Belaka and Chaudandigadhi municipalities in Udayapur district. Likewise, Dhankuta municipality has developed economic development policy by incorporating the quality seed production, fertilizers support, and agriculture technical services.

Municipalities have strategies and policies to give subsidy to increase agriculture production and productivity. They provide subsidy on seeds, poly-house, mini-tillers, fruit saplings etc. To provide technical supports every municipality has separate section for agriculture and livestock with dedicated staff. Annually, municipality allocates budget for construction and/or rehabilitation of small irrigation schemes.

3.10.1 Agriculture related services received by the farmers in surveyed areas

The overall finding from the HH survey regarding agriculture support services from local government is summarized below. Out of the 1,770 respondents, above 80% stated that they are getting technical services from local governments (Table 16). However, only 15% farmers in SIP-II areas have received cash grants and/or agricultural inputs and tools from the local government.

Table 16: Various services received by the farmers (multiple choices)

Services from the municipality	Numbers of Farmers	Percentage
Advisory services from local government, NGOs, private sector	249	14
Training from agriculture office/NGOs	298	17
Technical services from JT/JTA	1,459	82
Information about the program and budget of the municipality	214	12
Farmer aware about the agriculture program	298	17
Input and tool support from local governments	262	15

All WUAs have plans to establish a repair and maintenance fund for irrigation schemes. Nearly 25% WUAs have already established the fund. In the FGDs and KIs, the group members and stakeholders elaborated that they have plan to establish repair and maintenance fund for small irrigation schemes. Some of them already have collected fund the same purpose and understand that this fund is essential for the sustainability of the irrigation schemes.

Local government capacity to provide technical services in agriculture is still weak. So, capacity development interventions are imperative to help increase access to technical services among the small farmers. Development of local resources persons or encourage private sector like agro-vets to provide embedded services⁸ to their clients, which also help them expand their businesses.

⁸ Embedded services occur when a seller of inputs provides "free" services as part of the transactional relationship.

3.11 Poverty Prevalence

The HH survey revealed that majority of farmers in the SIP-II working areas are at subsistence level and largely rely on traditional farming practices. A Multidimensional Poverty index (MPI) was calculated to measure the poverty status of the study area by caste/ethnic group and HH head. Figure-7 below shows that MPI (Head count ratio) percent of study area is 21%. Among the three major castes/ethnic groups, the highest MPI percent was found among Dalit community (32%) followed by BCTN (22.1%) and Janajati (18.4%). MPI value disaggregated by gender of the HH head, male-headed HHs found to be relatively in better position than their counterpart. This might be due to male going abroad for earning remittances and collecting HH's assets.

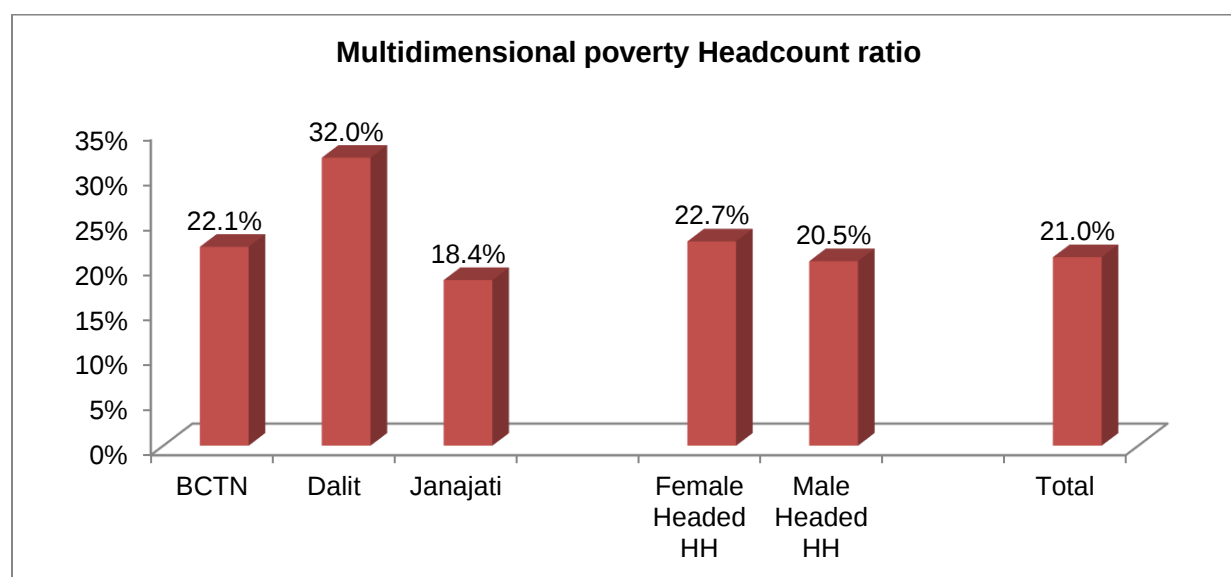


Figure 7: Multidimensional Headcount Ratio

3.12 Migration

The finding of the baseline survey indicates that 28% of the surveyed HHs have at least one member migrated either in-country or outside the country. However, the scale of migration differs from one municipality to another. Out-country migration outweighs the total migration of the study location accounting to nearly 84% migrants being out county. Among them, 55% to Middle East, 17% to Malaysia and rest in other countries. In terms of total numbers of out-country migration, 12% are women.

Among the surveyed HHs the migrant family members' percent is highest in BCTN (53%) and the least (23%) in the Dalit community

Regarding duration of migration, nearly 46% of migrants are abroad for three years or more; nearly 36% for 1-2 years, and only 18% for a year. The migration trend has changed to some extent after the COVID-19 pandemic and large number of labour migrants have returned and retained in their villages practicing agriculture or other enterprises of their interest. However, the magnitude of migrant returnees and their status have not been studied explicitly in this study.

In the case of in-country migration, almost all migrants go to the neighbouring Terai districts or urban areas for seasonal employment. Often, they work there as agriculture workers during planting and harvesting seasons. Work in factories, business and service centre like hotels, restaurants, groceries, construction programme etc. are also common areas for their employment.

3.12.1 Purposes of migration

The major reason behind migration among the surveyed HHs is to sustain their families' livelihoods. Among the respondents, 85% stated 'livelihoods' as a major cause for migration; 11% for professional jobs⁹; and only 7% for higher education (Figure 8).

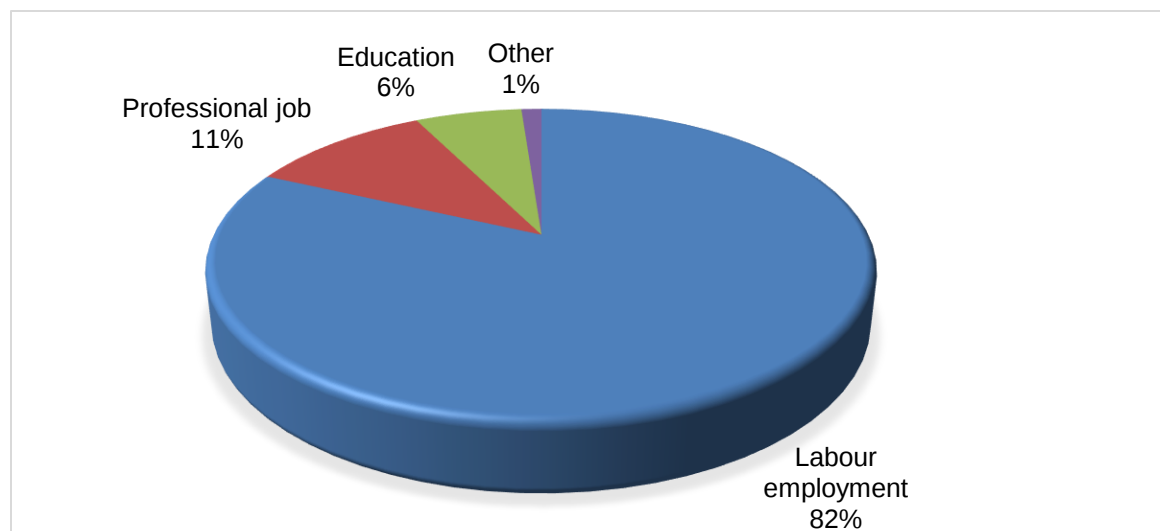


Figure 8: Major purposes behind migration

Although migration has contributed significantly in reducing HH poverty, it has negatively impacted on labour availability in agriculture. KIIs and FGDs respondents opined that despite positive impacts of foreign employment on poverty reduction, there are various socio-economic and demographic consequences of labour migration described as below:

- Foreign migration of youths has adverse effects on agriculture yield by inducing a labour shortage in the sector.
- The remittance-receiving agricultural HHs are not investing to enhance agriculture productivity, despite increased HH incomes, they are investing on consumption, purchasing luxurious goods and construction of house in urban areas and promoting internal migration by leaving behind farms and agricultural activities.
- The participants of youth migration groups in the FGDs opined that the labour migration contributed to feminisation of agriculture; women, elderly people and children are overburdened with farming and HH chores.

⁹ Jobs related with the individual's education and skill level.

3.13 Challenges to Agriculture Commercialisation

The different challenges faced by the farmers for agriculture commercialisation are discussed in this section on the basis of agriculture production practices and ecological zone (altitude ranges). Responses against different types of challenges for agriculture commercialisation varied across different types of farmers. Lack of market, high cost of inputs, high transportation cost, difficulty in obtaining credit are the key obstacles of agriculture commercialisation in the targeted communities (Figure 9) across the three categories of farmers - commercial, semi-commercial and subsistence.

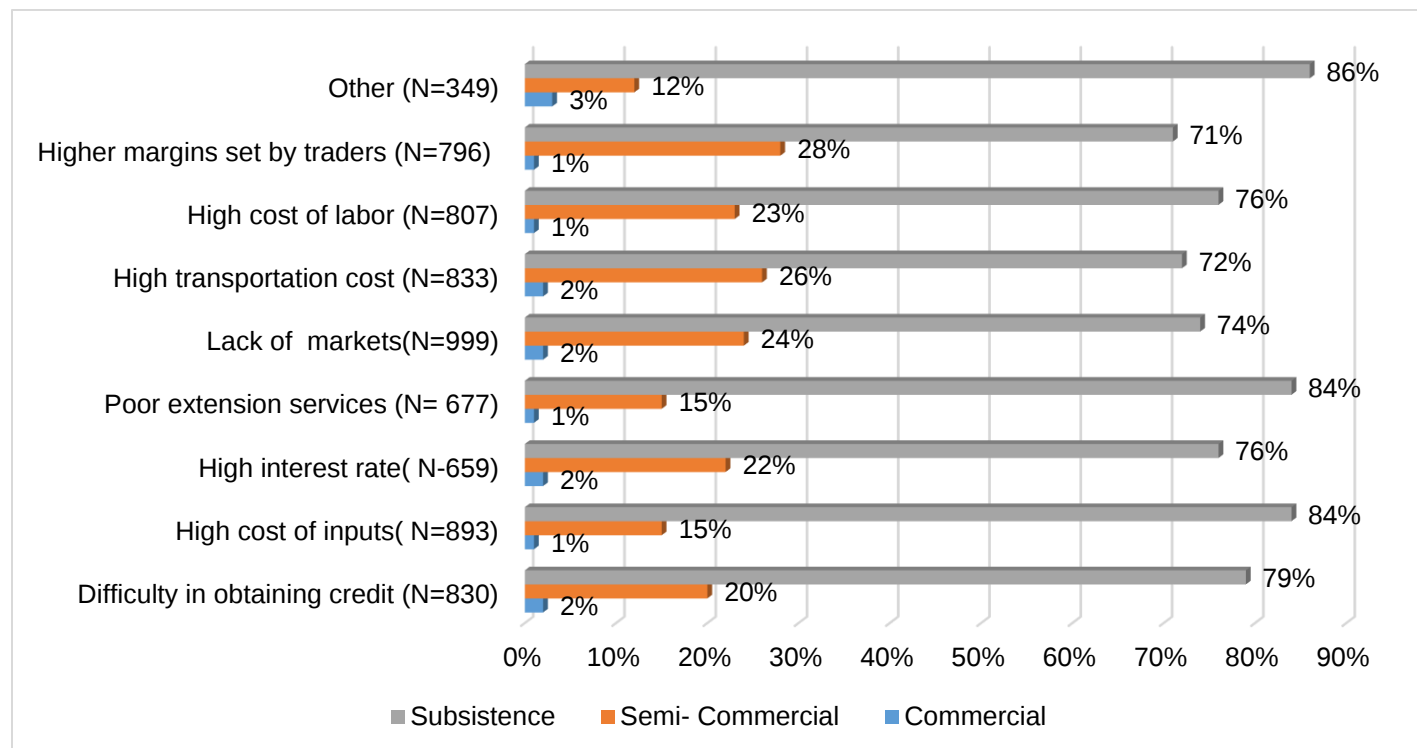


Figure 9: Challenges of agriculture commercialisation by types of farmers

When those challenges are analysed across three ecological zones, high inputs cost, lack of market, poor road network, and high-cost transportation was major challenges in hills and high-hills (Fig 10), whereas farmers from foot-hills mentioned high interest rate to invest, difficult to obtain credit and high margin set by traders among others as key obstacle for producing agriculture products at commercial scale.

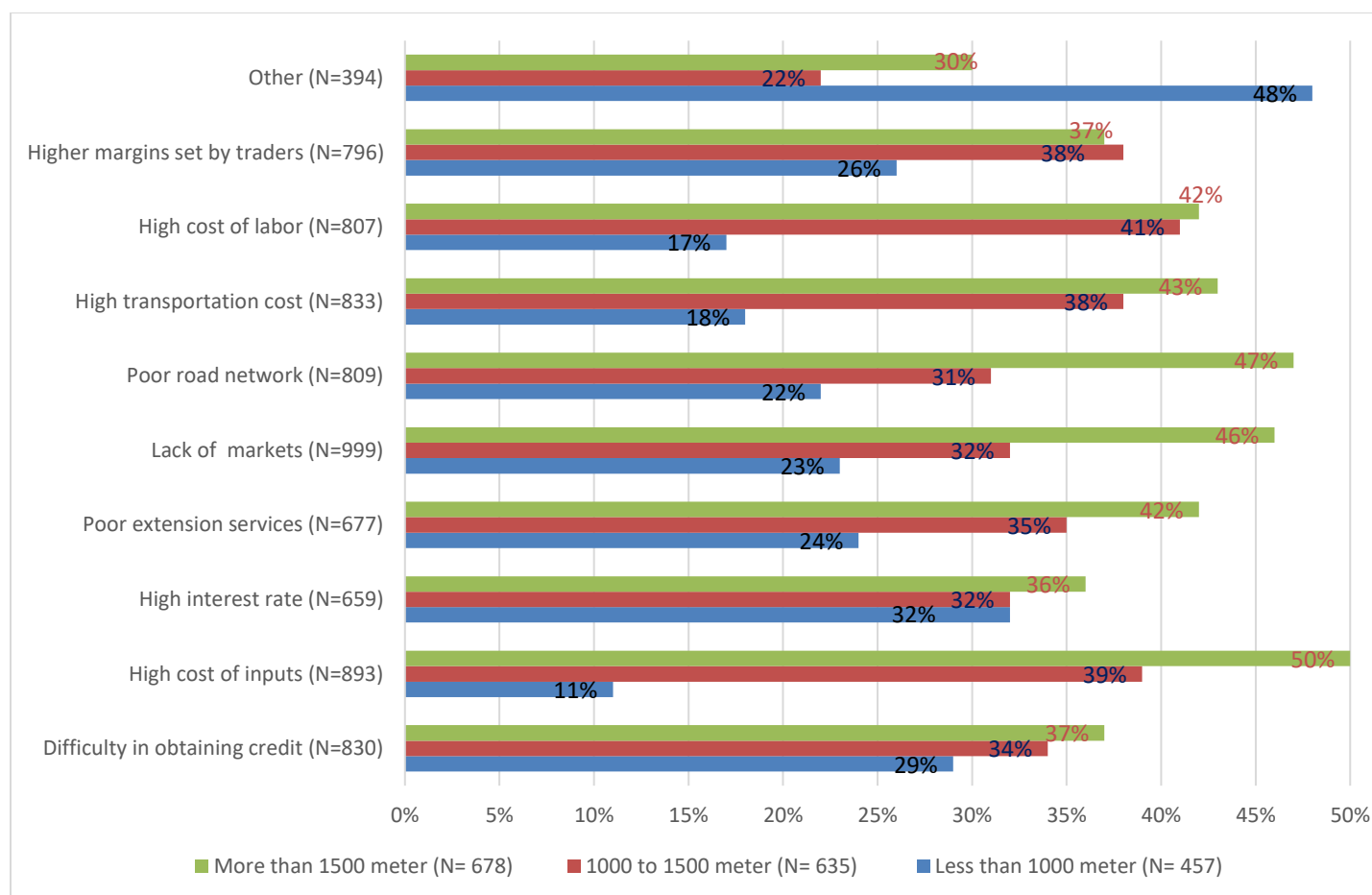


Figure 10: Challenges for agriculture commercialisation by ecological zone

Overwhelming number of participants in FGDs and KIIs stated market as a key issue in agriculture commercialisation. Municipalities have prioritised market promotion activities along with the agricultural production interventions. Except dairy products like cheese, cash crops such as tea and cardamom in commercial areas of Ilam, Panchthar, Dhankuta and Tehrathum districts, other agriculture products are not at scale for any contract agreements with traders. Local cooperatives are also acting as input suppliers and outputs buyers in some locations of Dhankuta, Ilam and Udayapur districts.

In almost all of the FGDs with WUA members and farmers groups, respondents stated that there is land shortage for smallholder farmers, who really are interested in commercial agriculture. Recently, few numbers of farmers have started leasing land for agriculture purpose. However, due to lack of proper regulation and guideline of land leasing at the local governments' level, interested farmers are also facing trouble to start commercial agriculture. Migration of young people for employment has caused shortage of agriculture labour, causing low agricultural production, which is also an important reason behind slow pace of agriculture commercialisation.

4. Conclusion

Despite being the main contributor in HH economy and two-third population engaged in it, low productivity and low incentive in agriculture sector has affected the retention of youths and smallholder farmers in farming and pushed them toward migration and wage labour employment. In this context, through the rehabilitation of irrigation schemes and linkages with agriculture and market, SIP-II is implemented by the local governments

Despite smaller land holding agriculture sector is still a key contributor to the HH income and sustenance. Although above 80% are subsistence farmers in the SIP-II area, nearly 50% farmers sell part of their agriculture products in the local haat bazaar (weekend market) and local market. Volume of such sell is, however, very small.

Average productivity of majority of the crops in the programme area is lower than the national and provincial averages. Similarly, agriculture market systems are not well developed, with some exception in Ilam, Dhankuta, Udayapur, and Tehrathum districts, hindering commercialisation. Migration of youths for foreign employment has also caused shortage of agriculture labour force and adversely affected agriculture production. Agriculture advisory services are either inadequate or less effective.

Lack of effective technical advisory services (inadequate numbers of the technical staff and technical knowhow), unavailability of quality inputs, lack of land management policy at the local government level, and inadequate infrastructure facilities and services, such as irrigation, storage and market, are major constraints to transform traditional subsistence farming to commercial farming in the SIP-II areas.

Leaving land fallow in winter is prevailing across the programme areas (relatively more with subsistence farmers) resulting in lower cropping intensity. In the surveyed areas, 34% of farmers leave their land fallow during winter due to various reasons largely due to lack of irrigation and labour shortage.

With increased access to year-round irrigation facility, there is a huge scope of increasing the current cropping intensity that will obviously contribute to food production and achieve the goal of HHs' food self-sufficiency and additional income from trading of surplus farm products.

Therefore, to transform the subsistence farming into semi-commercial and then commercial agriculture farms, it is essential to intensify the technical services and develop a context-specific local strategy on agriculture. Considering food security as a major issue of the local communities by all the three tiers of government is imperative to increase agricultural production and productivity.

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Annexes

Annex I: Indicator wise baseline values of the project results

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
Impact: Small Farmers, especially from the disadvantaged groups (DAGs) reduce their poverty by increasing their agricultural income					
Average agriculture income increases by 100% (Baseline # NRs. 25,728¹⁰ per hh per annum)	NRs. 25,728	NRs 72,666	NRs 51,456		Page 17, table 14 (sum of agriculture, livestock income). Suggested to revise the target.
Average income from sale of agriculture products increase by 75% (Baseline # to be established from the schemes that will be taken up by the project)		NRS. 25,044	NRs 43,827		Page 17, table 14
Overall poverty in programme intervention areas reduce by 20% from 20% to 16%. (Province 1 data)¹¹	20%	20.95%	16%		Page 21, Figure 7
Outcome 1: Local Governments (LGs) respond effectively to the needs of small farmers for irrigated agriculture					

¹⁰ Nepal Average Monthly Household Income, Nepal Rastra Bank, 2015. This report has given NRs. 2,144 per month income from Agri, livestock and fisheries produce.

¹¹ Nepal's Multidimensional Poverty Index: Analysis Towards Actions, 2018, Government of Nepal, National Planning Commission.

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
100% LGs have established a one window system¹² for identification/ budgeting /implementation/ monitoring/ support of irrigation schemes (Baseline # 0)	15%		100%		
35% (20,000 hectares) increase in additional area under year-round irrigation in participating LGs (baseline 56,893¹³ hectares)	56,893 hectares	35%	76,893 hectares		
100% schemes have received at least one visit of a rural advisory services¹⁴ provider during the production cycle (Baseline# 15%¹⁵)	15%		100%		
Outcome 2: Small farmers especially from DAGs increase agricultural productivity.					
65'000 HHs benefited from year-round and increased irrigation water					
40% beneficiaries are from DAGs	0%	-	40%		

¹² A one window system will provide a single entrance for all matters related to development and support for irrigated agriculture. This is underpinned by a uniform set of policies, procedures and funding mechanisms.

¹³ Irrigation Master Plan, Water Resource Project Preparation Facility, 2019.

¹⁴ Rural advisory services, also called agriculture extension, are all the different activities – from public or private service providers - that provide the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organisational, and management skills and practices so as to improve their livelihoods and well- being. (Christoplos, 2010)

¹⁵ Source for the Baseline is Krishi Diary. (2016). Ministry of Agricultural Development, GoN. Published by: AICC, Hariharbawan, Kathmandu.

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
70% of the program beneficiaries have a (In SIP command area) landholding of less than 0.5 ha.	0%	-	70%		
30% increase in the yields of major irrigated food crops (Paddy, Wheat and Maize) in SIP command area					
Paddy	3.56 Mt/ha	3.56 Mt/ha	4.63 Mt/ha		Page 13 Table 9 Baseline value is taken from Crop cut survey conducted by SIP
Wheat	2.09 Mt/ha	2.09 Mt/ha	2.72 Mt/ha		
Maize	4.38 Mt/ha	4.38 Mt/ha	5.69 Mt/ha		
30% increase in cropping intensity in SIP command area (baseline: 160% target 190%)	160%	-	190%		Page 12, Table 9. Suggested to revise the target
Winter vegetable production and other high value crops increases by a minimum of 50% (by volume) above the current total production in SIP schemes (Baseline #)		3.84 Mt/ha (Winter vegetables) 15.59 Mt/ha (winter Potato)	5.76 Mt/ha		Page 18 Page 12

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
90% irrigation schemes built or rehabilitated under the program are functioning well after 3 years of completion (Baseline # 93%¹⁶)	93%	-	90%		Suggested to review the target
At least 80% of WUAs establish a fund for Operation & Maintenance and major repairs, through the equitable collection of water service fees (proposed to move up this indicator from an output level)	0%	-	80%		
Outcome 3: Market actors offer innovative supports and products to farmers in irrigated schemes.					
50% of WUA¹⁷ that have contracted at least one input provider in the last 12 months (Baseline 0%)	0%	-	50%		
50% of SIP schemes that have established contracts with traders or wholesalers to buy their crops (Baseline 0%)	0%	-	50%		
70% of beneficiary farmers sell part of their irrigated agriculture production directly to the market (Baseline will be established as the schemes are selected)		46.6%	70%		Page no 13
Outputs related to outcome 1					
Output 1.1: Provincial Government strengthens its capacity to support Local Governments					

¹⁶ Short term monitoring (STM) survey was conducted in 244 of the schemes completed in FY 2015-16 & 2016-17. STM is conducted by SIP I in FY 2018/19.

¹⁷ The WUA in this outcome are from irrigation schemes that fulfill the High Potential for Market Development (MDP) criteria

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
Norms, standards, strategies and policies for small irrigation are published officially (baseline # not available)	N/A	-	N/A		
All responsible Federal/Provincial Government Agencies arrange to send the SIP budget authority to the program LGs by the end of August	0	-	100% LGs		
A guideline on one window approach for small irrigation within the LGs is available (baseline # not available)	0	-	100%		
An internet-based MIS and automated project preparation system is available and operational for use by the LGs (baseline # not available)	0	-	100%		
At least one learning event is organised every year for LGs included in the program on, innovations and experiences in the development of small-scale irrigation (baseline # not organised)	0	-	At least 1 per year		
Output 1.2: LGs strengthen their legislative and executive capacity for implementing small irrigation schemes					
A one window approach for small irrigation within the LG is available (baseline # not available)	0	-	100		

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
LG Councils select irrigation schemes for implementation through a demand driven process (baseline # not done))	0	-	100		
LGs appoint a focal person¹⁸ for SIP planning, designing, construction supervision and post construction support	0	-	60 (or all implementing LGs)		
100% LGs prepare and approve the bills within three weeks of the start of the measurement ((baseline # 4-6 weeks)	N/A	-	100		
100% LGs ensure timely payments to WUA's (within 30 days of bills being recommended for payment by LG Support Unit	N/A	-	100		
Output 1.3: LGs build their capacity to provide support to the farmers in irrigated agriculture development					
80% Agriculture Development Committees (ADCs) in SIP implemented LGs meet at-least twice every year	0	-	80%		
80% Agriculture Development Committees (ADCs) in SIP implemented LGs recommend the selection of irrigation schemes for funding in annual budget to the LG councils	0	-	80%		

¹⁸ The focal person approves the detail design and cost estimates of the irrigations scheme.

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
80% ADCs include and assign priority for the agriculture extension and input support for the selected SIP irrigation schemes	0	-	80%		
LGs provide agriculture extension support and facilitate the provision of agriculture inputs for 80% SIP projects	0	-	80%		
80% of the LG address contractual complaints related to irrigation schemes in a satisfactory manner	N/A	-	80%		
Outputs related to Outcome 2:					
Output 2.1: Small farmers organise themselves inclusively in Water User Associations					
100% WUA committees have representation from head, middle and tail of irrigation system	0	-	100%		
40% WUA committee members are women, with at least 1 woman or a representative of a discriminated group in a leadership position.	0	-	40% + at least 1 woman or a representative of a discriminated group in a leadership position		

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
100% WUAs practice Public hearing, review and auditing & place hoarding board at scheme sites	0	-	100%		
Output 2.2: Water User Associations (WUAs) build and/or rehabilitate Small Irrigation Systems equitably					
Approximately 1300 irrigation schemes are constructed or rehabilitated	0	-	1300		
1'000'000 person –days of employment through the construction of irrigation schemes	0	-	1,000,000		
All WUAs/farmers equitably contribute at least 10% of the project construction cost	0%	-	10%		
Output 2.3: WUA operate and maintain irrigation systems equitably					
100% WUA have received training for Operations & Maintenance (O&M)	0%	-	100%		
All WUAs prepare plans and cost estimate for recurrent system maintenance	0%	-	100%		
80% WUAs prepare and implement plans for equitable and timely water distribution.	0%	-	80%		
Output 2.4: Farmers access agriculture extension services from LGs					
80% schemes receive training on integrated crop and water management, including the	0%	-	80%		

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
operation of the distribution system, on farm storage facilities and pressurised water distribution (sprinklers, drip irrigation) (Baseline #0)					
100% of SIP supported schemes receive a visit from a LG JTAs at-least once before the construction begins.	0%	-	100%		
80% farmers in SIP schemes have contact numbers of LG ward chairs, JT/JTAs, nearby agro-vet providers	0%	-	80%		
Output 2.5: Water User Associations plan the production in their FMIS based on commercial opportunities					
50% Farmers in FMIS supported by the project plan their irrigated commercial crops based on reliable information on market demand	0%	-	50%		
50% JT/JTAs and private service providers provide production advice based on market demand	0%	-	50%		
80% farmers have contact numbers of traders and buyers, whole-sellers and retailers of agriculture products, agri-insurers	0%	-	80%		
Outputs related to Outcome 3:					
Output 3.1: Input service providers provide maintenance, production advice or embedded services to FMIS					

Narrative Summary	Baseline values as per SIP Pro Doc	Baseline values established by study	Target value	End line Value	Notes
Numbers of input providers offering services to FMIS to maintain or repair irrigation schemes	0	-	5 (at least 1 in each cluster)		
Output 3.2: Traders and retailers establish contacts with WUA members					
80% of WUA reporting ongoing discussions with traders and buyers	0%	-	80%		
Simple and accurate paddy information system is developed and operational (baseline # not available)	N/A	-	1		
Farmers consult paddy information system before bringing produce to the market	0	-	N/A		

Annex II: Number of schemes selected by district

District	Palika	Total number of schemes	Number of schemes selected for baseline	Agro-ecological zone
Bhojpur	Bhojpur Municipality	10	4	Midhills
Bhojpur	Tyamke Maiyum Rural Municipality	8	3	Highhills
Dhankuta	Chaubise Rural Municipality	10	4	Midhills
Dhankuta	Dhankuta Municipality	8	4	Midhills
Ilam	Sandakpur Rural Municipality	12	5	Midhills
Ilam	Suryodaya Municipality	11	5	Midhills
Khotang	Diprung Chuichumma RM	11	4	Midhills
Khotang	Diktal Rupakot Majhuwagadhi Municipality	12	3	Highhills
Okhaldhunga	Molung Rural Municipality	7	3	Midhills
Okhaldhunga	Siddhicharan Municipality	13	3	Midhills
Panchthar	Falgunanda Rural Municipality	9	4	Midhills
Panchthar	Phidim Municipality	4	2	Midhills
Terhathum	Laligurans Municipality	8	4	Highhills
Terhathum	Myanglung Municipality	9	4	Highhills
Udayapur	Belaka Municipality	10	4	Foothills
Udayapur	Chaudandigadhi Municipality	9	3	Foothills
	Total		59	

Annex III: Participants in FGDs & KIIs

1. FGDs' participants

FGDs with WUAs

1. Irrigation scheme: Poktingkhola, Siddicharan-7 Okhaldhunga						Types of Scheme: Rehabilitation	
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Representation in Scheme
1	Sushila Rai	F	42	No	Treasurer	Janajati	Tail
2	Balasari Rai	F	49	No	User	Janajati	Middle
3	Raharmaya Rai	F	48	No	Chairperson	Janajati	Tail
4	Dhan Bdr Rai	M	55	No	User	Janajati	Middle
5	Ashjit Rai	M	47	No	Member	Janajati	Middle
6	Dipak Rai	M	31	No	Member	Janajati	Middle
7	Asha Rai	F	55	No	User	Janajati	Tail
8	Ras Bdr Rai	M	52	No	User	Janajati	Middle
9	Rajina Rai	F	31	No	User	Janajati	Middle

2. Irrigation scheme: Tallotole Dalitbasti irrigation, Molung -2 Okhaldhunga						Types of Scheme: New	
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Representation in Scheme
1	Shov Bdr BK	M	30	No	Chairperson	Dalit	Tail
2	Tej Prasad Ghimire	M	43	No	Secretary	B/C	Head
3	Prabin Ghimire	M	43	No	Member	B/C	Middle
4	Dak Bdr BK	M	35	No	User	Dalit	Tail
5	Bheshnath Dahal	M	50	No	Member	B/C	Head
6	Bheshnarayan Ghimire	M	34	No	Member	B/C	Tail
7	Sushila Tolangi	F	22	No	Treasurer	Dalit	Tail

3. Irrigation scheme: Chhepekhol Kule Naagthan irrigation, Dprung Chuichumma- 2, Khotang						Types of Scheme: New	
SN	Full Name	Gender	Age	PWD	Position	Ethnicity	Representation in Scheme
1	Moti Chandra Rai	M	29	No	Chairperson	Janajati	Head
2	Manisha Rai	F	18	No	Secretary	Janajati	Tail
3	Kamal Shrestha	M	41	No	User	Janajati	Middle
4	Kamala Devi Rai	F	40	No	Member	Janajati	Middle
5	Laxmi Kumar Rai	M	38	No	Member	Janajati	Middle
6	Sumane Rai	M	31	No	User	Janajati	Tail
7	Ganesh Nischal Shahi	M	27	No	User	B/C	Middle
8	Sarbadhan Rai	M	51	No	User	Janajati	Tail
9	Lila Kumari Shrestha	F	42	No	User	Janajati	Head

4. Irrigation scheme: Bhachuwa Ramite Irrigation, Belaka - 9, Udayapur						Type of scheme: New	
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Representation in Scheme
1	Devraj Rai	M	39	No	Chairperson	Janajati	Head
2	Narayan Rai	M	33	No	Treasurer	Janajati	Middle
3	Dil Bdr Rai	M	34	No	User	Janajati	Tail
4	Imbulal Rai	M	38	No	Member	Janajati	Middle
5	Nomaya Rai	F	42	No	User	Janajati	Head
6	Tirth Kumari Bid	F	37	No	Member	Janajati	Head

5. Irrigation scheme: Jaljale Namuna Sana Sinchai, ward no- 8, Diktal, Khotang						Type of scheme: New	
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Representation in Scheme
1	Ram Kumar Biswakarma	M	36	No	Chairperson	Dalit	Middle
2	Laxmi BK	F	41	No	Member	Dalit	Head
3	Urmaila BK	F	25	No	User	Dalit	Middle

4	Asmita BK	F	19	No	User	Dalit	Tail
5	Shuva Maya BK	F	62	No	User	Dalit	Middle
6	Bimal BK	M	18	No	User	Dalit	Middle
7	Kamala BK	F	40	No	User	Dalit	Middle
8	Gokul BK	M	46	No	User	Dalit	Head
9	Khadak BK	M	50	No	User	Dalit	Middle

6. Name of Irrigation Scheme: Tibungkhola Tallo Irrigation Scheme, Laligurans -2, Terhathum						Type of Group: Farmer	
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Representation in Scheme
1	Nar Bdr Limbu	M	43	No	Chairperson	Janajati	Middle
2	Astaman Limbu	M	24	No	Secretary	Janajati	Tail
3	Ratna Kumari Mimi	F	46	No	Treasurer	Janajati	Middle
4	Gumandhoj Limbu	M	51	No	User	Janajati	Middle
5	Dalmaya Limbu	F	51	No	User	Janajati	Middle
6	Bhimraj Gurung	M	47	No	Member	Janajati	Head
7	Usha Hudnam	F	36	No	Member	Janajati	Middle
8	Nisha Tumbayo	F	31	No	Member	Janajati	Middle
9	Muna Chomjong	F	45	No	Member	Janajati	Head
10	Panchamaya Limbu	F	55	No	Member	Janajati	Tail

FGDs with famers groups

1. Farmers' group: Shreekhola Irrigation Scheme, Suryodaya Mncp-1, Gairigaun Ilam						Type of Group: Farmer	
SN	Full Name	Sex	Age	PWD	Position in group	Ethnicity	Representati on in Scheme
1	Nirmal Katuwal	M	43	No	User	B/C	Head
2	Ratna Rai	M	59	No	User	Janajati	Head
3	Bibimaya Tamang	F	60	No	User	Janajati	Tail
4	Lalman Tamang	M	63	No	User	Janajati	Tail
5	Suk Bdr Tamang	M	40	No	User	Janajati	Middle
6	Nabin Tamang	M	55	No	User	Janajati	Middle
7	Bikram Rai	M	38	No	User	Janajati	Head
8	Pemba Tamang	F	37	No	User (Mason)	Janajati	Tail
9	Ashish Tamang	M	32	No	Secretary	Janajati	Middle

2. Farmers' group: Lungdung Indreni Irrigation Scheme, Myanglung-7, Terhathum						Type of Group: Farmer	
SN	Full Name	Sex	Age	PWD	Position in group	Ethnicity	Representati on in Scheme
1	Kamal Limbu	M	37	No	Chairpers on	Janajati	9842127612
2	Santosh Limbu	M	29	No	Secretary	Janajati	9842253686
3	Baalkumari Limbu	F	32	No	Treasurer	Janajati	
4	Mina Kumari Limbu	F	25	No	Member	Janajati	
5	Sujan Limbu	M	31	No	Member	Janajati	
6	Kishnimaya Limbu	F	38	No	Member	Janajati	
7	Gajendra Bdr Tamang	M	61	No	Member	Janajati	
8	Anita Tamang	F	42	No	Member	Janajati	
9	Man Bdr Limbu	M	32	No	User	Janajati	

3. Farmers' group: Bharauli Khola sana sinchai, Chaudandi - 9, Udayapur						Type of scheme: New	
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Representation in Scheme
1	Surendra Rai	M	40	No	Chairperson	Janajati	Middle
2	Kamana Ghimire	F	25	No	Secretary	B/C	Tail
3	Babita BK	F	27	No	Treasurer	Dalit	Head
4	Tek Ojha	M	47	No	Member	B/C	Tail
5	Ramdal Rai	M	52	No	Member	Janajati	Middle

FGDs with youths

1. Youths in group, Siddicharan -7, Surke, Okhaldhunga							Types of group: Youth
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Position in the irrigation scheme
1	Bina Rai	F	26	No	User	Janajati	Middle
2	Mingma Sherpa	M	29	No	User	Janajati	Middle
3	Mingmatasi Sherpa	F	23	No	User	Janajati	Middle
4	Apsara Rai	F	40	No	Secretary	Janajati	Tail

2. Youths in group, Belaka-7, Udayapur							Types of group: Youth
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Position in the irrigation scheme
1	Nabin Kumar Magar	M	36	No	User	Janajati	Middle
2	Kabindra Adhikari	M	34	No	User	BCTN	Middle
4	Tulasi Khadaka	M	28	No	User	BCTN	Middle
4	Umesh Karki	M	36	No	user	BCTN	Tail

3. Youths in group, Chhipekula Kolenagem, Diktel-2							Types of group: Youth Migration
SN	Full Name	Sex	Age	PWD	Position	Ethnicity	Position in the irrigation scheme
1	Komal Shrestha	M	29	No	User	Janajati	Head
2	Kamal Devi Rai	F	34	No	User	Janjati	Middle
4	Gnesh Nischal Shahi	M	28	No	User	BCTN	Middle
4	Manish Rai	F	18	No	user	Janjati	Tail
5	Bhupendra Rai	M	25	No	User	Janjati	Head

2. KIIs' participants

SN	Name	Sex	Address	Designation	Organization	Date of interview	Contact number
1	Narayan Lamsal	M	Suryodaya Munc, Ilam	Plant Protection Officer	Department of Agriculture	18/01/2022	9842653377
2	Roshan Khatiwada	M	Sandakpur RM, Ilam	Agriculture Section Chief	Department of Agriculture	24/01/2022	9844651381
3	Binod Khatri	M	Molung RM, Molang	Agriculture Section Chief	Department of Agriculture	01/02/2022	9862506286
4	Devendra Sharma	M	Suryodaya Mncp-9, Ilam	Coordinator	Economic Development committee (EDC)	19/01/2022	-
5	Giriraj Khanal	M	Sandakpur RM-2, Ilam	Coordinator	Economic Development Committee (EDC)	24/01/2022	9814056978
6	Bhim Bahadur Darji	M	Siddicharan Mncp-12, Okhaldhunga	Agriculture Section Chief	Department of Agriculture	30/01/2022	9851163380
7	Sirjana Bayalkoti	F	Falgunanda RM, Panchathar	Agriculture Section Chief	Department of Agriculture	07/02/2022	9803173761
8	Yam Bahadur Sangraula	M	Phidim Mncp, Panchathar	Plant Protection Officer	Department of Agriculture	-	9817358054
9	Nuhang Rai	M	Myanglung Mncp, Terhathum	Plant Protection Officer	Department of Agriculture	31/01/2022	9868287771
10	Min Bdr Budhathoki	M	Diktel Municipality Mncp, Khotang	Junior Technical Assistant (JTA)	Department of Agriculture	10/02/2022	9841967064
11	Laxmi Prasad Regmi	M	Diprung RM, Khotang	Agriculture Technician (JTA)	Department of Agriculture	27/02/2022	9810436885
12	Indra Narayan Sahu	M	Chaudandi Mncp, Udaypur	Agriculture Section Chief	Department of Agriculture		9807705049

SN	Name	Sex	Address	Designation	Organization	Date of interview	Contact number
13	Buddhinath Timsina	M	Belaka Mncp-9, Udaypur	Agriculture Section Chief	Department of Agriculture		9843019295
14	Ghanendra Ghising	M	Chaubise RM-6, Dhankuta	JTA	Department of Agriculture	11/02/2022	9842041939
15	Bhaktaman Rai	M	Dhankuta Mncp-5, Dhankuta	Agriculture Dev Officer	Department of Agriculture	02/10/2022	9842116256
16	Dhan B Adhikari	M	Tyamkemaiprang RM, Bhojpur	Head of Agriculture section	Tyamkemaiprang RM	31/01/2022	9852053533
17	Jankeshari Rai	F	Bhojpur Municipality	Head of Agriculture section	Bhojpur Municipality	28/01/2022	9810507558
18	Rajendra Dhakal	M	Phidim Mncp-1, Panchthar, Phidimbajar	Supplier / Agrovet	Om Shai Pathibhara Supplier,	04/02/2022	9852684672
19	Binam Shrestha	M	Bhojpur Mncp-7, Bhojpur	Agrovet	Bhojpur Agrovet concern	28/01/2022	9852086460
20	Umesh Raya	M	Dhankuta Mncp-7, Dhankuta	Manager	Biu-byabasahik Utpadan Agri Coop	07/02/2022	9810474355
21	Durga Devi Bhattarai	F	Suryodaya Mncp-10, Ilam	Deputy Mayor	Municipality	18/01/2022	9852642002
22	Tek Bahadur Rai	M	Suryodaya Mncp-11, Kerabari, Ilam	Ward chairperson	Ward	18/01/2022	9842748085
23	Uday Bahadur Rai	M	Sandakpur RM, Ilam	Chairperson	Rural Municipality		
24	Mahesh Rai	M	Sandakpur RM, Ilam	CAO	Rural Municipality		
25	Jit Bahadur Samba	M	Sandakpur RM-5, Ilam	Ward chairperson	Ward	02/02/2022	-

SN	Name	Sex	Address	Designation	Organization	Date of interview	Contact number
26	Ichchhya Kumari Gurung	F	Siddicharan Mncp-12, Okhaldhunga	Deputy Mayor	Municipality	30/01/2022	9842858199
27	Maniraj Rai	M	Molang RM-3, Okhaldhunga	Chairperson	Rural Municipality	31/01/2022	9841535837
28	Pradip Baniya	M	Molang RM-1, Okhaldhunga	Ward chairperson	Rural Municipality	03/02/2022	9841522050
29	Bir Bahadur Kurumbang	M	Falgunanda RM, Panchthar	Chairperson	Rural Municipality	30/01/2022	9852669966
30	Narayan Prasad Aangdembe	M	Falgunanda RM-6, Panchthar	Ward chairperson	Rural Municipality	30/01/2022	9852684589
31	Gajadhar Bhattarai	M	Phidim Mncp-1, Panchthar	Ward chairperson	Municipality	01/02/2022	9852684611
32	Urmila Shrestha	F	Phidim Mncp-4, Panchthar	Deputy Mayor	Municipality	04/02/2022	9852620182
33	Narayan Prasad Acharya	M	Myanlung-7, Terhathum	Ward chairperson	Municipality	26/01/2022	9852042024
34	Rudra Bdr Limbu	M	Laligurash RM-2, Terhathum	Ward chairperson	Rural Municipality	23/01/2022	9862017618
35	Sanjaya Kumar Tumbahamphe	M	Myanlung Mncp, Terhathum	Chairperson	Municipality	26/01/2022	
36	Arjun Nabihang	M	Laliguras RM, Terhathum	Chairperson	Rural Municipality	23/01/2022	
37	Mugadhan Rai	M	Diktel Ru. Ma. Mncp-10, Khotang	Ward chairperson	Municipality	21/02/2022	9861182799

SN	Name	Sex	Address	Designation	Organization	Date of interview	Contact number
				(EDC member too)			
38	Deepnarayan Rijal	M	Diktel Ru. Ma. Mncp, Khotang	Mayor	Municipality	22/02/2023	9852849906
39	Harka Bdr Khatri	M	Diktel Ru. Ma. Mncp-2, Khotang	Ward chairperson	Municipality	17/02/2022	9842943379
40	Bhim Bdr Khatri	M	Diprung Chuichumma RM-2, Khotang	Ward chairperson	Rural Municipality	26/02/2022	9843564252
41	Bhupendra Rai	M	Diprung Chuichumma RM, Khotang	Chairperson	Rural Municipality	27/02/2022	9851247166
42	Purna Prasad Rai	M	Temke Maiyung RM-3, Bhojpur	Ward Chairperson	Rural Municipality	31/01/2022	9851049091
43	Bishnu Kumar Bhujel	M	Bhojpur Mncp-1, Bhojpur	Ward Chairperson	Municipality	28/01/2022	-
44	Ranjit Aangbuhan g	M	Temke Maiyung RM, Bhojpur	Chief Administrative Officer	Rural Municipality	31/01/2022	9843675045
45	Mamita Rai	F	Bhojpur Mncp, Bhojpur	Deputy Mayor	Municipality	28/01/2022	9852073444
46	Govinda Kumar Khadka	M	Belaka Mncp-5, Udaypur	Ward Chairperson	Municipality	-	
47	Bharat Kumar Magar	M	Belaka Mncp-3, Udaypur	Ward Chairperson	Municipality		9816730471
48	Yagya Kumari Ruchal	F	Chaubise RM, Dhankuta	Vice Chairperson	Rural Municipality	16/02/2022	9852050084

SN	Name	Sex	Address	Designation	Organization	Date of interview	Contact number
49	Sakuntala Basnet	F	Dhankuta Mncp-2, Dhankuta	Deputy Mayor	Municipality	17/2/2022	9842062459
50	Mamindra Kumar Limbu	M	Chaubise RM-2, Dhankuta	Ward Chairperson	Rural Municipality	11/02/2022	9842314108
51	Sandip Rayamajhi	M	Dhankuta Mncp-9, Dhankuta	Ward Chairperson	Municipality	7/02/2022	9852061789
52	Narad Niraula	M	Belaka Municipality	Chairperson EDC	Belaka Municipality	15/02/2022	9819972237
53	Dhuklal Shrestha	M	Bhojpur Mncp-7, Bhojpur	Chairperson	Local CCI	28/01/2022	9842039752
54	Sher Bdr Khatrri	M	Belaka Mncp-9, Udayapur	Treasurer	FNCCI	23/01/2022	9805330333
55	Bijaya Santoshi Rai	M	Dhankuta Mncp-6, Dhankuta	Chairperson	FNCCI	8/02/2022	9842024971
56	Raju Kumari Chaudhary	F	Belaka Municipality	Vice Chairperson	Udayapur		9852829018
57	Rita Kumari Chaudhary	F	Chaudandig adhi Municipality	Vice Chairperson	Udayapur		9852844058

Annex IV: FGDs and KIIs checklist

FGD with WUA

Introduction

My name is _____. I am working for the "Baseline study survey of Small Irrigation Program (SIP) Phase – II through Quest for Development. SIP is implemented byPalika. As part of this survey, I would like to interview you. The Survey Team will keep your personal information confidential and will use it only for the purpose of this survey and analysis. We will greatly appreciate if you kindly cooperate with us. This group discussion will take about an hour but you can stop it any time and continue later. Thank you very much for your kind cooperation.

Do you agree? A. yes B. No

- District: --- Palika: --- Ward#: --- Community: ---
 - Name of WUA:
 - Type of Scheme: a) New or b) rehabilitated
 - Date of FGD: ---
 - Facilitator's Name:
1. Participants details

SN	Name	Sex	Age	PWD (Y/N)	Position in group	Ethnicity	Rep from head, middle and tail
1							
2							
3							
4							
5							
6							
7							
8							
9							

1. How many members are there in your WUA (give disaggregated information)?
2. Since how long you have been member of this WUA?
3. What is the major source of income among the members of your WUA?
4. Why are you rehabilitating this irrigation scheme?
5. What changes are you expecting after the rehabilitation of the irrigation scheme?
6. What are the major crops produced in your area?
7. Do users sell any surplus produce or is it only sufficient for consumption?
8. What crops or products did the members of the WUA sell during last one year?

9. Do people practice commercial agriculture in your community? If not, why? If yes, what all do they sell and to whom?
10. Do people in the community have willingness to shift towards commercial farming? Do they have enough incentives?
11. How do you distribute water among the users?
12. Did you experience any conflict among the users in your WUA? If yes, how did you resolve the issue?
13. Does the WUA collect maintenance and repair fund? How much per year?
14. What is land holding pattern among the members of your WUA, give detail of irrigated and non-irrigated land types within cultivable area?
15. If cultivable land remains fallow, what are the reasons?
16. Have you received any government subsidy for farming activities? Give detail
17. Where do you sell these products? Who are key market actors?
18. Has the WUA or anyone from the community been part of an agreement or contract with traders for selling agriculture produces?
19. Has the WUA or anyone from the community been part of an agreement or contract with input suppliers?
20. What are services and products the market actors provided to your WUA?
21. What are the key challenges prevailing in agriculture sector development in your area?
22. What do you know about the agriculture programs budgets in the Palika? How do you participate in the budgeting process?
23. Do you want add to anything else, missing during this discussion?

Thank you

FGD with famers' groups

Introduction

Namaste!

My name is _____. I am working for the "Baseline study survey of Small Irrigation Program (SIP) Phase – II through Quest for Development. SIP is implemented byPalika. As part of this survey, I would like to interview you. The Survey Team will keep your personal information confidential and will use it only for the purpose of this survey and analysis. We will greatly appreciate if you kindly cooperate with us. This group discussion will take about an hour but you can stop it any time and continue later. Thank you very much for your kind cooperation.

Do you agree? A. yes B. No

- Location:
- District: --- Palika: --- Ward#:--- Community:---
- Name of Group/ Organization:
- Date of FGD: ---
- Facilitator: Note taker (if different):

Participants' detail

SN		Name	Sex	Age	PWD (Y/N)	Position in group	Ethnicity	Rep from head, middle and tail
1								
2								
3								
4								
5								
6								
7								
8								
9								

1. Tell us about the farmer's group. What does it do and who are its member?
2. Since how long you are in this group? how many members are there in this group?
3. Are you aware of the irrigation scheme being rehabilitated in your community? Is anyone involved in the WUA or in the construction of the scheme? way is each of you involved in SIP project?
4. What are the major agriculture products in your areas?
5. What is the percentage of agriculture contribution in your family income? What are the other sources of income?
6. Where do you sell the surplus quantity of the agriculture produces?
7. What are the main products your group sold during last 12 months?
8. Who are local actors of agriculture markets?
9. What are the services and products your group received from the local agriculture markets?

10. Has anyone from the community been part of an agreement or contract with traders for selling agriculture produces?
11. Has the WUA or anyone from the community been part of an agreement or contract with input suppliers?
12. Has your group received any subsidy from the local government for the development of agriculture production?
13. Do people practice commercial agriculture in your community? If not why? If yes, what all do they sell and to whom?
14. Do people in the community have willingness to shift towards commercial farming? Do they have enough incentives?
15. What are the key challenges prevailing in agriculture sector development in your area?
16. Awareness about the agriculture programs budgets in the Palika: How do you get information (sources) about the agriculture programs in your Palika?
17. Do people seek input services from private service providers? if yes why? Why not through government agencies?
18. What is the migration trend in your area? How does it affect the agriculture sector?

Thank you

FGD with youths

Introduction

Namaste!

My name is _____. I am working for the "Baseline study survey of Small Irrigation Program (SIP) Phase – II through Quest for Development. SIP is implemented byPalika. As part of this survey, I would like to interview you. The Survey Team will keep your personal information confidential and will use it only for the purpose of this survey and analysis. We will greatly appreciate if you kindly cooperate with us. This group discussion will take about an hour but you can stop it any time and continue later. Thank you very much for your kind cooperation.

Do you agree? A. yes B. No

- Location:
- District: --- Palika: --- Ward# :--- Community:---
- Name of Group/ Organization:
- Date of FGD: ---
- Facilitator: Note taker (if different):

Participants' detail

SN	Name	Sex	Age	PWD (Y/N)	Position in group	Ethnicity	Contact Number
1							
2							
3							
4							
5							
6							
7							
8							
9							

1. Tell us about the youth group. What does it do and who are its member?
2. Since how long you are in this group? how many members are there in this group?
3. Are you aware of the irrigation scheme being rehabilitated in your community? Is anyone involved in the WUA or in the construction of the scheme? way is each of you involved in SIP project?
4. Do people practice commercial agriculture in your community? If not why? If yes, what all do they sell and to whom?
5. Do people in the community have willingness to shift towards commercial farming? Do they have enough incentives?
6. What is the current trend of youth migration from this area?
7. Who are the migrants?
8. What are main reasons that forced the youths to migrate?
9. What are purposes of migration?
10. On average how long are they are in foreign land?
11. What are the key challenges prevailing in youth's development in your area?
12. Awareness about the youth employment programs budgets in the Palika: How do you get information (sources) about the agriculture programs in your Palika?
13. What are the effects of youth migration in agriculture other development sector?
14. What are their aspirations for the future?

KII with local chamber of commerce and industry (CCI)

Introduction

My name is _____. I am working for the "baseline study survey of Small Irrigation Program (SIP) Phase – II executed by SWISS through Quest for Development. As part of this survey, I would like to interview you. The Survey Team will keep your personal information confidential. We will use it only for the purpose of this survey and analysis. We will greatly appreciate if you kindly cooperate with us. My interview will take about half an hour but you can stop it any time and continue later. Thank you very much for your kind cooperation. Do you agree for this interview? A. Yes B. No

Name:		
Sex: M ☐ F ☐ Other ☐		
District:	Gaun/Nagarpalika :	Ward No:
Name of Organization:		
Contact No.:		
Designation:		
Date of Interview:		

1. Are you aware of SIP?
2. How does your organization collaborate with SIP?
3. What key farm products are produced by small holder farmers?
4. What are the products and services provided by market actors to the farmers?
5. What are the major farm products coming to markets from the local farmers?
6. How much of the local farm produces covers the market demands?
7. Who are the key agriculture market actors?
8. What are key service and products are provided by the local market actors?
9. Do you know anything about the market actors and WUA/farmers' groups signing contract agreement for input supply and farm products trading?
10. How the price of farmer's produce determined, is there minimum support price fixing practice adapted by the local governments?
11. What is migration trend of the producer households in this area?
12. What are opportunities and challenges of agriculture value chain development of local products?

KII with Economic Development Committee

Introduction

Namaste!

I am _____. I work for Q4D for the baseline survey of SIP. As a participant of the project/program, your experience and feedback will be of immense importance for fair and evidence based baseline survey and context analysis. Please feel free to share your opinion. If you don't like, you can stop me at any time. It will take approximately 30-45 minutes of your time. All Information collected from you will be used only for this baseline study purposes.

Do you agree for the interview?
(Yes or No)

Name:		
Sex: M ☒ F ☐ Other ☐		
District:	Gaun/Nagarpalika :	Ward No:
Name of Organization/Department:		
Contact No.:		
Designation:		
Date of Interview:		

1. What do you know about the SIP project and its activities in your areas?
2. How does your office collaborate with SIP?
3. What are the priorities of the LG in the agriculture sector?
4. What are the opportunities in this LG in the agriculture sector?
5. Can you briefly tell us about the agriculture planning process? How do you ensure that SIP schemes receive programs and budgets from LGs?
6. What is the role of the economic development committee?
7. What are major arable land types and their uses in this municipality/district?
8. What is main source of livelihoods of people in this municipality/ district?
9. What are the key agriculture products of this municipality/district?
10. What is status of food security in the district?
11. What types of support is your office providing to the farming communities particularly smallholder farmers?
12. What are major traded agriculture products in this district?
13. Where are the key markets for local producers?
14. Who are the key market actors and what are their products and services?
15. Is there any practice of contract agreement between farmers and input suppliers (agro vets, traders) for input services?
16. Is there any practice of contract agreement between farmers and traders to sell their agro-produces?
17. What are key opportunities and challenges of agriculture sector in this municipality/district?

Thank you

KII with Local Government authority

Introduction

My name is _____. I am working for the "baseline study survey of Small Irrigation Program (SIP) Phase – II executed by SWISS through Quest for Development. As part of this survey, I would like to interview you. The Survey Team will keep your personal information confidential. We will use it only for the purpose of this survey and analysis. We will greatly appreciate if you kindly cooperate with us. My interview will take about half an hour but you can stop it any time and continue later. Thank you very much for your kind cooperation. Do you agree? A. yes B. No

Name:		
Sex: M ☐ F ☐ Other ☐		
District:	Gaun/Nagarpalika :	Ward No:
Contact No.:		
Designation:		
Date of Interview:		

1. What is the role of the municipality in implementation of SIP?
2. How many irrigation schemes are currently being implemented in this municipality?
3. What policies and plans has the LG formulated for promotion of small irrigation and agriculture commercialization?
4. What are the major sources of livelihoods of people in this municipality?
5. What is contribution of agriculture sector in livelihoods of the local people?
6. How are the land resources managed in this municipality? How much of the cultivable land (approximately) remains fallow in this LG? Is there a policy to manage this?
7. What is the level of poverty and employment in the municipality?
8. What is the trend of migration in this municipality? How does this affect the agriculture sector?
9. What are the major agriculture produces of this municipality?
10. What are the key marketable agriculture produces of this municipality?
11. Where are the local agriculture market center in the municipality?
12. Who are key local market actors in the municipality?
13. What services and/or agriculture extension services are being provided by the LG to SIP beneficiaries?
14. What services and products are the market actors providing to beneficiaries of SIP?
15. What are tangible benefits/ outcomes expected from implementation of SIP?
16. What are the challenges and opportunities for the LGs for enterprising the agriculture production system in this municipality?
17. Anything else you want to add?

Thank you

KII with Agriculture Development Section

Introduction

Namaste!

I am _____. I work for Q4D for the baseline survey of SIP. As a participant of the project/program, your experience and feedback will be of immense importance for fair and evidence-based baseline survey and context analysis. Please feel free to share your opinion. If you don't like, you can stop me at any time. It will take approximately 30-45 minutes of your time. All Information collected from you will be used only for this baseline study purposes.

Do you agree for the interview?
(Yes or No)

Name:		
Sex: M ☒ F ☐ Other ☐		
District:	Gaun/Nagarpalika :	Ward No:
Name of Organization/Department:		
Contact No.:		
Designation:		
Date of Interview:		

1. Questions
1. What do you know about the SIP project and its activities in your areas?
2. How does your office collaborate with SIP?
3. What are the priorities of the LG in the agriculture sector?
4. What are the opportunities in this LG in the agriculture sector?
5. Can you briefly tell us about the agriculture planning process? How do you ensure that SIP schemes receive programs and budgets from LGs?
6. What is the role of the economic development committee?
7. What are major arable land types and their uses in this municipality/district?
8. What is main source of livelihoods of people in this municipality/ district?
9. What are the key agriculture products of this municipality/district?
10. What is status of food security in the district?
11. What types of support is your office providing to the farming communities particularly smallholder farmers?
12. What are major traded agriculture products in this district?
13. Where are the key markets for local producers?
14. Who are the key market actors and what are their products and services?
15. Is there any practice of contract agreement between farmers and input suppliers (agro vets, traders) for input services?
16. Is there any practice of contract agreement between farmers and traders to sell their agro-produces?
17. What are key opportunities and challenges of agriculture sector in this municipality/district?

Thank you

Annex V: Households and population data of the surveyed Palikas

District	Name of Palika	HHS	Female	Male	Total
Ilam	Sandakpur GaunPalika	4,031.00	7,620.00	7,840.00	15,460.00
	Suryodaya NagarPalika	14,119.00	27,353.00	27,922.00	55,275.00
Panchthar	Phidim NagarPalika	12,433.00	24,750.00	23,963.00	48,713.00
	Falgunanda GaunPalika	5,263.00	10,417.00	10,836.00	21,253.00
Tehrathum	Myanglung NagarPalika	4,934.00	9,731.00	9,347.00	19,078.00
	Laligurans NagarPalika	3,773.00	7,936.00	7,482.00	15,418.00
Bhojpur	Bhojpur NagarPalika	6,775.00	13,450.00	12,676.00	26,126.00
	Tyamke Maiyum GaunPalika	3,855.00	7,880.00	7,611.00	15,491.00
Dhankuta	Chaubise GaunPalika	4,493.00	9,750.00	8,764.00	18,514.00
	Dhankuta Municipality	9,803.00	18,769.00	17,387.00	36,156.00
Khotang	Diktel NagarPalika	10,719.00	21,950.00	21,345.00	43,295.00
	Diprung GaunPalika	3,849.00	8,410.00	81,339.00	89,749.00
Udayapur	Belaka Municipality	12,170.00	26,827.00	24,631.00	51,458.00
	Chaudandigadhi NagarPalika	12,857.00	28,148.00	25,389.00	53,537.00
Okhaldhunga	Molung GaunPalika	4,173.00	8,480.00	8,464.00	16,944.00
	Siddicharan NagarPalika	7,173.00	14,423.00	13,554.00	27,977.00
	Total	120,420.00	245,894.00	308,550.00	554,444.00

(Source: Preliminary findings of population census of Nepal 2021, CBS)