Local food plants for nutrition

IMPROVING DIETS AND REDUCING FOOD SCARCITY WITH THE HELP OF LOCAL FOOD PLANTS IN SUDURPASCHIM PROVINCE OF NEPAL

SD=HS Sowing Diversity = Harvesting Security

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Acronyms

ASOCUCH	Asociación de Organizaciones de los Cuchumatanes
CTDT	Community Technology Development Trust
CSI	Cognitive Salience Index
DSR	Dietary Species Richness
ESAFF	Eastern and Southern Africa Small Scale Farmers' Forum
FFS	Farmer Field School
FOVIDA	Fomento de la Vida
FVS	Food Variety Score
HDDS	Household Dietary Diversity Score
HFIAS	Household Food Insecurity Access Scale
HHS	Household Hunger Scale
Li Bird	Local Initiatives for Biodiversity, Research and Development
MAHFP	Months of Adequate Household Food Provisioning
MsHDDS	Micronutrient Sensitive Household Dietary Diversity Score
NAFRI	National Agricultural and Forestry Research Institute
NUS	Neglected and Underutilized Species
PELUM	Participatory Ecological Land Use Management
SD=HS	Sowing Diversity = Harvesting Security
ZAAB	Zambia Alliance for Agroecology and Biodiversity

Foreword

This document presents the main household-level findings of the baseline survey conducted between 2019-2021, during the second phase of the Sowing Diversity = Harvesting Security (SD=HS) programme (2019-2023). The results of the baseline are complemented with the main findings of the diagnostic exercises conducted by SD=HS' Farmer Field Schools (FFS). Both activities are part of SD=HS' work on Local Food Plants for Nutrition. SD=HS is a global program, and our work on local food plants is currently implemented by Oxfam Country Offices and partner organizations in seven countries. These partners are the National Agricultural and Forestry Research Institute (NAFRI) and the Agricultural Research Center (ARC) in Laos, the Local Initiatives for Biodiversity, Research and Development (Li Bird) in Nepal, the Asociación de Organizaciones de los Cuchumatanes (ASOCUCH) in Guatemala, the Participatory Ecological Land Use Management (PELUM) and the Eastern and Southern Africa Small Scale Farmers' Forum (ESAFF) in Uganda, the Zambia Alliance for Agroecology and Biodiversity (ZAAB) in Zambia, the Community Technology Development Trust (CTDT) in Zambia and Zimbabwe, and the Fomento de la Vida (FOVIDA) in Peru. SD=HS programme is coordinated by Oxfam Novib.

The use of the baseline data and FFS diagnosis conducted by farmers allowed us to establish the local and regional nutritional and agroecological conditions in the communities where the Farmer Field Schools (FFS) on Nutrition and Local Food Plants were implemented. The baseline data served to advise and guide the development of a country-specific FFS curriculum and the implementation of FFS activities, by informing FFS participants, collaborators, and other stakeholders about the potential role of local food plants in improving local diets and reducing the food scarcity period.

This Briefing Note is part of a series of briefing notes summarizing the program's findings on nutrition. The comparison of the baseline and FFS diagnosis results across the seven program countries will be consolidated in global SD=HS publications.

We are grateful for the funding support from the Swedish International Development Cooperation Agency (Sida).

We hope this document, which provides new and detailed data, contributes to increased attention on the role of local food plants for healthy and affordable diets, and improved nutrition of indigenous peoples and smallholder farmers.

1 Introduction

1.1 Malnutrition

Malnutrition remains one of the greatest global health challenges, and women and children are its most visible and vulnerable victims. People are malnourished when: (a) their diet does not provide adequate calories or nutrients for their body growth and normal function, (b) they are unable to fully utilize the food they eat due to illness, or (c) they take in too much energy, saturated or trans-fat, salt, and sugar (overnutrition). In all cases, malnutrition is closely linked to disease as it affects the function and recovery of every organ system. Poverty exacerbates the likelihood and effects of malnutrition. Furthermore, malnutrition contributes to higher healthcare expenses, decreased productivity, and hindered economic growth, fostering an ongoing cycle of poverty and ill-health[1].

Nepal grapples with a complex web of challenges, particularly in the realm of malnutrition, as it copes with a post-earthquake recovery, limited investments, infrastructure deficiencies, and susceptibility to climate change. The aftermath of the 2015 earthquake left 1.4 million people in need of food assistance, exacerbating food insecurity issues. With gender and caste disparities playing a pivotal role, women and lower castes face unequal access to opportunities, further deepening malnutrition challenges. The agricultural sector, employing the majority of the population, struggles to generate an adequate food supply, resulting in widespread hunger and increased malnutrition. Depressed rural economies underscore the urgent need for focused interventions to address malnutrition, considering it not only as a health concern but also as a critical aspect of broader socio-economic challenges in Nepal[2].

The nutritional landscape in Nepal presents a complex interplay with poverty, reflecting both progress and persistent challenges. While the country is 'on course' to meet certain maternal, infant, and young child nutrition targets, such as addressing stunting, other critical indicators reveal ongoing struggles. The high prevalence of anaemia among women of reproductive age at 35.7% and the lack of progress in exclusive breastfeeding, affecting 62.1% of infants lacking this, point to formidable hurdles. Moreover, the elevated rates of stunting at 31.5% among children under 5, exceeding the Asia region's average, and wasting at 12.0%, among the highest globally, highlight the impact of poverty on diverse nutritional outcomes[3].

1.2 Food scarcity

For many people, the availability of food is driven by seasonal cycles, and the availability of food is least in the pre-harvest months. During food scarcity periods, household food stocks from the last harvest have dwindled. This may coincide with food shortages in the local market, meaning that food that is still available is sold at inflated prices. In this period of the year, the nutrition security of the family is most at stake. Rural households may be forced to resort to various coping strategies to deal with food scarcity, such as reducing the diversity and quantity of their meals, which has an effect on macro and micronutrient deficiencies of household members. Other strategies to which farmers resort when food scarcity really hits them, such as mortgaging or selling the land, livestock, and other household assets, may result in further spiraling into poverty. The challenges experienced during the scarcity period can be increasingly aggravated by the consequences of climate change. The psychological effects of food scarcity challenges are profound, and all family members may experience high levels of anxiety and stress during this period. Women are especially affected, as their responsibilities often comprise food production, income-generating activities, and care for other household members (including food preparation). The effects of food scarcity periods tend to be overlooked by

policymakers, or may only get attention when these result from natural or human-made calamities.

Nepal's unique economic landscape, characterized by low per capita income, finds resilience in its outperformance on poverty and food security indices, primarily attributed to the crucial safety net provided by remittances from migrant workers. However, recent global instability and the impact of climate change have contributed to worsening trends, unveiling disparities in food insecurity across districts. The reliance on a limited range of staple foods, such as rice, wheat, potato, and corn, is a notable factor contributing to the food and nutrition security challenge[4]. The resulting loss of nutritional diversity in daily diets intensifies malnutrition concerns, particularly evident in the high hills and mountains of Nepal, which have long faced a food deficit[4,5].

Despite government initiatives, official figures from 2020 indicate that only 48.2% of households in Nepal are food secure. The overemphasis on a narrow set of major food products exacerbates malnutrition, especially in regions with native and locally adapted species that are often neglected. Barley, buckwheat, millets, amaranth, and other crops with high nutritional value face underutilization, further hindered by cultural and religious taboos branding them as unholy foods. This underscores the imperative for education and public awareness campaigns to promote the nutritional benefits of these underutilized crops, offering a potential avenue to address malnutrition challenges in the country[5,6].

1.3 Objectives

The objective of SD=HS work on Local Food Plants for Nutrition is twofold: 1. To enhance dietary diversity[a] and food security; 2. To reduce the duration and severity of climate-related food scarcity seasons. This is achieved through promoting access to and consumption of diverse and nutritious local food plants while safeguarding local biodiversity and optimizing the management of these crucial plant resources. By achieving these goals, the initiative aims to improve overall nutrition security and resilience to climate challenges.

In order to improve the nutrition status of smallholder farmers and indigenous peoples, the following questions were addressed:

- What are, according to farmers, the local causes and consequences of malnutrition?
- What characterizes the food scarcity period and which strategies do farmers implement to cope with it?
- What is the role of local food plants in improving the diversity of the diet during the food scarcity and sufficiency periods?
- What is the role of the agroecosystems and local environments in the provision of local food plants?
- Are households that consume more local food plants less prone to suffer from food insecurity, food scarcity, and lower dietary diversity and quality?
- How can we best measure this? What are the implications of local food plant consumption for the most vulnerable households?
- What are the local food plants on which knowledge is shared by men and/or women in the communities?

[a] Diverse diets include a variety of foods from different food groups, including cereals; white roots and tubers; vitamin A-rich vegetables and tubers; dark green leafy vegetables; other vegetables; vitamin A-rich fruits; other fruits; organ meat; flesh meat; eggs; fish and seafood; legumes, nuts and seeds; milk and milk products; oils and fats; sweets; spices, herbs, and beverages. A diverse diet is important to ensure the intake of a wide variety of nutrients, which is needed for a healthy life.

- Which are the local food plants that are consumed during the food scarcity period?
- Who are the most powerful household members in terms of access to food?
- What are the roles of women and men in the acquisition of local food plants?
- Does gender affect the knowledge of local food plants?

This Briefing Note is an attempt to answer these questions, by comparing the consumption of local food plants in food scarcity and sufficiency periods, and its effects on achieving dietary diversity and quality throughout the year. It further addresses the role of local food plants in strengthening communities' coping strategies, in view of their demographic and socio-economic profiles. It also reflects the intention to raise awareness, stimulate discussions, and trigger feedback from a wider audience of stakeholders on the role that local food plants may play in improving nutrition and ensuring healthy and affordable diets. Finally, it provides information to support policies and legislation that promote diverse and healthy diets through the improved and sustainable use of biodiversity available in the environment.

2 Methodology

2.1 Household survey

The household survey took place from 2019 to 2021 in two different periods (scarcity season and sufficiency season) [Table 1]. Data was collected by local enumerators who speak the local language. They were trained by the *Local Initiatives for Biodiversity, Research and Development (Li Bird),* who pilot-tested the questionnaire before collecting the data. The household survey was conducted in a representative sample of communities, representing each agroecosystem and ethnic group in the project region. In each selected community, a random household sampling equivalent to 30% of all households living in the community took place to ensure statistical representativeness. For villages with 30 to 100 households, a sample of 30 households was used; for villages with 30 or fewer households, all households were interviewed. Households that had been living for less than one year in the community or households that had not been engaged in farming were excluded from the sample. All informants participated freely and with prior informed consent.

Table 1. *Data collection periods during scarcity and sufficiency seasons in the four surveyed districts*

Sufficiency season (round 1)	Scarcity season (round 2)
December 2019	April - May 2021

This Briefing Note presents the results of the following survey modules: (1) demographic and socio-economic characteristics, (2) severity of food insecurity, (3) dietary diversity, (4) local food plant acquisition, (5) free-listings of local food plants, (6) features of the food scarcity season, and (7) sources of information modules of the household survey[b]. The demographic and socio-economic module includes collected data that allowed the calculation of variables related to gender and household vulnerability, and that gave a general indication of the main productive activities of the household, among others. All interviews (except for the demographic and socio-economic module) were conducted in both food scarcity and sufficiency periods.

[b] The detailed explanation of each module, including the survey questionnaire, is accessible in the Baseline Tool document (http://bit.ly/2WSHfTf). The tool was revised and agreed upon with all partner organizations.

Food insecurity was measured using the Household Food Insecurity Access Scale (HFIAS) and the Household Hunger Scale (HHS)[7] [Table 2]. According to the HFIAS indicator guide[8], a food-secure household experiences no food insecurity conditions, or it might rarely experience concerns about sufficient access to food. A mildly food insecure household often worries about not having enough food, it might be unable to eat preferred foods and have a more monotonous diet than desired, or it can even consume some foods considered undesirable. A moderately food insecure household often sacrifices quality more frequently, by eating a monotonous diet or undesirable foods and can start to cut back on quantity by reducing the size of meals or number of meals. Finally, a severely food insecure household has resorted to cutting back on meal size or number of meals and its members can still run out of food, go to bed hungry, or go a whole day without eating[8].

Table 2. *Food insecurity indicators and their definitions*

Food Insecurity Indicators	Abbreviation	Definition
Household Food Insecurity Access Scale	HFIAS	It measures the severity of household food insecurity during the past four weeks (30 days). It ranges from 0 to 27, indicating the degree of insecure food access. Households are categorized as food secure, mildly food insecure, moderately food insecure, or severely food insecure[7].
Household Hunger Scale	HHS	It is derived directly from the HFIAS and it includes only three hunger-related aspects of insecure food access: "little to no hunger in the household", "moderate hunger in the household", or "severe hunger in the household"[7].

A 24-hour dietary recall-based interview was also conducted to capture detailed information about all foods and beverages consumed by the respondent in the past 24 hours[9]. Based on the results of the 24-hour recall, the Household Dietary Diversity Score (HDDS), Micronutrient Sensitive HDDS (MsHDDS), the Food Variety Score (FVS) and Dietary Species Richness (DSR), were all calculated [Table 3].

Table 3. *Dietary diversity indicators calculated based on the 24-hour recalls, and their definitions*

Dietary Diversity Indicators	Abbreviation	Definition
Household Dietary Diversity Score	HDDS	It assesses a household's economic access to food (i.e. its ability to produce, purchase or otherwise secure food for consumption by all household members). The potential score range is 0-12[10].
Micronutrient Sensitive HDDS	MsHDDS	It disaggregates and reorganizes the HDDS food groups into 16 micronutrient-based groups[11].
Food Variety Score	FVS	It measures the number of different food items consumed from all possible items eaten (individual foods, food mixtures, food categories, or a combination of these)[12].
Dietary Species Richness	DSR	It measures the number of different species consumed per day, assessing both nutritional adequacy and food biodiversity[13].

Local food plant acquisition events, based on a recall period of seven days, also captured the multiple environments from which local food plants were acquired, and gender roles related to their harvesting or gathering. A detailed explanation of how each index was calculated, alongside the rationale of each survey module, and the survey questionnaire itself are

accessible upon request. The tools were revised and agreed upon by all partner organizations. Each partner could adapt, test the tools, and include specific sections relevant to their own context.

The free listings of the food plants aim to provide an overview of local knowledge and were used for the development of a list of species based on the knowledge that is shared by community members. Given that knowledge is intrinsically related to gender, free listings were requested from the head of household and his/her spouse separately. The results of the free listings were analysed by using the cognitive salience index (CSI). The CSI combines frequency and order of mention across men's and women's lists for each plant species and reflects the knowledge of a specific plant (the higher the CSI, the higher the knowledge of that specific plant[14]. In addition, the species that are more widely used among households during the food scarcity season were identified using the traffic light exercise[15]. For that, the enumerator asked men and women to give a colour to each plant species in relation to the period when it is consumed, as follows:

- Green light: local food plant species are consumed during the sufficiency period, or when food may not be plentiful but generally available to the community in adequate quantities and qualities.
- Amber light: local food plant species are consumed during a period in which food reserves are alarmingly low.
- Red light: local food plant species are consumed during a situation in which the food supply is depleted, which condition requires emergency measures.

The food scarcity module not only assessed the months in which households have reduced access to food[16] but also captured the variety of local food plants consumed in times of food scarcity. The sources of information module captured the current and preferred sources of information for the community households on health, sanitation, and nutrition issues, to help design strategies to communicate with farmers by using preferred channels.

The data was analysed with descriptive and non-parametric statistics. Spearman rank correlations were calculated between ordinal or continuous variables. Kruskal-Wallis ranked tests estimated correlations between one nominal variable that has two or more categories and a continuous variable. Mann-Whitney tests estimated correlations between one nominal variable that has two categories and a continuous variable. Finally, Chi-Square tests were calculated between two nominal variables.

2.2 FFS diagnostic exercises

The FFS diagnosis took place in 2021 for seven FFS established during that year in the Sudurpaschim province of Nepal. Data was collected by FFS facilitators who speak the local language. They were trained on the FFS approach for the work on nutrition and local food plants, including the conduction of diagnostic exercises and FFS activities, by Li Bird as part of the training of trainers. All FFS members participated freely and with prior informed consent.

This Briefing Note presents the results of the malnutrition problem tree, decision-making with respect to intra-household food distribution, and timeline analysis of local food plants and nutrition exercises from seven FFS for which we had complete and good-quality data. The analysis of the data was mainly a descriptive exercise, showing patterns, frequencies, and means, where applicable. The FFS diagnostic exercises are detailed in the illustrated module 'Diagnostic Phase' of the FFS Field Guide, which also includes the forms by which results were reported. More information on the FFS work on Nutrition and Local Food Plants is provided on the SD=HS website and is summarized in the Online Course, accessible through the SD=HS website.

2.3 Household and FFS locations

In total, data were collected from 473 households for the baseline survey and seven FFS for the Diagnostic exercise. Table 4 presents the distribution of the households and FFS surveyed across six municipalities of the Sudurpaschim province of Nepal.

Table 4. *Distribution of sampled households and FFS across the six municipalities, involved in the activities indicated*

	FFS diagnostic exercise		Baseline survey	
Municipalities	Number of FFS	Percentage of total number of FFS	Number of households	Percentage of total number of households
Jorayal Rural Municipality	1	14.3%	99	20.9%
Ganyapdhura Rural Municipality	2	28.6%	82	17.3%
Joshipur Rural Municipality	0	0.0%	31	6.6%
Laljhadi Rural Municipality	1	14.3%	105	22.2%
Gauriganga Municipality	2	28.6%	126	26.6%
Kailari Rural Municipality	1	14.3%	30	6.3%
Total	**7**	**100%**	**473**	**100%**

Figures 1 below shows the location of the surveyed households and FFS within the Sudurpaschim of Nepal. The map figures were prepared by Matteo Petitti.

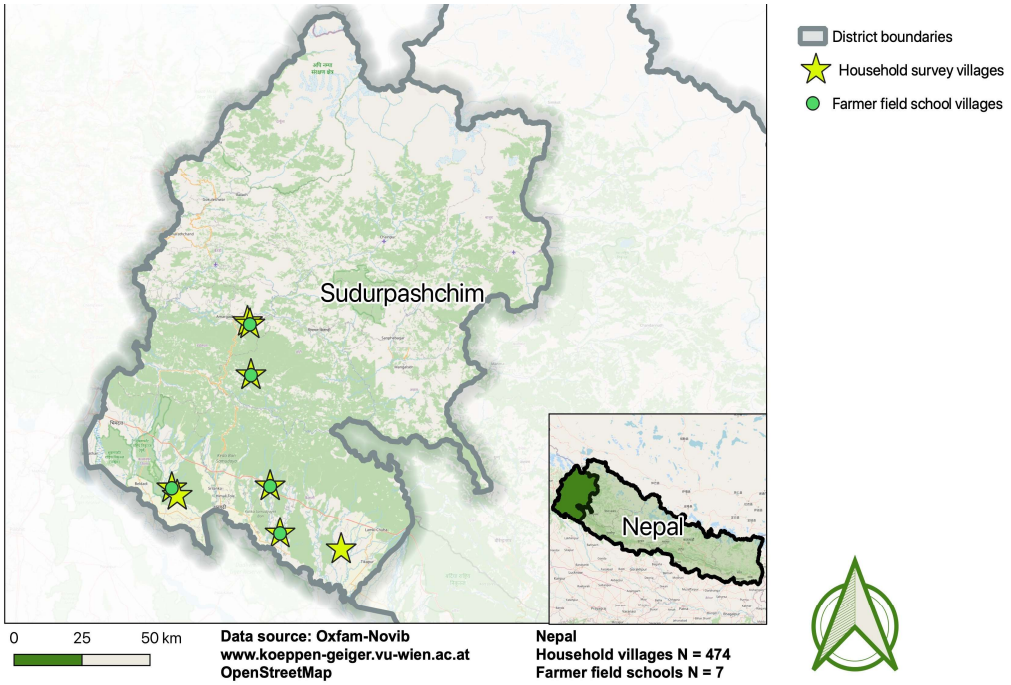

Figure 1. Map indicating the location of households and FFS within the Sudurpaschim of Nepal

3 Results

3.1 Indigenous peoples and smallholder farmers in Nepal

Agroecological conditions determine largely which crops can be successfully grown and which farming conditions need to be fulfilled, e.g. irrigation, maximum time to maturity, and dependence on fertilizers. Recently, climate change has caused the agroecosystems to become drier and rainfall patterns to become more irregular. Such changes bear heavily on crop production and food security.

Indigenous peoples and smallholder farmers surveyed in Nepal live in tropical and subtropical cool temperate zones, which are characterized by an annual average temperature of 26-27 °C and 18-22 °C respectively, and an annual average rainfall between 1280 -1390 mm [Table 5].

Table 5. *Agroecological information of the study sites*

Study Site	Climatic Zone	Geography	Altitude Range (Meters above sea level)	Annual Avg. rainfall (mm)	Annual Avg. Temperature in °C (Min-Max)	Agroecosystem	Demography	
							Total Population (HHs no.)	Ethnic Composition (%)
Jorayal RM	Subtropical to Cool Temperate	River basin, Mid hills and high hills	684-2752 MASL	1337 mm	22°C (0.2 °C - 44°C.)	Two-season cultivation with crop rotation of wheat/ maize/ vegetables. Soil type mostly Sandy clay.	19788 (4320)	BCTN***: 69.2% Janjati: 14.5% Dalit: 12.2% Other: 4.1%
Ganyapdhura RM	Subtropical to Cool Temperate	River basin, Mid hills and high heels	648-2700 MASL	1346 mm	18°C (3.6 °C - 32°C)	Two-season cultivation with crop rotation of wheat/ potato/ maize/ vegetables. Sandy clay soil type.	13655 (3360)	BCTN: 68.2% Janjati: 13.7% Dalit: 14.2% Other: 3.9%
Joshipur RM	Tropical	Gangetic plain	148-162 MASL	1340mm	26°C (11°C-42°C)	Two-season cultivation with crop rotation of rice/wheat/mustard.	37187 (7751)	BCTN: 10.3% Janjati: 78.2% Dalit: 7.4% Other: 4.1%
Laljhadi RM	Tropical	Gangetic plain	150-250 MASL	1320mm	26°C (15°C-43°C)	Two-season cultivation with crop rotation of rice/ wheat/ mustard.	25037 (4745)	BCTN: 6.8% Janjati: 80.5% Dalit: 2.7% Other: 10%
Gauriganga MC**	Tropical	Gangetic plain	165-944 MASL	1280mm	26°C (11°C-42°C)	Two-season cultivation with crop rotation of rice/ wheat/ mustard.	64558 (13781)	BCTN: 44.3% Janjati: 35.2% Dalit: 3% Other: 17.5%
Kailari RM*	Tropical		120-203 MASL	1385mm	27°C (12°C-42°C)	Two-season cultivation with crop rotation of rice/ wheat/ mustard/ maize.	49917 (10174)	BCTN: 3.5 % Janjati: 90 % Dalit: 3.2 % Other: 3.3%

*RM: Rural Municipality, MC: Municipality, MASL: Meters above seas level, BCTN: Brahmin/Chettri

According to the Holdridge Life Zone classification [17,18], 62% of the communities involved are situated in the tropical dry forest zone, while the location of the remaining 38% of the areas classified are in the subtropical moist forest zone. Köppen Climate classification[19] indicates that all (100%) of the implementing areas have a climate of warm temperate winters and dry hot summers. The surveyed communities mostly rely on wheat, rice, potato and mustard farming to sustain their livelihoods. More than 90% of wheat is cultivated for household consumption.

Table 6 presents the socio-demographic characteristics of the participating communities. The majority of the households investigated had an average size of 5 household members and belonged to indigenous tribes (56%). Male household heads were present in more than 80% of the households interviewed, indicating that female-headed households formed a sizable

minority. The educational level and literacy rates of the surveyed households showed that 39% of household heads have completed primary education, although 27% do not know how to read or write. Almost 39% of the household heads have never attended formal education, while 16% have completed secondary education.

Table 6. *Results from socio-demographic module of baseline survey*

Socio-demographic variables	Sufficiency season interviews (R1)			
	N	%	Mean	St. D.
Ethnic Groups				
Brahmin/Chettri	123	26%		
Dalit	87	18%		
Indigenous	262	56%		
Household size			5.1	2.3
Sex of household head				
Man	393	83%		
Woman	78	17%		
Main occupation of household head				
On farm	354	75%		
Outside farm	66	14%		
Both	53	11%		
Age of household head			45.4	13.1
Literacy of household head				
Only read	24	5%		
Only write	20	4%		
Both	299	64%		
None	125	27%		
Education of household head				
Never attended formal education	184	39%		
Primary	183	39%		
Secondary	75	16%		
Highest education	26	6%		
Number of migrants per household			3.1	3.3
Number of children (incl. orphans) per household			1.3	1.2
Number of chronically ill people per household			0.1	0.3
Number of women in child-bearing age per household			1.6	1.0
Total land area (ha) per household			0.4	0.7
Main productive activities per household				
Agriculture	453	37%		
Livestock farming	436	35%		
Non-agricultural activities	78	6%		
Business	48	4%		
Remittance	113	9%		
Other	101	8%		
Farm ownership				
Owned	437	72%		
Rented	20	3%		
Borrowed from family or friends	9	2%		
Communal land	5	1%		
Other	133	22%		
Number of crops grown in the past 12 months, and for what use			14.2	4.6
Sales			1.8	3.1
Consumption in the household			12.2	5.1
Barter			0.9	2.1
Market orientation (proportion of harvest for sale)			12%	20%
Presence of income from non-agricultural activities	391	83%		
Presence of home garden	435	92%		

** The results are based on the baseline household survey, in which 473 households participated. Ethnic groups: N=472 (missing values=1); Household size: N=473 (missing value=0) ; Sex of household head: N=471 (missing value=2); Main occupation of household head: N=473 (missing values=0); Age of household head: N=472 (missing values=1); Literacy of household head: N=468 (missing values=5); Education of household head: N=468 (missing values=5); Number of migrants: N=166 (missing values=308); Number of children: N=473 (missing values=0); Number of chronically ill people: N=473 (missing values=0); Number of women in child-bearing age: N=473 (missing values=0); Total land area: N=472 (missing values=1); Main productive activities: N=473 (missing value=0); Farm ownership: N=473 (missing values=0); Number of crops grown on the past 12 months: N=473 (missing value=0); Market orientation: N=473 (missing value=0); Presence of income from non-agricultural activities: N=473 (missing values=0); Presence of home garden: N=473 (missing values=0). The percentages are calculated over the valid number of responses for each variable, excluding missing values.*

In terms of their productive activities, 37% of the households interviewed work in agriculture, 35% of them in livestock farming and more than 70% also own a farm, while 92% of them operate a home garden. An average total of 14 crops were grown by the households in the past 12 months and the average sale proportion from their harvest is 12%, while the rest was mostly consumed in the household. In addition, more than 80% of the households have an income from non-farming activities.

3.2 Local causes and consequences of malnutrition

The diagnostic exercises addressed the causes and consequences of malnutrition using the Malnutrition Tree as a tool. Farmers participating in the FFS were allowed more than one open response. The most important cause of malnutrition mentioned by the FFS participants was the imbalanced diets that lack important nutrients for maintaining health [Table 7]. This response which does not reveal a root cause of malnutrition suggests a lack of knowledge on how malnutrition is developed. Indeed, lack of knowledge on what foods are actually nutritious and healthy was mentioned four times within the seven FFS. Environmental and agronomic challenges, as well as poverty, were mentioned once by the FFS participants as important causes of malnutrition. In conclusion, lack of basic nutrition knowledge is suggested to be the main cause of malnutrition.

Table 7. *Causes of malnutrition as reported by FFS participants*

Malnutrition cause	Number of answers	Percentage of answers	Details and examples
Imbalanced diet	7	54%	Lack of Vitamin A, calcium, iodine, protein; lack of balanced diet
Knowledge lack or gap	4	31%	Lack of awareness of nutrition; bad food habits
Environmental/agronomic challenges	1	8%	High use of pesticides; polluted water
Poverty	1	8%	Low income
Total	13	100%	

**The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked allowed FFS to give more than one open response. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of answers (N=13) collected from the 7 FFS.*

The most important consequence of malnutrition reported five out of 13 times within the surveyed FFS, were illnesses like night blindness and diarrhoea [Table 8]. Stunted growth in children and general undernutrition or improper development were reported four times, while overall weakness and lethargy were reported three times by the FFS participants. No mention was noted regarding obesity or overnutrition, while all consequences of malnutrition mentioned were related to health.

Table 8. *Consequences of malnutrition as reported by FFS participants.*

Malnutrition consequence	Number of answers	Percentage of answers	Details and examples
Illnesses	5	42%	Night blindness; diarrhoea; cholera
Stunted growth	4	33%	Undernutrition; stunted growth; lack of proper development of the healthy body
Overall weakness, lethargy and poor productivity	3	25%	Weakness in bones; Reduced functioning of the immune system
Total	**12**	**100%**	

**The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked allowed FFS to give more than one open response. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of answers (N=12) collected from the 7 FFS.*

Regarding the changes in nutrition over the past 30 years, the responses of the FFS participants were divided. In particular, four out of seven responses (57%) reported that nutrition has improved during the past three decades, while the rest (43%) reported the exact opposite [Table 9]. The difference in these results might be because of how the question was perceived by the participants, and might not reflect the actual nutrition situation over the past years in the Sudurpaschim province. This particular response might need follow-up.

Table 9. *Nutrition changes in the village in the last 30 years*

Changes in nutrition	Number of answers	Percentage of answers
Improved	4	57%
Worsened	3	43%
Total	**7**	**100%**

**The details and examples are taken directly from the FFS diagnostic reports. The question asked was "Has the nutrition in the village changed in the last 30 years?". The percentages are calculated over the total number of answers (N=7) collected from the 7 FFS.*

Three main factors affected the nutritional status of the households according to the participants of the seven FFS, and they were all mentioned equally three times [Table 10]. These were the lack of knowledge on food composition and the benefits of local food plants, the decreased consumption of local food plants, and the introduction of new varieties of staple crops. These causal factors indicate an awareness of the existing low dietary diversity and how this can affect household nutrition status and direct the lack of knowledge more specifically to food composition and nutritional content.

Table 10. *Major factors that affected the nutritional status of the households*

Factors influencing the change	Number of answers	Percentage of answers	Details and examples
Lack of knowledge/education	3	33%	Lack of knowledge on the nutritional content of local food plants
Loss of local foods in diet	3	33%	Low dietary diversity; consumption of more animal food than vegetables
Introduction of new crops/varieties	3	33%	Use of improved varieties
Total	**9**	**100%**	

**The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked ("What were the major factors that affected the nutritional status of the households?") allowed FFS to give more than one open responses. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of answers (N=9) collected from the 7 FFS.*

3.3 Understanding local diets

The baseline survey showed that household dietary diversity (HDDS) and micronutrient-sensitive dietary diversity (MsHDDS) were higher during the scarcity season compared to the sufficiency season [Table 11]. It is important to note that both the HDDS and MsHDDS indicators simply group food plants in categories such as cereals, tubers, vegetables, fruits, and legumes and measure to what extent the household diet contains crops from these groups. That means that unfortunately these indicators cannot capture the diversity of food plants consumed within each food group, e.g. diversity of vegetables, fruits, etc. However, the indicator FVS, which measures the variety of different food items[12,13], scored also higher during the food scarcity season. This suggests that the increased household dietary diversity (HDDS), micronutrient-sensitive dietary diversity (MsHDDS), and variety of different food consumption (FVS) during the scarcity season when food is less available, could be a substitute for the decreased availability and consumption of main staples, whose sole consumption hinders dietary diversity. No data were collected over the second survey round for the Dietary Species Richness (DSR) indicator.

Table 11. *Dietary diversity (HDDS, MsHDDS, FVS and DSR) differences between scarcity and sufficiency seasons*

Dietary diversity	Sufficiency season (mean ± sd)	Scarcity season (mean ± sd)
HDDS (0-12)	4.4 ± 1.4	5.9 ± 1.5
MsHDDS (0-16)	4.8 ± 1.7	7.6 ± 1.9
FVS (>0)	7.2 ± 3.4	16.3 ± 7.5
DSR (>0)	5.9 ± 2.4	N/A

** The results come out the baseline household survey, in which 473 households participated. During the first survey round (sufficiency season) 3 values were missing (N=470), while during the second survey round (scarcity season), 42 values were missing for HDDS and MsHDDS (N=431) and 43 values were missing for FVS and DSR (N=430).*

Regarding the dietary diversity in relation to the specific food groups, we noted that cereals were the most consumed food groups during both the scarcity and sufficiency seasons, although their consumption significantly decreased during the scarcity season [Table 12]. Vegetables and legumes, nuts and seeds were also consumed more during the sufficiency season compared to the scarcity season, while the opposite appears to happen for fruits, tubers and roots, which appeared more dominantly in the scarcity season. Interestingly, fruits are one of the least consumed food groups, especially during the food sufficiency season, reconfirming the lack of knowledge on the nutritional benefits of certain foods, and indicating an opportunity to increase the consumption of local fruits to improve nutrition.

Table 12. *Main food groups consumed during the scarcity and sufficiency seasons*

Food Group	Sufficiency season		Scarcity season	
	N	% HHS	N	% HHS
Cereals	470	22.7%	435	17.0%
White tubers and roots	246	11.9%	410	16.1%
Vegetables	396	19.1%	367	14.4%
Fruits	28	1.4%	74	2.9%
Meat	71	3.4%	104	4.1%
Eggs	13	0.6%	19	0.7%
Fish and other seafood	27	1.3%	34	1.3%
Legumes, nuts, and seeds	342	16.5%	294	11.5%
Milk and milk products	272	13.1%	153	6.0%
Oils and fats	39	1.9%	233	9.1%
Sweets	33	1.6%	69	2.7%
Spices, condiments and beverages	135	6.5%	362	14.2%
Total	2072	100.0%	2554	100.0%

** The results are deduced from the baseline household survey, in which 473 households participated. During the first survey round (sufficiency season) 3 households were missing (N=470), while during the second survey round (scarcity season), 39 households were missing (N=434). The percentages are calculated over the total number of answers per season.*

3.4 Local food plants diversifying the diet

Table 13 presents the food groups in which important local food plants in the Sudurpaschim province of Nepal are categorized. These plants have been selected for their importance in food scarcity season and/or due to their high nutritional value.

Table 13. *Important local food plants and food groups*

Scientific name	English name	Local name	Food group
Dioscorea bulbifera	Aerial yam	गिठ्ठा	tubers and roots
Chenopodium album	Goose foot	बेथे	vegetables
Setaria italica	Foxtail millet	कागुनो	cereals
Lepidium sativum	Garden Cress	चम्सुर	vegetables
Macrotyloma uniflorum	Horse gram	गहत	legumes, nuts and seeds
Coccinia grandis	Ivy gourd	कुन्द्रुक	vegetables
Basella alba	Malabar Spinach	पोइ साग	vegetables
Vigna umbellata	Rice bean	गुराँस/सोत्ता	legumes, nuts and seeds
Hibiscus sabdariffa	Roselle	अमिल लर्चा	vegetables
Perilla frutescens	Perilla	सिलाम	legumes, nuts and seeds
Urtica dioica	Stinging nettle	सिस्नो	vegetables
Colocasia esculenta	Taro	पिडालु, गाबा, कर्कलो	tubers and roots
Eleusine coracana	Finger millet	कोदो	cereals
Rumex nepalensis	Nepal Dock	हलहले साग	vegetables
Ipomoea batatas	Sweet Potato	गन्जी, सखरकंद	tubers and roots

Out of the 41 local food plants identified in the seven FFS, 16 of them were mentioned because of their nutritional importance [Table 14]. Few of these plants were mentioned due to their use in versatile preparation (10%), in religious rituals (7%), and in scarcity season (5%). Even fewer plants were reported because of their medicinal value (5%) and because of their tolerance for pests and diseases (2%). It shows that although local food plants are acknowledged for their nutritional contribution, there is no clear linkage made to the scarcity season, as only a couple of them were recognised as specifically important in that period.

Table 14. *Perceived importance of local food plants used in times of food scarcity*

Perceived importance	Number of plants	Percentage of plants
Provides important nutrients	16	39%
Versatile preparations	4	10%
Religious/ritual importance	3	7%
Available in scarcity seasons	2	5%
Medicinal value	2	5%
Tolerant to pests and diseases	1	2%

**The results come out the FFS diagnostic exercise, for which data was collected out of 7 FFS. In total, 41 local food plants were identified. Percentages reflect the number of plants divided by the total number of plants identified in this exercise (N=41). For some plants, no perceived importance was assigned.*

3.5 Measuring the severity of food insecurity

The baseline survey results suggest that household food insecurity was higher during the sufficiency season compared to the scarcity season [Table 15]. Unfortunately, food insecurity during the food scarcity season is estimated to be much higher. This unlikely outcome might reflect mistakes in data collection.

Table 15. *Food insecurity (HFIAS, HHS) differences between scarcity and sufficiency seasons*

Food Insecurity	Sufficiency season (mean ± sd)	Scarcity season (mean ± sd)
HFIAS (0-27)	11.0 ± 8.2	1.7 ± 4.3
HHS (0-6)	3.8 ± 2.8	0.1 ± 0.5

** The results come out the baseline household survey, in which 634 household participated. During the first survey round (sufficiency season) 9 values were missing (N=464), while during the second survey round (scarcity season) 38 values were missing (N=435).*

The HHS index, which measures hunger, is derived directly from the HFIAS, but it only assesses the most severe experiences of food insecurity. The baseline survey showed that only 2% of the interviewed households were experiencing moderate or severe hunger during the scarcity season [Table 16]. The very low food insecurity score during the scarcity season (second survey round) could reflect mistakes in data collection. Unfortunately, food insecurity during the food scarcity season is estimated to be much higher.

Table 16. *Percentage of households that suffer from food scarcity throughout the year*

Household Hunger Scale (HHS)	Sufficiency season		Scarcity season	
	N	% Hhs	N	% Hhs
Little to no hunger (% total Hhs)	162	34.2%	425	89.7%
Moderate hunger (% total Hhs)	12	2.5%	9	1.9%
Severe hunger (% total Hhs)	290	61.2%	1	0.2%

** The results are calculated based on the data from the baseline household survey, in which 634 households participated. During the first survey round (sufficiency season) 9 values were missing (N=464), while during the second survey round (scarcity season) 38 values were missing (N=435).*

3.6 The food scarcity period

Given the links between food scarcity and food insecurity, it was important to look into the current length of the scarcity period within the Sudurpaschim province of Nepal. Table 17 presents the percentage of the investigated households that suffer from food scarcity throughout the year. Although March and April seem to be the months showing the largest shortages, with more than 30% of households experiencing food scarcity, significant food shortages are also mentioned between July and September (>15% of households). Nevertheless, during May and June, the months which are considered part of the food scarcity season, only a small percentage of households are reporting food shortages. It should be noted that the rainy season spans June to August, indicating that the scarcity period commences before the rainy season and extends slightly beyond its conclusion. This suggests a potential explanation: the depletion of food stocks before the rainy season begins, with harvests occurring after the season concludes.

Table 17. *Percentage of households that suffer from food scarcity indicated per calendar month*

Months	Percentage of households
January	11%
February	10%
March	33%
April	30%
May	4%
June	6%
July	16%
August	20%
September	16%
October	5%
November	4%
December	6%

**The results come out the first-round of the baseline household survey (during December 2019, sufficiency season), in which 473 households participated and 2 values (Hhs) were missing (N=471).*

The most important characteristic of the food scarcity season, mentioned in 3 of the 6 responses within the seven FFS, was the climatic changes and more specifically the start of the rainy season which usually equals the initiation of food shortages [Table 18]. Purchasing food and consuming stored or preserved food are also characteristics of the scarcity season as reported by the FFS participants. No food shortages or hunger were mentioned which might be a result of the way the question was asked.

Table 18. *Characteristics and definition of the scarcity season as mentioned by the FFS participants*

Characteristics of the scarcity season	Number of answers	Percentage of answers	Details and examples
Climate changes	3	50%	Start of rainy season; rainy season followed by dry season
Food purchase	2	33%	During food scarcity, people purchase the food from the market
Consumption of stored food	1	17%	Consumption of roots and tubers which have been stored
Total	6	100%	

**The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked allowed FFS to give more than one open responses. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of answers (N=6) collected from the 7 FFS.*

3.7 Food plants during the food scarcity season

The average number of food plant species used in times of food scarcity per household was 2.1 (± 2.4). Table 19 presents the most frequently used food plants in times of scarcity. Rice, taro, potato, radish and wheat were the plants mentioned with the highest frequencies (each ≥14% of the households). Although rice, wheat and potato are considered to be major staple foods, rather than local food plants, they seem to play an important role during food scarcity, perhaps in reduced volumes.

Table 19. *Key food plant species used during food scarcity period*

Food plants used in food scarcity	Number of households	Percentage of households
rice	83	28%
taro	56	19%
potato	42	14%
radish	41	14%
wheat	40	14%
maize	34	12%
greater yam	26	9%
finger millet	20	7%
fiddlehead fern	18	6%
chenopodium bethe	11	4%
aerial yam	11	4%
fern, netted adder's tongue	11	4%
pumpkin	11	4%
mustard	10	3%
bitter gourd	9	3%
broad leaf mustard	9	3%
stinging nettle	9	3%
chilli	8	3%
sponge gourd	8	3%

**The results come out the baseline household survey, in which 473 households participated. In total, 1 value was missing (N=472).*

3.8 Multiple environments can support diverse diets: Local food plant acquisition

Sourcing of local food plants

In the scarcity period, a significant number of households (69%) are reported to have purchased at least one of the local food plants they mentioned, while much fewer said that they gathered (6.7%) or harvested (21.0%) them. The respective figures reported for the sufficiency period indicated that most households (49%) harvest at least one of the plants they mentioned, while fewer gather (18%) or purchase (27%) them. All figures are higher in the sufficiency period than in the scarcity season, suggesting that more local food plants are consumed in the sufficiency season. This confirms the minor role that local food plants currently have in local diets during the scarcity season.

The small number of species (13) reported to be gathered in the scarcity season compared to the sufficiency season (69), might indicate inferior growing conditions in the scarcity season. Similarly, 118 species were harvested during the sufficiency season compared to 40 species in the scarcity season, probably for the same reason of less favourable growing conditions in the scarcity period. This difference between the seasons did not appear for plants that were purchased.

Sites where the local food plants originated from

The majority of the local food plants listed originated from the agricultural field or the home garden with some variation in absolute numbers between the scarcity and sufficiency periods [Table 20]. More specifically, a greater number of species was reported to be sourced from the agricultural fields and home gardens in the sufficiency season, compared to the scarcity season, suggesting again less favourable growing conditions during the latter. Furthermore, during the scarcity season, only 15% of the mentioned plant species are brought from the forests, compared to 31% during the sufficiency season. In contrast, public spaces, and more specifically riversides, are much more popular during the scarcity period compared to the sufficiency period. This indicates that, during the food scarcity season, riversides and other public spaces are more important sites for collecting food plants compared to forests. This could be due to the greater availability of water in riversides that supports the vegetation of some local food plants during scarcity season.

Table 20. *Number of plant species and sites where they originate from*

Place of origin	Sufficiency season		Scarcity season	
	Number of species	Percentage of species	Number of species	Percentage of species
Agricultural field	99	60%	51	63%
Home garden	91	55%	47	58%
Forest	51	31%	12	15%
Public spaces	13	8%	32	40%
Roadside	2	1%	4	5%
Lake	5	3%	6	7%
Riverside	6	4%	22	27%
Market	71	43%	44	54%
Other	40	24%	19	24%

** The results come out the baseline household survey, in which 473 households participated. In total, 29 households were missing in the sufficiency period (N=444), and 47 during the scarcity period (N=426). During the first survey round (sufficiency season), 165 plant species were mentioned, while during the second survey round (scarcity season) 81 species were mentioned. Percentages reflect the number of species brought from each different place, divided by the total number of different species mentioned.*
***Public spaces are a grouped category and consist of the combination of roadsides, lakes and riversides.*

3.9 Women's and men's roles: Local food plant acquisition

Household members that acquire local food plants for the household

Baseline survey data showed that although men (81%) seem to acquire a slightly bigger variety of local food plants than women (78%) during the sufficiency season, women are sourcing a significantly bigger variety during food scarcity season (93%) [Table 21]. Children do not seem to contribute to the local food plant acquisition for their households during either season. Whereas the species provided by women and men show considerable overlap, the total number provided by women during the scarcity season is substantially larger. This demonstrates the important role women have in sourcing local food plants and nourishing the family during food scarcity.

Table 21. *Number of plant species that are acquired by various family members*

Family member	Sufficiency season		Scarcity season	
	Number of species	Percentage of species	Number of species	Percentage of species
Man	133	81%	56	69%
Woman	128	78%	75	93%
Both genders	13	8%	33	41%
Children	0	0%	0	0%
Others	1	1%	0	0%

**The results are based on the baseline household surveys, in which 473 households participated. In total, 29 households were missing in the sufficiency period (N=444), and 47 during the scarcity period (N=426). During the first survey round (sufficiency season), 165 plant species were mentioned, while during the second survey round (scarcity season) 81 species were mentioned. Percentages reflect the number of species brought from each different place, divided by the total number of different species mentioned.*

3.10 Women's and men's knowledge on local food plants (Free listings)

Individual men (9.8 ± 4.1) listed a slightly higher number of plants than individual women (8.8 ± 4.5), indicating that men have a slightly bigger knowledge of local food plants. As a group, men reported also a larger number of local food plants (183 different species/349 men), compared to women (164 different species /417 women). However, most plant species were listed by the two genders with very similar frequencies. Annex 1 presents the full list of plants and the frequencies in which they were mentioned by men and women, including the Sutrop CSI index[14].

3.11 Relationships with dietary diversity and food insecurity indicators

A significantly positive relationship was found between the number of crops grown in the past 12 months for consumption and household food insecurity (HFIAS) during the food sufficiency season ($p<0.001$). A significantly negative correlation was found for this relationship during the scarcity season. This suggests that during the scarcity season when food security is threatened, the households that consume a smaller number of crops are more food-insecure, while the opposite appears to happen during the food sufficiency season. In particular, during the sufficiency season, when more food is available, the more food-insecure households grow more crops for consumption.

A significantly negative relationship was found between the number of local food plants that were acquired and household food insecurity (HFIAS) ($p<0.01$), but this time the correlation was significant only during the sufficiency season. This suggests that despite the larger food availability during the sufficiency season, the households that consume a smaller number of local food plants are more food-insecure and that those consuming a larger number of local food plants are more food-secure. This highlights the important role of local food plants in food insecurity.

A significantly negative relationship was found between the number of crops grown in the past 12 months for consumption and the household dietary diversity (HDDS and MsHDDS), during the food sufficiency period ($p<0.01$). This unexpected finding may indicate that during the sufficiency season, households enlarge their consumption of major staples and consume less of the additional crops, resulting in a lower dietary diversity.

During scarcity season, a significantly positive relationship was found between the number of local food plants that were brought home and the household dietary diversity (HDDS and MsHDDS) ($p<0.001$), meaning that these households that acquire more local food plants during the food scarcity season have a higher dietary diversity. This can be explained by a higher reliance on minor crops that help households to maintain more diverse diets.

3.12 Intra-household decision making

Worldwide, women play a key role in safeguarding the nutrition of their families through their wide knowledge of local food plants, which allows diversification of diets and higher nutrient intake. Empowering them can contribute to their own food and nutrition security and that of their families[20]. However, in many cultures, there are major gender inequalities in relation to the access and control of resources, including food, with major consequences for the nutrition of women and children.

Indeed, five responses within the seven FFS indicated that mothers are the ones who decide what to eat in the household, while fathers were reported only three times to also make such decisions [Table 22].

Table 22. *Decision making member regarding what to eat in the household*

Decision making member	Number of answers	Percentage of answers
mother	5	63%
father	3	38%
Total	8	100%

** The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked ("Who decides what to eat in the household?") allowed FFS to give more than one response: 1= Father, 2= Mother, 3= Children, 99= Other, please specify [multiple options allowed]. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of answers (N=8) collected from the 7 FFS.*

Fathers (75%) were reported to be the most powerful household members in providing access to food at large, including from other sources than the owned farm, whereas mothers (25%) were reported only twice to have that role by the FFS participants [Table 23].

Table 23. *Most powerful household members in terms of access to food*

Most powerful member	Number of answers	Percentage of answers
father	6	75%
mother	2	25%
Total	8	100%

** The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked ("Who are the most powerful household members in terms of access to food?") allowed FFS to give more than one response: 1= Father, 2= Mother, 3= Children, 99= Other, please specify [multiple options allowed]. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of answers (N=8) collected from the 7 FFS.*

The vast majority of FFS participants (86%) reported that children are the least powerful household members in terms of access to food, while mothers were reported once as the least powerful household members [Table 24].

Table 24. *Who are the least powerful household members in terms of access to food?*

Weakest members	Number of answers	Percentage of answers
children	6	86%
mother	1	14%
Total	7	100%

** The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked ("Who are the least powerful household members in terms of access to food?") allowed FFS to give more than one response: 1= Father, 2= Mother, 3= Children, 99= Other, please specify [multiple options allowed]. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of answers (N=7) collected from the 7 FFS.*

Overall, Tables 22, 23, and 24 indicate that although women are most important in the intra-household food distribution, that is they decide what to do with the food that is already available, men have more power in accessing food from any source and providing it to their household.

The baseline analysis further showed that the length of the men's list of plants was significantly longer (more plants reported) in male-headed households compared to female-headed households ($p<0.05$). This finding indicates a relationship between decision-making power and knowledge about food resources.

A relationship is also suggested between the gender of the household member that decides about the income from the main farming and non-farming activities and the number of plants listed by the two genders of each household. More specifically, the length of the men's list of plants was significantly higher (more plants mentioned) in the households where men decided what to do with the income from farming and non-farming activities ($p<0.001$). Interestingly, the length of the women's list of plants was also significantly higher (more plants mentioned) in the households where men decided what to do with the income from the same farming and non-farming activities ($p<0.01$). These correlations suggest, that when men decide what to do with the income from farming and non-farming activities, the plant knowledge of men is higher and very similar to those of the women. This could be a result of the increased knowledge on local food plants that men have due to their role in decision-making in access to food as household heads.

3.13 Evaluation of coping strategies and possible solutions

The main coping strategies to fight food and nutrition insecurity are better food processing and storage, as they were reported nine times throughout the seven FFS [Table 25]. Increased consumption of local food plants was reported to be a coping strategy seven times by the FFS participants, although this might reflect an intention rather than an existing strategy since local food plants are still underrepresented in the household diets. In addition, relying on neighbours and family for food or money was mentioned three times by the FFS participants as a coping strategy during the scarcity season. It is important to note that agriculture-related coping strategies were not mentioned, which might be an artefact of the way the question was asked.

Table 25. *Main strategies used to cope with the scarcity season and their severity as reported by the FFS participants*

Coping strategies	Number of answers	Percentage of total answers	Details and examples
Food processing and storage	9	47%	Preservation of vegetables for lean season; storage of processed food, vegetables; grain storage in traditional way (Bhakari)
Consumption of local/wild plants	7	37%	More consumption of local food plants; collect from the forest; use of wild food plants; use of NUS crops (gittha, finger millet, barley)
Relying on neighbours and family for food/money	3	16%	Exchange of goods for food
Total	**19**	**100%**	

** The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked allowed FFS to give more than one open responses. During data analysis, the responses were then grouped into categories. The percentages are calculated over the total number of responses (N=19) collected from the 7 participating FFS.*

Malnutrition is often associated with food scarcity and focuses on the particular consequences of the latter. Therefore, solutions to cope with malnutrition and food scarcity overlap. The most popular counter strategies to combat malnutrition according to FFS participants were better food preparation and cooking demonstrations (41%) [Table 26]. Sowing local food plants was mentioned eight times as a possible solution to malnutrition while improving seed germination was reported four times by the FFS participants. Other activities, like improving seed storage, food preservation and harvesting of local food plants were mentioned less frequently.

Table 26. *Possible solutions to malnutrition by farmers*

Solutions	Number of answers	Percentage of answers	Related research objective
Food preparation and cooking demonstrations	11	41%	Reduce gooey texture during cooking; diversify recipes; improve the taste of sitalchini plant
Sowing local food plants	8	30%	Reduce shattering; reduced disease incidence
Seed germination and breaking seed dormancy	4	15%	Seed germination test
Seed storage	2	7%	
Harvesting wild food plants	1	4%	
Food preservation	1	4%	
Total	**27**	**100%**	

** The details and examples are taken directly from the FFS diagnostic reports. The way the question was asked allowed FFS to give more than one open responses. During data analysis, the responses were then grouped into categories. The percentages are*

calculated over the total number of responses (N=38) collected from the 7 participating FFS. Other activities category includes answers like the creation of home gardens and special nutrition topics.

3.14 Ways to promote the use of local food plants by local communities

Health facilities (20%) and NGOs (19%) are the channels by which most households obtain information [Table 27]. Neighbours were the next source of information that was being used by 13% of the responding households. No reference was made to extension services. Also, agriculture-related information sources were only used by 6% of the interviewed households. This suggests that support to cope with food scarcity and dietary needs is better received when obtained from health facilities and NGOs.

Table 27. *Current sources of information*

Sources of information	Current sources	
	N	% Hhs
Neighbour	161	13%
Health facilities	250	20%
Community health	97	8%
Support group, farmer group, FFS	73	6%
NGOs	234	19%
Radio	131	11%
School children	85	7%
TV	53	4%
Pamphlet	136	11%
Cell phone	10	1%
Other	161	13%

** The results come out the first round of baseline household survey, in which 473 household participated and 28 value is missing (N=445). The questions were asked in a way that allowed households to provide multiple responses. Percentages reflect the number of households that mentioned the source of information, divided by the number of households that responded the question (N=445).*

4 Conclusions

In examining the changes in nutrition over the past 30 years among FFS participants, a diverse range of perspectives emerged. Four out of seven FFS reported an improvement in nutrition, while three participants expressed a contrasting view, revealing a divided sentiment within the community. The identified factors influencing nutritional status were consistently mentioned by all seven FFS, emphasizing their interlinked nature. The lack of knowledge on ingredient composition and the benefits of local food plants, coupled with decreased consumption of these plants and the promotion of new staple crop varieties, collectively shaped the nutritional landscape of the households.

The seasonal dynamics further illuminated the complexities of food availability. The rainy season, spanning from June to August, marked the beginning of reported scarcity periods that extended beyond this timeframe. This temporal misalignment suggests that food stocks had already depleted before the rainy season, with harvests realized afterward. Cereals remained the staple food group throughout the year, but their consumption significantly decreased during scarcity periods. Fruits, roots, and tubers became more prominent during scarcity, with rice, taro, potato, radish, and wheat emerging as the most frequently consumed species, indicating their vital role during periods of food scarcity.

The study also shed light on the rich biodiversity of local food plants within the community. Of the 41 identified local food plants, 16 were highlighted for their nutritional importance, regardless of their specific role in scarcity periods. The diversity of local food plant consumption

increased during sufficiency seasons, emphasizing their importance in providing a well-rounded diet. Additionally, gender differences in sourcing local food plants were evident, with women acquiring a significantly broader variety during food scarcity seasons.

The overlapping solutions proposed by FFS participants to combat malnutrition and food scarcity underscored the need for holistic strategies. Better food preparation and cooking demonstrations emerged as popular counter strategies, alongside initiatives such as sowing more local food plants and improving seed germination. While these approaches were widely recognized, other activities like improved seed storage, food preservation, and intensified harvesting of local food plants were mentioned less frequently, suggesting potential areas for targeted interventions to address the multifaceted challenges faced by the community.

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6 ANNEX 1. KNOWLEDGE OF LOCAL FOOD PLANTS

			Freelistings												Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:				% of hh that indicated traffic light:		
								green	amber	red	green	amber	red		green	amber	red
aaijairu			4	1	3	0.00	0.00	0%	0%	100%	0%	0%	100%				
aalas			5	3	2	0.00	0.00	0%	33%	67%	0%	100%	0%				
aamara/ amala	gooseberry	Phyllanthus emblica	48	25	23	0.01	0.01	52%	28%	32%	17%	39%	0%				
aarareita			1	1	0	0.00	0.00	100%	0%	100%	0%	0%	0%				
abrakh			2	1	1	0.00	0.00	0%	100%	0%	0%	100%	0%				
ainselu			6	4	2	0.00	0.00	0%	0%	100%	0%	0%	100%				
airat			2	0	2	0.00	0.00	0%	0%	0%	50%	0%	50%				
akpatte sag			1	0	1	0.00	0.00	0%	0%	0%	0%	0%	0%				
amattako phal			1	0	1	0.00	0.00	0%	0%	0%	100%	0%	0%				
amil larcha			33	16	17	0.01	0.01	94%	6%	0%	29%	24%	6%	100%	0%	0%	
amilo			7	3	4	0.00	0.00	0%	100%	0%	0%	100%	0%				
apple			2	2	0	0.00	0.00	0%	0%	100%	0%	0%	0%				
arahar			1	1	0	0.00	0.00	0%	0%	100%	0%	0%	0%				
aramale			1	1	0	0.00	0.00	0%	0%	100%	0%	0%	0%				
athanni			5	3	2	0.00	0.00	0%	100%	0%	0%	100%	0%				
badahar			1	0	1	0.00	0.00	0%	0%	0%	0%	100%	0%				
badam	peanut		42	17	25	0.01	0.01	59%	41%	0%	4%	56%	0%				
bafula			1	0	1	0.00	0.00	0%	0%	0%	0%	0%	0%				
bagale			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%				
bajarmuwa			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%				
bakra			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%				
ban tarul	wild Yam	Dioscorea hamiltonii Hook.f.	61	38	23	0.01	0.01	47%	50%	3%	26%	61%	0%	100%	0%	0%	
banana			25	13	12	0.01	0.01	31%	62%	8%	17%	33%	8%	100%	0%	0%	
banarjawa			3	1	2	0.00	0.00	0%	0%	100%	100%	0%	0%				
bangathha			3	1	2	0.00	0.00	100%	0%	0%	100%	0%	0%				
banjarawa			3	1	2	0.00	0.00	0%	100%	0%	0%	100%	0%				

			Freelistings											Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:			% of hh that indicated traffic light:		
								green	amber	red	green	amber	red	green	amber	red
banko			28	12	16	0.00	0.01	50%	33%	17%	25%	50%	0%			
barhamase			3	1	2	0.00	0.00	0%	100%	0%	0%	0%	0%	100%	0%	0%
barhar			3	2	1	0.00	0.00	0%	100%	0%	0%	0%	0%			
barley	barley	Hordeum vulgare	102	46	56	0.02	0.02	17%	70%	13%	2%	86%	13%	50%	50%	0%
bayer			5	2	3	0.00	0.00	0%	100%	0%	0%	100%	0%			
bean	common bean	Phaseolus vulgaris?	197	95	102	0.04	0.04	52%	46%	2%	29%	50%	2%	80%	20%	0%
bel														0%	0%	100%
besar			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%			
bethe	chenopodium (Bethe)	Chenopodium album L	233	92	141	0.05	0.06	62%	34%	4%	28%	46%	2%	73%	18%	9%
bhamara			17	8	9	0.00	0.00	75%	25%	0%	78%	22%	0%			
bhango			2	1	1	0.00	0.00	0%	100%	0%	0%	100%	0%			
bhatta/ bhatmas	soybean	Glycine max	95	43	52	0.02	0.02	40%	58%	2%	19%	73%	4%	43%	57%	0%
bhindi			4	2	2	0.00	0.00	100%	0%	0%	0%	0%	0%			
bhogate			9	4	5	0.00	0.00	75%	25%	0%	0%	0%	0%			
bhuisyau			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
bhumara sag			2	1	1	0.00	0.00	100%	0%	0%	100%	0%	0%			
bhyakur			11	9	2	0.00	0.00	33%	56%	11%	0%	100%	0%			
bodi	cowpea	Vigna unguiculata	92	41	51	0.01	0.01	66%	34%	0%	31%	53%	0%	50%	0%	50%
bora			1	0	1	0.00	0.00	0%	0%	0%	0%	100%	0%			
lauka	bottle gourd	Lagenaria siceraria	95	47	48	0.02	0.01	43%	55%	4%	33%	52%	2%	67%	33%	0%
brinjal	brinjal	Solanum melongena	63	28	35	0.01	0.01	32%	64%	4%	31%	54%	3%	100%	0%	0%
patgobhi	cabbage	Brassica oleracea var. capitata	72	30	42	0.01	0.01	33%	60%	7%	19%	67%	2%	0%	0%	100%
carrot			14	5	9	0.00	0.00	80%	20%	0%	0%	56%	0%			
chameli sag			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
chamsur			13	7	6	0.00	0.00	29%	43%	29%	17%	33%	17%	100%	0%	0%
chana	chickpea	Cicer arietinum	25	11	14	0.00	0.00	45%	55%	0%	0%	64%	7%			
chaulani saag														100%	0%	0%
chichinna			17	5	12	0.00	0.00	0%	60%	40%	33%	50%	17%			

			Freelistings												Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:				% of hh that indicated traffic light:		
								green	amber	red	green	amber	red		green	amber	red
khursani	chilli	Capsicum annuum	104	40	64	0.01	0.02	68%	30%	3%	52%	33%	2%		88%	0%	13%
chimeli sag			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%				
chiuri			2	2	0	0.00	0.00	50%	0%	50%	0%	0%	0%				
chotaudi															0%	100%	0%
dadu			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%				
dakhi			5	3	2	0.00	0.00	67%	33%	0%	0%	100%	0%		0%	0%	100%
dal			7	6	1	0.00	0.00	33%	50%	0%	0%	100%	0%		50%	50%	0%
dengarjawa			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%				
denrajak sag			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%				
dhan sag			6	3	3	0.00	0.00	0%	100%	0%	0%	100%	0%		0%	100%	0%
dhaniya	coriander	Coriandrum sativum	150	75	75	0.03	0.02	55%	40%	5%	43%	55%	4%		0%	100%	0%
dhegarjawa sag			6	3	3	0.00	0.00	100%	0%	0%	0%	0%	0%				
dhindo															100%	0%	0%
dudu			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%				
fafar			1	0	1	0.00	0.00	0%	0%	0%	0%	0%	100%				
flour			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%				
gahat	horse gram	Macrotyloma uniflorum	67	27	40	0.01	0.01	19%	81%	0%	13%	85%	3%		0%	100%	0%
gappu			1	0	1	0.00	0.00	0%	0%	0%	0%	100%	0%				
garlic			145	68	77	0.03	0.03	68%	31%	1%	30%	51%	1%		100%	0%	0%
ghangaru			9	7	2	0.00	0.00	0%	0%	100%	0%	50%	50%				
ghartakhal															100%	0%	0%
ghengarjawa			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%				
ghiraula			48	19	29	0.01	0.01	58%	37%	5%	31%	52%	3%		63%	38%	0%
ghiukumari			1	0	1	0.00	0.00	0%	0%	0%	0%	0%	100%				
aduwa	ginger	Zingiber officinale	65	28	37	0.01	0.01	57%	39%	4%	38%	57%	3%				
gittha	aerial yam	Dioscorea bulbifera	81	49	32	0.02	0.01	59%	33%	8%	56%	16%	22%		73%	18%	9%
golo larcha			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%				
grapes			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%				
guava			36	17	19	0.01	0.01	24%	76%	0%	21%	37%	0%		67%	33%	0%

			Freelistings											Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:			% of hh that indicated traffic light:		
								green	amber	red	green	amber	red	green	amber	red
gular			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
gurans			3	2	1	0.00	0.00	0%	100%	0%	0%	100%	0%			
guri larcha			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%	100%	0%	0%
gurra			6	2	4	0.00	0.00	0%	50%	50%	0%	50%	50%			
halhale sag			3	1	2	0.00	0.00	0%	100%	0%	50%	50%	0%			
harmale			5	2	3	0.00	0.00	0%	0%	100%	0%	0%	100%			
harro			3	2	1	0.00	0.00	100%	0%	0%	0%	100%	0%			
jalke			4	0	4	0.00	0.00	0%	0%	0%	0%	100%	0%	0%	0%	100%
jamun			5	2	3	0.00	0.00	0%	100%	0%	0%	100%	0%			
janaki			1	1	0	0.00	0.00	0%	0%	100%	0%	0%	0%			
jarhan			1	0	1	0.00	0.00	0%	0%	0%	0%	0%	100%			
jarko saag			6	4	2	0.00	0.00	0%	100%	0%	0%	100%	0%			
jaulo														100%	0%	0%
jeera			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%			
jhinma goriya			1	1	0	0.00	0.00	0%	0%	100%	0%	0%	0%			
jibre sag			150	74	76	0.04	0.04	46%	46%	8%	28%	43%	0%	73%	9%	18%
kafal			7	5	2	0.00	0.00	20%	60%	20%	0%	0%	100%			
kaguno	foxtail millet	Setaria italica	27	10	17	0.00	0.01	10%	40%	50%	12%	24%	65%	50%	0%	50%
kal tauke			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%			
kalau	small Pea	Pisum sativum	103	43	60	0.02	0.02	42%	56%	2%	10%	67%	2%	75%	25%	0%
kamara			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
kapro			2	0	2	0.00	0.00	0%	0%	0%	100%	0%	0%			
kapuwa			6	3	3	0.00	0.00	100%	0%	0%	0%	0%	0%	0%	0%	100%
karammo sag			42	20	22	0.01	0.01	30%	70%	0%	23%	68%	0%	0%	100%	0%
karauda			2	2	0	0.00	0.00	50%	50%	0%	0%	0%	0%			
karela	bitter gourd	Momordica charantia	69	27	42	0.01	0.01	41%	59%	0%	43%	48%	0%	56%	33%	11%
katahar			22	11	11	0.00	0.00	0%	100%	0%	36%	45%	0%	0%	100%	0%
kauli			23	8	15	0.00	0.00	50%	50%	0%	20%	53%	0%	100%	0%	0%
kewa														0%	0%	100%

			Freelistings												Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:				% of hh that indicated traffic light:		
								green	amber	red	green	amber	red		green	amber	red
khiro			31	11	20	0.00	0.01	36%	55%	9%	50%	45%	5%		60%	20%	20%
khole saag			17	9	8	0.00	0.00	89%	11%	0%	13%	0%	0%		86%	0%	14%
kimbu			1	1	0	0.00	0.00	0%	0%	100%	0%	0%	0%				
kodo	finger millet	Eleusine coracana	153	64	89	0.04	0.05	22%	77%	2%	17%	76%	4%		0%	70%	30%
kohya			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%				
koiralo			20	13	7	0.00	0.00	0%	0%	100%	0%	14%	86%		50%	50%	0%
koopindo	ash gourd	Benincasa hispida	75	31	44	0.01	0.01	68%	32%	0%	39%	25%	0%		83%	17%	0%
kucheu			2	1	1	0.00	0.00	100%	0%	0%	0%	0%	0%				
kukumato sag			2	0	2	0.00	0.00	0%	0%	0%	0%	100%	0%				
kumara			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%				
kundruk	ivy gourd	Coccinia grandis	60	26	34	0.01	0.01	77%	23%	0%	21%	26%	0%		0%	100%	0%
kusam			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%		100%	0%	0%
kutude ko saag															0%	100%	0%
kwatti															100%	0%	0%
lady finger			20	8	12	0.00	0.00	38%	63%	0%	50%	50%	0%		50%	50%	0%
lahata			191	101	90	0.05	0.04	62%	37%	1%	34%	42%	1%		40%	50%	10%
latte	amaranth	Amaranthus dubius Mart. ex Thell	63	23	40	0.01	0.01	17%	83%	0%	13%	78%	5%		0%	100%	0%
leechi			11	7	4	0.00	0.00	0%	100%	0%	0%	100%	0%				
lemon			24	12	12	0.00	0.00	25%	75%	0%	17%	67%	0%				
masuro	lentil	Lens culinaris	128	68	60	0.04	0.02	51%	46%	3%	23%	48%	3%		57%	43%	0%
linudo			1	0	1	0.00	0.00	0%	0%	0%	100%	0%	0%				
liro															100%	0%	0%
makai	maize	Zea mays	242	128	114	0.09	0.06	37%	58%	5%	23%	67%	4%		26%	65%	9%
aanp	mango	Mangifera indica	53	31	22	0.01	0.01	6%	87%	6%	14%	68%	0%		100%	0%	0%
maresam			4	2	2	0.00	0.00	100%	0%	0%	100%	0%	0%				
mass	black gram	Vigna mungo	63	26	37	0.01	0.02	35%	65%	0%	8%	84%	0%		0%	100%	0%
mausami			3	1	2	0.00	0.00	0%	100%	0%	0%	100%	0%				
methi			21	6	15	0.00	0.00	50%	50%	0%	20%	60%	7%				
millet			10	7	3	0.00	0.00	43%	57%	0%	33%	0%	33%				

			Freelistings											Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:			% of hh that indicated traffic light:		
								green	amber	red	green	amber	red	green	amber	red
mutiya sag			4	2	2	0.00	0.00	100%	0%	0%	0%	0%	0%			
mutter			6	5	1	0.00	0.00	20%	80%	0%	0%	100%	0%			
naspati			6	4	2	0.00	0.00	25%	75%	0%	0%	50%	0%			
nihar			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
okra			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
ol			1	0	1	0.00	0.00	0%	0%	0%	0%	100%	0%			
pyaj	onion	Allium cepa	83	39	44	0.01	0.01	31%	67%	3%	16%	80%	2%			
orange			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%			
palak/ palungo	spinach	Spinacia oleracea	40	15	25	0.00	0.01	33%	53%	7%	16%	68%	8%	100%	0%	0%
mewa	papaya	Carica papaya	45	22	23	0.01	0.01	36%	55%	9%	9%	52%	0%			
parwal			6	3	3	0.00	0.00	33%	67%	0%	0%	67%	0%			
pator			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
patpau														25%	25%	50%
peach			2	1	1	0.00	0.00	0%	100%	0%	0%	100%	0%	0%	100%	0%
penographa			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%			
perra			3	2	1	0.00	0.00	100%	0%	0%	100%	0%	0%			
peyara														0%	0%	100%
phafer	buckwheat	Fagopyrum esculentum	43	21	22	0.01	0.01	5%	57%	38%	9%	41%	50%	0%	40%	60%
pidalu/ gaba/ ghuiya/ karkallo	taro	Colocasia esculenta	365	188	177	0.09	0.07	40%	55%	5%	24%	51%	5%	48%	43%	9%
poe sag			31	15	16	0.01	0.01	80%	20%	0%	38%	25%	0%			
pomegranate			5	3	2	0.00	0.00	0%	100%	0%	0%	100%	0%			
potato			276	151	125	0.09	0.06	59%	40%	1%	24%	48%	2%	60%	33%	7%
puisarpa			2	1	1	0.00	0.00	0%	100%	0%	0%	100%	0%			
puls			1	0	1	0.00	0.00	0%	0%	0%	0%	100%	0%			
farsi/ kaddu	pumpkin	Cucurbita moschata	137	65	72	0.02	0.02	42%	54%	5%	25%	56%	0%	27%	64%	9%
mula	radish	Raphanus sativus	225	107	118	0.05	0.04	65%	33%	3%	17%	36%	3%	12%	78%	10%
rajma			5	4	1	0.00	0.00	75%	25%	0%	0%	0%	0%			
ramchana			26	12	14	0.00	0.00	42%	50%	8%	7%	43%	21%			

			Freelistings												Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:				% of hh that indicated traffic light:		
								green	amber	red	green	amber	red		green	amber	red
rayo/ bhaji	broad leaf mustard	Brassica juncea var. rugosa	275	128	147	0.06	0.06	55%	45%	1%	19%	51%	1%		33%	67%	0%
retuwa			1	1	0	0.00	0.00	0%	0%	100%	0%	0%	0%				
rice			461	228	233	0.25	0.20	41%	44%	21%	19%	56%	21%		22%	61%	17%
saag			3	1	2	0.00	0.00	0%	100%	0%	50%	0%	0%				
sagargung			56	31	25	0.01	0.01	35%	55%	10%	24%	44%	0%		80%	0%	20%
salgam			4	2	2	0.00	0.00	0%	100%	0%	0%	100%	0%				
salipha			7	5	2	0.00	0.00	20%	80%	0%	50%	50%	0%				
salmeuda			6	3	3	0.00	0.00	0%	100%	0%	0%	67%	33%				
samphu			12	5	7	0.00	0.00	100%	0%	0%	14%	29%	0%				
sarifar			1	1	0	0.00	0.00	0%	0%	100%	0%	0%	0%				
shakharkhand			1	1	0	0.00	0.00	100%	0%	0%	0%	0%	0%				
silam (bhangiro)			2	1	1	0.00	0.00	0%	100%	0%	0%	100%	0%				
siltung			5	3	2	0.00	0.00	67%	33%	0%	50%	0%	0%				
simta			2	1	1	0.00	0.00	100%	0%	0%	0%	100%	0%				
sisno/ sisnu	stinging nettle	Urtica dioica L.	90	45	45	0.01	0.01	60%	38%	2%	64%	29%	7%		78%	0%	22%
skush			10	8	2	0.00	0.00	63%	25%	13%	50%	50%	0%		100%	0%	0%
sup sag			1	0	1	0.00	0.00	0%	0%	0%	0%	0%	0%				
sweet lemon			14	8	6	0.00	0.00	0%	100%	0%	33%	50%	0%		0%	100%	0%
taama			26	13	13	0.01	0.00	69%	23%	8%	62%	23%	8%				
tamakhu			2	1	1	0.00	0.00	0%	100%	0%	0%	100%	0%				
taro			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%				
tarul/ ghar tarul	greater yam	Dioscorea alata	200	102	98	0.04	0.03	48%	48%	4%	42%	43%	2%		73%	12%	15%
til			36	16	20	0.01	0.01	44%	50%	6%	5%	70%	0%				
timur			3	3	0	0.00	0.00	33%	67%	0%	0%	0%	0%				
titaura															0%	100%	0%
tomato			84	38	46	0.01	0.01	66%	29%	5%	15%	35%	4%		0%	100%	0%
tomato tree			1	1	0	0.00	0.00	0%	100%	0%	0%	0%	0%				
toraila			1	0	1	0.00	0.00	0%	0%	0%	100%	0%	0%		100%	0%	0%
besar	turmeric	Curcuma longa	121	56	65	0.02	0.02	73%	23%	4%	48%	28%	0%				

			Freelistings											Food Scarcity		
Food plant	English name	Scientific name	Total number (men + women)	Number of men	Number of women	Sutrop CSI men	Sutrop CSI women	% of men that indicated traffic light:			% of women that indicated traffic light:			% of hh that indicated traffic light:		
								green	amber	red	green	amber	red	green	amber	red
ukhu			19	12	7	0.01	0.00	50%	50%	0%	29%	57%	0%			
uneeu saag	fiddelhead fern	Dryopteris cochleata (D. Don)	109	52	57	0.02	0.02	52%	44%	4%	42%	40%	2%	44%	39%	17%
upparteri larchi			4	2	2	0.00	0.00	100%	0%	0%	0%	0%	0%			
urda			2	2	0	0.00	0.00	0%	50%	50%	0%	0%	0%			
vamara sag			10	4	6	0.00	0.00	100%	0%	0%	100%	0%	0%			
vegetables			2	1	1	0.00	0.00	0%	100%	0%	0%	100%	0%			
wa			2	1	1	0.00	0.00	0%	0%	100%	0%	0%	100%			
watermelon			4	0	4	0.00	0.00	0%	0%	0%	0%	100%	0%			
wheat			340	173	167	0.15	0.11	50%	46%	5%	16%	62%	8%	35%	58%	8%

**The table presents the results of the 'free listing' module, and the 'plants in food scarcity' module of the baseline analysis; In total, 349 men and 417 women out of 473 participating households, responded to the 'free listing' module and listed 183 (men) and 164 (women) species; Regarding the 'plants in food scarcity' module, out of the 473 households, 1 was missing and 472 did actually participate and listed a total of 80 species; Sutrop CSI reflects the knowledge of a specific plant (the higher the CSI, the more representative is the plant of the knowledge shared by community members); Colour visualization: Green= used in affluent period, Amber= used in moderate food scarcity period, Red= used during severe food scarcity period.*