



WOMEN, SEEDS AND NUTRITION

CONSOLIDATED BASELINE SURVEY
REPORT FOR VIETNAM AND
ZIMBABWE



OXFAM

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CONTENTS

ACRONYMS	4
EXECUTIVE SUMMARY	5
1. INTRODUCTION	9
2. BACKGROUND	12
2.1. NUS AND NUTRITION - GLOBAL CONTEXT AND CHALLENGES	12
2.2. NUTRITION SITUATION IN ZIMBABWE AND VIETNAM	15
3. METHODOLOGY	18
3.1. AMENDED FAO 24-HOUR RECALL HOUSEHOLD DIETARY DIVERSITY SCORE	20
3.2. COMMUNITY RESOURCE FLOW FOR NEGLECTED AND UNDERUTILIZED SPECIES	22
3.3. SAMPLE SURVEY	23
4. SURVEY FINDINGS AND ANALYSIS	25
4.1. DEMOGRAPHIC AND BIOPHYSICAL DATA	25
4.2. HOUSEHOLD SOURCES OF FOODS	27
4.3. HOUSEHOLD DIETARY DIVERSITY SCORE (HDDS)	30
4.4. NATURE OF HUNGER PERIODS AND RELATED COPING MECHANISMS	39
4.5. NEGLECTED AND UNDERUTILIZED SPECIES AND WOMEN'S ROLES	48
5. DISCUSSION	76
5.1. HOUSEHOLD DIETARY DIVERSITY SCORES IN VIETNAM AND ZIMBABWE	76
5.2. NUS MANAGEMENT AND SEED SYSTEMS: PROPOSED PATHWAYS	77
6. CONCLUSIONS	83
6.1. NUTRITION CONCEPTS AND BIODIVERSITY RICH DIETS	83
6.2. THE NATURE OF THE HUNGER PERIOD AND APPLIED COPING MECHANISMS	84
6.3. THE ROLE OF NEGLECTED AND UNDERUTILIZED SPECIES IN COMMUNITIES' FOOD AND NUTRITION SECURITY	85
6.4. WOMEN'S ROLES IN IMPROVING FOOD DIVERSITY	87
6.5. METHODOLOGY AND TOOLS: PROPOSED ADJUSTMENTS	88
7. FINAL RECOMMENDATIONS	90
ANNEX 1. SDHS PILLAR 3 – WOMEN, SEEDS AND NUTRITION	92
ANNEX 2. COMMUNITY RESOURCE FLOW FOR NUS	51
ANNEX 3. WEALTH RANKING CRITERIA USED FOR TARGET HOUSEHOLDS DURING THE JUNE 2015 SURVEY	56

ACRONYMS

CTDT	Community Technology Development Trust
FAO	Food and Agriculture Organization of the United Nations
FFS	Farmer Field School
FG	Food Group
FGD	Focus Group Discussion
HDDS	Household Dietary Diversity Score
MEL	Monitoring, Evaluation and Learning
MICS	Multiple Indicator Cluster Survey
NUS	Neglected and Underutilized Species
PRA	Participatory Rural Appraisal
PRC	Plant Resource Centre
SEARICE	Southeast Asia Regional Initiatives for Community Empowerment
Sida	Swedish International Development Cooperation Agency
WHO	World Health Organization

EXECUTIVE SUMMARY

This report is the first presentation of the consolidated findings of the baseline studies in Vietnam and Zimbabwe for Pillar 3 of the global programme, Sowing Diversity = Harvesting Security (SD=HS), funded by Sida and the Dutch National Postcode Lottery. A final consolidated version that includes Myanmar and Peru will be available in 2017. Pillar 3 aims to empower women to reclaim their role in food security by strengthening their capacity in seed management, nutrition and global policy engagement, thus enabling them to claim their Right to Food.¹ Pillar 3 has a special focus on neglected and underutilized species (NUS), as they have a potential to improve dietary diversity, contribute to income generation, and become important in local farming systems as the climate changes. With growing climate uncertainties, there is an urgent need to diversify the food base to include a wider range of food crop species for greater cropping system resilience. In many traditional food systems, NUS are acknowledged to have a much higher nutrient content than globally abundant species commonly produced and consumed. NUS also contribute to the cultural heritage of local communities.²

For the purpose of participatory diagnosis and planning, community inputs were obtained in order to develop appropriate interventions under Pillar 3, aligning them with current conditions, needs and priorities. Baseline studies were carried out to ensure accountability towards the communities and the donors. These studies strived to understand: the current food security of communities, in particular women's diverse nutritional sources during both sufficiency and hunger periods; the management systems for traditional crops, including NUS; and the roles of women farmers in improving food diversity in the communities.

A global framework, based on the multiple evidence-based approach, and a number of survey tools were developed and agreed upon within the partner consortium. The following survey tools were included in the global framework: a questionnaire containing demographic questions and an amended FAO 24-hour recall Household Dietary Diversity Score (HDDS),³ as well as questions specifically addressing the hunger period and coping strategies; a community resource flow mapping for NUS; and a wealth ranking tool. To investigate aspects of seasonality in food security, an amended HDDS was performed during the period of greatest food shortage and during the relative food sufficiency period. The baseline survey was carried out in Zimbabwe by SD=HS partner, Community Technology Development Trust (CTDT), in collaboration with the National University of Zimbabwe. In Vietnam, the baseline survey was carried out by SD=HS partner, Southeast Asia Regional Initiatives for Community Empowerment (SEARICE), and the local counterpart in the country, the Plant Resource Centre (PRC). The sample for the baseline in Vietnam included households from indigenous communities in the Provinces of Lao Cai, Ha Giang and Son La, whereas for the baseline in

¹ The right to have regular, permanent and unrestricted access, either directly or by means of financial purchases, to quantitatively and qualitatively adequate and sufficient food corresponding to the cultural traditions of the people to which the consumer belongs, and which ensure a physical and mental, individual and collective, fulfilling and dignified life free of fear (United Nations Special Rapporteur on the Right to Food).

² FAO. (2014). *Promotion of underutilized indigenous food sources for food security and nutrition in Asia and the Pacific*. Bangkok: FAO.

³ The Household Dietary Diversity Score (HDDS) reflects the economic ability of a household to access a variety of foods. Information on household food consumption during the previous day is collected and HDDS is then determined by counting the number of food groups from which food had been consumed (FAO, 2010).

Zimbabwe, households were sampled from the CTD T project districts of Goromonzi, Tsholotsho, Chiredzi and UMP.

In **Vietnam**, the number of food groups consumed by the majority of households is slightly higher, at three to four out of 16 (the HDDS during both the hunger period and the sufficiency period averaging 3.6). '*Rice*', '*dark green leafy vegetables*' and '*oils and fats*' are the most consumed groups, followed by '*spices, condiments and beverages*' during the hunger period (though the latter might be interpreted as an artefact, as the interviews coincided with a festival of the ethnic communities). '*Other vegetables*' are the fourth most consumed group during the sufficiency period.

Households in **Zimbabwe** mainly consume foods from only two or three groups out of 12 (the average HDDS is 2.5 during the hunger period and 3.2 during the sufficiency period), in particular food groups '*cereals*', '*vegetables*' and '*legumes, nuts and seeds*'.

Seasonal hunger is a persistent and often silent event that affects farming families in a cyclical manner, especially the poorest of the poor. It usually occurs in between seasons, often just before the next harvest, when the previous year's food stocks have dwindled, food prices are high and jobs are scarce. Unlike famine, which is caused by irregularities or unusual collation of events, seasonal hunger is predictable. Seasonal hunger tends to be less dramatic or less visible; people may have limited access to food in terms of quantity and quality, and may be undernourished. Given that one of the aims of Pillar 3 is to shorten hunger periods and reduce the percentage of people suffering from such periods, the baseline surveys mapped the duration, timing and peaks of the hunger period in Zimbabwe and Vietnam. This information will be used to tailor the interventions under Pillar 3. Common to both Vietnam and Zimbabwe is a community perception that relates the hunger period to the availability of the main staple crops and, hence, mainly refers to the intake of calories, but not to the nutritional value of the diet. Despite a simultaneous reduction in HDDS during the hunger period, the communities perceived the reduced availability of staples as the hardest impact of food scarcity.

The main coping mechanisms in Vietnam were to 'gather wild food, hunt or harvest immature crops,' 'borrow food or rely on help from a friend or relative' or 'purchase food on credit,' resulting in the overall maintenance of food diversity. In contrast to Vietnam, dietary diversity in Zimbabwe was reduced during the hunger period. This conclusion was corroborated by the finding that two of the three most common coping strategies in Zimbabwe were to reduce the number of meals and the size of meals, which essentially also entailed a reduction in caloric intake. The differences observed between the coping strategies in these two countries reflect divergent levels of poverty, social relations and climatic/environmental conditions, and show that improving food security during the hunger period requires divergent approaches.

The findings show that the main focus of the community is on the staple food; in Vietnam, hunger is often defined as the absence of the staple food, whereas vegetables are used to 'substitute' the staple food. The interventions should therefore contribute to awareness on the (nutritional) value of other crops, the importance of a diversified diet and the potential pathways to improved household dietary diversity.

The findings in Vietnam and Zimbabwe clearly show that in both countries the communities rely on a number of *wild plants*⁴ and *minor crops*⁵ for households' food and nutrition security *throughout the year*. At the same time, *increased consumption* of a number of collected plants (some of which appeared to be less utilized during periods of relative sufficiency) and parts of regular food crops⁶ was observed particularly *during the period of scarcity*. It should be noted, however, that what is perceived by the communities as *less utilized* (such as certain stigmatized vegetables) might not necessarily be classified as NUS by the programme. The survey also noted that, as a coping mechanism, communities wild plants and minor crops as *a source of complementary or alternative income* (though not on a commercial scale) in order to ensure household food security during periods of scarcity.

The baseline in Vietnam and Zimbabwe produced an extensive list of wild plants and minor crops that are important during both periods of hunger and plenty. The majority of the plants on the list are collected/wild ones. The bias of the survey findings towards such plants is related to the fact that the communities associate NUS with those plants that are freely accessible/collected from the wild, with limited or no crop management required (such as cat's whiskers [*Cleome gynandra*] in Zimbabwe).

At the time of writing, the classification of the wild plants and minor crops to NUS on the basis of the programme's working criteria, was not yet concluded. Therefore, this report puts an emphasis on *elaborating the communities' knowledge and values of these plants*, instead of presenting a comprehensive list of NUS. Nevertheless, Section 4.5 reports on the preliminary findings of the discussions with the communities in Zimbabwe regarding what they perceived as criteria for neglected and underutilized food plants.

Hence, the importance of NUS plants for food and nutrition security, as well as their role as a part of the cultural identity of the communities, would need to be further discussed with the communities. For future work, the programme recommends first to develop common working criteria for NUS and an understanding of people's value and knowledge of the plants, before the onset of the baseline survey.

Some examples of important food plants in the programme areas in Vietnam include wild banana flower (*Musa acuminata*) and *Centella asiatica*,⁷ as well as mustard green (*Brassica juncea* L.)⁸. In Zimbabwe, black jack (*Bidens pilosa*) and cat's whiskers (*Cleome gynandra*), both collected, were ranked by the communities as the most important vegetables. The survey results showed that, apart from increased consumption of wild plants, another coping mechanism during periods of scarcity is to consume *parts of regular crops* (in particular, leaves) – a practice that is *not resorted to during periods of sufficiency*. It appeared that the consumption of such parts was associated with negative perceptions. The *inclusion of 'stigmatized' food plants or certain parts of regular crops* (such as cassava and sweet potato

⁴ *Wild vegetables* (e.g. wild banana flower in Vietnam and cat's whiskers in Zimbabwe), *wild non-food plants* (e.g. tiger grass in Vietnam)

⁵ *Minor crops* (e.g. mustard green in Vietnam and moringa and okra in Zimbabwe)

⁶ Exemplified by cowpea and pumpkin leaves

⁷ collected

⁸ cultivated

leaves) in household diets showed the importance of these stigmatized plants in households' food security in periods of stress.

The programme will use the baseline exercise of the Farmer Field School (FFS) curriculum to *identify more semi-domesticated and domesticated food plants* that have not yet been captured by the current surveys.

The survey also observed that the majority of wild plants and minor crops cited in Vietnam and Zimbabwe are *not yet covered by mainstream agricultural research*. Hence, knowledge on the use and value of these plants, including their potential role in food and nutrition security – although clearly familiar to the communities – is not widespread. The extensive knowledge on the use and values of wild plants captured in this report will be compared with data from relevant nutrition institutes in the respective countries, in order to validate the nutrition contents of the reported plants and the potential roles of these plants in household food and nutrition security.

The findings in Vietnam suggest that people's perceptions and cultural values are closely linked with their agro-ecosystems and may explain the diverse knowledge on the uses and values of the wild plants and minor crops that form parts of these systems. The programme could look into this issue from a traditional point of view: i.e. how the perceptions and cultures of smallholder farmers and indigenous peoples, as well as their agro-ecological systems, influence the use of wild plants and minor crops for food and nutrition security.

The survey *underlined women's roles and traditional knowledge* related to collecting, preserving and processing of food plants, as well as their perceived health and nutritional benefits. As an illustration, women in Zimbabwe have an important role in the collection of certain food plants, since it is only women who possess the specific set of skills required to identify the edible parts, and to select and pluck the right leaves for the right taste.

The report concludes with *some recommendations* for future interventions. The programme could contribute to raising awareness and appreciation of the value of wild plants and minor crops and the value of the knowledge attached to the latter, as well as to lifting the social stigma related to certain wild plants, minor crops and parts of cultivated plants consumed during the hunger period. Programme interventions will focus on women, given their important role in ensuring food and nutrition security. Such interventions will build on women's knowledge and skills, and aim to address their challenges. In the identification of NUS that could be potentially addressed by the FFS activities, criteria defined by women participants should be taken into account. Women should also be involved in identifying and addressing options to increase the consumption of prioritized NUS in order to increase nutrition security at household level and the role of NUS as coping mechanism during the hunger period. Further studies are recommended on the following:

- Women's access to wild plants growing in remote places where such access might be constrained;
- The linkages between the communities' perceptions of NUS and their cultural values, interlinked with their agro-ecosystems and with the different knowledge on the uses and values of food and non-food plants;
- The potential role of wild plants and minor crops as well as NUS in coping mechanisms used during the hunger period.

1. INTRODUCTION

The 'Sowing Diversity=Harvesting Security' Programme (hereafter, SD=HS), funded by the Swedish Development Cooperation (Sida) and the Dutch National Postcode Lottery, is a global programme implemented by 8 consortium partners in 5 countries, led by Oxfam Novib. The objectives of the SD=HS Programme are:

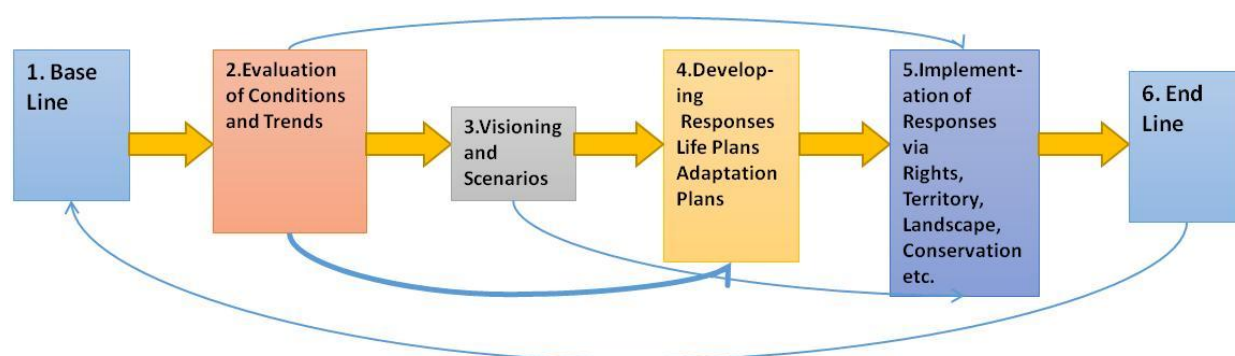
- To uphold, strengthen and mainstream the rights and technical capacities of indigenous peoples and smallholder farmers, and
- To influence local to global policies and institutions on the access to and sustainable use of plant genetic resources for food and nutrition security under conditions of climate change.

The SD=HS Programme is implemented through an integrated pillar approach: Pillar 1 – Scaling up models; Pillar 2 – Farmer Seed Enterprises; Pillar 3 – Women, Seeds and Nutrition; and Pillar 4 – Governance and Knowledge Systems.

Pillar 3 of the SD=HS Programme is guided by the following objective: “to empower women to reclaim their role in food security through strengthening their capacity in seed management and nutrition and global policy engagement to claim their rights to food.”

Implementation of the work under the SD=HS pillars starts with a baseline in order to obtain insight into conditions and trends, and thus help shape the vision and scenarios for the work in support of the pillars and the overall programme. Outcomes of the baseline will be used to design the responses and activities, and to evaluate programme impacts through comparison with the outcomes of the endline survey (see Figure 1).

Figure 1: Role of the baseline in the SD=HS Programme cycle



Source: ANDES

To inform the work on Pillar 3, a baseline survey was carried out initially in Northern Vietnam and Zimbabwe in 2015 with the following objectives:

- To understand the **current food supply conditions** of communities, in particular women's diverse nutritional sources, in periods of hunger and sufficiency; the management systems of traditional nutritious crops, including Neglected and Underutilized Species (NUS), and the roles of women farmers in improving food biodiversity of the communities;

- To generate data on the communities' nutritional status, on the basis of which to assist the **communities to develop their own plans** to improve their diets;
- To develop a **monitoring, evaluation and learning (MEL) tool** that registers the changes in knowledge, views and activities impacting on the local diets;
- To serve as a participatory diagnostic tool that facilitates the planning of programme interventions and policy agenda;
- To ensure **accountability** towards the communities and the donors.

The Pillar 3 baseline survey was designed to understand the following research questions:

1. Nutrition **concept of biodiversity-rich diets**:
 - a. What are **the sources** (crops, species) and access to **food and nutrition** by season (during both sufficiency and hunger periods) at the household level?
 - b. What are **the roles of women and men** in safeguarding food and nutrition security at the household level?
 - c. How do people understand (according to local⁹ **indigenous** and **formal**¹⁰ knowledge) nutrition (concept, value and indicators) in relation to overall diets (biodiversity levels in relation to changing dietary patterns)?
 - d. Is nutrition a recognized concept at the community and household level? Has this changed over recent times? Is attention to nutrition recognized as being important? Do communities measure nutrition quality in relation to health, e.g. by the number of different food items, or the presence or absence of specific food items in their diet? What is considered as good food and why?
2. The **nature of hunger periods** and related **coping mechanisms**:
 - a. Do communities suffer from hunger periods? What is the nature, time, duration, and frequency of the hunger period? Has this changed over time? Does hunger involve a lack of calorie intake, or a lack of diversity in the diet, or both? Who are most affected and what are their coping mechanisms?
3. Interrelations between nutrition and hunger, with **specific focus on NUS and women's roles**:
 - a. What is the role of NUS in the food and nutrition security of the communities? How does this role change during periods of sufficient food availability and during hunger periods?
 - b. What are the most important NUS for women and what improvements can be introduced in their management and seed systems?
 - c. Which NUS are wild,¹¹ semi-domesticated and/or domesticated?
 - d. What is the share of collected versus cultivated NUS in the diet during normal and hunger periods?
 - e. How can people under local circumstances improve their health and well-being through increased food diversity?

⁹ Local knowledge is the knowledge that people in a given community have developed over time, and continue to develop. Wall, C. (2006). *Managing local and external knowledge in a development research project in Uzbekistan*. *Knowledge Management for Development Journal* 2(3): 111-122. www.km4dev.org/journal

¹⁰ Beyond that is the distinction between local formal knowledge — such as locally published books and journals, locally generated epidemiological information and medical patient records — and local indigenous knowledge, which embraces local customs and practices, often in oral or other traditional forms of expression, including storytelling, song, theatre and dance. WHO. (2004). *Health Research for Policy, Action and Practice Resource Modules: Version 2. Module III: Promoting the use of knowledge in policy and practice. Unit 6.*

¹¹ The term 'wild' when applied to plants or plant species refers to those that grow spontaneously in self-maintaining populations in natural or semi-natural ecosystems and can exist independently of direct human action. The term is contrasted with 'cultivated' or 'domesticated' plants or plant species that have arisen through human action, such as selection or breeding, and that depend on management for their continued existence. <http://www.fao.org/docrep/003/w8801e/w8801e02.htm>.

f. How can women help improve food diversity levels of the community?

This report contains the consolidated findings of the Pillar 3 Baseline Survey undertaken in Vietnam and Zimbabwe. In the other two countries implementing Pillar 3, Peru and Myanmar, data collection was still ongoing at the time this report was finalized. Once the survey results for the latter countries become available, a final version of this document presenting the findings for all four countries will be released in 2017.

2. BACKGROUND

2.1. NUS AND NUTRITION - GLOBAL CONTEXT AND CHALLENGES

Despite the worldwide concerted efforts to reduce hunger, still about 795 million people are undernourished¹². More than 2 billion people are afflicted by one or more nutrient deficiencies¹³ (caused by diets lacking essential vitamins and minerals required for proper growth and development, such as vitamin A, iron, zinc and calcium) and more than 1.9 billion adults are overweight.¹⁴ Malnutrition remains one of the greatest global health challenges, and women and children are its most visible and vulnerable victims. In all its forms, malnutrition is closely linked to disease – as both cause and effect. Poor health, in turn, impacts on multiple agricultural functions and outputs. High prevalence rates of malnutrition and infectious and chronic diseases decrease productivity through labour shortages. Poor health also impacts on farmers' ability to innovate and develop new farming systems. Ill health among families of producers can impact on production through absenteeism to provide health and other care, and the loss of household income or other outputs of agricultural work. This particularly affects women, who are often both the primary producers and primary caretakers.¹⁵

It is estimated that by 2050, the world's population will reach 9.1 billion – 34 percent higher than today – and that this increase will occur mostly in developing countries. Urbanization will continue at an accelerated rate; by that time, about 70 percent of the world's population will be urban, i.e. 49 percent higher than today. The rapid growth of cities is challenging the provisioning capabilities of agriculture and changing food systems at local and global levels. Simultaneously, a shift in urban diets to less diverse and more processed foods has increased the incidence of non-communicable diseases such as obesity and diabetes.¹⁶

Rapid agricultural intensification, mostly focused on cereal-based cropping systems – although producing sufficient calories – has not addressed the need to provide an adequate diversity of nutrients necessary for a healthy life. This may be observed in the local diets of people in the developing countries, in which starchy staple foods are the main components and there is little dietary diversification in the form of nutrition-rich food groups such as eggs, dairy, fruits and pulses.

From approximately 350,000 species within the plant kingdom, between 30,000 to 50,000 plant species are edible. Of this number, only around 7,000 have been cultivated to date, with significant number of varieties having been developed and managed by small-scale farmers. The Food and Agriculture Organization of the United Nations (FAO) estimates that 150 plant species are mainly responsible for the world's food supply (FAO, 1999). Of those 150, only 12 plant species and five animal species provide 75 percent of the world's food. More than half of the world's plant-derived food energy supply comes from a limited number of varieties of three “mega-crops”: rice, wheat, and maize. Sorghum, millet, potatoes, sweet potatoes, soybean and sugar provide an additional 25 percent. It is worth noting that small-scale

¹² Food and Agriculture Organization of the United Nations (FAO). (2015). *The State of Food Insecurity in the World 2015*. Rome: FAO.

¹³ Food and Agriculture Organization of the United Nations (FAO). (2012). *The State of Food Insecurity in the World 2012*. Rome: FAO.

¹⁴ WHO. (2016). *Obesity and Overweight Fact Sheet*. Geneva: WHO.

¹⁵ <http://www.unep.org/dewa/Asssssmems/Ecosystems/iAAsTD/tabId/105853/Default.aspx/>

¹⁶ CBD. (2006). *Agricultural biodiversity: A cross-cutting initiative on biodiversity for food and nutrition*. <https://www.cbd.int/decision/cop/default.shtml?id=11037> (accessed August 14, 2014).

farmers, including women farmers, produce more than half of the food that is grown around the world; in some regions, this may even be as much as 80 percent.¹⁷

The current over-reliance on a handful of major staple crops has inherent agronomic, ecological, nutritional and economic risks and is not sustainable in the long run. Simultaneously, many regions, especially in the developing countries, experience unprecedented weather events caused by climate change, environmental degradation, loss of biodiversity and ecosystem services, and - particularly in certain areas - growing urbanization and industrialization, which further put at risk global food and nutrition security.

Aside from staple crops, many 'minor crops' are the backbone of the diet for millions of people in different parts of the developing world, especially the poor. Throughout history, farmers have consumed NUS to complement their diets, and have relied NUS to provide a safety net during periods of stress, such as when major staple crops fail or in the aftermath of disasters and other emergencies. For example, most mountain and hill districts in Nepal are food-deficit, yet the population manages to survive due to the availability of uncultivated wild plants in their natural surroundings.¹⁸ According to the State of the World on Plant Genetic Resources for Food and Agriculture (FAO, 2010), a global acknowledgement of and attention to NUS is being manifested by the growing interest of many countries in collecting and conserving NUS. Country reports from all regions describe the role and uses of different NUS, ranging from those that are important for dietary diversity or have the potential to make a greater contribution to income generation, to those that are becoming important in local farming systems as the climate changes. With growing climate uncertainties, there is an urgent need to diversify the food base to a wider range of food crop species for greater cropping system resilience. In many traditional food systems, NUS are acknowledged to have a much higher nutrient content than globally abundant species commonly produced and consumed. NUS also contribute to the cultural heritage of local communities.¹⁹

The effort to link up agricultural biodiversity, in particular NUS, with nutrition is in line with the target of Sustainable Development Goal 2 to '*maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed, by 2020.*' In recent years, the value of biodiversity for an improved nutrition status has been acknowledged as one component of approaches to address malnutrition (Toledo and Burlingame, 2006). The recent work of Bioversity International has shown that agricultural biodiversity could potentially act as a safety net against hunger, offering a rich source of nutrients for improved dietary diversity and quality, and a basis for strengthening local food systems and environmental sustainability.²⁰

¹⁷ IFAD and UNEP (2013); FAO (2014).

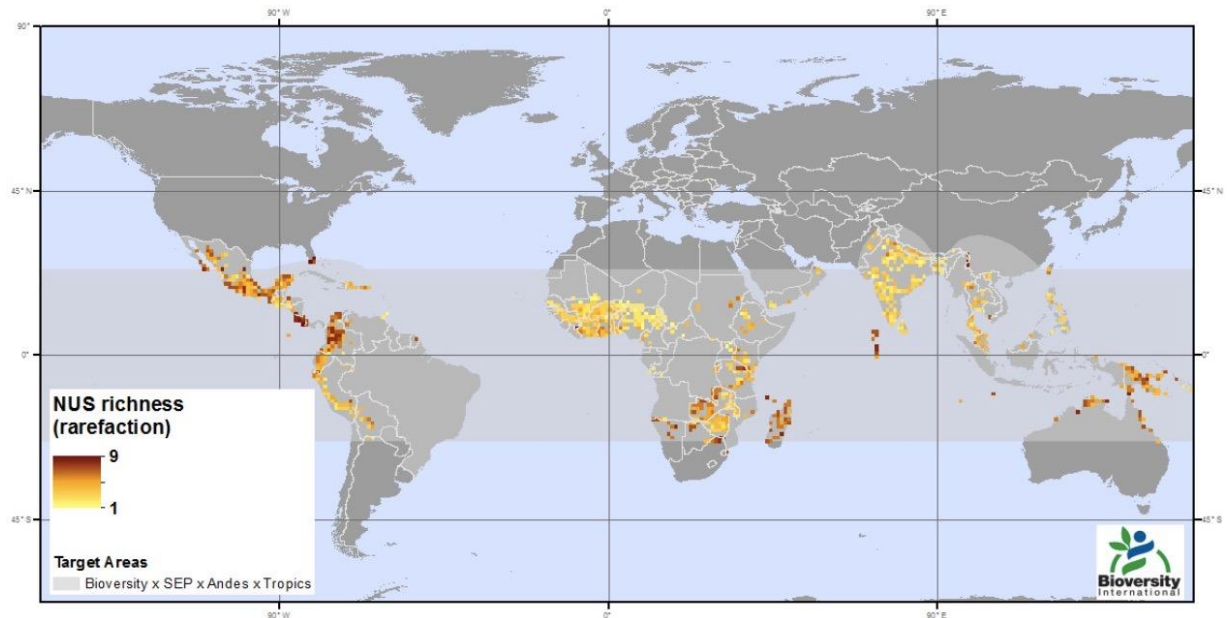
¹⁸ Shyam Kishor Shah. (2014). *Dietary contribution of underutilized minor crops and indigenous plants collected from uncultivated lands and forests in Nepal.*

¹⁹ FAO. (2014). *Promotion of underutilized indigenous food sources for food security and nutrition in Asia and the Pacific.* Bangkok: FAO.

²⁰ Bioversity. (2013). *Diversifying food and diets: Using agricultural biodiversity to improve nutrition and health.* Eds. J. Fanzo, D. Hunter, T. Borelli, and F. Mattei.

Yet, there are many challenges in linking a greater use of biodiversity with improved nutrition status, due to the fact that nutrition is influenced by many factors such as climate, agricultural practices, processing and storage, geography and geochemistry, water safety and hygiene, health care, culture, education and women empowerment.

Figure 1: Atlas of NUS Hotspots



Source: Gaisberger et al. (2014)

Seasonal hunger is a persistent and often silent cycle that affects farming families, especially the poorest of the poor. This usually occurs in between seasons, often just before the next harvest, when the previous year's food stocks have dwindled, food prices are high and jobs are scarce. Unlike famine, which is caused by irregularities or unusual collation of events, seasonal hunger is predictable. Seasonal hunger tends to be less dramatic or less visible; people have limited access to food in terms of quantity and quality and are undernourished. As a result, they are not able to function well and have weak immune systems; this especially affects the mental and physical development of children. Seasonal hunger exacerbates peoples' vulnerability, especially of those who suffer from chronic poverty.

Owing to the seasonality of agriculture, seasonal hunger is an important feature of food and nutrition insecurity, which tends to be overlooked by policy makers and not factored in food insecurity statistics. In fact, seasonal hunger tends to gain attention only when exacerbated by natural or human-made calamities.

The baseline survey of Pillar 3 of the SD=HS Programme aims to explore the interrelations between nutrition and hunger, with specific focus on NUS and women's role. Also key to the assessment is a review of the existing and future role of women farmers in improving food diversity and nutrition status of the community.

In line with the SD=HS Programme, the survey was designed to focus on strengthening (women) farmers' technical capacities in the management and use of plant genetic resources and – specifically for Pillar 3 – the management and maintenance of NUS. The SD=HS Programme acknowledges the complexity and interdependency of factors that influence

nutrition status (water, sanitation and hygiene [WASH], access to health services, education, etc.). Hence, the baseline takes into account these limitations as the factors to be addressed jointly in collaboration with relevant nutrition and health agencies in the respective countries.

2.2. NUTRITION SITUATION IN ZIMBABWE AND VIETNAM

Zimbabwe

Since 1990, Zimbabwe has transitioned from being the food basket of southern Africa to a state of chronic food insufficiency. The cumulative impacts of poor food and agricultural policies and recurrent drought have resulted in poor food availability and access, contributing to high levels of malnutrition in many areas of the country. In 2015, the prevalence of undernourishment²¹ was 33 percent.²² The Multiple Indicator Cluster Survey (MICS) conducted in 2014 indicated that 11 percent of children under the age of five years are underweight. Stunting remains Zimbabwe's top nutrition challenge, with nearly 28 percent of children under the age of five having heights too low for their age as a result of chronic malnutrition. Stunting rates in rural areas (30 percent) are higher than in urban areas (20 percent). The chronic malnutrition rate is classified as medium according to the World Health Organization's (WHO) classification for assessing severity of malnutrition²³. The national prevalence of acute malnutrition is 3 percent.²⁴

The prevalence of micronutrient deficiencies is high across all age groups of the Zimbabwean population (see Table 1). The National Child Survival Strategy 2010 - 2015 of the Government of Zimbabwe noted that 25 percent of all deaths of children under the age of five are attributed to nutritional deficiencies.

Table 1: Prevalence of micronutrients in Zimbabwe

Micronutrient deficiency	Population group	Prevalence
Vitamin A²⁵	Children under 5	19
	Children living with HIV	25
	Women 15-49 years	23
	Rural women	24
Anemia²⁶ (Hb<11 g/dl)	Pre-school	58
	Pregnant women	47
Iodine deficiency²⁷	School children	16

Source: National Micronutrient survey 2012, Zimbabwe Demographic Health Survey 2005-06 and MoHCW and UNICEF 2009

Note to Table 1: The figures indicated in the table represent national rates. Provincial rates of different forms of undernutrition vary substantially.

²¹ Percentage of the population whose food intake is insufficient to meet dietary energy requirements continuously.

²² http://data.worldbank.org/indicator/SN.ITK.DEFC.ZS?order=wbapi_data_value_2015+wbapi_data_value+wbapi_data_value-last&sort=asc

²³ WHO Global database on Child Growth and Malnutrition Cut-off points and summary statistics

<http://www.who.int/nutgrowthdb/about/introduction/en/index5.html>

²⁴ Multiple Indicator Cluster Survey (2014).

²⁵ National Micronutrient Survey (2012)

²⁶ Zimbabwe Demographic Health Survey (2005-06)

²⁷ MoHCW and UNICEF (2009)

The MICS also points out that, in Zimbabwe, only 28 percent of children aged between 6 and 23 months receive the minimum dietary diversity (corresponding to at least four out of 7 food groups).²⁸ Generally, the diet of the majority of children is composed of cereal grains, with few additional food items supplying essential amino acids. Given that 59 percent of this age group, for which nutrition is critical, is fed in line with the minimal meal frequency,²⁹ only 13 percent of children are being fed a minimum acceptable diet.³⁰

Key Result Area 5 of Zimbabwe's **National Nutrition Strategy** (2014-2018) is to strengthen multi-sectoral coordination and collaboration for an integrated nutrition response. It calls for collaboration across sectors to address nutrition challenges. The strategy envisages that through the agricultural sector, food-based approaches to ensure dietary diversity for good nutrition will be promoted, coupled with post-harvest management for year-round availability of safe nutritious food.

Specifically, the National Nutrition Strategy seeks to achieve the following goals related to dietary diversity:

- To ensure that 80 percent of women of reproductive age have the capacity to safely provide for their food, health and nutrition security using appropriate technologies by 2018;
- To increase the proportion of households consuming safe and acceptable diets all year round to at least 80 percent by 2018.

The priority given to improving dietary diversity is reflected in the monitoring and evaluation plan of the National Nutrition Strategy, which includes: dietary diversity as an outcome indicator; an allocation of 5.6 percent of the total budget of the strategy to the promotion of dietary diversity at the household level; and a costed plan for the development of a strategy for business-led action to strengthen the food value chain in order to increase marketplace availability of nutrient-dense foods and dietary diversity in target populations by 2015.

Chronic malnutrition is prevalent even in areas with maize surplus, which reflects micro-nutrient deficiency related to low dietary diversity rather than insufficient food quantity.³¹ The widespread prevalence of micronutrient deficiencies and the low dietary diversity of young children in Zimbabwe call for a Pillar 3 approach that promotes dietary diversification to tackle hidden hunger, in line with the National Nutrition Strategy.

Vietnam

²⁸ Minimum dietary diversity is defined as receiving foods from at least 4 of 7 food groups: (1) grains, roots and tubers; (2) legumes and nuts; (3) dairy products (milk, yogurt, cheese); (4) flesh foods (meat, fish, poultry and liver/organ meats); (5) eggs; (6) vitamin-A rich fruits and vegetables; and (7) other fruits and vegetables.

²⁹ Minimum meal frequency among currently breastfed children is an intake of solid, semi-solid, or soft foods 2 times or more daily for children aged 6-8 months and 3 times or more daily for children aged 9-23 months. For non-breastfed children aged 6-23 months, it is defined as an intake of solid, semi-solid or soft foods, or milk feeds, at least 4 times daily.

³⁰ The minimum acceptable diet for breastfed children aged 6-23 months is defined as an intake of the minimum dietary diversity and the minimum meal frequency. For non-breastfed children, it further requires at least 2 milk feedings in addition to the minimum dietary diversity.

³¹ WFP. (2014). *Zimbabwe: Results of exploratory food and nutrition security analysis*.

Vietnam has achieved incredible social and economic progress over the last decade. National stunting rates reduced from over 40 percent to 23 percent since 2000. However, stunting prevalence varies considerably by wealth group, region and ethnicity. In the lowest wealth quintile, stunting rates peak at 41 percent (noting that the proportion of the population below the national poverty line is 17 percent and 50 percent of ethnic minorities are poor),³² whereas only 6 percent of the children under five in the highest wealth quintile are chronically malnourished. In the Northern Midlands and mountain areas and the Central Highlands, approximately one in three children is stunted. Of great concern is the stunting prevalence among ethnic minority children under 5 years of age (41 percent, of whom 14 percent are severely stunted).

North Central and Coastal areas and the Red River Delta in Vietnam face the highest rates of underweight among women of reproductive age. The regional and ethnic variation observed with regard to stunting prevalence is not seen for wasting (i.e. acute undernutrition). The prevalence of wasting among all children under 5 as a result of acute hunger is 4 percent and two times higher among children 0-5 months of age (9 percent). Table 2 shows that the prevalence of child malnutrition in the provinces targeted by Pillar 3 is higher than the national rate.

Table 2: Prevalence of underweight, stunting (chronic malnutrition) and wasting (acute malnutrition) in the target areas for Pillar 3 compared to the national figure

Province	Underweight (%)			Stunting (%)		Wasting (%)	
	Moderate	Severe	Very severe	Moderate	Severe	Moderate	Severe
Ha Giang	14.0	8.9	0.2	19.8	15.4	9.8	2.7
Lao Cai	16.4	3.4	0.2	21.8	13.4	5.8	3.5
Son La	16.7	4.7	0.3	19.6	4.8	10.3	2.0
National	13.2	1.2	0.1	15.2	9.7	6.8	4.8

Anemia rates among children under 5 (29 percent) and women of reproductive age (29 percent)³³ are described as a moderate public health significance, according to WHO's classification.³⁴ Again, anemia prevalence among both women and children is highest in the Northern Midlands and mountain areas. Several studies have shown that anemia in Vietnam is mostly caused by iron deficiency and could be prevented by improving the dietary intake of iron. Vitamin A deficiency affects roughly 14 percent of pre-school children, increasing the risk of disease and death from infectious diseases.³⁵ After relaxation of the iodization law, Vietnam has seen an alarming increase in iodine deficiency and it is facing now one of the highest rates of this deficiency in South-East Asia.

³² United Nations. *Millennium Development Goals Indicators*. Available at <http://mdgs.un.org/unsd/mdg/data.aspx>.

³³ General Nutrition Survey (2009-2010)

³⁴ <http://www.who.int/vmnis/indicators/haemoglobin.pdf>

³⁵ NIN and UNICEF. (2011). *A Review of the Nutrition Situation in Viet Nam 2009–2010*. Hanoi: Statistical Publishing House.

Gender equality has improved over recent years and women's participation in the work force already exceeds 70 percent.³⁶ However, women are primarily working in the informal and quasi-informal sectors, such as agricultural daily wage labour and garment sectors. Therefore, they often do not experience labour conditions that allow to optimize care for young children, including breast feeding and access to optimal complementary feeding.³⁷ According to the Nutrition Surveillance conducted by the National Nutrition Institution in 2010, only 51.7 percent of children aged between 6 and 23 months received a minimum acceptable diet (i.e. in line with the age appropriate meal frequency and minimum number of food groups included in the diet).

In view of the above, Pillar 3 in Vietnam aims to design special interventions targeting the food systems of the ethnic communities, in order to improve their dietary intake and nutritional status.

3. Methodology Pillar 3 of the SD=HS Programme, with its focus on NUS and nutrition, forms a new field of work for the SD=HS partner consortium. For this reason, the programme consulted experts in this field³⁸ and simplified the FAO 24-hour recall Household Dietary Diversity Score as one of the tools for the baseline survey.

A global framework and two main sets of survey tools were developed, discussed and agreed within the partner consortium. The global framework provides **a proposed list of essential data** to be collected and analysed during the baseline survey, and outlines the proposed survey methods. It enables **a systematic global consolidation and comparison** of four country baselines (for Peru, Vietnam, Zimbabwe, and Myanmar) based on the agreed essential data sets, collected by means of the **research questions** (listed in the Introduction section). The development of a global framework for cross-country analysis was done through a multi-evidence-based approach that recognizes the diversity of environmental, cultural and world views of communities within and among countries, and different gender perspectives and power relations, as well as local and scientific knowledge systems. The richness and diversity of knowledge systems demands respect and valuation of each knowledge system on its own terms and in the co-generation of knowledge for understanding and defining change and transformation.

The research questions were shared within the consortium, commented on and agreed upon with all Pillar 3 partners in September 2014, creating a joint ownership by all partners implementing Pillar 3 activities. Based on these research questions, two survey tools were developed and agreed upon. However, in the spirit of respecting and building on diversity, it was also agreed that each partner could include specific sections relevant to their own context and adapt the tools to local circumstances, on the condition that such inclusions would not compromise the overall global framework and the basic survey tools. In each of the target countries, the survey tools were adapted, translated and tested. Enumerators were trained by the University of Zimbabwe and the country management team in Vietnam.

This baseline report consolidates the reports from the two countries where the baseline surveys were completed first, i.e. Zimbabwe and Vietnam. The analysis and lessons from

³⁶ Labour force participation rate is the proportion of the population ages 15 and older that is economically active: all people who supply labour for the production of goods and services during a specified period. <http://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS>

³⁷ Chaparro, C., L. Oot, and K. Sethuraman. (2014). *Vietnam Nutrition Profile*. Washington, DC: FHI 360/FANTA.

³⁸ Wageningen University

these two countries will serve to test and refine the global framework for the Pillar 3 baseline. A revised and consolidated global baseline report will be published upon the completion of the baseline surveys in Myanmar and Peru.

The following survey tools were included in the global framework:

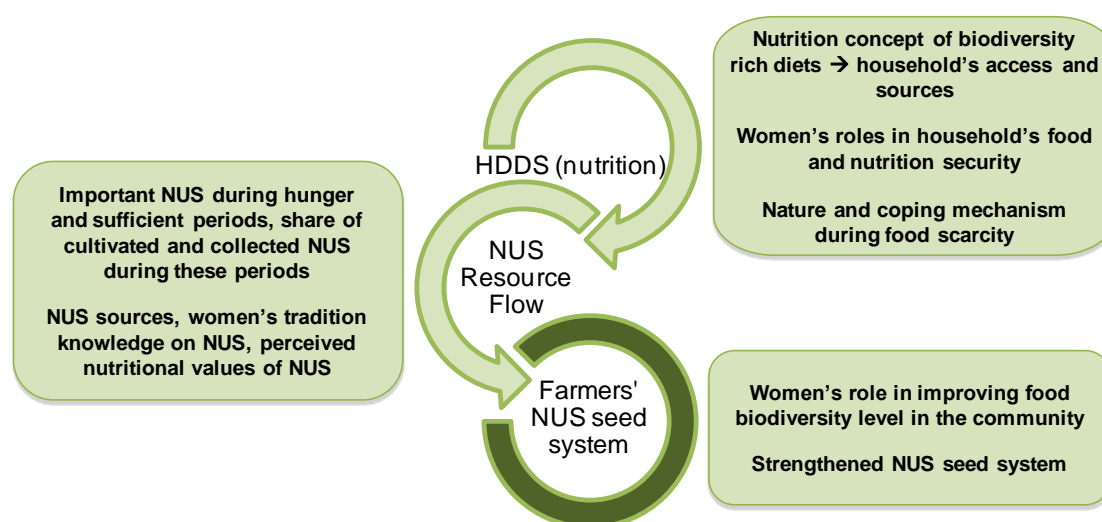
- Questionnaire, consisting of:
 - Demographic questions
 - Amended FAO 24-hour recall Household Dietary Diversity Score (HDDS)
 - Questions specifically addressing the hunger period and coping strategies
- Community resource flow for Neglected and Underutilized Species
- Wealth Ranking tool

Figure 5 presents how the survey tools were used to assess the baseline situation for different Pillar 3 themes.

To investigate aspects of seasonality and the use of NUS in food security, an amended HDDS survey was performed during the period of greatest food shortage and during the food-sufficient period. In Zimbabwe, the HDDS survey was performed in November 2014 (the period of greatest food shortage) and again in June 2015 (just after the harvest). In Vietnam, the HDDS survey was conducted in March 2015 during the period of rice adequacy (i.e. the sufficiency period) and in September 2015 (just before the harvest) during the period when there is not enough rice.

The baseline survey was carried out in Zimbabwe by SD=HS partner, the Community Technology Development Trust (CTDT), in collaboration with the National University of Zimbabwe. In Vietnam, the baseline survey was carried out by SD=HS partner, the Southeast Asia Regional Initiatives for Community Empowerment (SEARICE), and the local counterpart in the country, the Plant Resource Centre (PRC).

Figure 2: Themes and methodologies for the Pillar 3 baseline global framework



3.1. AMENDED FAO 24-HOUR RECALL HOUSEHOLD DIETARY DIVERSITY SCORE

The HDDS reflects the economic ability of a household to access a variety of foods. Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security (Hoddinot and Yohhanes, 2002; Hatloy et al., 2000 in FAO, 2010).

Information on household food consumption during the previous day was collected and used to determine the HDDS by measuring the number of food groups from which food had been consumed. In general, any increase in HDDS reflects an improvement in the households' diet.

The HDDS was used to establish a baseline for Pillar 3 in order to allow an assessment of improvements in food security through comparison with HDDS results from the endline survey. The HDDS questionnaire represents a rapid, user-friendly and easily administered low-cost assessment tool. Scoring and analysis of the information collected with the questionnaire is straightforward. In addition, its universal applicability makes the HDDS suitable for use as a standardized questionnaire in all Pillar 3 countries. As such, the questionnaire is not culture-, population- or location-specific and, therefore, had to be adapted to the local context prior to use in the field.

The HDDS tool presented in the *FAO guidelines for measuring household and individual dietary diversity* was modified to create a simplified version for use in the SD=HS Programme. Food groupings may differ according to objectives, ultimately depending on the main characteristics of the diet that the score intends to reflect (i.e. animal protein or micronutrient adequacy). In Zimbabwe, 12 food groups were used, ensuring that the score accurately reflects the consumption of micronutrients, carbohydrates and protein-rich foods. Vietnam followed the standard list of FAO, which is divided into 16 food groups. Table 3 lists the food groups that have been used in the two countries. It also shows how 7 specific food groups in Vietnam were regrouped into 3 food groups in Zimbabwe, namely vegetables, fruits and meat; each colour highlights which of the food groups used in Vietnam were merged into one food group in the HDDS questionnaire used in Zimbabwe. By disaggregating fruits, vegetables and tubers rich in Vitamin A from other fruits, vegetables and tubers, the survey in Vietnam generated richer data on the type micronutrients accessed by households as compared to the survey in Zimbabwe.

Table 3: Food groups used in Vietnam and Zimbabwe to measure household dietary diversity

Vietnam		Zimbabwe	
Number	Food group	Zimbabwe	
FG1	Cereals	A	Cereals
FG2	White roots and tubers	B	Roots and tubers
FG3	Vitamin A rich vegetables and tubers	C	Vegetables
FG4	Dark green leafy vegetables		

FG5	Other vegetables		
FG6	Vitamin A rich fruits	D	Fruit and fruit juices
FG7	Other fruits		
FG8	Organ meat	E	Meat
FG9	Flesh meat		
FG10	Eggs	F	Eggs
FG11	Fish and seafood	G	Fish and seafood
FG12	Legumes, nuts and seeds	H	Legumes, nuts and seeds
FG13	Milk and milk products	I	Milk/dairy products
FG14	Oils and fats	J	Oils and fats
FG15	Sweets	K	Sweets
FG16	Spices, condiments, beverages	L	Spices, herbs and beverages

The total value of the HDDS per household is then computed by summing the individual values for all food groups included in the dietary diversity score.

The average HDDS for the hunger and sufficiency periods in Vietnam and Zimbabwe were calculated as follows:

$$\text{Average HDDS} = \frac{\text{SUM (HDDS of each household in area X during period X)}}{\text{Number of households}}$$

The HDDS questionnaire was further amended by adding a question to identify the primary source of food procurement. Responses were coded as follows: (1) cultivated; (2) collected; (3) purchased; (4) borrowed, bartered, exchanged for labour, gift from friends or relatives; (5) food aid; and (6) other. Data on those food items that were cultivated or collected was later linked to the results of the **community resource flow for NUS** (explained in the next section). In addition to the 24-hour recall, the survey also included questions on the timing and duration of the hunger period and coping strategies used by the households during such periods.

In **Zimbabwe**, wealth ranking was conducted as a focus group exercise in the course of the survey undertaken during the sufficiency period. Community representatives were asked to describe the characteristics of a typical household in the highest, middle and lowest wealth groups and agree on a set of wealth ranking criteria for the target community. Each individual household in the survey sample was then assigned to one of the three socio-economic groups as appropriate. The average HDDS was calculated for each of the socio-economic groups.

3.2. COMMUNITY RESOURCE FLOW FOR NEGLECTED AND UNDERUTILIZED SPECIES

The community resource flow for NUS was adapted from the *Material Resource Flow* – a tool consisting of a diagram that presents the components of agriculture and food systems existing within a community and illustrates the corresponding linkages between them, differentiated by gender in terms of access and use.

The Community Resource Flow for NUS³⁹ aims to:

- Identify the NUS and their roles as part of diversified food sources of indigenous peoples and smallholder farmers
- Understand local knowledge on the nutritional values of NUS
- Understand local knowledge on the management of NUS, including applied seed/maintenance systems, accessibility, sharing and uses of NUS
- Identify the most important NUS for food and nutrition security of households from women's perspective
- Help identify problems and challenges faced by women farmers in managing the existing maintenance systems of the identified most important NUS species.

The tool was used as part of the Participatory Rural Appraisal (PRA),⁴⁰ whereby the participants were invited to sketch their farms and various enterprises, including the sources from which they derive their food.⁴¹ They were then asked to identify and list the plants gathered or harvested and brought to their homes from the various sources depicted in their drawings. In this regard, the participants were requested to first draw the food plants consumed during the hunger period, followed by those collected in the sufficiency period, and then those used throughout the year. One important step in the process was to share with the communities *the SD=HS Programme's working criteria on NUS*, in order to *identify which criteria resonate with the community and discuss with the participants their own concepts and definition of NUS*. To achieve this, the facilitator can refer to the list of food plants reported in the 24-hour recall and prompt the participants to point out possible NUS plants and the criteria why these are perceived as NUS. Based on the compiled list of food plants cited as being available either in the lean period or the sufficiency period or all year long, the participants were requested to point out which of these plants they considered as NUS, using the criteria they identified earlier as a reference. This exercise was meant to create a deeper understanding and/or provide complementary information on the role of the HDDS food groups and the frequencies with which these food plants/crops were referred to in the 24-hour recall, each classified as either cultivated or gathered.

³⁹ Programme working criteria for NUS can be found in 4.5.

⁴⁰ Participatory rural appraisal (PRA) is a methodology used to enhance: (a) development agents' understanding of the rural reality for the purpose of project planning and implementation; and (b) a sense of ownership and responsibility among the rural poor for better results and social acceptance of the programme. Different participatory methods are used for different ends. Sometimes participatory approaches are the means and ends in themselves.

⁴¹ The NUS resource flow can include the following (as appropriate): parcel(s) of farm lots, home gardens, forest and surroundings, grasslands/meadow at the margins of the farms, ponds, swamps, lakes, roadsides, markets and access, use by gender and age, and wealth and status.

3.3. SAMPLE SURVEY

Sampling for households survey

In Zimbabwe, the baseline survey was conducted in four districts: Chiredzi District in Masvingo Province; Goromonzi District and Uzumba Maramba Pfungwe (UMP) District in Mashonaland East Province; and Tsholotsho District in Matabeleland North Province. The first survey took place in the hunger period (November 2014), involving 602 households from 93 villages in 10 wards. It was followed by a second survey in the sufficiency period (June 2015), involving 611 households from 109 villages in 12 wards. The sample for the survey in both the hunger and sufficiency periods included 19 percent of the total households living in the villages targeted by Pillar 3. Households were selected randomly for each village. Around 80 percent of the respondents were women. It should be noted that the households surveyed in the hunger period were different than those surveyed in the sufficiency period. However, it was assumed that the selected households in the two consecutive surveys had similar characteristics, as they were geographically close (i.e. within walking distance). On the other hand, although villages in a ward may have similar characteristics in terms of agro-ecological conditions, livelihoods, education levels, average household composition and nutrition challenges, it was assumed that there might still be substantial differences between them that could influence the results of the HDDS and the community resource flow for NUS, such as access (distance) to food sources, access to markets, road infrastructure, etc.

In North Vietnam, the baseline survey was conducted in three provinces located to the north of the Red River Delta: Son La Province and Lao Cai Province in the north-west and Ha Giang Province in the north-east. SH=HS Pillar 3 interventions will target two predominantly indigenous communities in each province, namely, Na Ot and Chieng Ve communes in Mai Son District, Son La Province; Ta Phin and Hau Thao communes in Sapa District, Lao Cai Province; and Bach Ngoc and Ngoc Minh communes in Vi Xuyen District, Ha Giang Province.

The government of Vietnam, through the commune authorities, officially ranks each household's economic status as either *poor*, *near-poor*, *average*, or *rich*. The list of households in each commune contains this classification or ranking. From this list, 30 households in each of the six chosen communes were selected at random from among the poor and near-poor households to participate in the household survey. Women in the households were selected as respondents. The total sample size for the baseline was 180 households, equal to approximately 5 percent of the 3,948 households living in the target area for Pillar 3 in Vietnam.

Sampling for the community resource flow for NUS

In Zimbabwe, two Focus Group Discussions (FGDs) were conducted per district in those wards where CTDT was already involved in organizing Farmer Field Schools. In order to facilitate the survey, participants from two wards gathered in a single location to develop NUS resource flow maps and carry out FGDs. However, focus groups were formed by village, so that the responses would still reflect the situation of the separate villages.

Communities in the following wards were involved in developing the NUS resource flow map, conducting the FGDs and identifying the NUS plants used (vegetables and wild fruits):

- Chiredzi: wards 3 and 4

- Goromonzi: wards 10 and 11
- Tsholotsho: wards 2 and 22
- UMP: wards 8 and 9

In Vietnam, important preliminary information on the communes selected by the Country Management Team (CMT)⁴² was obtained through the commune authorities and union leaders (e.g. number of ethnic groups, village lists of households classified as *poor* or *near poor*, etc.). The commune authorities also coordinated the invitation of participants to the PRA with the aim of assembling an as dispersed sample as possible, covering households from all hamlets within the jurisdiction of the commune. FGDs⁴³ involved groups of 10-15 community members, including women, men and youth (regardless of ethnicity). Each group completed the same set of PRA questions and presented the answers in a plenary to arrive at a consensus regarding the prevailing conditions in the commune. Commune authorities (members of People's Committee) also participated during the plenary/validation sessions.

It took three days to complete the PRA process in each commune. Participation of all group members was encouraged despite language challenges, as some members did not understand and speak Vietnamese. An interpreter from among group members was needed to help facilitate the process (e.g. by translating Vietnamese to H'Mong and vice versa).

The PRAs in Vietnam did not utilize the common tool "Community resource flow for NUS," opting instead to use the following tools to collect data on NUS:

- Resource map to provide a general view of the community, including conditions of biodiversity;
- Transect map to understand the sources of food available in the community;
- NUS hunt to identify available NUS and other plants used for;
- Seasonal calendar to map the seasons, cropping systems and economic activities, gender roles, food availability during the hunger period (using local definitions) and coping mechanisms;
- NUS valuation to determine the local/tribal names of NUS, various uses of parts of the plants, locations where sourced or grown;
- Kitchen visits to view the actual foods prepared and stored in the households' kitchens, food storage practices, food sources.

It was reported that the SD=HS Programme's working definition of NUS was not discussed with the communities in Vietnam. Instead, the communities cited a number of indigenous plants, referring to the PRC's list of plants considered as NUS. It should be noted that many of the indigenous plants on the list are wild, and may not necessarily include domesticated and/or semi-domesticated plants that could be included in the NUS category as defined by the programme.

⁴² CMT for Pillar 3 in the north of Vietnam was comprised of multi-stakeholder institutions responsible for baseline establishment and, eventually, programme implementation. The Plant Genetic Resources Center (PRC), Vietnam Academy of Agricultural Sciences (VAAS) of the Ministry of Agriculture and Rural Development (MARD), heads the CMT for Pillar 3 in Vietnam. Other members of the team are: the National Institute for Nutrition (NIN), Ministry of Health; the Society of Sciences and Rural Development (a national network); the Northwest Agriculture and Forestry Research Center (NAFRC); Mai Son Agriculture and Rural Development Department in Son La Province; PRC and Vi Xuyen Agriculture and Rural Development in Ha Giang Province; the Temperate Crop Research Development Center (TCRDC) and the Sapa Agriculture and Rural Development Department in Lao Cai Province.

⁴³ Definition by the University of Arizona: A focus group could be defined as a group of interacting individuals having some common interest or characteristics, brought together by a moderator, who uses the group and its interaction as a way to gain information about a specific or focused issue.

4. SURVEY FINDINGS AND ANALYSIS

4.1. DEMOGRAPHIC AND BIOPHYSICAL DATA

Table 3: Location characteristics

	Vietnam, Ha Giang	Vietnam, Lao Cai	Vietnam, Son La	Zimbabwe, Chiredzi	Zimbabwe, Goromonzi	Zimbabwe, Tsholotsho	Zimbabwe, UMP
Number of households	174,253	131,380	265,088	67,278	58,013	25,845	26,989
Number of women	404,088	326,000	606,268				
Farming system	80% subsistence, 20% commercial production	80% subsistence, 20% commercial production	75% subsistence 25% commercial production	Subsistence	Subsistence	Subsistence	Subsistence,
Agroecological zone	Tropical climate	Very diverse – with areas of tropical, sub-tropical and temperate zones	Tropical climate	Vast semi-arid, drought-prone area (driest, agroecological region V) less than 500mm per year	High potential agroecological zone II (high rainfall and moderate temperatures for crop production)	Low rainfall, high temperatures, low potential for crops but good pastures for livestock (agroecological zone IV), less than 650 mm of rainfall per year	Agro-ecological zone IIB (16%), region III (20%) and region IV (majority of land)

Major crops	Rice, maize, cassava	Rice, maize, vegetables, fruits, medicinal plants	Rice, maize, coffee	Sorghum, maize, pearl millet	Maize, finger millet, sorghum, sweet potatoes	Pearl millet	Maize (Uzumba), sorghum, pearl millet (Maramba), and sorghum and pearl millet (pfungwa)
Annual rainfall (mm)	2,253.6	1800-2000	1,400	584	970	555	692
Altitude (m above sea level)	500-2000	250 - 3143	600	430	1380	1060	1160
Average area cropped per household (sq. m.)	7,700	5,800	7,100				
Household size	4.8	5.35	4.48	5.9	4.7	5.3	5.3
Soil type	Humic acrisols ⁴⁴	Humic acrisols	Feralite soil ⁴⁵	Heavy clay	Sandy loams	Kalahari sands	Sandy clay loams

⁴⁴ Acrisols have an umbric A horizon or a high organic matter content in the B horizon, or both (<http://www.fao.org/soils-portal/soil-survey/soil-classification/fao-legend/key-to-the-fao-soil-units/en/>)

⁴⁵ Soil type having yellowish red color, with rather high humus content, vulnerable to erosion and acidification.

In Zimbabwe, it was observed that for an average of 73 percent of the households in all four districts, agriculture is the main source of income. This varies between the districts: Tsholotsho District has the highest number of households (92 percent) deriving their main income from agriculture, followed by UMP (83 percent), Chiredzi (70 percent) and Goromonzi (50 percent). Despite high literacy rates (76 percent in English and 93 percent in Shona), almost 17 percent of the households in Goromonzi are formally unemployed, while 14 percent are involved in casual or informal work. Most of the farmers are engaged on their farms, but only produce crops for household/subsistence consumption. According to key informants, most of the people within the working class are not employed because of the prevailing economic situation in Zimbabwe. It can thus be concluded that there is no significant earning outside farming in all of the four districts.

The PRA in Vietnam found that abundant labour force is available for production activities in the surveyed sites. Nonetheless, due to the low level of education and skills, household income is low and many households are classified as poor. The basic income of households (all households in Ha Giang and Lao Cai, and almost all households in Son La) comes from farming, indicating that local livelihoods depend mostly on agricultural activities.⁴⁶ Farm products are used primarily for self-sufficiency and trading is not very common, only undertaken when farmers need cash, in which case they prefer to sell their own bred animals. Secondary sources of income include various seasonal activities, including selling leaves or flowers of tiger grass/broom grass (*Agrostis maxima* Roxb.), selling handcrafts, or engaging in seasonal labour. However, income from these activities is temporary and unstable.

4.2. HOUSEHOLD SOURCES OF FOODS

In line with the outcome of the World Food Summit of 1996, the SD=HS Programme defines food security as a condition in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food, which meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept at the family level, with individuals within households as the focus of concern.⁴⁷ The main dimensions of food security are explained below:

- **Food availability:** implies sufficient quantities of appropriate, necessary types of food from domestic production, commercial imports or donors, which are consistently available to people or within their reach.
- **Food access:** is the ability to acquire sufficient quality and quantity of food to meet all household members' nutritional requirements for productive lives. Food access is a situation when there is adequate income or other resources to purchase or barter to obtain appropriate food needed to maintain consumption of an adequate diet/nutrition level.
- **Food utilization:** refers to the individual's biological capacity to make use of food for a productive life. It is when food is properly used, proper food processing and storage techniques are employed, adequate knowledge of nutrition and child care techniques exist and are applied, and adequate health and sanitation services exist.

The baseline survey, in particular the 24-hour recall of the HDDS survey, focused primarily on gathering data for the first two dimensions: food availability and food access.

⁴⁶ The PRAs undertaken in Son La Province during the two periods provided conflicting findings on household income. The information from one PRA indicates that the main livelihood of households in this province comes from cash crops such as sugarcane and coffee.

⁴⁷ FAO. (2002). *The State of Food Insecurity in the World 2001*. Rome: FAO.

As elaborated earlier, the FAO 24-hour food recall of the HDDS survey was tailored to the context of the programme. The following were included as follow-up questions to the recall:

- What are the sources of the food you have eaten in the past 24 hours?
- For those plants that are gathered, please identify the plants, the sources of collection and the persons responsible to collect these plants.

With reference to the food groups and each food item therein, the communities in the three communes of **Vietnam** identified four major sources of food: homegrown, collected from the wild, purchased, and purchased on credit.

Table 4: Households' food sources for all the food groups in the HDDS assessment in Vietnam

Food groups	Ha Giang Province (%) ⁴⁸	Lao Cai Province (%)	Son La Province (%)	Average (%)
Homegrown: FG1 (rice, maize), FG3 (pumpkin, sweet potato), FG4 (Brassica family, chayote, sweet potato buds, katuk), FG12 (beans)	100	100	100	100
Wild vegetables	45	37	58	47
Purchase	42	35	58	45
Purchase on credit	10	8	8	9

Table 4 suggests that the types of vegetables commonly consumed by the communities include both cultivated vegetables (*Brassica* family, chayote, sweet potato bud, katuk), semi-domesticated vegetables and those collected from the wild. Wild vegetables, such as fern (rau dón), forest banana flower, katuk (*Melientha suavis*), bitter vegetable, red sour vegetable, Centella (*Centella asiatica*), rau bò khai (*Erythralium scandens* Blume), and rau cỏ bọ (*Oxalis corniculata* L.), are collected to increase the households' **daily** food access.

Fruits are almost never collected from the wild. Instead, they are grown in home gardens and usually sold on the market. The consumption of fruits, if not during the meal, has not been reported.

Generally, households in the three provinces consume only what they grow and what can be gathered from the wild, except for condiments (especially monosodium glutamate [MSG], salt and other foods of Food Group 16), which they purchase. They also purchase bread, which is consumed on very rare occasions, as well as rice during the hunger period when stocks from the harvest run out (either with cash or credit).

In **Zimbabwe**, the survey cited three sources of food; produced at household level, obtained through food aid, and obtained from the market. Most of the foods found in the daily household diets are produced at the household level. However, due to recurrent droughts and related food insecurity, many affected households receive food aid from donor governments

⁴⁸ The percentage of households which have access to the indicated food groups

and aid agencies. Certain types of food are not locally produced and must be bought from the markets, including basics like salt, cooking oil and various livestock products. Among income sources, sales from market gardening was identified as the most common source of income used to purchase additional food (17 percent), followed by sales from crop production (13 percent) and sales from poultry production (7 percent).

Table 5 shows the good plants grown at household level in the four districts of Zimbabwe. The HDDS in UMP is high compared to the other three districts (to be discussed in section 4.3), although the number of food groups sourced from home production is low. This suggests that the relatively high number of households with income from sales from market gardening (46 percent) and with a comparatively higher level of nutritional knowledge is leading to a higher level of food purchases and, consequently, the more diverse diet of the households in this district.

Table 5: Food plants grown at household level in the four districts of Zimbabwe (presented in English, and *local name in italic*)

Food groups	Chiredzi Vast semi-arid, drought-prone area	Goromonzi High potential agroecological zone II (high rainfall and moderate temperatures for crop production)	Tsholotsho Low rainfall, high temperatures, low potential for crops but good pastures for livestock	UMP Agroecological zone IIB (16%), region III (20%) and region IV (majority of land)
Staple crops	Sorghum, maize, pearl millet	Maize, finger millet, sorghum, sweet potatoes	Pearl millet	Uzumba: maize, Maramba: maize, sorghum and pearl millet Pfungwa: sorghum and pearl millet
Legumes, nuts	Cowpeas, sesame	<i>Bambara</i> (round) nuts, cowpeas, groundnuts, sunflower seeds, beans		Uzumba: Groundnuts Maramba: cowpeas and groundnuts
Vegetables	<i>Derere</i> (okra), <i>Nyapape</i> (a climber), <i>Muchacha</i> , <i>Tihothi</i> , <i>Bangala</i> , <i>Tsine</i> , <i>Mowa</i> , <i>Chibonji</i> , <i>Teka</i> , <i>Howa</i>	Tomatoes, onions		

Fruits	<i>Nzvinda, mushangahume, nyii, matiti, mawuyu, nwambo, tipela, shakwari</i>	<i>Matunduru, hute, matamba, mazhanje, tsubvu, nhunguru and muguriwando</i> (wild fruits) and guava and banana as exotic fruits		
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The people in UMP normally gather wild fruits, including *matohwe, mazhanje, hacha, tsvubvu, nyii, masau, mawuyu and matamba*. It was also pointed out by key informants that people could be encouraged to make use of locusts, *nhowa* (a type of caterpillar), *hakwa, kawuyu* (okra), blackjack, wild okra (*nunje*) and baobab leaves. Due to climate change, the wetlands in Uzumba and Maramba have dried out, which has resulted in the disappearance of some indigenous vegetables (manenge and mutsvandimire) that used to grow there during the hunger month of August. The communities have also lost some rice varieties, certain cultivars of cowpeas, groundnuts and bambara nuts that they used to grow in the past. Cassava and *runinga* are now scarce due to lack of a seed bank and good-quality propagation material.

4.3. HOUSEHOLD DIETARY DIVERSITY SCORE (HDDS)

The percentages of households that reported consuming foods from specific food groups on the previous day are shown in Table 6. The questionnaire included in the annex provides an example of a detailed list of foods comprising each group.

Table 6: Food groups consumed in the past 24 hours by surveyed households pillar 3 (percentage of households) and HDDS scores in two different seasons in Vietnam and Zimbabwe

Vietnam			Zimbabwe		
Food group	Sufficiency period (March)	Hunger period (September)	Food group	Sufficiency period (June)	Hunger period (November)
Cereals	100	100	Cereals	100	100
White roots and tubers	3	3	Roots and tubers	13	2
Vitamin A rich vegetables and tubers	4	5	Vegetables	92	88
Dark green leafy vegetables	94	96			
Other vegetables	27	27			
Vitamin A rich fruits	2	2			
Other fruits	-	-	Fruits and fruit juices	4	11
Organ meat	1	1			
Flesh meat	22	11			
Eggs	9	6	Flesh meat	6	14
Fish and seafood	15	2	Eggs	0	1
Legumes, nuts and seeds	11	13	Fish and seafood	5	6
Milk and milk products	0	2	Legumes, nuts and seeds	35	21
Oils and fats	49	51	Milk/dairy products	3	1
Sweets	7	8	Oils and fats	9	0
Spices, condiments, beverages	20	48	Sweets	6	2
Mean HDDS	3.6	3.6	Spices, herbs, beverages	51	41
			Mean HDDS	3.2	2.5

The scores indicated in Table 6 show that the surveyed communities in Vietnam and Zimbabwe include 3 to 4 food groups in their daily diet. Overall, the scores from both countries reflect a low level of dietary diversity.

Since different sets of food groups were used in Zimbabwe and Vietnam, each country's average HDDS cannot be directly compared to that of the other. For example, consumption of three different types of vegetables (Vitamin A-rich vegetables, dark green leafy vegetables and others) would increase the HDDS by 3 units in Vietnam and only by 1 unit in Zimbabwe.

In **Vietnam**, the majority of the households consumed foods from 3 or 4 food groups both in the hunger period (September) and in the sufficiency period (March), except in Lao Cai Province (for disaggregation of the HDDS by province, see Figure 6).

Table 6 shows that, in Vietnam, the four food groups (FG) were mainly comprised of: FG1 (rice – 100 percent of the households), FG4 (dark green leafy vegetables such cabbage, chayote, pumpkin and winter gourd – more than 94 percent of the respondents), FG14 (oils and fats – more than 48 percent of the respondents) and FG16 (spices, condiments and beverages – 49 percent during the hunger period and 20 percent during the sufficiency period).

Household consumption of FG3 (Vitamin A-rich vegetables and tubers), FG4 (dark green leafy vegetables) and FG5 (other vegetables) is almost similar during the periods of hunger and sufficiency. Key informants explained that there is a lack of interest in widening the existing vegetable diversity and related dietary quality among ethnic people in Vietnam, like the H'Mong of Lao Cai. They would rather eat more of what they prefer in terms of taste (e.g. bamboo shoots and greens) than to diversify their vegetable intake. For the H'Mong, diversity is achieved when rice, vegetables and meat/fish are included in the diet, and further diversification *within* the food group of *vegetables* is not considered necessary.

Wild vegetables make up a considerable part of the vegetable consumption in Vietnam (see Table 7).

Table 7: List of wild vegetables collected for consumption in Vietnam

Wild vegetables	Local name	Scientific name
Fern		<i>Diplazium esculentum</i>
Pak wan	<i>Rau ngot rung</i>	<i>Melientha suavis</i> Pierre –
Wild banana flower		<i>Musa acuminata</i> or <i>Musa</i> genus
Bamboo shoot		<i>Bambusa</i> genus or <i>Phyllostachys</i> genus
Bitter herb		<i>rau dang</i>
	<i>Rau rut rung</i>	
Centella	<i>Centella asiatica</i>	
Cape gooseberry	<i>Tam bop</i>	<i>Physalis angulate</i>
	<i>Cu mai</i>	<i>Dioscorea hamiltonii</i>
Indian goosegrass	<i>Man trau</i>	<i>Eleusine indica</i>
Mushroom		
Redflower ragleaf	<i>Tau bay</i>	<i>Crassocephalum crepidioides</i>
Orchid tree		<i>Bauhinia variegata</i>
Four leaves flower		<i>Marsilea quadrifolia</i>

In **Vietnam**, of great concern in terms of micronutrient intake and status is the limited consumption of fruits rich in Vitamin A (2.2 percent of households during both periods) and other fruits (0 percent of households during both periods). According to a key informant, there are no fruits that can be gathered from the forests or the wild. The surveyed households, being poor or near poor, lack resources to buy fruits and consume them as a regular diet component. Some households with small land holdings grow a few fruit trees in their home gardens (e.g. bananas), but they sell the fruits to buy food. Since household consumption of the main sources of Vitamin A (i.e. Vitamin A-rich fruits and vegetables) is very low, and there is hardly any consumption of milk or eggs, the surveyed households might be at risk of Vitamin A deficiency. Therefore, Pillar 3 interventions should explore the potential of NUS to address the low intake of Vitamin A. In this regard, household access to fruits through homestead production could be an important pathway to improving dietary diversity.

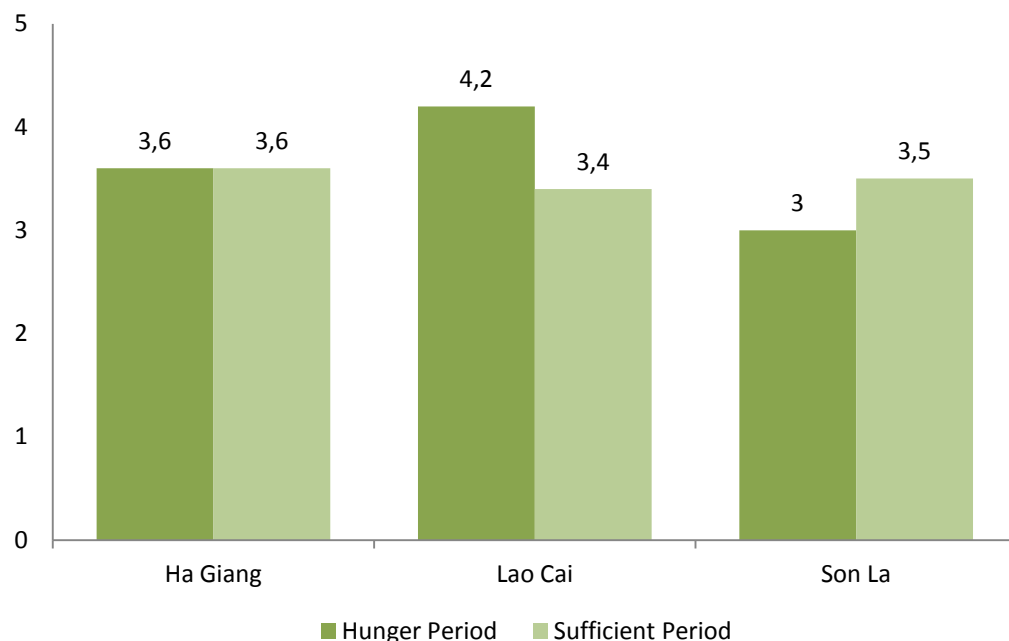
During the hunger period (September), consumption of the following food groups fell to lower levels as compared to the sufficiency period (March): flesh meat (from 22 to 12 percent), eggs (from 9 to 6 percent), and fish and seafood (from 15 to 2 percent). The programme may explore options to replace these animal food items with protein-rich and micronutrient-rich plant species during the hunger period. It should be noted, however, that the overall HDDS for the hunger period and for the sufficiency period are the same. This can be partly explained by the increase in the consumption of FG16 (spices, condiments and beverages) during the hunger period (from 20 to 48 percent). In this case, equal HDDS for the periods of hunger and sufficiency do not imply that the quality of diet is similar in both periods.

The consumption of milk and milk products in Vietnam is very low in both the hunger period (2 percent) and the sufficiency period (0 percent). This can probably be explained by either

lactose intolerance, which is common in Asia, or the rural cultural practice of feeding milk only to children. Only four households in the sample (i.e. 2.2 percent) reported feeding milk to their children the day before the survey.

The graph in Figure 6 displays the HDDS score by province in Vietnam during periods of hunger and sufficiency.

Figure 6: HDDS by province, Vietnam



For each of the three provinces, the two food groups with the highest scores during the sufficiency period were cereals and vegetables. The food group with the third highest score varied between the three provinces: in Ha Giang, the third highest score was attributed to other vegetables (46 percent); in Lao Cai, it was attributed to GF14 (oils and fats - 40 percent) and FG16 (spices, condiments and beverages - 40 percent); and in Son La, it was attributed to other vegetables (25 percent) and oils and fats (28 percent). The dietary quality in Ha Giang, where FG5 (other vegetables) comprised the third most consumed food, might be considered slightly better than in the two other provinces.

This finding suggests that even if the communes in Lao Cai score higher in the number of food groups consumed as compared to the communes in the other two provinces, the quality of diet in Ha Giang and Son La might be richer. This is due to the fact that the food group *other vegetables* scores higher in the diet of the latter, instead of *oils/fats* and *spices* reported in Lao Cai.

Furthermore, the data collected in Lao Cai shows that during the hunger period, rice is normally mixed with other foods such as pumpkin and corn powder in order to increase the quantity of food. Households also consume boiled young corn and as an alternative for rice and thereby increase the intake of vegetables. Out of the three districts, the highest consumption of dark leafy green vegetables during the hunger period was observed for Lao Cai. Unfortunately, data for consumption by FG was not disaggregated by province.

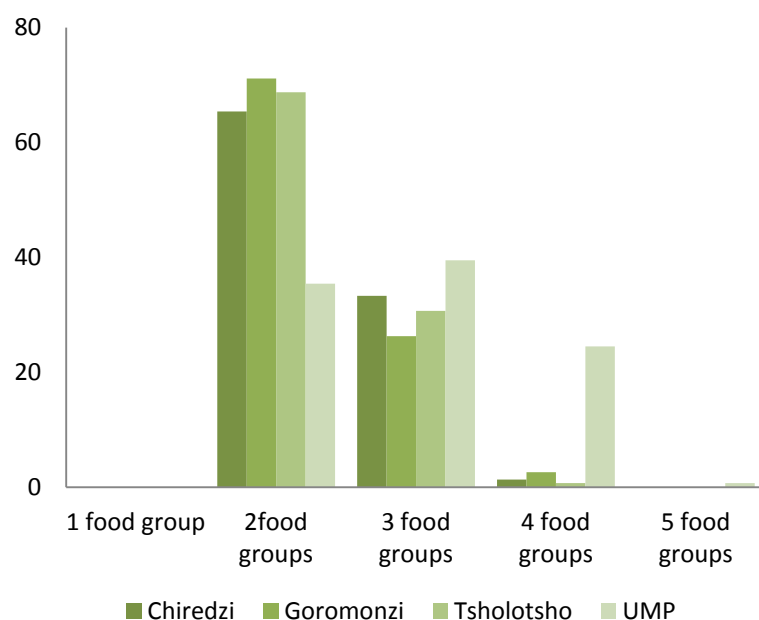
Therefore, it is not possible to explain the increased HDDS during the hunger period in Lao Cai by comparing the household consumption of the food groups during the period of hunger and the period of sufficiency.

A variety of vegetables that grow along forest edges can be collected only during the period of sufficiency, when the climate is favourable for their growth. More on these vegetables can be found in Chapter 4.5 on NUS.

In considering local food security, it is important not to focus only on the availability of the staple crop in the diet (i.e. rice in the case of Vietnam). However, considering the prominence of staple crops with regard to the people's own perception of the hunger period, interventions that aim to promote a biodiverse diet have to build around the availability of staple crops and the importance of micronutrients in relation to caloric intakes.

In **Zimbabwe**,⁴⁹ the majority of the surveyed households consume foods from only 2 or 3 food groups out of 12 (see Table 6). All the households have cereals in their diet; *sadza* is the main dish in Zimbabwe, normally made from ground maize (in Goromonzi and UMP), sorghum (in Chiredzi) or pearl millet (in Tsholotsho). The second most consumed food group is *vegetables* (consumed by 88 and 92 percent of all households in hunger and sufficiency periods respectively), served fresh or dried in main meals, or as relish. The third most commonly consumed food group is spices, herbs and beverages, which usually make only a small contribution the nutrient content of the diet.

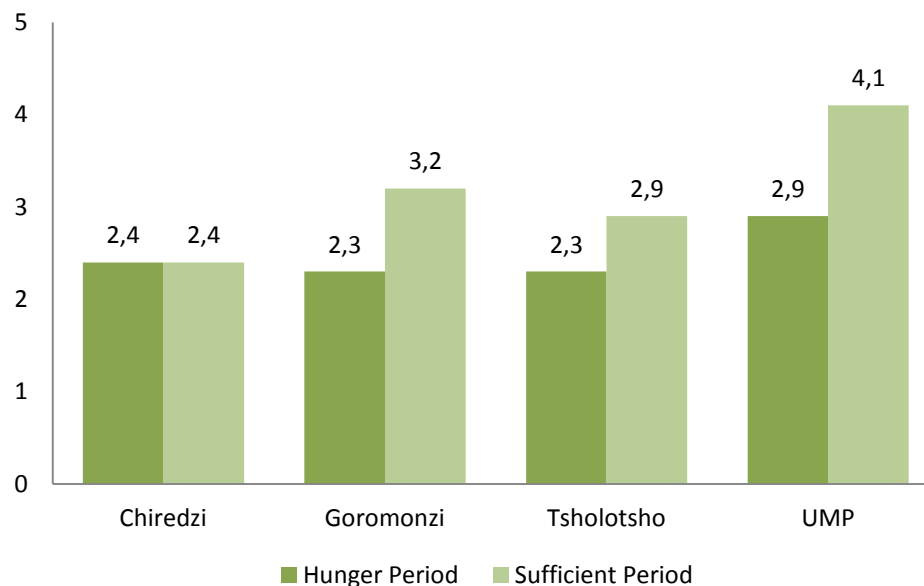
Figure 7: Percentage of households in each diet category during the lean period in Zimbabwe



⁴⁹ Final HDDS data for Zimbabwe were made available only in early June 2016. Validation and analysis will be concluded before the finalization of this report.

Figure 7 shows that households in UMP consume a greater variety of foods; 25 percent of the surveyed households reported consuming 4 food groups, representing the highest dietary diversity. The majority of households in Chiredzi, Goromonzi and Tsholotsho consumed only two food groups, while only between 26 to 40 percent in the four districts had a diet that included three food groups.

Figure 8: HDDS by district, Zimbabwe



The interviews concerning households' diets took place in the four districts in November (the hunger period) and in June (the sufficiency period). Figure 8 shows the HDDS by district during the two periods. The largest difference is observed in UMP (2.9 during the hunger period versus 4.1 during the sufficiency period). The higher HDDS score during the sufficiency period can be mainly attributed to a sharp increase in the consumption of legumes, nuts and seeds (from 35 to 60 percent) and oils (from 0 to 30 percent), see also Table 8. The consumption of sweets, spices, herbs and beverages also increases by more than 10 percent during the sufficiency period. The relatively higher HDDS in UMP were attributed by key informants to the presence of a seed bank established by CTDT. The latter has enabled the communities to understand the lack of diversity in their seed system and, consequently, begin to select and cultivate a number of small grains in their fields. It also facilitates the exchange of seeds and setting up of FFS experiments.

Table 8: Food consumption by food groups (percentage of households consuming the food group in the 24-hour recall) in the hunger period (November) and the sufficiency period (June)

		Chiredzi		Goromonzi		Tsholotsho		UMP	
Food group		Hunger	Sufficiency	Hunger	Sufficiency	Hunger	Sufficiency	Hunger	Sufficiency
A	Cereals	100	100	100	100	100	100	100	100
B	Roots and tubers	2	3	3	31	0	1	2	15
C	Vegetables	92	97	91	92	89	86	82	91
D	Fruit and fruit juices	0	1	3	1	3	1	37	11
E	Meat	12	7	11	2	15	8	20	9
F	Eggs	1	0	2	0	0	0	3	1
G	Fish and sea food	6	2	6	4	3	7	10	8
H	Legumes, nuts and seeds	18	7	17	26	15	51	35	60
I	Milk/dairy products	1	0	1	3	1	0	2	9
J	Oils and fats	0	1	0	6	0	0	0	30
K	Sweets	5	0	1	0	0	0	4	23
L	Spices, herbs and beverages	19	25	53	57	53	72	39	53

Table 8 shows that the intake of legumes, nuts and seeds is considerably low in both periods in Chiredzi and Goromonzi, and low during the hunger period in UMP and Tsholotsho. Consumption of the other protein-rich food groups, such as meat, eggs, fish and seafood, is also nominal (not more than 20 percent of the households).

The consumption of fruit and fruit juices is very low in all districts, except in UMP during the hunger period. In the latter district, 37 percent of the households include fruit (such as mango or *mazhanje*) in their diet during the hunger period (November). However, given that these fruits become available in UMP earlier than in the other districts (where they ripen in December), the larger diversity in UMP could be an artifact of the sampling method. Had the sampling been done two weeks later in the hunger period, other districts might also have shown a higher proportion of fruits. Yet, it was also observed that 20 percent of the households in UMP included meat in their diet during the hunger period, while only 12, 11 and 15 percent of households in Chiredzi, Goromonzi and Tsholotsho respectively reported meat consumption in the past 24 hours. The overall lower diet diversity observed in Chiredzi and Tsholotsho was explained by key informants as the result of less rain in both districts.

Another interesting observation was that households in all four districts consume oil only during the sufficiency period and that only in Goromonzi the intake of roots and tubers increases considerably during that period.⁵⁰ No conclusions can be drawn concerning the

⁵⁰ These findings will need to be validated during the first phase of the Farmer Field School.

intake of Vitamin A-rich fruits in Zimbabwe, as all types of fruits were aggregated under one food group. This applies to the intake of Vitamin A-rich vegetables as well.

Setting the target for the HDDS

Table 9 presents the indicators that came out of the FGDs and were used to rank the households according to their economic status. Criteria used to define wealth categories in each of the districts can be found in Annex 3.

Table 9: Indicators used for wealth ranking of the households

Chiredzi	Goromonzi	Tsholotsho	UMP
<ul style="list-style-type: none"> • Livestock (cattle) • Crop yields • Cash • Family size • Number of wives • Vehicle ownership • Business (store) • Farming assets • Number of meals per day 	<ul style="list-style-type: none"> • Type of buildings • Number of cattle • Collection of NUS • Consumption of NUS 	<ul style="list-style-type: none"> • Number of cattle • Number of children • Availability of food (food security) • Collection and selling of NUS • Number and type of buildings • Granary • Size of land 	<ul style="list-style-type: none"> • Number of cattle • Type of buildings • Consumption of meat • Collection and consumption of NUS • Ability to pay school fees • Age of marrying girls

The consumption, collection and sales of NUS were included as criteria in the wealth ranking exercise in Goromonzi, Tsholotsho and UMP. Those collecting, consuming and selling NUS were considered poor. The idea to include these criteria was most probably influenced by the facilitators of the FGDs, who suggested this characteristic to the group. If rich people want to consume NUS, they would normally buy it from the poor rather than collect it themselves. Key informants mentioned that in the capital, where NUS are less available, some of the rich do consume NUS as a delicacy. This may indicate that, generally, NUS carries a social stigma and the project intervention would need to break this perception.

Table 10: The proportion of surveyed households in each wealth class

District	Poor	Middle	Rich	Total
Chiredzi	48.7	37.3	14.0	100
Goromonzi	35.8	23.9	40.3	100
Tsholotsho	48.5	29.9	21.6	100
UMP	34.9	38.8	26.3	100
Average	42.0	32.5	25.6	100

Table 11: The stratified HDDS in each district for the surveys conducted in June 2015 (the period of food sufficiency)

	Chiredzi		Goromonzi		Tsholotsho		UMP	
Wealth ranking	Number of HHs*	HDDS	Number of HHs	HDDS	Number of HHs	HDDS	Number of HHs	HDDS
Rich	73	2.7	57	3.9	65	3.7	53	4.8
Middle	56	2.1	38	3.2	45	2.9	59	4.1
Poor	21	2.5	64	2.6	40	2.2	40	3.5
Total	150	2.4	159	3.2	150	2.9	152	4.1

* Households

4.4. NATURE OF HUNGER PERIODS AND RELATED COPING MECHANISMS

Do communities suffer from hunger periods?

When asked if they faced hunger periods in the past year, approximately 40 percent of the respondents in **Zimbabwe** replied positively. In **Vietnam**, the proportion of households facing hunger periods in the past year was more than 90 percent in each of the provinces. Table 12 displays the proportion of households that reported to have faced a hunger period in the past year, listed by district in Zimbabwe and by province in Vietnam.

In Vietnam, hunger periods were also discussed in the FGDs. Participants generally agreed on the regular occurrence of the hunger period. According to the responses to the questionnaire, at least 2 percent of the households suffer hunger in every month of the year in the three surveyed provinces in Vietnam. This food insecurity is most probably not related to food availability (especially during cropping seasons), but to chronic factors such as poverty.

Table 12: Percentage of households that reported inadequate food in the past year (subjective scoring)

Food insecurity	Chiredzi	Goromonzi	Tsholotsho	UMP	Average Zimbabwe	Ha Giang	Lao Cai	Son La	Average Vietnam
	%	%	%	%	%	%	%	%	%
Yes	29.2	35.1	41.3	56.5	40.5	96.7	93.3	90.0	93.3
No	52.6	60.9	56.0	40.8	52.6	3.3	6.7	10.0	6.7
Unspecified	18.2	4.0	2.7	2.7	6.9				

What is the nature, time, duration and frequency of the hunger period?

Interestingly, the perception of the duration of the hunger period largely depended on who was asked, and possibly also on how it was asked. For example, in Ngoc Minh in Ha Giang province, women groups identified considerably longer hunger periods than men (6 versus 4 months). It was noted that for large households (7-8 members) the hunger period was longer,

as opposed to newly married couples and newly separated couples, or smaller families (2-4 members) – in some cases, twice as long. Baseline survey participants in Vietnam linked hunger periods to factors that have a negative effect on total rice yields, such as the size and location of arable lands, water availability and the climate.

Table 13 represents the duration and timing of the hunger period in the target areas in Zimbabwe and Vietnam. Data for Zimbabwe was sourced from discussions with key informants. In Vietnam, the survey asked the respondents to recall whether their households faced hunger in any particular month(s).

Table 13: Time, duration and peaks (dark green) of the hunger period (based on key informant interviews in Zimbabwe and the household survey in Vietnam)

	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Zimbabwe												
Chiredzi												
Goromonzi												
Tsholotsho												
UMP												
Vietnam												
Ha Giang												
Lao cai												
Son la												

In Zimbabwe, the hunger period starts in September in Chiredzi and Goromonzi, and one month later (i.e. October) in Tsholotsho and UMP. Hunger periods last for about 4-6 months and break in January or February, when people start consuming green harvests from their fields.

The hunger period in the three provinces in Vietnam stretches from March to September. Especially in March, April and August – the ‘between-crop’ period when people are about to harvest rice – hunger reaches its peak. More specifically, in Son La Province, the hunger period is from March to September, but hunger peaks during August, affecting 85 percent of the households. Meanwhile, in Ha Giang and Lao Cai, the hunger period starts in March and ends in August. It affects 40-72 percent of households in Lao Cai (peaking in July) and 35-70 percent in Ha Giang (peaking in April).

Whereas the most acute hunger periods in Vietnam occur during April – August, affecting over 60 percent of the surveyed households, a minimum of 6 percent of the households interviewed during the hunger period reported facing hunger year-round. The highest

proportion of households facing hunger at some stage was reported for August in Son La Province (87%).^{51,52}

Furthermore, households in Zimbabwe were classified into four categories according to the duration of the food insecure period (see Table 14).

Table 14: Classification of households in terms of food security⁵³

Food security category	Chiredzi	Goromonzi	Tsholotsho	UMP	Total
	%	%	%	%	%
Food secure (12 months of food availability)	55.2	58.9	54.0	11.6	45.2
Mildly food insecure households (1 to 2 months of food insecurity)	7.8	4.0	14.7	10.2	9.1
Moderately food insecure households (3 to 5 months of food insecurity)	14.9	15.9	18.0	29.9	19.6
Severely food insecure households (≥ 6 months of food insecurity)	8.4	10.6	8.0	14.3	10.3
Unspecified	13.6	10.6	5.3	34.0	15.8
Total	100.0	100.0	100.0	100.0	100.0

Does hunger involve a lack of calorie intake or a lack of diversity in the diet or both?

When asked to describe the nature and duration of the hunger period, responses in Vietnam strongly varied between female participants, male participants and youth. The only definition widely agreed on by all groups in all districts was that hunger involves the lack of rice, suggesting that hunger is predominantly associated with caloric intake. The women in Ha Giang province defined hunger as a lack of rice and vegetables. The youth groups defined hunger as a lack of rice and corn. In Lao Chai, men also defined hunger periods as those months with a lack of money. According to the household *surveys*, the hunger period is mainly characterized by a reduction in the percentage of households consuming flesh meat, eggs, and fish and seafood. The overall HDDS for the sufficiency and hunger periods were equal for Ha Giang, higher for the hunger period in Lao Cai and lower during the hunger period in Son La.

In **Zimbabwe**, household access to a diverse diet is lower during the hunger periods. According to the HDDS, people in Goromonzi and UMP consume on average one food group less during the hunger period. Two out of three main coping strategies in Zimbabwe - (a)

⁵¹ Results from the survey conducted in the *hunger period*. Proportions of households facing hunger by month according to the survey conducted during the *sufficient period* are generally slightly lower, but still as high as 55 percent.

⁵² Similar data is not available for Zimbabwe, where the percentage of households facing hunger in each month was not reported.

⁵³ Similar data not available for Vietnam

reducing the number of meals eaten in a day; (b) borrowing food or relying on help from friends or relatives; and (c) limiting portion sizes at mealtimes – are related to the quantity of food intake and therefore most probably to the caloric intake.

Who are the most affected and what are their coping mechanisms?

The majority of the respondents in Zimbabwe did not specify their coping strategies. The question on coping mechanisms was preceded by a question on whether households experience hunger periods (see Table 12). After giving a negative response to this question, respondents might have felt that a question on coping strategies was not applicable. Besides, the question came at the very end of the lengthy questionnaire; according to the research team, respondents seemed less motivated to answer the final questions. Findings for this question are therefore not as strong.

Among those who did specify their coping strategies during the hunger period, the three most used strategies were: (a) to reduce the number of meals eaten in a day; (b) to borrow food, or rely on help from friends or relatives; and (c) to limit portion sizes at meal times. In addition to those coping mechanisms, community members in Chiredzi (81.8 percent), Tsholotsho (36.7 percent), Goromonzi (2 percent) and UMP (29.9 percent) received food aid. In Chiredzi and Tsholotsho, many respondents received remittances from family members and relatives working in South Africa or Botswana.

In Vietnam, the three most common coping strategies identified by the baseline survey were: (a) to borrow food, or rely on help from a friend or relative; (b) to purchase food on credit; and (c) to gather wild foods, hunt or harvest premature crops.

These findings indicate that the coping strategies of the communities in Zimbabwe and those in Vietnam diverge considerably. This could possibly be explained by cultural differences (e.g. with regard to reaching out to friends and relatives) and the different ecosystems in Zimbabwe and Vietnam (e.g. with regard to gathering wild foods). The results are presented in Table 15.

Table 15: Coping mechanisms during the hunger period (multiple strategies per household possible)*

Coping strategy	Ha Giang	Lao Cai	Son La	Vietnam average	Chiredzi	Goromonzi	Tsholotsho	UMP	Zimbabwe average
a. Rely on less preferred and less expensive foods	55	22	13	30	0	2.0	5	0.0	2
b. Borrow food, or rely on help from a friend or relative	68	65	47	60	1	4	15	4	6
c. Purchase food on credit	25	60	63	49	0	1	1	0	1

d. Gather wild food, hunt, or harvest immature crops	48	42	18	36	1	0	1	1	1
e. Consume seed stock held for next season	0	3	12	5	0	0	0	0	0
f. Send children to eat with neighbours	0	0	7	2	0	0	0	0	0
g. Limit portion size at mealtimes	7	5	10	7	4	1	1	14	5
h. Restrict consumption by adults in order for small children to eat	8	22	8	13	1	0	1	1	1
i. Feed working members	7	18	15	13	0	0	0	0	0
j. Ration the money and buy prepared food	0,	2	8	3	0	0	0	0	0
k. Reduce number of meals eaten in a day	10	15	35	20	5	3	4	16	7
l. Skip entire days without eating	0	2	2	1	0	0	0	0	0

* Notes to Table 15: As previously explained, 56.6 percent of the respondents in Zimbabwe did not specify their coping mechanisms; this might explain why the proportions for the three most used coping mechanisms are still very low.

In Vietnam, the same data was collected during the sufficiency and hunger periods. Interestingly, it was found that respondents reported to practice all coping strategies mentioned during the actual hunger period, but in the sufficiency period they only reported to practice some coping mechanisms. Apparently, scores for coping mechanisms are higher during a period in which they are actually applied.

The baseline in Vietnam assessed *which family members are most affected* by each of the coping strategies during the hunger period.⁵⁴ Limiting portion sizes at meal times and

⁵⁴ Six groups of household members were distinguished: adult male, adult female, young male, young female, elderly male, and elderly female.

reducing the number of meals mostly affected the whole family. 'Purchasing food on credit' and 'borrowing food, or relying on help from a friend or relative' was mostly reported by men, both adult and elderly. In Son La, only elderly women reported helping men by gathering wild food, hunting, or harvesting immature crops.

The survey in Vietnam conducted FGD with male, female and young participants separately in order to further explore the coping mechanisms used by farmers in the survey areas. The outcomes of these discussions showed that, in both Ha Giang and Lao Cai Provinces, the communities did not prepare for the hunger period and therefore resorted to short-term solutions, most commonly: (a) additional paid work (different types of work for different ethnic groups); (b) selling of hand-made products and/or wild plants; and/or (c) substituting or supplementing of food sources. In Ha Giang, corn, cassava, bamboo shoots and NUS were used as substitutes for rice. In particular, corn and cassava are consumed in boiled, roasted or cooked form; *men men* is a popular food prepared from corn powder by the H'Mong ethnic group to replace rice during the hunger period. Likewise, during the hunger periods, the Bach Ngoc collect from the forests a variety of plants, including bamboo shoots, ferns, Giang leaves (similar to bamboo), medical plants, wild orchids and plants to make brooms (e.g. tiger grass) to sell or for own use/consumption. According to the FGDs, selling produce at the local markets is more effective in terms of enhancing income and improving food security for some ethnic minorities in Lao Cai (e.g. Dai) than for others (e.g. H'mong), due to differences in access to markets and skills needed to interact with potential buyers, and as well as race discrimination.

More research is needed regarding the coping strategies employed by different community groups and household members in Zimbabwe. As part of this research, it would be useful to find out whether those households that did not report any coping strategies nevertheless have certain hunger prevention strategies, which they could share with other households.

Collection of wild foods as a coping mechanism during hunger periods

In the past, people in Zimbabwe used to gather a variety of wild fruits, such as *masau*, *matohwe*, *mawuyu*, *matamba*, *mazhanje*, *hacha*, *tsvubvu* and *nyii*, as a coping mechanism during hunger periods. However, these fruits have become scarce due to the reduction in forest areas as a result of the increasing population in the districts and consequent clearing of forests for cultivation.

According to the participants of the FGDs in Lao Cai (Vietnam), community members often collect vegetables from the wild (such as bamboo shoots, ferns and pennywort) during periods when cultivated vegetables are in short supply. The natural growth rate of bamboo cannot keep up with the demand; therefore, it needs to be cultivated, but access to land is also limited. Section 4.5 contains more detailed findings on the collection of wild fruits and vegetables as a coping strategy during the hunger period and the rest of the year in Zimbabwe and Vietnam.

Communities' perception of nutrition aspects of their diet

For **Zimbabwe**, the baseline survey results related to the communities' understanding of **the concept of nutrition and dietary diversity** were rather limited. They only show that 94

percent of the respondents across the districts indicated that they thought vegetables were important for the nutritional value of their diets.

The participants in **Vietnam** considered vegetables as essential for a nutritious diet. Vegetables are also appreciated because of their taste and contribution to the feeling of satiety, and are also seen as a welcome alternative to protein-rich foods. Some participants indicated that vegetables help to cool down the body temperature, and that vegetables were good for digestion as well as for human health in general. Farmers in Vietnam could not identify which nutrients are provided by vegetables, considering nutrients as something mysterious.

In general, local farmers had basic knowledge on food storage and its importance, based on experience of the previous generations. However, most of households do not have fridges to keep cooked foods, which was reported to lead to many problems related to human health.

In **Zimbabwe**, community awareness and knowledge on nutrition was assessed through key informant interviews with other NGOs and government health workers, the main focus being on the question *whether people were trained/aware or not*. The key informants in Zimbabwe reported that, apart from some caregivers, only few have ever received training on nutrition issues and felt that the community needed training on nutrition values and the importance of dietary diversity.

According to the same key informants, the limited knowledge on nutrition was also the reason why nutritional benefits were not part of the selection criteria when crops were selected in the context of FFS. However, at the same time, 45 percent of the farmers reported that the nutritional value of their crops was reduced as a result of climate change, which would suggest that they do have some knowledge on the nutritional value. FGD participants in Goromonzi cited that the vegetables identified as NUS were disappearing from the diet, because people were ignorant about their nutrition value and hence could not make use of them as a food source.

In Zimbabwe, key informants reported that malnutrition was especially high in Tholosothe. A few households maintain so-called 'nutrition gardens' that were developed during previous nutrition education sessions, but they face difficulties in maintaining the gardens due to unavailability of water.

In UMP, the nutrition status of the communities varied by ecological region within the district. The nutrition status of the Uzumba population was fair due to their own food production and nutrition gardens. Conservation agriculture has made Maramba more food secure, but at the same time the nutrition status is poor as people do not put their nutrition knowledge into practice. Similarly, in Pfunwe, people did not use their nutrition knowledge when selecting, growing, harvesting, storing and processing. In addition, the area appeared food insecure and most of the community members bought food with income they acquired through illegal mining and gaming.

In order to augment information on the nutrition situation, anthropometric measurements were taken in November 2014. Participants were very interested in measuring their Body Mass Index (BMI) (and disappointed when these measurements were not included in the survey in June 2015), as normally they could only have their BMI measured at a clinic. The enthusiasm

among communities to assess nutrition status, as reported by the enumerators, would need to be communicated to relevant institutions that specialize in nutrition interventions. Common 'Growth Monitoring and Promotion' programmes for children under 5 years of age are not implemented in the area.

The baseline results showed that most farmers in Zimbabwe use drying (54 percent) or pesticides (39 percent) to preserve their produce for future consumption. It was also found that one third of the respondents boiled their green leafy vegetables for more than 20 minutes – a process could potentially destroy heat-sensitive micronutrients.

For participants in Vietnam, the importance of safe food preservation is mainly in allowing them to cope with the hunger period. The food shortage during hunger periods had made people aware of the importance of food storage as a means to providing adequate food for every family member throughout the year. To this end, harvested food plants are usually either pickled or dried and cleaned, and then hung up on the kitchen shelves or stored in a corner for later use. However, many of the surveyed households were unable to accumulate adequate food stocks, because the majority of them had experienced food shortages for a relatively long period. In mountainous areas, unsafe storage practices resulted in the development of contaminants, in particular fungi and weevils, seriously affecting the quality of food stocks. Proper food preservation and storage practices could reduce the damage caused by weevils and moisture, preserve the quality, quantity and nutrition value of food over a long period, and avoid health risks.

During FGDs, statements were made which indicated that **maternal and child caring practices** were suboptimal and needed to be addressed in order to improve the nutrition status of the communities (see box 1).

BOX 1 CARING PRACTISES VIETNAM

"I only stay at home about one month after giving birth; after that I have to work normally in the field while carrying my baby on my back."

– Member of a women's group in Hau Thao commune, Lao Cai, Vietnam

"I am pregnant, but I don't know how old my baby is, because I have not yet gone to the doctor for a medical check. I still have to work in the field and haven't got any special diet despite bearing a child. If I deliver the baby in the field, my husband will assist me."

– Member of a youth group in Ta Phin commune, Lao Cai, Vietnam

During the FGDs in Goromonzi, women demonstrated considerable knowledge on nutrition. For instance, they stated that the crop most suitable for children is *nyemba* (cowpea), which is ground into porridge. The millets are fed to malnourished children to help them regain energy; they are also high in iron. Sunflower was considered to be a good source of oil and fat. Soya bean was valued as a protein source, whereas maize was seen as important for energy in the form of sugars. It was also reported that a mix of sorghum and millet juice shortens the labour period for pregnant women. To this end, the FGD recommended that pregnant women should start taking the juice in their third trimester, in addition to eating

groundnuts, green beans and finger millet for energy for themselves and for the baby. The women obtained their health and nutrition knowledge from the community health workers and caregivers.

In the course of the baseline study in Zimbabwe, it was *often* mentioned during key informant interviews that the communities did not have access to safe drinking water. This could be a major factor for undernutrition resulting from intestinal infections in the programme areas. Though beyond the scope of this programme to address, water hygiene and sanitation issues should be raised in community discussions and nutrition fora in order to determine whether other ongoing or planned initiatives by other stakeholders could tackle these problems in the programme areas. Key informants suggested various solutions, including drilling of more boreholes in the communities, establishment of irrigation schemes and rain water harvesting, and the rehabilitation of old dams. Improved availability of water would enable the development of nutrition gardens.

4.5. NEGLECTED AND UNDERUTILIZED SPECIES AND WOMEN'S ROLES

An effort was made in the course of the baseline survey to identify the *food plants* consumed by the communities and the sources of these plants, as well as to classify these food plants into NUS.⁵⁵ An extensive list of food plants and where they were sourced from was successfully compiled both in Vietnam and Zimbabwe. *The classification of these plants into NUS* on the basis of the programme's working criteria of NUS proved to be challenging in Zimbabwe. In Vietnam, where other tools⁵⁶ were applied, the discussion on the working criteria of NUS and NUS classification were not attempted. At the time of writing, NUS classification of the *wild plants and minor crops*⁵⁷ identified in consultation with the community was not yet concluded therefore this version of the report *elaborates the communities' knowledge and value of these plants, instead of presenting a comprehensive list of NUS*.

The findings in both countries show that what is perceived as NUS may not necessarily be considered as such by international research and development community. This can be explained by the fact that NUS is a *moving target*, wherein the terms 'neglect' and 'underutilized' are relative to the perspectives, behaviour and values of social institutions.

According to Bioversity International, NUS are those plants to which little attention is paid or which are entirely ignored by agricultural researchers, plant breeders and policymakers. Typically, NUS are not commercially traded as commodities. They are wild or semi-domesticated varieties and non-timber forest species adapted to particular, often quite local, environments. Many of these varieties and species, along with a wealth of traditional knowledge about their cultivation and use, are being lost at an alarming rate (Padulosi et al., 2013). However, species that are classified under NUS, such as *oca* (*Oxalis tuberosa*) and *mashua* (*Tropaeolum tuberosum*), two of the hundreds lesser known NUS crops of the Andes, are highly important to the Andean communities. For example, for the communities living in Potato Park, Peru, *oca* and *mashua* are far from neglected; these crops are (nearly) sacred. Contrary to being underutilized, these crops play daily roles in people's food security, cultural rites and identity. When asked what is understood as NUS and requested to identify which of the food plants are NUS, the communities in Zimbabwe, for example, associated the word 'neglect' with those food plants that were rarely consumed and have almost or totally disappeared. Hence, the importance of NUS food plants for food and nutrition security, as well as a part of the cultural identity of the communities, would need to be further discussed with the communities. For future work, the programme recommends first to develop common working criteria on NUS and an understanding of *people's value and knowledge of the plants, before the onset of the baseline survey*.

Furthermore, the list of *wild plants and minor crops* presented in reports from Vietnam and Zimbabwe is largely composed of those plants that are collected, and only a few semi-domesticated and domesticated plants have been included. The *bias* toward the collected plants may be attributed to the following factors:

- While the programme's working definition of NUS clearly defined semi-domesticated and domesticated food plants as NUS, in addition to those that are collected, this apparently was not clear to the communities;

⁵⁵ According to the SD=HS Programme's six working criteria of NUS

⁵⁶ Such as transect map and NUS hunt (see Methodology section)

⁵⁷ See box 2 below

- As indicated above, the communities associated NUS with those food plants that are freely available in the wild, with limited or no management required. This consequently excluded the majority of the cultivated food plants. In Zimbabwe, this includes food plants that are limited in terms of availability and accessibility and, hence, less consumed;
- A more open and participatory exploration of NUS, such as provided by the NUS flow map exercise, was not always performed in the course of the baseline survey. The NUS flow map indicated data's related to collection on farms, in gardens, by roadside and in the wild;
- The concept of NUS may not have been clear to all enumerators.

The fact that the baseline survey has not been able to capture most of the cultivated food plants is a key learning, demanding adjustments to the methodology. Future FFS learning objectives and plans will take this into consideration and make an effort to capture more of the cultivated food plants that are perceived important by the communities. It is noted that the findings of the survey in Vietnam, which have been able to record a significant number of cultivated plants, are a good starting point for further discussions through the FFS.

Against this background, the following section on NUS will present an extensive list of *wild plants and minor crops* from Vietnam and Zimbabwe, with a focus on the collected ones, and discuss/analyse the *communities' knowledge and perceived importance of these plants*.

BOX 2. WILD AND MINOR CULTIVATED PLANTS

The Programme has adopted FAO's definition of minor crops. The categorization of crops as major or minor is based on their relative importance in relation to towards food security (FAO. 2010). In this context, it should be noted that some crops that are categorized as globally minor, are sub-regionally or nationally major. This is illustrated by for example a number of small grains and legumes.

The community resource flow for NUS in Zimbabwe and the tools used during the baseline survey in Vietnam, such as the transect map, were able to record a significant number of wild plants and minor crops that are important for household food and nutrition security in both countries. According to the communities, wild plants and minor crops considered important for households food and nutrition security in the two countries include *wild vegetables* (e.g. wild banana flower in Vietnam and cat's whiskers in Zimbabwe), *wild non-food plants* (e.g. tiger grass in Vietnam) and *minor crops* (e.g. mustard green in Vietnam and moringa and okra in Zimbabwe). In addition to wild plants and minor crops, it was reported that *specific parts of regular crops*, such as the leaves of cowpeas or pumpkin, are also consumed to diversify the households' diets, particularly during the periods of vegetable scarcity. Although initially regular crops did not fit the programme's working definition of NUS, it became clear that the target communities perceived parts of these regular crops as minor vegetables. It should be emphasized that due to the attached social stigma, the communities resort to using such plant parts (e.g. leaves) as food only when other vegetables are scarce.

Source: FAO. (2010). *The Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture*. Rome: FAO.

Understanding communities' criteria of neglected and underutilised species

The SD=HS Programme takes on a constructivist perspective in understanding NUS. The scientific and commercial neglect of specific species exists mainly because the peoples, for whom these species are important, are neglected. The peoples who grow and utilize these crops are often marginalized and impoverished. Therefore, from the SD=HS Programme perspective, the central focus in defining and identifying NUS should be on peoples and their agro-ecology and food systems. SD=HS partners work in multi-resource agro-ecologies; whether these be in rice-based or potato-based or small grains-based ecosystems, these agro-ecologies often contain a great biodiversity of food plants, many of which are semi- and non-domesticated. NUS is part of the complex management of resources from plant genetic resources, farming systems and landscapes within social institutions. SD=HS Programme takes on the following broad working criteria for NUS:

- Important for food and nutrition security of the indigenous peoples and smallholder farmers
- Part of the cultural identity of communities, playing a role in their social relations and embedded in traditional knowledge (e.g. collection management, folk taxonomy, processing, use, etc.)
- Little or no research and commercial interests in the species concerned
- Lack of sustained seed multiplication
- Includes domesticated, semi-domesticated and non-domesticated species
- Adapted to local conditions, and sourced from various locations such as farmers' fields, home gardens, forests, grasslands/meadows, ponds, swamps, lakes, rivers, roadsides, markets, etc.

The survey in **Vietnam and Zimbabwe** confirmed that *the perceived importance* of the wild plants and minor crops is to a large extent related to the *role of these plants in ensuring food and nutrition security* (the first working criterion). This is exemplified by statements regarding the perceived medicinal value, benefits for pregnant and breast-feeding women (Vietnam), and functions such as a good source of iron and improvement of children's appetite (Zimbabwe). Although the baseline survey aimed primarily at obtaining information related to food plants, understandably, non-food plants were also cited by the communities, given their importance.

The findings in the two countries highlighted that although wild plants and minor crops are important for the communities' food security in general, the perceived importance of these plants is *higher during periods of scarcity*. The findings in **Vietnam** revealed that a number of wild plants and minor crops that are not utilized as much during period of sufficiency receive more attention and are collected and/or harvested more frequently during the lean period. As an illustration, the communities of Hau Thao and Ta Phin of Lao Cai Province reported that during the hunger period their members would make a special effort to gather food plants from the forest, while normally they would only collect food plants on their way home (along roadsides), or on their way to collect firewood (in the forest) or maize (from the field).

Similarly, it was reported that, during the hunger period, communities in Chiredzi and UMP Districts in Zimbabwe collected wild fruits that would not be collected otherwise. The baseline survey in Zimbabwe also found that the communities attached importance to *parts of regular crops*, such as the leaves of cowpea (*munyemba*) and pumpkin (*muboora*), *during the lean period*. This is again explained by the fact that these leaves are utilized by the communities during the months when vegetables are scarce (July to September), while in the period of

sufficiency, the communities do not use these leaves as food due to the attached social stigma (i.e. their image as 'vegetables of the poor'). Since the SD=HS Programme defines NUS as the whole plant, not parts of it, cowpea and pumpkin are categorized as regular crops within the scope of the programme.

From this information, it may be concluded that both *wild plants and minor crops* play an important role in household food and nutrition security *throughout the year*. At the same time, *increased consumption* of a number of wild plants (*some of which appeared to be less utilized during periods of relative sufficiency*), and parts of regular crops⁵⁸ was observed particularly *during the periods of scarcity*. Again, it should be noted that what is perceived by the communities as less utilized (such as stigmatized vegetables) might not necessarily be classified as NUS by the programme.

Picture 1: Munyemba (cowpea leaves) and muboora (pumpkin leaves): examples of parts of regular crops included in households' diets during periods of scarcity



Table 16: Communities' criteria for NUS: an illustration from Zimbabwe

Community concept and definition of NUS	Example of NUS in this category	Propagation
Food plants easily accessible in the wild, collection of seed is not required due to abundance	*Nyevehe (cat whiskers) – easily found in maize fields, even considered as a weed *Bonongwe (amaranth) – easily found growing next to cattle enclosures	Natural propagation, sufficient numbers of plants survive in the wild
*Wild plants that are not easily accessible due to seasonality (i.e. growing for a limited period of time in summer) and limited availability of seeds *Cannot be preserved (normally eaten fresh)	Manyanya and mutangyetyange	Natural propagation

⁵⁸ Such as cowpea and pumpkin leaves

*Limited availability due to limited yields, seed is not locally available ⁵⁹ *Labour-intensive for both crop cultivation and processing *Limited marketing opportunities.	<i>Rapoko</i> (finger millet)	Cultivated
*Perceived as poor person's food but important during hunger periods *Perceived as curative food for people living with HIV	<i>Tsine</i> (black jack)	Natural propagation
Engrained in local culture, especially in relation to women's knowledge	<i>Nyevhe</i> (cat's whiskers)	Natural propagation
Medicinal value, e.g. for treating sore throat	Okra	Cultivated

The findings in Vietnam and Zimbabwe suggest that defining the communities' concept of NUS and classifying the wild plants and minor crops accordingly to this concept were indeed challenging exercises. Adjustments to the methodology (in particular with regard to the use of the community resource flow map for NUS) will need to be made in order to *work with the communities on a set of criteria that is based on their knowledge of the plants*. The findings on what communities consider as criteria for NUS are presented in this section.]

Table 16 illustrates that, aside from finger millet, the communities understand NUS as those wild food plants for which no human management is required. In addition, it was reported that they consider NUS as 'poor person's plants' – i.e. associated with a certain stigma. NUS plants is therefore not consumed during sufficiency periods in favour of higher-value crops, sometimes based on a preferred taste. The wild plants and minor crops are included in households' diets only in hunger periods when availability of vegetable crops is limited. The survey also made clear that those collecting and consuming NUS were considered as poor people, and that rich people would not collect NUS themselves but might sometimes buy them from the poor. Finally, the community members indicated that wild plants and minor crops, for which knowledge on collection, preservation and processing is limited, are considered as NUS. Elements in the SD=HS Programme's working criteria for NUS that resonate with the community include limited market opportunities for NUS, the absence of active propagation, and the relation with cultural identity, in particular women's knowledge on harvesting techniques (i.e. *nyevhe* [cat's whiskers]). *Rapoko* (finger millet) is perceived as NUS, since it is low in yield, the seed is not always available locally, cultivation and processing are known to be labour-intensive and, in particular, a lucrative market is lacking. Despite these challenges, the communities acknowledge that, with the changing climate, small grains such as finger millet perform better than maize and hence could play a key role in ensuring the communities' food and nutrition security. Low market demand for cowpeas, groundnuts and Bambara nuts, as well as climate change,⁶⁰ were assumed to be the cause of disappearance of certain cultivars of these plants.

In **Vietnam**, some of the plants considered important are not included in household diets but are primarily gathered to be sold in the market (e.g. tiger grass is used to make brooms and *giang* leaves are used as cake wraps). The same coping mechanism was observed in Zimbabwe: certain wild plants and minor crops were apparently common to the community due to their commercial value and sold in the market to generate income to buy food in

⁵⁹ Seeds or propagation materials are not sold in markets

⁶⁰ The areas below Goromonzi used to receive 100 days of rain, which is no longer the case, while the dry period has increased by up to 29 days.

periods of scarcity. Hence, it can be concluded that *another community criterion for NUS* is as a *source of additional income* (though not on a commercial scale). This complementary/alternative source of income is important to ensure households' food security.

Important wild plants and minor crops during lean and sufficient periods

One of the key outputs of the baseline surveys in Vietnam and Zimbabwe is the list of wild plants and minor crops that are important in both period of hunger and sufficiency, including an identification of the sources of these plants. As explained earlier, due to communities' bias toward collected plants, the lists presented below are largely based on those wild plants and minor crops that are collected.

Vietnam

The PRC in Vietnam suggested a shortlist of NUS known in Ha Giang Province, which is composed of only eight species (see Table 17). In addition to the species in this list, the community members cited a number of collected plants that are also preferred and commonly consumed (see Table 19). This list includes the preferences of women (listed in the table under WG), men (MG), and youth (YG). The list suggests that, compared to the other groups, women could identify the largest number of NUS, as well as their consumed parts and collection locations.

Table 17: PRC's list of NUS consumed by communities involved in the programme

NUS Name	Ngoc Minh			Bach Ngoc			TOTAL
	WG	MG	YG	WG	MG	YG	
Bamboo shoot (12)	X	X	X	X	X	X	6
<i>Hibiscus sabdariffa</i> L. (9)		X	X	X	X	X	5
<i>Sauropus androgynus</i> L. (7)	X	X	X		X		4
<i>Mimosoideae</i> (16)	X	X	X		X		4
<i>Paederia foetida</i> L. (10)			X		X		2
Winged bean			X			X	2
Wild lolot					X		1
Wild sweet potato					X		1

Table 18: Examples of collected vegetables in Ha Giang and Lao Cai Provinces

Ha Giang Province	Lao Cai Province
Fern	Fern (<i>sua</i> or <i>don</i>)
Bamboo shoots	<i>Centella asiatica</i>
<i>Centella asiatica</i>	Banana flower
Edible amaranth	Co
Ramie	Ce
	Khau Lenh
	Tau
	Dang

The surveyed communities in Vietnam assigned a key role to the collection of wild plants, especially in periods of scarcity. This was confirmed by the Hau Thau commune of Lao Cai Province, where many kinds of vegetables are cultivated (and therefore easily accessible) in

the gardens, such as green mustard, sugar beet, chayote, mungbean and pumpkin. Nonetheless, during periods when vegetables are scarce, community members collect fern, dang and wild banana flowers from the forest. Bamboo shoots, although considered important in Lao Cai Province, are not accessible to the Ta Phin commune (unlike the Hau Thao commune), as they do not grow in the wild.

In Ha Giang, fern is collected along water streams and riverbanks, while bamboo shoots are gathered from the forest. These are mainly used for food, although it was cited that during the hunger period they are also sold in the market. It was also recorded that during the hunger period the Bach Ngoc commune in Ha Giang collects *Chit* flower (tiger grass) from January to February (the sufficiency period) to make brooms, and *Giang* leaves (similar to bamboo leaves but bigger) from July to December to sell in the market as cake wraps.

Table 19: Other wild plants and minor crops preferred and commonly used and/or consumed by the Ngoc Minh and Bach Ngoc communes of Ha Giang Province (not in the PRC list)

Plant name	Collecting location	Consumed/used parts	Ngoc Minh			Bach Ngoc		
			WG	MG	YG	WG	MG	YG
Fern (<i>Phac cut</i>)	Forest, stream bank, field	Shoot and young leaves	X	X	X	X	X	X
Knot weed	Forest, garden	Young leaves			X		X	X
Wild banana flower	Forest	Flower		X			X	X
<i>Centella asiatica</i>	Field	Whole plant			X			X
Pigweed	Field	Shoot						X
Oxalis spp.							X	
<i>Rau mo</i>							X	
<i>La chua</i> <i>Khau chom lom</i> (Tay language)	Forest	Leaves	X		X			
La lot plant	Forest, garden	Leaves			X			
<i>Phac Tang</i> (Tay language)	Forest	Young leaves	X	X				
<i>May Quat</i> (Tay language)	Forest	Leaves	X					
<i>La Sau</i> (Tay language)	Forest	Leaves	X					
<i>La Si</i> (Tay language)	Forest	Leaves	X					
<i>Cang To</i> (Tay language)	Forest	Leaves	X					
Water mimosa	Garden	Young leaves	X	X				
<i>Rau zaub</i> <i>khauv necs</i> (H'Mong language)	Field	Whole plant				X		
Sorrel	Maize field	Leaves				X		
<i>Tshuai iab</i> (H'Mong language)	Forest	Young leaves				X		
<i>Xia Mun Nam</i> <i>Dia</i> (Dao language)	Forest	Whole plant				X		

<i>Đia Xieu</i> (Dao language)	Forest	Whole stem				X		
<i>Cuu Soi Nganh</i> (Dao language)	Garden, forest	Whole stem				X		
<i>Can dem</i> (Dao language)	Forest	Root				X		
<i>Gian tuu</i> (Dao language)	Forest	Root				X		
<i>Dia gan</i> (Dao language)	Forest	Stem				X		
<i>Sam cau</i> (Dao language)	Forest	Stem				X		
<i>Dat che</i> (Dao language)	Forest	Whole plant				X		
<i>Mang Mac Hau</i> (Tay language)	Forest	Young leaves, ripe fruit		X				
<i>Rau Tau Bay</i>	Hills	Young shoots, young leaves		X				
<i>Phac bon</i> (Tay language)	Garden	Young shoots, young leaves		X				
<i>Nha cha pau</i> (Tay language)	Hills	Root		X				
<i>May phi cay</i> (Tay language)	Hills	Young leaves		X				
<i>Nha booc tim</i> (Tay language)	Hills	Vine		X				

The table above suggests that, overall, women have better knowledge on collection and utilization compared to other groups (men and youth). This implies that women might not have access to certain wild plants, such as wild banana flower, as only men and youth appear to have the knowledge on their collection and utilization. Further research is needed, possibly through the FFS, to understand issues around women's access to those wild plants that currently collected only by men, especially if such plants can enable women to ensure their households' food and nutrition security.

Table 20: Other wild and minor cultivated plants preferred and commonly used and/or consumed by the Ta Phin and Hau Thao communes in Lao Cai Province

Name of plants			Utilization	
H'mong language	Dao language	Kinh language	H'mong people	Dao people
Man gi đê	Pi tan im luong	Jiaogulan		
Mao xay	Tong de		Cure for various body pains	
Cua lua	Ngung cau puong			
Si ki tua	Sa dia pi			
Khau nenh	Chan mia			
Xua de	Cha menh			

Xu thông	Gung sang		Used as hemostatic medicine	
Rau pa	Dia chun			
Po de	Hau hap			
Tau	Chu mua mia			
So chi	La ngoi		Used as hemostatic medicine	
So nho	Kenh pam pia			
Be nau			Consumed together with chicken meat after giving birth	
Chi po can	Chia gim piu		Cure for tooth ache	
Rau bua giong	Tung mia pien		Used as feed for pigs	
Rau a	Lay ton	Rau đắng	Used as medicine, contains high vitamin levels	Edible leaves
Rau bao no	Phin cha mia		Used as feed for pigs and vegetables for humans	
Po dan po			Cure for scalds and burns	
Mia choi si	Rao chu tra		Cure for diarrhea	Cure for pains in legs and hands
Chi po	Gim si		Used as fresh fruit	Cure for diarrhea
Pe			Used as drinks	
Ce	Cha bong sui		Used to prepare soup	
Pa	Lay gan		Used as feed for pigs	
Da	Ta cang		Cure for chest pain and arthritis	Cure for bad cough
Rau co	Peo lay		Used to prepare soup	
Xua to cham	Dia tan		Cure for back and stomach pain	Used as hemostatic medicine
Sua	Nhai chuot	Fern	Used to prepare soup	Used to prepare soup
Rau trong	Nang gun mia		Added to chicken meat	
Chi tua lo			Provides Vitamin K	
Rao chu cha	Mia choi si		Cure for various body pains	
Hoa chuo rung		Wild banana flower	Used as vegetable	
Centella		Centella	Used as vegetable	Used as vegetable
Indigo		Indigo	Used to dye cloth	
Flax		Flax	Used in weaving	

Tobacco plant		Tobacco plant	Used in cigarettes	
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Another important finding (see Table 20 above for Lao Cai Province) is related to *the extensive traditional knowledge associated with these wild plants and minor crops*. The table shows that many plants are known by different local names given to them by different ethnic groups. In some cases, these different local names may be associated with different knowledge on utilization. As an illustration, a plant, known as *mia choi si* by the H'mong ethnic group and as *rao chu tra* by the Dao ethnic group, is used by H'mong to cure diarrhea and by the Dao peoples to cure pain in hands and legs.

Given the rich information associated with these plants, as revealed by the survey, the programme would benefit from a follow-up study to understand better how these wild plants and minor crops contribute to communities' food and nutrition security, in particular *their different contributions during periods of stress and sufficiency*. There could be cases where certain plants are deemed to be important by the communities, especially by women, but not extensively used due to the challenges discussed above. Further validation with the community members is needed to understand which of these challenges could be addressed in follow-up activities, including through the FFS.

Table 21 presents a compilation of the two lists of wild plants and minor crops used in Ha Giang and Lao Cai Provinces, indicating known English/scientific names. It clearly suggests that many of the plants known only in local languages and the associated knowledge regarding their value and use may not have been previously researched. Moreover, although used in local diets, they may not be fully and extensively utilized.

Table 21: Compilation of wild and cultivated vegetable plants in North Vietnam

Diet category	Crop (English common name)	Species (Scientific name)	Local name (tribal name)	Sources (cultivated/gathered; from where?)	If gathered; who in the household is involved?
Some of the plants indicated below are not considered as NUS according to the programme's working definition, i.e. cabbage, cucumber, bamboo shoot.					
Wild vegetables	Wild banana flower	<i>Musa acuminata</i> or <i>Musa</i> genus	Hoa chuoai rung	Forest	Husband
	Bamboo shoot	<i>Bambusa</i> genus or <i>Phyllosatachys</i> genus	Mang	Mountain	Husband, wife
	Fern	<i>Diplazium esculentum</i>	Rau don	Riverbank, field, road side	Wife
	Unknown name	Undefined	Rut rung	Mountain, field bank	Wife, husband
	Unknown name	Undefined	Rau thoi	Field bank	Wife
	Wild katuk	Undefined	Ngot rung	High mountain	Husband, wife
	Pennywort/centella	<i>Centella asiatica</i>	Rau ma	Field bank, home garden	Wife, children
	Water taro (purple color)	<i>Colocasia esculenta</i> (L.) Schott	Khoai nuoc (khoai tia)	Field bank, forest	Wife
	Lesser yam	<i>Dioscorea esculenta</i>	Cu bon, cu tu	Forest	Husband, wife
	Four leaves flower	<i>Marsilea quadrifolia</i>	Co bo	Field bank	Children, wife
	Cape gooseberry	<i>Physalis angulata</i>	Tam bop	Field bank	Wife
	Elephant ear fig	<i>Ficus auriculata</i>	Va	Forest, road side	Husband, wife
	Orchid tree	<i>Bauhinia variegata</i>	Hoa ban	Forest, road side	Wife
Cultivated vegetable	Eggplant	<i>Solanum melongena</i>	Cap hao	Home garden	Wife, children
	Cabbage	<i>Brassica oleracea</i>	Cai bap	Home garden	Wife, children
	Papaya (Immature fruit)	<i>Carica papaya</i>	Du du	Home garden	Wife, husband
	Mustard green	<i>Brassica juncea</i> L.	Rau cai, cai canh, cai meo	Home garden	Wife, children
	Pumpkin shoot	<i>Cucurbita pepo</i>	Bi ngo	Home garden	Wife, children
	Morning glory	<i>Ipomoea aquatica</i>	Rau muong	Home garden	Wife, children

	Potato	<i>Solanum tuberosum</i>	Khoai tay	Home garden	Wife, children
	Lettuce	<i>Lactuca sativa</i> L. var. <i>longifolia</i>	Xa lach	Home garden	Wife, children
	Cucumber	<i>Cucumis sativus</i>	Dua chuot	Home garden	Wife, children
	Banana (Immature fruit)	<i>Musa acuminata</i>	Chuai	Home garden	Wife, husband
	Sugar beet leaf	<i>Raphanus sativus</i> var. <i>Hortensis</i>	Cai cu	Home garden	Wife, children
	Katuk	<i>Sauropus androgynus</i>	Rau ngot	Home garden	Wife, children
	Amaranth	<i>Amaranthus viridis</i> or <i>Amaranthus tricolor</i>	Rau den	Home garden	Wife, children
	Watercress	<i>Nasturtium officinale</i> or <i>Nasturtium microphyllum</i>	Cai xoong	Home garden	Wife
	Long bean	<i>Vigna unguiculata</i> subsp. <i>Sesquipedalis</i>	Qua dau	Home garden	Wife, children

Zimbabwe

The *community resource flow* for NUS exercise undertaken in Zimbabwe produced a list of vegetables and wild fruits considered important due to the fact that they are consumed both in periods of scarcity and sufficiency. The list also indicates their period of availability and information on who collects them. This report focuses specifically on vegetables, both cultivated and wild. Consistent with the findings in Vietnam, many of the wild plants and minor crops listed in Table 22 and Table 23 are known only by their local names, while English and/or scientific names are unknown. This suggests that the majority of these plants identified in Vietnam and Zimbabwe are *not yet covered by mainstream agricultural research*. Hence, knowledge on the use and value of these plants, including their potential role in food and nutrition security – although clearly familiar to the communities – is not widespread.

Table 22: Wild and minor cultivated food plants cited during the *community resource flow* for NUS exercise in Chiredzi

Food plants	Local name	Scientific name	Sources	Responsible	Period of availability
Codes for period of availability: sufficiency period ⁶¹ (1); lean period ⁶² (2); both periods – lean and sufficiency (3); throughout the year (4)					
Ward 3 (15 species)					
	Chimilani			Women, children	3
Cowpea leaves	Munyemba	<i>Vigna unguiculata</i>	Field	Women, children	Fresh leaves collected during sufficiency period and dried for consumption throughout the year
	Dzvengetsvenge	<i>Commelina Bingalensis</i>		Women, men, children	4
	Uwanzanyoka			Women, children	3
	Gushamunda/gushapfumo	<i>Abelmoschus esculantus</i>	Field	Women, children	3
	Manhande	<i>Abelmoschus esculantus</i>		Women, children	3
Fresh Baobab leaves	Guselechimu	<i>Adansonia digitata</i>		Women, children	2
	Majikanjou			Women, children	3
	Mowa	<i>Amaranthus hybridus</i>	Field	Women, children	2
Black jack	Mushiji				2
Ward 4 (9 species)					
	Chibonji		River	Women	
	Teka		Fields	Women	
	Bowamanga	<i>Amaranthus</i>	Forest	Women	

⁶¹ Sufficiency period is defined as the period between February and August.

⁶² Lean period is defined as the period between September and January.

		<i>hybridus</i>			
	Guse/Gusha	<i>Abelmoschus spp</i>	Fields	Women	1
	Mushroom	<i>Agaricus Bisporus</i>	Forest	Women	1
5 species cited both in ward 3 and 4					
	Guse	<i>Abelmoschus spp</i>	Fields	Women	
Pumpkin leaves	Muboora		Fields	Women (and children/ward 3)	3
	Nyapape		Forest	Women (and children, men/ward 3)	3
	Chikisambwa		Forest	Women (and children/ward 3)	2
Cat's whiskers	Bangala/nyevhe	<i>Cleome gynandra</i>	Fields	Women (and children/ward 3)	Fresh nyevhe collected during sufficiency period and dried for consumption throughout the year

The majority of the 29 wild plants and minor crops identified in Chiredzi (Table 22) are available during both the lean period and the period of sufficiency. Some plants are reported to be available only in lean periods, such as *Amaranthus hybridus*. Cowpea leaves and cat's whiskers are normally collected during sufficiency periods and then dried for consumption throughout the year. Half of the wild plants and minor crops cited in Chiredzi are found in the fields, such as cowpea leaves, *Abelmoschus esculantus* and pumpkin leaves, but not all are cultivated, e.g. cat's whiskers. The fact that the two wards are not far apart⁶³ explains why some plants were cited in both of them. However, such factors as the vicinity of food sources and the way questions were phrased may have influenced some of the different responses in each ward.

Table 23: Wild plants and minor crops cited during the *community resource flow for NUS* exercise in Goromonzi

Food plants	Local name	Scientific name	Source	Responsible	Period of availability
Codes for period of availability: sufficiency period ⁶⁴ (1); lean period ⁶⁵ (2); both periods - lean and sufficiency (3); throughout the year (4)					
Ward 10 (4 species)					
Okra	Derere/bupwe	<i>Trimfetta annua</i>	Garden, field, forest	Women	4
No known English or scientific	Manyanya		Forest	Women	3

⁶³ Focus group discussions regarding the community resource flow for NUS were carried out in wards which are 20km apart.

⁶⁴ Sufficiency period is defined as the period between February and August.

⁶⁵ Lean period is defined as the period between September and January.

name					
Spindle pod	Mutyangetyange	(<i>Cleome epilobioides</i>)	Forest, field	Women	3
Wild cucumber – spreading type	Mugakashamba		Field	Women	3
Ward 11 (10 species)					
	Chembere dzagumana/zifodya	<i>Brassica carinata</i>	Field	Women	3
	Chirevereve		Swamp	Women, children	3
Wild okra	Nyaguru		Swamp	Women	3
Cassava leaves	Mufarinya	<i>Manihot esculenta</i>	Field	Women	4
Sweet potato leaves	Mbambaira	<i>Ipomoea batatas</i>	Field	Women	4
Baobab leaves		<i>Adansonia digitata L.</i>	Forest	Women	3
No know English name	Kanyima varume				3
	Hambakachera		Forest	Women	3
	Jekwa	<i>Abelmoschus esculantus</i>	Forest	Women	3
6 species cited in both wards 10 and 11					
Cat's whiskers	Nyevhe	<i>Orthosiphon aristatus (Blume)</i>	Field	Women	3
Cowpea leaves	Munyemba	<i>Vigna unguiculata</i>	Field	Women	3
Gallant soldier	Kaboora poto		Forest, garden	Women	4
Pumpkin leaves	Muboora	<i>Cucurbita maxima</i>	Field	Women	3
Amaranth	Bonongwe	<i>Amaranth hybridus</i>	Field	Women	3
Black jack	Tsine	<i>Bidens pilosa</i>	Garden, field	Women	2

In Goromonzi, many wild plants and minor crops available in both periods were cited in both wards 10 and 11. This includes cat's whiskers, cowpea leaves, gallant soldier, pumpkin leaves, amaranth and black jack. Only black jack was reported to be available in periods of scarcity. Regular crops, such as cassava, sweet potato and okra, are available throughout the year; moreover, the leaves from cassava and sweet potato are utilized during periods of scarcity. It is also noted that children or women collected different plants, although sourced from the same locations. As an illustration, children normally take part in collecting *chirevereve* from the swamp, while nyaguru (wild okra) — also sourced from the swamp — is collected only by women. Collection of wild okra apparently requires specific collection skills that only women possess.

Picture 2: Derere or okra – most preferred by women due to relatively easy preparation



Table 24: Wild plants and minor crops cited during the *community resource flow for NUS* exercise in Tsholotsho

Food plants	Local name	Scientific name	Source	Responsible	Period of availability
Codes for period of availability: sufficiency period ⁶⁶ (1); lean period ⁶⁷ (2); both periods – lean and sufficiency (3); throughout the year (4)					
Ward 2 (3 species)					
	Nyevhe		Field, kraal	Women, girls	
Amaranth	Mowa	<i>Amaranth hybridus</i>			1
	Nyemba	<i>Vigna unguiculata</i>	Fields	Women	1
Ward 22 (3 species)					
Cassava		<i>Manihot esculenta</i>		Women and men	4
Pumpkin leaves		<i>Cucurbita maxima</i>		Women	1
	Mashamba	<i>citrillus vulgaris</i>		Women	1
8 species cited in both ward 2 and 22					
Sweet potato leaves	Mbambaira	<i>Ipomoea batatas</i>	Garden, field	All	1
	Nyevhe/runi/eludhe	<i>Cloeme gynandra</i>	Field, kraal	Women, girls	1
Pumpkin leaves	Muboora	<i>Cucurbita maxima</i>	Field, garden	Women, girls	1
Finger millet	Rapoko/rukweza	<i>Eleusine coracana</i>		Women and men	1
Indigenous cucumbers	Magaka	<i>Cucumis</i>		Women	1

⁶⁶ Sufficiency period is defined as the period between February and August.

⁶⁷ Lean period is defined as the period between September and January.

		<i>metuliferus</i>			
Mushroom	Howa		Anthill, field, forest	Men	1
Sweet rids	Ipwa			Women	1
	Derere	<i>Trimfetta annua</i>	Field	Women and girls	1

In Tsholotsho, it was observed that many of the wild plants and minor crops were cited in both wards. Almost all plants are available in periods of sufficiency, while cassava is available throughout the year.

Table 25: Wild plants and minor crops food plants cited during *community resource flow* for NUS in UMP

Food plants	Local Name	Scientific name	Source	Responsible	Period of availability	Propagation
Codes for period of collection: sufficiency period (1); lean period (2); lean (early summer) and sufficiency (late summer) (3) Codes for seed management: natural propagation (NP); cultivated (C)						
Ward 9 (18 species)						
Cat's whisker	Nyevhe	<i>Cleome gynandra</i>	Field	Women	2	NP
Black jack	Mutsine	<i>Bidens pilosa</i>	Garden/field	Women	2	NP
Pumpkin leaves	Muboora	Pumpkin leaves <i>Cucurbita maxima</i>	Field/garden	Women	4	C
	Munyemba	<i>Vigna unguiculata</i>	Field	Women	4	C
	Tsunga/Chifodya	<i>Brassica carinata</i>	Garden	Women	4	C
Wild okra	Derere-nyunje	<i>Corchorus tridens</i> , <i>C. trilobularis</i>	Field	Women	4	NP
	Derere-rechipodzi	<i>Abelmoschus esculentus</i>	Field/garden	Women	4	C
Wild okra	Derere-samwenda	<i>Sesamum angustifolium</i>	Field/garden	Women	3	C
	Chembere dzagumhana	<i>Brassica carinata</i>	Garden	Women	4	C
Cassava leaves	Mufarinya	<i>Manihot esculenta</i>	Garden	Women	1	C
Sweet potato leaves	Mashizha embambaira	Sweet potato (<i>Ipomea batatas</i>) leaves	Garden/field	Women	1	C
No English/scientific names known	Furanhema		Field	Women	1	NP
	Moringa	<i>Moringa oleifera</i>	Home	Women	2	C
	Mujakari	<i>Cleome epilobioideus</i>	Field	Women	3	NP
Sesame	Kauninga	<i>Sesamum</i>	Forest	Women	2	NP

		<i>indicum</i>				
	Sisito		Field/ garden	Women	4	NP
	Kamusekadera		Garden	Women	4	NP
Pumpkinseed (balls)	Mabumbe		Field	Women	4	C
Ward 8 (13 species)						
	Runi	<i>Cleome gynandra</i>	Field	Women	3	NP
No English/scientific names known	Karubura		Forest	Women	3	NP
Black jack	Kanzota	<i>Bidens pilosa</i>	Forest	Women	3	NP
No English/scientific names known	Nyakorowa		River	Women	3	NP
No English/scientific names known	Manyanya		Forest	Women	3	NP
Sesame	Karunisango		Forest	Women	3	NP
Mushroom	Howa	Mushrooms	Forest	Women	3	NP
Sesame	Karunika		River	Women	3	NP
	Chifuru		Field	Women	3	NP
	Kanyimavarume		Field	Women	3	NP
	Gezi		Field	Women	3	NP
	Katumbukachura		Field	Women	3	NP
	Gahwekahwe		Field	Women	3	NP
4 species cited in both ward 8 and 9						
Amaranth	Bonongwe	<i>Amaranth hybridus</i>	Field	Men	2 (ward 9), 3 (ward 8)	NP
No English/scientific names known	Tsongora		Forest	Women (ward 8), men (ward 9)	3	NP
No known English/scientific name	Kasongo		Garden	Women, men	4 (ward 9), 3 (ward 8)	NP
	feso/ruredzo	<i>Dicerocaryum zanguebarium</i>	Forest	Women	2 (ward 9), 3 (ward 8)	NP

Among the four districts where the *community resource flow for NUS* exercise was conducted, UMP District reported the highest number of wild plants and minor crops. A

total of 35 species were cited in both wards. The majority of plants are available both in periods of sufficiency and scarcity. Cat's whiskers, black jack, moringa, sesame, amaranth, *Amaranthus hybridus* and *Dicerocaryum zanguebarium* (*feso/ruredzo*) were cited in ward 9 as those plants that are available during the period of scarcity, while no such plants were cited in ward 8. It is noted that the two wards are not far apart, hence an overlap in the periods of availability of some plants is expected. The fact that the same plants (such as *feso/ruredzo*) were reported to be available in lean periods in ward 9, and in both lean and sufficiency periods in ward 8, may indicate that communities of ward 9 attached more importance to these plants in periods of scarcity – i.e. when they played a role in household diets. Almost half of the wild plants and minor crops cited in ward 9 (10 out of 22) are cultivated in household gardens or farmers' fields, including cowpea, pumpkin, sweet potato, moringa and different varieties of okra. For many of these plants, it is their edible parts (i.e. leaves) that are considered to be important. It also appears that the leaves of these regular crops, although available in lean and sufficiency periods or throughout the year, are normally incorporated in households' diets during periods of scarcity.

The different agro-ecological systems of the districts may explain the different periods of availability of some plants in these districts. As an illustration, cat's whiskers (*nyevhe*) is available for a longer period in Goromonzi (December to February) compared to Chiredzi and UMP (where it is available only for two months, December to January). This implies that the communities in Chiredzi and UMP have less time to collect and dry the leaves for preservation as compared to the communities in Goromonzi.

Communities' perceived importance of collected and cultivated vegetables in hunger and sufficiency periods

Tables 22 to 25 show that the majority of wild plants and minor crops are available during both the period of scarcity and the period of sufficiency. The plants available from January to December appear to be especially abundant in UMP District; this observation suggests that there might be a correlation between the considerable number of gardens in both wards of UMP and the availability of these plants throughout the year. However, only a limited number of plants were reported to be available in periods of scarcity, including cat's whiskers, black jack, moringa, sesame, amaranth, *Amaranthus hybridus* and *Dicerocaryum zanguebarium* (*feso/ruredzo*). The importance of *yearlong availability of these wild plants and minor crops* is clearly exemplified by the fact that the communities preserve cowpea leaves and cat's whiskers collected during periods of sufficiency for consumption at any period of the year. Inclusion of stigmatized food plants, such as *parts of the regular food crops (e.g. cassava and sweet potatoes), in households' diets during periods of stress* underscores the importance of these plants in ensuring households' food and nutrition security.

To further unpack the perceived importance of these food plants, two additional FGDs⁶⁸ were organized jointly by CTD and Oxfam Novib on 31 March and 1 April 2016 in Goromonzi (ward 11) and UMP (ward 9). These FGDs attempted to confirm the findings produced with the help of the *community resource flow map for NUS* and to rank the food plants based on their importance as defined by the communities. Discussion of the SD=HS Programme's working criteria revealed that the first part of working criterion 2 (i.e.

⁶⁸ Conducted after the baseline survey in the four districts to collect data using the *community resource flow for NUS* tool.

little research) did not resonate with the group (as could be expected), but its second part (i.e. no commercial interest) was deemed most relevant. Table 26 below compiles the findings from the two groups participated in the FGDs in Goromonzi.

Table 26: List of vegetables compiled during the community resource flow map for NUS exercise and used in FGD ranking exercise in Goromonzi

Group A		Group B	
Plant name	Location of collection	Plant name	Location of collection
Nyevhe (cat's whiskers)	Field	Chembere dzagumana	Field
Bonongwe (amaranth)	Field	Nyevhe (cat's whiskers)	Field
Munyemba (cowpea leaves)	Field	Zifodya	Field
Muboora (pumpkin leaves)	Field	Munyemba (cowpea leaves)	Field
Derere/bupwe (okra)	Garden, field, forest	Kaboora poto	Field
Nyenje	Field	Muboora (pumpkin leaves)	Field
Tsine (black jack)	Garden, field	Bonongwe	Field
Manyanya	Forest	Tsine (black jack)	Forest
Mutnyetyange	Forest, field	Nyeje	Field
Kaboora poto	Forest, garden	Mbambaira	Field
Mugakasango	Field		

When asked to explain why they consume these vegetables, the women in one group cited such reasons as their nutrition value for all family members as well as medicinal properties. For example, they mentioned that pumpkin leaves were good for strengthening children's bones, while okra and tsine (black jack) could be used to treat mouth sores and sore throats for children.

While some okra is cultivated in the gardens, the women also collected wild okra during the rainy season (November to March). Wild okra is easy to cook and tastes good even without adding oil. It is also relied upon as comfort food during illness since it is easy to swallow and digest.

As indicated earlier, *manyanya* and *mutangyetyange* were cited as important vegetables that were not easily accessible as they only grow during a short period in summer.⁶⁹ *Manyanya* can only be found growing on a special type of soil in mountainous or hilly areas. Both plants have to be eaten fresh and therefore cannot be preserved. Moreover, a special collecting method is used to gather *manyanya* in order to avoid rash and itchiness. Despite the experienced difficulties, the women mentioned that they still collect these plants for consumption because of the perceived health benefits (*mutangyetyange* scored 10 out of 10 in the ranking) and ease of preparation (with regard to *manyanya*). The women wisely noted that 'those that are rare are usually the nicest.'

⁶⁹ Three seasons are recognised in Zimbabwe: (1) a hot wet season from mid- November to March (summer); (2) a cold dry season from April to July (winter); and a hot dry season from August to mid-November (spring) (FAO, undated, <http://www.fao.org/ag/agp/agpc/doc/counprof/zimbabwe/zimbab.htm>)

The ranking by both groups was done based on the criteria defined by the communities (see Table 27).

Table 27: Criteria for NUS ranking defined by the FFS participants in Goromonzi

Ranking criteria group A	Ranking criteria group B
Nutrition value	Nutrition value
Medicinal value	Efficiency (defined as <i>little amount of NUS required for cooking</i>)
Taste	Taste
Availability	Multiple uses (i.e. the various ways in which the foods can be prepared and consumed)
Easy to cook	

Group A defined the ranking criteria as follows:

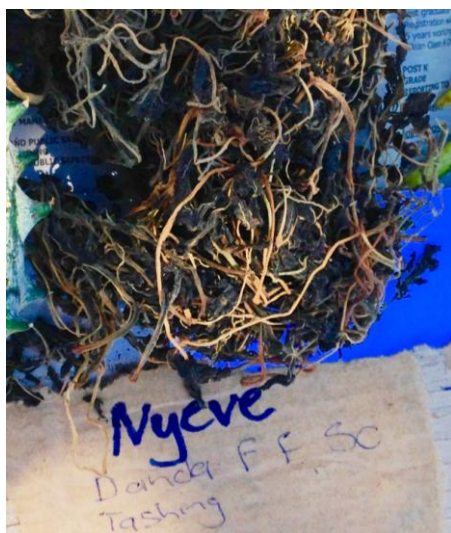
- Nutrition value equated to the perceived health benefits for the whole family;
- Availability depended on whether the plants could be accessed and consumed both in summer and winter (e.g. munyemba, nyevhe and tsine are collected during the winter period and dried for consumption throughout the year);
- Easy to cook implied that preparation time was short, cooking did not require other ingredients such as oil (with particular emphasis on the latter) and that plant parts could be cooked on their own;
- Medicinal value scored high if the plant was perceived to boost the immune system or possess curative properties;
- Good taste depended on women's preferences.

Based on these combined criteria, Group A ranked the following plants as the top three: nyevhe (cat whiskers), munyemba (cowpea leaves), and tsine (black jack). Had the ranking used nutrition value as the only important criterion, nyevhe and tsine would have received the highest scores. The results of the ranking exercises undertaken by the two groups had similarities, with munyemba (cowpea leaves) deemed an important food plant by both groups.

The women also reported that their knowledge on the nutrition value of the plants was obtained partly from the community health workers and partly from their elders. Both information sources were considered equally important.

Meanwhile, in UMP, tsine (black jack) came out strongly as the most preferred food plant, based on the criteria of *nutrition value and accessibility* during the hunger period. This was despite the various stigma attached to it as a plant consumed by people living with HIV, a 'poor person's crop,' a weed and a plant used as animal fodder. Black jack also scored highest in terms of medicinal value (88 out of 100). The communities mentioned that health benefits of black jack included its properties as a cure for mouth sores and hypertension, support for good heart function and benefits for malnourished children.

The output of this ranking exercise is a shortlist of the most important food plants. This list can be used in consultations with FFS participants to identify those plants that need improved management, to be addressed through dedicated FFS activities.



Picture 5: Nyeve (cat's whiskers) – perceived as a plant with a high nutritional value, preferred by women

Women's traditional knowledge on wild plants and minor crops

In both **Vietnam and Zimbabwe**, it was reported that mainly women are involved in the collection of wild plants and minor crops and possess extensive knowledge on the utilization of such plants and their perceived nutrition and health benefits.

In **Vietnam**, the survey showed that local farmers have extensive knowledge on nutrition and medicinal value of many wild plants and minor crops. This is illustrated by the Ngoc Minh and Bach Ngoc communes of Ha Giang Province, where many such plants are used as food and medicine, as well as to make wine. In the four communes of Ha Giang and Lao Cai Provinces, it was noted that in general women seem to have better knowledge on collection and utilization of these plants, and that both men and women elders are more knowledgeable than the younger generations. Women elders from the Dao and Ray ethnic groups of Ha Giang Province and the Dao and H'mong people of Lao Cai Province are recognized for their extensive knowledge on medicinal plants, especially those that are beneficial for pregnant and breast feeding women. On the other hand, men elders are known to have knowledge on plants that are used to treat various diseases. This knowledge on collection and utilization as well as health and nutrition benefits of plants is still passed down from generation to generation among the ethnic minorities.

In general, the traditional knowledge on collecting and the use of wild plants and minor crops varies between the different communities and/or ethnic groups. For example, the ethnic groups living near forested and upland areas, such as the Dao and H'Mong people in *Lao Cai Province*, are known to use NUS plants for consumption and medicinal purposes *more intensively than those residing in lower areas of the country (i.e. central Vietnam)* such as the Tay and Nung. In this context, it must be noted that each ethnic group names the food plants differently and sometimes recognizes different uses of these plants. For example, the Dao people use *Poinsettia* species as food for breastfeeding mothers in order to stimulate milk production, while the H'mong people use it to cure stomach ache. The Dao people use *dia diu* as food for pregnant women preparing to give birth, whereas the H'Mong people used it to cure colic and diarrhea. A plant lacking a

name that the Dao people claim contains poison and may cause death of pigs is used by the H'Mong people to feed goats.

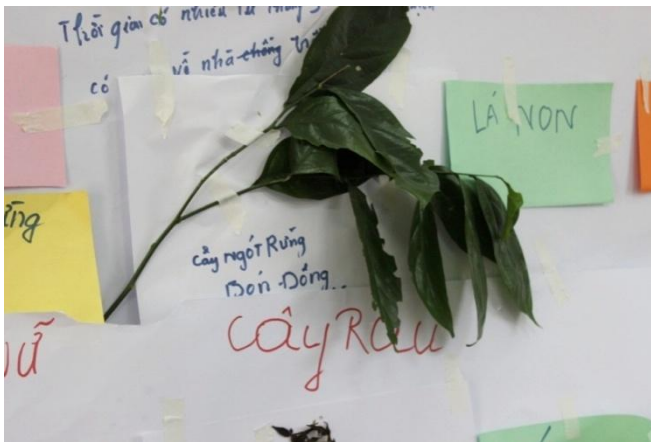
In Ta Phin commune, the Dao people often bring wild plants from the forest to cultivate in their home gardens, while the H'mong only collected them fresh from the forest. Wild plants that are domesticated in home gardens are perceived to be of lesser quality and productivity than those growing in forests; different factors, such as soil nutrients and temperature, are assumed to explain the different yields. For this reason, some of the ethnic people do not want to cultivate NUS plants in their gardens. Exceptions include indigo plants that are used to dye cloth by Hau Thao and Ta Phin communes and flax plants that are used for weaving by the Hau Thao commune. Some of the traditional knowledge on collection and use of food plants is summarized below:

Table 28: Women's knowledge on food plants in North Vietnam

Food plants	Associated knowledge
Fern	Collection management: fern is rarely found in the months of June and July. Hence, farmers often cut off old plants to stimulate plant regeneration. Due to this practice, fern becomes available again for collection, normally in August (source: youth group of Back Ngoc commune, H'mong group).
Bamboo shoot	Preservation: One of the common preservation practices for bamboo shoots is pickling. To this end, hardy parts are removed and the remainder is finely chopped, then put into jars, poured over with cold water, covered with plastic and kept for natural fermentation. Bamboo shoots can also be dried by hanging them on top of a stove or by dividing the bamboo into four pieces.
Certain type of plant (name is unknown)	Medicinal properties: The community in Minh Thanh Village, Bach Ngoc Commune, collects and uses a certain type of plant with unknown name for curing infertility. This plant is cooked with other medicinal plants (Xia Mun Nam Dia, Dia Xieu and Cuu Soi Nganh, A) and the cooking water, believed to contain medicinal properties.
<i>Can Giem (root)</i>	Medicinal properties: good for pregnant and breastfeeding women, increases blood
<i>Gian Tuu</i>	Medicinal properties: good for pregnant and breastfeeding women, promotes uterine contraction after birth
<i>Dia Gan</i>	Medicinal properties: good for pregnant and breastfeeding women, dissolves blood after birth
<i>Sam Cau</i>	Medicinal properties: for pregnant and breastfeeding women as a tonic
<i>Xia Mun Nam Dia</i>	Medicinal properties: for women to bathe in after giving birth (source: Dao household of Minh Thanh village). The plants are available in the deep forest.
<i>May Quat, La Sau, La Si and Cang To</i>	Medicinal properties: to cure osteoarthritis pains (source: Tay people in Xam Village, Ngoc Minh Commune). These plants are collected from the forest. The plants are chopped, heated, covered with fabric and then applied to the painful area.
<i>Kheng loc chiu</i> and galangal roots	Medicinal properties: used by many ethnic groups such as the Dao, Nung and Tay. Herbal yeast is made from 25-30 plants, which are almost all collected from forests. Two indispensable ingredients of herbal yeast are <i>Kheng loc chiu</i> and galangal roots.
Rau	Nutritional values: many NUS plants are believed to have high carotenoids and minerals and may thus play a key role in improving the micronutrient content in the diets of local people. The H'Mong people indicated that <i>Rau</i> contains many vitamins.
Chi tua lo	Nutritional values: <i>known for its Vitamin K content.</i>
	Local cuisine and cultural values: NUS plants enhance the flavour in local cuisine and have long been important in gastronomic traditions of the local communities.



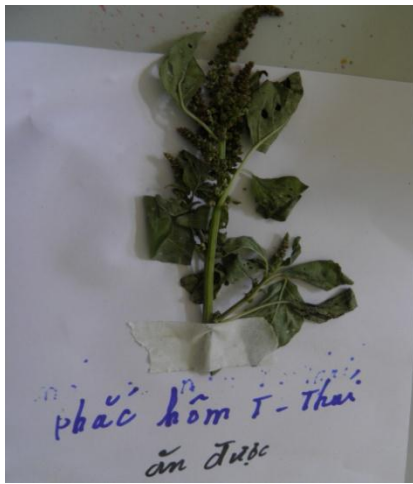
Picture 6. Wild banana flower, North Vietnam (source: Plant Resources Centre)



Picture 7. Wild katuk, North Vietnam (source: Plant Resources Centre)



Picture 8. Lesser yam (source: Plant Resources Centre)



Picture 9. Amaranth (source: Plant Resources Centre)

Zimbabwe

Table 29: Women's knowledge on the food plants in Zimbabwe

Food plants	Associated knowledge	Propagation
Pumpkin leaves	Good for children: promote bones growth	
Okra	Treats mouth sores and children's sore throat (wild okra is normally used as comfort food)	Cultivated
Tsine (black jack)	Treats mouth sores and children's sore throat Contains high iron levels, good for pregnant women	Natural propagation
Mutangyetyange	Perceived high health benefits Should only be eaten fresh	
Manyanya	Easy to prepare and cook Should only be eaten fresh	
Munyemba (cowpea leaves)	Best NUS for children and women	Cultivated
Mhambaira (sweet potato)	<i>'If you eat sweet potato, you don't have to eat for the rest of the day, because it is so nutritious'</i>	Cultivated
Muboora	Shrinks when cooked	Cultivated
Jekwa	Used as beverage	Cultivated
Nyevhe (cat's whiskers)	Bitter and reportedly not liked by children (though children themselves cited their preference for this vegetable as <i>'it is good for us, because it contains vitamins'</i>).	Natural propagation
Derere- Nyenje	Not liked by most children	Natural propagation
Chembere dzagumhana		Cultivated
Kaboora poto	Also called 'Golden soldier,' as it is perceived to be very nutritious	Natural propagation
Bonongwe		Natural propagation

As mentioned earlier, women in the four programme districts of Zimbabwe have a prominent role in the collection of wild plants and minor crops; it was suggested that this has been a part of local culture for many generations. Women are familiar with the growth location, the seasonality and the perceived nutritional value and/or health benefits of these plants. For example, they cited that the iron and vitamin contents of black jack (tsine) could promote a good immune system and suggested that it could be used to cure hypertension, diabetes, and alleviate the symptoms of cancer and HIV. Knowledge on proper preservation of the collected plants is important to women, as they are responsible for ensuring the daily availability of food for their families. Women must plan in advance to collect those plants that have limited seasonality and cannot be preserved (i.e. dried), but which are nevertheless perceived as very nutritious, such as *mutyangetyange* (available for only two months in summer). While this strategy does not solve the problem of seasonality, awareness of benefits enables the women to make a timely decision concerning the inclusion of these plants in their households' diets. Women's specific skills are also needed during harvesting. Men are known to have less experience in distinguishing the edible parts of the food plants and harvesting them in a manner that enhances their flavours.

As elaborated in the previous section, the communities in Zimbabwe cited that one of the reasons leading to the disappearance of the wild plants and minor crops is that people are not aware of their nutritional value. Since women are most familiar with the perceived nutritional value of wild plants and minor crops (and normally the ones deciding what food to serve at home on a daily basis), the role they could play in preventing further loss of this local knowledge is to raise awareness among all household members on the health and nutrition benefits of such plants. The most effective way to do this would be by promoting and/or introducing the consumption of these nutritious plants in their own households.

The findings from the *community resource flow map for NUS* exercise confirmed that women are primarily responsible for the collection of the food plants. When asked why men were seldom involved in gathering food plants, the women responded that this division of labour was engrained in their culture. They also added that men should not be bothered by such 'minor tasks.' The harvesting process of the plants required *certain knowledge and skills that only women possess*, such as bending, selection of the right leaves and appropriate harvesting techniques. As an illustration, the women mentioned that they only gathered the soft leaves of certain plants, noting that the technique used to pluck the leaves affects the taste of the food. Women knew to only harvest leaves from the middle part of the pumpkin plant, and only the top ones from *munyemba* and *nyeve*, which are the softest leaves with the best taste.

This suggests that while food plants (in particular, wild plants and parts of regular crop plants) are important for household food security and the management of these food plants requires considerable knowledge, largely contributed by women, there is a certain connotation attached to the collection of these plants as a chore of lesser importance. This has been identified as one of the areas that the programme should address by raising awareness on the value of NUS and the value of associated knowledge.

5. DISCUSSION

5.1. HOUSEHOLD DIETARY DIVERSITY SCORES IN VIETNAM AND ZIMBABWE

The mean HDDS scores for households during the hunger and food sufficiency periods in Zimbabwe were 2.5 and 3.2 respectively. In Vietnam, the mean HDDS scores were 3.6 in both periods. This difference reflects a stronger variation of household food access throughout the seasons in Zimbabwe. In general, the observed HDDS scores reflected access to a limited variety of foods.

The largest difference in HDDS scores between the hunger and food sufficiency periods was observed in UMP, Zimbabwe (2.9 during the hunger period versus 4.1 during the sufficiency period). In UMP, 40 percent of the households included fruit in their diet such as mango or mazhanje; these fruits are available earlier in UMP, while in other districts they only mature in December. This could mean that the larger diversity observed in UMP might be due to the timing of the survey. Had the sampling been done two weeks later in the hunger period, other districts might have also shown a higher proportion of fruits. Yet, it was also observed that 26 percent of the households in UMP included meat in their diet, while only 18, 15 and 17 percent of households in Chiredzi, Goromonzi and Tsholotsho respectively reported meat consumption in the past 24 hours.

In Vietnam, during the hunger period (September), consumption of the following food groups fell to lower levels as compared to the sufficiency period (March): flesh meat (from 22 to 12 percent), eggs (from 9 to 6 percent) and fish and seafood (from 15 to 2 percent). The programme may explore options to ensure protein intake that is more affordable than these animal food items by promoting the supply of protein-rich and micronutrient-rich plant species during the hunger period. However, the overall HDDS for hunger and sufficiency periods are the same. This can be partly explained by the increase in the consumption of FG16 (spices, condiments and beverages) during the hunger period (from 20 to 48 percent). In such case, equal HDDS for hunger and sufficiency periods do not imply that the quality of diet is also equal.

Of great concern for micronutrient intake and status is the limited consumption of Vitamin A-rich fruits (2.2 percent during both periods) and other fruits (0 percent during both periods) in Vietnam. According to a key informant, there are no fruits that can be gathered from the forests or other wild areas. The surveyed households, being poor or near poor, lack the money to buy fruits and consume them as a regular diet component. Given small landholdings, some households grow a few fruit trees and shrubs in their home gardens (e.g. bananas), but they often sell the fruits to buy other food. Since household consumption of both vitamin A-rich fruits and vitamin A-rich vegetables is very low, and there is hardly any milk or egg consumption, the surveyed households might be at risk of vitamin A deficiency. Pillar 3 interventions should explore the potential of NUS to address and compensate for the low intake of Vitamin A-rich foods. Household access to fruits through homestead production could be an important pathway to improving dietary diversity.

Approximately 40 percent of the respondents in Zimbabwe reported to have experienced hunger in the year prior to the survey, versus more than 90 percent in Vietnam. This could be related to the demographics of the two samples. In Vietnam, only poor and nearly-poor farmers were included in the survey, whereas in Zimbabwe random sampling was applied. In Vietnam, 6 percent of the households reported to face hunger year-round (when interviewed during the hunger period). This food insecurity is most probably not

related to food availability during cropping seasons, but to chronic factors such as poverty.

The results showed that in Zimbabwe the highest percentage of households that reported to have faced hunger in the past year was recorded in UMP, where the majority of the respondents experienced inadequate food accessibility in the past year. Although Chiredzi and Tsholotsho Districts are generally drier than UMP, their reported food insecurity was lower. Furthermore, the food insecure period appears to be the longest in UMP, and the highest proportion of severely food insecure households is also found among respondents in this district; only 12 percent of the respondents in UMP are classified as food secure. The latter is very low in comparison with the other three districts. Thus, despite the high scores for dietary diversity reported in UMP, more households face food insecurity. Unlike in Chiredzi and Tsholotsho, it is not common for people in UMP to receive remittances.

According to community members in Vietnam, hunger involves a lack of rice in the diet; therefore, many respondents related hunger to a lack of caloric intake. The HDDS, however, could not detect a decrease in the consumption of rice during the hunger period, since it only collected qualitative data (i.e. whether or not a food group was consumed during a particular period). The percentage of households consuming cereals (FG1) remained the same when data from the hunger period and the sufficiency period were compared, unlike for flesh meat, eggs, and fish and seafood. When asked for a definition of hunger, participants did not refer to a reduction in the consumption of other food groups captured by the HDDS. This may indicate that even though the consumption of other, nutrient-rich food groups is reduced during the hunger period, the limited availability of rice in particular may feel like the hardest hit. It can also point to lower perceived importance of the other food groups. This needs to be further explored with the FFS participants.

The research methodology recommended to assess the HDDS of the highest wealth rank and use this value to set a target for Pillar 3. However, the HDDS of the wealthier households is relative; it is not always higher than the HDDS of the poorer households (as illustrated in Chiredzi). Therefore, the programme recommended to set the target HDDS for each community in consultation with the respective SD=HS partner, local stakeholders and members of the concerned community. The findings of the HDDS exercise will be used to raise awareness regarding the poor dietary diversity of the target households. This awareness will facilitate further discussion among the community members on the importance of including or increasing the proportion of other food groups in household diets.

5.2. NUS MANAGEMENT AND SEED SYSTEMS: PROPOSED PATHWAYS

The following section aims to review the research questions underlying this report:

- What is the importance of NUS for the food and nutrition security of the communities during periods of sufficient food availability and during hunger periods?
- What are the most important NUS and how do we address improvement in their management and seed systems?
- Which NUS are cultivated and which ones are collected (or both)?
- What is the share of collected versus cultivated NUS in the diet during sufficiency and hunger periods?

To be able to answer these questions, a comparison was made between the findings of the 24-hour recall of the HDDS and the community resource flow map for NUS for both Vietnam and Zimbabwe. The first step was *to understand the importance of NUS in the nutrition and food security* of the communities, in particular during hunger and sufficiency periods by analysing both data sets.

As mentioned in section 4.5, NUS classification in consultation with the community proved to be difficult or was not attempted. Therefore, the following section discusses people's knowledge and value of the food and non-food plants that are not necessarily considered as NUS.

The role of collected vegetables for household diets during the hunger period in Vietnam: a comparison of the HDDS with the transect walk and the reported coping mechanisms

The HDDS in Vietnam highlighted the high intake of *dark green leafy vegetables (FG4)*, confirmed by more than 94 percent of respondents. The *HDDS for the hunger and sufficiency periods showed almost similar scores*. The hunger period was defined by the communities of Ha Giang Province in Vietnam as a period when there is 'a lack of rice and cultivated *vegetables*.' Furthermore, they acknowledged that '*vegetables are normally used as an alternative source of food* to keep them feeling full for a longer period of time.' The communities in Lao Cai explained the importance of vegetables as follows: 'rice is mixed with other foods, and we consume young corn *to replace vegetables*.' This confirms the *importance of vegetables in both periods of sufficiency and hunger*. The overall importance of vegetables in the household diet is best reflected by the statement of Ta Phin commune, Lao Cai Province, which declared that 'a good meal should at least *consist of vegetables*.'

The 24-hour recall in the three provinces of Vietnam showed that a diet in the sufficiency period normally consists of *vegetables cultivated at home or in upland fields*. These include cabbage, chayote, pumpkin and winter gourd (in Ha Giang and Son La Provinces), and green mustard, sugar beet, chayote, mung bean and pumpkin (in Lao Cai Province). However, the kitchen visits in Ta Phin commune of Lao Cai Province showed that vegetables are normally sourced *from the markets, or collected from the forest*, whereas a limited number of vegetables (green mustard, sugar beet and some herbs) are *intercropped with maize in the field*.⁷⁰

This is further supported by the data from the HDDS survey conducted during the sufficiency period, which showed that the daily diet of these communities also contains wild vegetables. This includes fern (*Diplazium esculentum*), Pak wan (*Melientha suavis* Pierre – *rau ngot rung*), wild banana flower (*Musa acuminata* or other *Musa* species), bamboo shoot (*Bambusa* genus or *Phyllostachys* genus), bitter herb (*rau dang*), *rau rut rung*, centella (*Centella asiatica*), cape gooseberry (*Physalis angulata* – *tam bop*), *Dioscorea hamiltonii* (*cu mai*), Indian goosegrass (*Eleusine indica* – *man trau*), mushroom, redflower ragleaf (*Crassocephalum crepidioides* – *tau bay*), orchid tree (*Bauhinia variegata*), four leaves clover (*Marsilea quadrifolia*), and many other plants with local/unknown names. This finding is in line with the results of the transect walk and

⁷⁰ Farmers without home gardens sow vegetables and maize together in the same field and harvest the vegetables before maize.

the NUS hunt⁷¹ carried out in Vietnam. Collected vegetables (such as fern, centella, edible amaranth, ramie, knot weed, wild banana flower, pigweed, oxalis, water mimosa, sorrel) in addition to the cultivated ones (such as hibiscus vegetable, winged bean, lolot plant and Phac Bon) were among those found in the two communes of Ha Giang Province. In addition to those listed, there are many other collected plants that could not be included in the list as there is no agreement on their common names. However, in Lao Cai Province, collected plants such as bamboo shoots (in particular in Ta Phin commune), *sua* or *don* (fern), *co*, *ce*, *khau lenh*, *tau dang*, centella and wild banana flower were reported to be *normally consumed during the hunger period*. The survey listed a number of plants that are commonly used for food and medicine in Lao Cai Province, such as indigo, flax and tobacco plant—and some other plants of which only the H'mong or Dao names are known.

The importance of wild vegetables in the household diets of target communities in Vietnam, especially during the period of vegetable scarcity, is confirmed by the results of the study on coping strategies. Gathering wild food is indeed cited as the second or third most important coping mechanism in Ha Giang,⁷² Lao Cai⁷³ and Son La⁷⁴ respectively. As explained in the section on coping mechanisms, friends or relatives are considered as the main safety net in Vietnamese culture. As such, they are approached first during periods of food scarcity, while the second coping strategy is to buy food on credit.

The *wild vegetables collected during the hunger period* include in particular bamboo shoots, fern vegetables (in Ha Giang and Lao Cai) and pennywort (in Lao Cai). However, bamboo shoots are not easily accessible in the environment of Ta Phin commune of Lao Cai Province: most of the bamboo trees in this commune are privately owned and normally cultivated in the forest or hills near the housing areas.

Interestingly, although vegetables are considered an important component of the daily diet, the majority of communities in Lao Cai Province indicated that they collected plants from the forest only and did not cultivate them. Efforts to cultivate these wild food plants in home gardens, either to improve the nutritional quality of the diet or as a coping strategy during the lean period, were not reported. It was reported that a few wild plants are also cultivated, such as medicinal plants used by the Dao communities in Ta Phin commune, or indigo used by the H'mong ethnic group of Ta Phin and Hau Thao commune of Lao Cai Province.

Suggestions for focus on wild plants and minor crops important for household food and nutrition security in Vietnam

Based on the findings presented above, the following is an effort to describe the most important wild plants and minor crops and suggestions to address improvements in their management and/or seed systems.

As described earlier, the results of the 24-hour recall did suggest some food plants (including wild and cultivated vegetables) that are considered important in local diets,

⁷¹ The community resource flow for NUS was replaced in Vietnam with a transect walk and an NUS hunt. See methodology section.

⁷² 2nd coping mechanism cited by 48 percent of surveyed households

⁷³ 3rd coping mechanism cited by 42 percent of surveyed households

⁷⁴ 3rd coping mechanism cited by 18 percent of surveyed households

especially during the hunger period. The report of the survey conducted in Vietnam confirmed that, generally, wild vegetables were reported as important in the daily diet. However, this result could not be validated on the basis of *the score and/or the classification* generated by the 24-hour recall. Limitation of the HDDS' scoring method and how it is being applied (i.e. incorrect classification into the food groups) may explain this gap. For example, as HDDS only collected qualitative information and the actual scores of individual food groups, it did not capture variation within each food group.

Apart from the high score for FG4 (dark leafy vegetables, consumed by 94 percent of respondents in the period of relative sufficiency and 96 percent of respondents in the hunger period), there is a low intake of FG3 (Vitamin A-rich vegetables and tubers, consumed by a maximum of 5 percent of all respondents in both periods) and FG5 (other vegetables, consumed by approximately 26 percent of respondents in both periods). A possible explanation could be related to the *classification* of all vegetables only into FG4 and FG5. For example, kitchen visits conducted during the sufficiency period in Ta Phin and Hau Thau communes of Lao Cai Province found that a diversity of vegetables was being consumed. While dark leafy vegetables were not found among them (which is in line with the score of FG4 for Lao Cai of 3 percent), a range of other vegetables and tubers – such as green mustard, sugar beet, pumpkin, mung bean, hot pepper, taro and sweet potatoes – were found during the visit.

It is noted that the PRAs in Vietnam mainly made reference to vegetables and only limitedly to fruits as being consumed and hence important in households' diets. Furthermore, the 24-hour recall showed that the consumption of legumes, nuts and seeds is quite low (reported by 10 to 13 percent of respondents in both periods), whereas the intake of vitamin A-rich fruits (reported by 2.2 percent of respondents in both periods) and other fruits (0 percent for both periods) is even lower. This points to another area for exploration, i.e. options for *improved cultivation and seed management of food plants belonging to the food groups FG12 (legumes, nuts and seeds), FG6 (Vitamin A-rich fruits) and FG7 (other fruits)*. Identification of important food plants from these food groups is therefore recommended. As explained earlier in the report, the communities already cultivate beans in their home gardens, while fruits are sourced from both home gardens and upland fields, or collected from the forest.

As explained above, consumption of wild and cultivated vegetables, although having the potential to improve the quality of the diet, was not reflected in the findings of the 24-hour recall for the two periods. In order to understand *the share of wild plants and minor crops in the diet during the lean and normal periods*, further data collection (e.g. through FFS baseline and/or endline surveys) is needed to enable a more detailed analysis of consumption patterns.

The role of collected vegetables for household diets during the hunger period in Zimbabwe and suggestions for future interventions

The data obtained in Zimbabwe was similarly analysed in order to answer the research questions listed above.

The findings of the *community resource flow map for NUS* exercise suggest that the majority of vegetables identified in the four districts are available during the period of sufficiency and the period of scarcity. For example, some of the wild plants and minor

crops that grow during the hunger period might still be available for collection at the beginning of the sufficiency period; among such plants is *nyevhe*, which can be found between December and February in Goromonzi, but only in the hunger period (December to January) in UMP and Chiredzi. It was also reported that some plants can only be found and collected during the hunger period (e.g. black jack in UMP in the period from December to January), whereas other plants of importance during the hunger period are available throughout the year (e.g. the cultivated *derere*/okra).

The extensive list of collected vegetables underscores the importance of these wild plants for the communities during the hunger period. However, this was not properly reflected by the study on coping mechanisms, as the majority of the respondents in Zimbabwe did not specify their coping strategies (see section 4.4).

The 24-hour recall recorded the following vegetables that are commonly found in the daily diet (in the order of frequency reported): covo, rape, cabbage (fresh or dried), okra (derere), onion, tomatoes, traditional vegetables, green beans, peas (fresh), green pepper, cauliflower, garlic, sweet corn, mushroom, pumpkin, butternut, carrots and spinach. In the community resource flow for NUS, only a limited number of these plants were indicated, such as okra, traditional vegetables and garlic. From this list, okra and garlic are mostly cultivated, although some okra is collected from the wild. To be able to understand properly the share of collected and cultivated NUS in the diet during both periods, more data on daily vegetable consumption during both periods are needed.

As a starting point in the effort to identify the most important NUS and ways to address improvement in their management, an analysis of the community resource flow for NUS was carried out. The findings list a number of wild plants and minor crops cited by the communities in each district. The follow-up ranking exercise in two districts, namely Goromonzi and UMP, showed that the community members, in particular the women, have clear motives for cultivating and/or collecting specific food plants for consumption. *Tsine* (black jack) and *nyevhe* (cat whiskers) were most preferred by one group in Goromonzi and one in UMP, due to their perceived health benefits. *Munyemba* (cowpea leaves) also scored high according to two groups in Goromonzi, while *zviyo* (millet) was praised for its perceived nutritional value and availability during the hunger period. *Tsine* and *nyevhe* are collected from the wild, while *munyemba* and *zviyo* are cultivated.

It is important to note that although the interviewed communities highly regard the food plants collected from the wild, in particular *tsine* (black jack) and *nyevhe* (cat whiskers) due to their perceived health benefits, the inherent stigma of their association with poor people's diets or (in the case of *tsine*) diets of people living with HIV should be addressed jointly with the community members. The three food plants – *tsine*, *nyevhe* and *zviyo* – were considered particularly important during the hunger period (September to January). *Tsine* is normally available in summer time (mid November to March),⁷⁵ but collected and dried for consumption in winter (April to July), while *nyevhe* is collected in periods of scarcity (December to January). The perceived nutritional value, health benefits and accessibility during the hunger period should be included as criteria for the ranking of NUS plants when planning FFS activities.

⁷⁵ Three seasons are recognised in Zimbabwe. These are: (1) a hot wet season from mid-November to March (summer); (2) a cold dry season from April to July (winter), and (3) a hot dry season from August to mid-November (spring). Source: FAO. (Undated). <http://www.fao.org/ag/agp/agpc/doc/counprof/zimbabwe/zimbab.htm>

In the four districts in Zimbabwe, *legumes, nuts and seeds* are part of the diet of at least 35 percent of the surveyed households during the sufficiency period. This figure is lower during the period of scarcity (21 percent). It is the fourth most important food group after 'cereals,' 'vegetables,' and 'spices, herbs and beverages.' It is clear that food plants from the food group 'legumes, nuts and seeds' play an important role in household diets of the communities in Zimbabwe, which future studies should seek to strengthen. It should be noted that there are significant variations among the districts in the consumption of this food group: in the sufficiency period, consumption was reported by 60 percent of surveyed households in UMP, 51 percent in Thsolotsho, 26 percent in Goromonzi and 7 percent only in Chiredzi. The high figure in UMP could be influenced by the fact that, although legumes were not at all cited during the community resource flow for NUS exercise, the findings showed inclusion of sesame (*Sesamum indicum*) and pumpkinseed (balls) in the diet. Three local names were cited for sesame (i.e. *kauninga*, *karunisango* and *karunika*), suggesting that these are different types of sesame.

Future work should also review the findings of the community resource flow map for NUS, where legumes were not reported. Traditionally, legumes, nuts and seeds have been a good protein source in the diets of many people living in dry areas, including in Zimbabwe, and hence should have appeared in the community resource flow maps. The crops concerned are more resilient than maize and can easily be cultivated in the home gardens, which is one of the recommendations arising from the survey in Zimbabwe. A recent report by USAID cited that legumes such as groundnuts, cowpeas and Bambara nuts constitute the bulk of crops that are important in the informal seed sector of the country.⁷⁶ Opportunities should be sought to increase the role of legumes, nuts and seeds in household diets in the programme areas.

⁷⁶ USAID. (2009). *Seed System Security Assessment: Zimbabwe*.

6. CONCLUSIONS

6.1. NUTRITION CONCEPTS AND BIODIVERSITY RICH DIETS

This baseline survey has demonstrated that, on average, the households in Pillar 3 programme areas in Vietnam and Zimbabwe have access to only a limited variety of food groups. This is of concern, as dietary diversity scores have been positively associated with the nutritional status of both young children and adults, independent of socio-economic factors.

Households in **Zimbabwe** mainly consume foods from only 2 or 3 groups out of 12 (the average HDDS during the hunger period is 2.5 and 3.2 during the sufficiency period), in particular '*cereals*', '*vegetables*' and '*legumes, nuts and seeds*.'

In **Vietnam**, the number of food groups consumed by the majority of the households is slightly higher at 3 to 4 out of 16 (the HDDS during both the hunger period and the sufficiency period averaging 3.6). The most consumed groups are '*rice*', '*dark green leafy vegetables*', and '*oils and fats*.' The fourth most consumed groups are '*spices, condiments and beverages*' during the hunger period (though this might be an artifact, as the interviews coincided with a festival of the ethnic communities) and '*other vegetables*' during the sufficiency period. The festival might have also caused a higher score than the average for a hunger period. Regardless, equal HDDS in hunger and sufficiency periods do not imply that the quality of the diet is equal. Some of the ethnic groups in Vietnam believe that diversity is already achieved when rice, vegetables and meat/fish are included in the diet, and consider further diversification *within* the food group of *vegetables* unnecessary. Since household consumption of Vitamin A-rich fruits and vegetables (main sources of Vitamin A) is very low, and there is hardly any milk or egg consumption, the surveyed households might be at risk of Vitamin A deficiency. Accordingly, Pillar 3 interventions should explore the potential of NUS to address the low intake of Vitamin A-rich food plants.

In the study areas in both Vietnam and Zimbabwe, critical food groups were lacking in the diet. Therefore, Pillar 3 interventions should focus on strategies that increase access and consumption of additional food groups both during the hunger and the sufficiency periods, in order to increase the dietary diversity and positively influence health of the target communities. In both countries, a general awareness of the importance of dietary diversity was evident, especially with regard to vegetables, which all communities considered essential for a 'good meal' due to their nutrient content. It should be noted that the mainstream Zimbabwean farmers and Vietnamese ethnic minorities may have very different attitudes towards biodiversity. Further research could elaborate how cultural differences influence the use of biodiversity and the diet of associated communities. One way to assess this relationship would be by comparing the perceived importance of food plants in one commune to perceptions in neighbouring communes with different agro-ecosystems and cultures.

Child malnutrition prevalence figures in programme areas in all three provinces in **Vietnam** were higher than the national average – a situation that is not unusual for ethnic minorities. In **Zimbabwe**, similar data disaggregated by district were not available. Community members responded with much enthusiasm when anthropometric

measurements were taken in the course of the survey, realizing that this practice enabled them to better understand the health condition of themselves and their children.

The baseline survey provided information on the current food diversity of the communities and identified food groups that are missing or lacking in their diets. More research is needed to better understand local indigenous knowledge on nutrition: what is perceived as good nutrition, the perceived role of nutrition in relation to health and labour productivity, and how communities evaluate their nutritional status. Such insight is essential to aligning the learning objectives of the FFS concerning nutrition with issues that are close to people's heart. This could be considered as an approach for the FFS, where participants are expected to develop strategies suitable to their local circumstances to improve their health and well-being by increasing food diversity.

6.2. THE NATURE OF THE HUNGER PERIOD AND APPLIED COPING MECHANISMS

The baseline survey mapped the timing, duration and peaks of the hunger period in order to tailor future Pillar 3 interventions aiming to improve food security in those months when it is most needed. Hunger periods appeared common among the survey households, with some households even facing chronic food insecurity throughout the year. The *definition* of the hunger period is often related to the availability of the main staple crop, and not necessarily to a lack of calories or the nutritional value of the diet. Perceptions on the *duration* of the hunger period varied between women, men and youth.

Hunger is supposed to involve a lack of calorie intake; however, among the interviewed communities in Vietnam, hunger is associated with a lack of home-grown rice. People in Vietnam sometimes consumed a greater variety of food during the hunger period than in the sufficiency period. Given that their three main coping mechanisms are to '*gather wild food, hunt or harvest immature crops*', '*borrow food or rely on help from a friend or relative*' or '*purchase food on credit*', In other words, dietary diversity may actually improve during the hunger period among ethnic communities in one of the provinces where the survey took place.

In contrast, dietary diversity appeared to decline in Zimbabwe during the hunger period. Two of the three most common coping strategies in Zimbabwe were to reduce the number of meals and the size of the meals, which must also entail a reduction in calorie intake. The observed differences between the coping strategies in these two countries reflect divergent social relations and agro-environmental conditions, and mean that there is no simple 'one-size-fits-all' solution to food insecurity.

This baseline study contributes to the understanding of the nature of the hunger period and the associated coping mechanisms. Among the latter is the migration of men to cities for employment, which may render women more vulnerable during the hunger period. This, however, may explain the baseline survey finding which noted that women tend to have a greater role and specialized knowledge in ensuring household food security during the hunger period. The SD=HS Programme aims to build upon people's coping strategies by promoting diverse crop production and biodiverse diets through the introduction of more drought-resilient and nutritious food crops such as legumes, and through improvements in the perception, use, preparation and consumption of NUS. Further studies and planning of interventions will be incorporated in the FFS. The FFS curriculum will be specifically targeted to women in view of their vulnerability and the role they play in ensuring household food security.

6.3. THE ROLE OF NEGLECTED AND UNDERUTILIZED SPECIES IN COMMUNITIES' FOOD AND NUTRITION SECURITY

The survey findings clearly showed that the communities in both Vietnam and Zimbabwe rely on a number of *wild plants*⁷⁷ and *minor crops*⁷⁸ for household food and nutrition security *throughout the year*. Concurrently, the survey detected *increased consumption* of a number of wild plants – some of which appeared to be less utilized during periods of relative sufficiency – and parts of regular food crops⁷⁹ during periods of scarcity.

The surveys also showed that *mainly wild vegetables* comprise the most important additions to household diets in times of scarcity in both Vietnam and Zimbabwe. The bias of the survey findings toward collected plants is related to the fact that the communities associate NUS with those plants that are *freely accessible in the wild, with limited or no crop management required* (e.g. cat's whiskers in Zimbabwe).

Some examples of important food plants in Vietnam include wild banana flower (*Musa acuminata*) and *Centella asiatica*⁸⁰ and mustard green (*Brassica juncea* L.)⁸¹. In Zimbabwe, black jack (*Bidens pilosa*) and cat's whiskers (*Cleome gynandra*) were ranked by the communities as the most important collected vegetables.

Furthermore, as shown in section 4.3, some food groups, such as vitamin-A rich vegetables and fruits in Vietnam and legumes, seeds and nuts in Zimbabwe are still *underrepresented* in communities' household diets.

Bambara nuts (*Vigna subterranea*) are known as the third most important legume in many areas in Africa after peanuts and cowpeas; they are also known to be resistant to harsh conditions. This crop, internationally classified as NUS and produced on small areas of land in Zimbabwe, is a good source of fibre, calcium, iron and potassium. As such, it has the potential to contribute to a more balanced diet, particularly in cases where the cultivation of other legumes might prove to be too risky due to unfavourable rainfall conditions.⁸² Although the crop can be regularly observed in the fields, the survey results in Zimbabwe did not feature the inclusion of Bambara nuts in household diets. Future interventions should explore options to promote the cultivation and consumption of Bambara nuts and various NUS from other food groups that have the potential to contribute to a more balanced diet of the communities involved in the programme.

A comparison of the list of food groups recorded during the 24-hour recall in both hunger and sufficiency periods with the list of food plants cited during the community resource flow map for NUS exercise revealed some (understandably) apparent discrepancies. Whereas the surveyed communities in both countries were able to cite a large number of wild and cultivated vegetables and wild fruits, of which many could be classified as NUS, only a limited number of those plants were listed as being a part of the daily diets captured during the 24-hour recall. This suggests that households are aware of the

⁷⁷ Including wild banana flower in Vietnam and cat's whiskers in Zimbabwe (wild vegetables) and tiger grass in Vietnam (wild non-food plants)

⁷⁸ Exemplified by mustard green in Vietnam and moringa and okra in Zimbabwe

⁷⁹ Illustrated by cowpea and pumpkin leaves in Zimbabwe

⁸⁰ collected

⁸¹ cultivated

⁸² Bioversity International. (2013). *Nutritious underutilized species - Bambara groundnut*. Fact sheet. 4p. Rome: Bioversity International.

existing wide diversity of vegetables and fruits in their locales, but may not have used some or all of them. This may be due to a number of reasons, including a lack of knowledge regarding where wild food plants could be sourced from, small amounts in which wild food plants occur, a lack of labour capacity to cultivate vegetables and fruits or collect the wild varieties, and the negative social perception regarding the species concerned. As explained earlier, limitation of the tool could also result in incorrect classification to the respective food groups. This reflects on a limited score of the nutritious food groups to which the plants should be classified into. Despite these challenges, the surveys showed that these wild plants and minor crops were cited as important for household food and nutrition security, particularly in the hunger period. While these plants indeed play a prominent role during the hunger periods, their consumption is not necessarily limited to such periods.

Furthermore, whereas the lists of wild plants and minor crops compiled in Vietnam and Zimbabwe are extensive, it is noted that the majority of the listed plants are known only by local names. The absence of English and/or scientific names suggests that these plants and the associated knowledge on use and value *are not yet widely accessible*, limiting their contribution to household diets and food and nutrition security.

The surveys confirmed many of the wild plants and specific parts of regular food crops, which are not utilized during the sufficiency period (e.g. due to the attached social stigma), are incorporated in household diets during stress conditions (i.e. lean periods).

Given the perceptions associated with some NUS as ‘poor person’ s crops’ or ‘women’ s crops,’⁸³ – as in the case of tsine (black jack) and nyevhe (cat whiskers) in Zimbabwe – the programme would need to understand the reasons underlying such perceptions and *raise awareness on and appreciation of the value of wild plants and minor crops as well as NUS and associated knowledge*. The *association of minor crops as ‘women’ s crops’* may, for example, accord them less value and, consequently, less priority when decisions on land allocation are made. Interventions should be planned in collaboration with the Ministry of Health and/or other national health care institutions in Zimbabwe with the objective of spreading the knowledge on the nutritional value and medicinal properties of these plants. This would enable the communities to make better informed decisions when planning to collect or plant and use these wild plants and minor crops. Collaboration with national nutrition and health care institutions should ensure that the local knowledge of women is taken into account.

The survey findings underlined women’ s roles in collecting, preservation and processing activities, as well as their traditional knowledge regarding the perceived health and nutrition benefits of the wild plants and minor crops. This knowledge, if captured and *recorded properly*, and *cross-referenced to scientific data*, could potentially provide a valuable database on the use of local food and non-food plants, developed by and for the communities.

The surveys undertaken in both countries also provided more insights into the perceived importance of the wild plants and minor crops for the target communities. *Accessibility and availability throughout the year* were cited as key criteria for decisions related to plant collection. In other words, the communities attached a higher importance to those food plants that could be collected and consumed throughout the year, rather than to those

⁸³ Legumes are often referred to as ‘women’s crops’ in Zimbabwe and less attention is given to these crops as compared to cash crops (<https://www.n2africa.org/content/limitations-production-legume-crops-zimbabwe>)

that could only be harvested in certain seasons and required preservation. Further on the issue of accessibility, the survey in Vietnam revealed that only men were involved in the collection of some wild plants from the forest, such as wild banana flower. This suggests that women do not always have access to the forest or need to be escorted there to gather wild plants.

One particular importance among those that the communities attach to wild plants, and which have enriched the Programme's working definition, is *the potential of these plants to serve as a source of additional income*, particularly in Vietnam. The additional and/or alternative cash generated through sale of wild plants (such as tiger grass and *giang* leaves) is used to purchase (or supplement) food for the household members, thus indirectly contributing to household food and nutrition security.

6.4. WOMEN'S ROLES IN IMPROVING FOOD DIVERSITY

One of the objectives of this survey was to explore options for women to improve household food and nutrition security by increasing the diversity of food available to the community. The survey findings showed that women in both Vietnam and Zimbabwe were responsible for the collection and utilization of wild food plants, and possessed knowledge on the perceived nutritional and/or health benefits of such plants. In Vietnam, it was reported that the knowledge possessed by women regarding the medicinal properties of wild plants and minor crops differed from that of men, and that older women and men normally possessed more of such knowledge than the younger generation. In addition, it was widely acknowledged that 'indigenous' plants played a prominent role in local gastronomic traditions: for example, some were used to enhance flavour in local cuisine.

The survey findings suggest that women are best positioned to ensure household food and nutrition security. They rely on their knowledge of various food sources, edible parts of NUS plants and associated nutrient contents, as well as their skills in harvesting, preservation and preparation to provide food for their family on a daily basis – a complex task, especially during periods of scarcity. In this context, the loss of knowledge on the nutritional value of wild plants and minor crops was cited as a challenge. Women could play a greater role in promoting and/or introducing the consumption of nutritious NUS plants in their households and communities. This is validated by findings in Zimbabwe, where it was reported that only women were involved in harvesting wild plants and minor crops, as this task requires specific skills that women possess (e.g. bending, identifying edible parts, selecting and plucking the right leaves for the right taste, etc.).

In Zimbabwe, some of the wild plants and minor crops considered nutritious can only be collected in summer during a rather short period of time (i.e. the sufficiency period). This requires the women to plan well in advance, taking into account that some of these plants can only be eaten fresh, while others can be preserved for consumption in the hunger period. Given the important role of women in ensuring household food and nutrition security, they should be the primary focus of programme interventions. Such interventions should build on women's knowledge and skills and aim to address the challenges they regularly encounter. When deciding which plants should be the focus of FFS activities, the criteria identified by women should be taken into account. Moreover, women should be involved in the identification and implementation of programme options

that increase the consumption of wild plants and minor crops and, thereby, the dietary diversity and nutrition security at household level.

How people's perceptions and cultural values influence their use of wild plants and minor crops

For smallholder farmers, and in particular for indigenous peoples, the traditional relationship with their lands and territories forms a core part of their identity and spirituality, and is deeply rooted in their culture, language and history. In other words, their food and livelihood security are interlinked with their agro-ecological systems.⁸⁴ Although not directly emerging from the baseline surveys, the findings in Vietnam suggest that people's perceptions and cultural values are closely linked with their agro-ecosystems and may explain the diverse knowledge on the uses and values of wild plants and minor crops that form parts of these systems. For example, the findings in Vietnam suggest that the mountain-based ethnic minorities in Lao Cai (i.e. the H'mong and Dao peoples) use wild plants and minor crops for consumption and for their medicinal properties more intensively than their countrymen in Son La Province (central Vietnam). However, this finding is still inconclusive, since the list of food and non-food plants from Son La is not yet available for further analysis.

There is a growing body of evidence that links agricultural biodiversity to nutrition and food security and thus to national and global policies and programmes tackling these issues.⁸⁵ Studies related to knowledge regarding biodiversity, its optimal uses and its conservation and management on-farm, in forests and in the wild provide further evidence of the role of agricultural biodiversity. One of the niches the programme could address is to explore this issue from the point of view of local indigenous knowledge; how the perceptions and cultures of smallholder farmers and indigenous peoples, as well as their agro-ecological systems, influence the use of wild plants and minor crops for food and nutrition security.

6.5. METHODOLOGY AND TOOLS: PROPOSED ADJUSTMENTS

Classification of food plants contributing to local household diets as NUS in the framework of the programme proved to be challenging. Given the bias of the survey findings towards wild plants and minor crops, the focus of future research may be on community knowledge and perceived importance of these plants. In this context, adjustments to the methodology, in particular to the use of terms in the *community resource flow for NUS*, will be carried out in order to make it possible to work with the communities based on what they know of these plants.

Interpreting the HDDS data and the data related to wild plants and minor crops⁸⁶ deemed important for household consumption also proved to be challenging. The HDDS did not capture variety within the food groups, nor did it provide quantitative information. In Zimbabwe, consumed foods could only be categorized as either 'fruits,' 'vegetables,' 'legumes, seeds and nuts,' 'roots and tubers' or 'cereals.' In Vietnam, HDDS data gave a

⁸⁴ FAO. (2006). *Cultural indicators of indigenous peoples' food and agro-ecological systems*. Technical paper. <ftp://ftp.fao.org/docrep/fao/011/ak243e/ak243e00.pdf>.

⁸⁵ For example, the Biodiversity for Food and Nutrition Programme (B4FN). See: Bioversity International. (2013). *Diversifying food and diets: Using agricultural biodiversity to improve nutrition and health*. ISBN-13: 978-1-84971-457-0. First edition. New York: Bioversity International.

⁸⁶ collected through the *community resource flow for NUS* exercise

better insight into the variety of vegetables consumed, as the respondents distinguished between 'Vitamin A-rich vegetables,' 'dark leafy green vegetables' and 'other vegetables.' However, HDDS results could not distinguish between household consumption of, for example, finger millet and maize within cereal food groups. The applied methodology, in particular the survey questionnaire, attempted to link the two tools – (1) the survey questionnaire that included the 24-hour recall and coping mechanism questions and (2) the community resource flow for NUS tool – in order to record not only the food groups but all wild plants and minor crops consumed and cited during the 24-hour recall. Future adjustments to the methodology will be considered in order to make this step more obvious, user-friendly and informative.

7. FINAL RECOMMENDATIONS

Based on the findings of the baseline surveys and the consequent analysis, the recommendations for Pillar 3 interventions are as follows:

- To explore the potential of wild plants and minor crops (of which many could be considered as NUS), including the cultivated ones, to address the nutrient gaps at the household level. For example, household access to fruits through homestead production could be an important pathway to improving Vitamin A intake. Another opportunity could be to prioritize those wild plants and minor crops that are rich in protein and micronutrients (categorized as 'legumes, seeds and nuts'), thereby compensating for the low intake of animal food.
- To focus on strategies that increase access and consumption of other critical food groups currently lacking in the diet in order to increase dietary diversity, both during the hunger *and* the sufficiency periods.
- To explore options to enhance and share nutritional knowledge through the FFS initiative, in order to address survey findings which revealed that community awareness regarding nutrition was in need of improvement. Local knowledge can thus be applied during the selection of crops, as well as with regard to the storage, processing and utilization of crop products.
- To discuss in the course of the FFS how people *understand* and *value* nutrition, and how these perspectives *relate to dietary diversity*. The interventions should build on existing initiatives to promote dietary diversity (e.g. Healthy Harvest nutrition education materials in Zimbabwe).
- To use the baseline exercise of the FFS to identify those non-domesticated, semi-domesticated and domesticated plants that were not captured by the community resource flow for NUS tool.
- To ensure that FFS learning objectives include a study of options to enlarge the number of cultivated crops (both common and NUS) in order to improve the nutritional quality of local diets (particularly in periods of scarcity), as well as options to promote sustainable collection and use of wild plants.
- To explicitly include criteria defined by women when setting objectives in future FFS activities. An engendered tentative list of FFS special topics could include: the importance of nutrition security and dietary diversity, the added value and management of NUS, and the use and documentation of local indigenous women's knowledge.
- To undertake further studies on women's access to a wider diversity of food groups, especially with regard to wild plants collected from remote places where access for women might be limited.
- To study options to increase the *market competitiveness* of NUS, given the importance of additional income or *alternative cash* generated through sale of NUS plants during periods of scarcity. *Raising awareness and appreciation* of the nutritional value and various uses of these plants, especially those with *attached social stigma* (as 'poor person's crops' or 'women's crops'), should be one of the programme's initial steps. The FFS should help the communities to better understand and manage the seed systems and agronomic requirements of the minor crops. Furthermore, sustainable harvesting practices could be explored for wild plants with a potential to contribute to household food and nutrition security.
- To further study how communities' perceptions and cultural values interlink with their agro-ecosystems and the knowledge on the uses and values of different food and non-food plants.

- To compare local indigenous knowledge of the wild plants and minor crops, especially those extensively used by women, with scientific data of the Ministry of Health and/or other national health care institutions in both Vietnam and Zimbabwe in order to better understand the nutrition value and medicinal properties of these plants.

ANNEX 1. SDHS PILLAR 3 – WOMEN, SEEDS AND NUTRITION

Baseline Survey Version 5

Introduction

(Introduction of your organisation) As a member of community, you have been selected to provide your candid and objective response regarding your current state in terms of women, seeds and nutrition security under conditions of climate change that may be addressed by this programme. The interview will comprise a series of questions and should take between 30 to 40 minutes to complete. Your participation in this baseline is entirely voluntary. I am going to ask you several questions. Please understand that there is no right or wrong answers. Just answer the questions to the best of your ability.

(i) Do you want to participate in this interview? Yes/No; If “No” proceed to the next household.

(ii) If “Yes”, how long have you been staying in this community? _____ years; if less than 12 months proceed to the next household.

Starting Time: _____ Ending Time: _____ Total Time _____

IMPORTANT INSTRUCTIONS FOR ENUMERATOR

1. Unless otherwise indicated, DO NOT READ OUT RESPONSE OPTIONS.
2. Unless otherwise noted, more than one answer per question is possible.
3. Follow the instructions carefully for each item as they vary across questions.

Section 1: Demographics and Livelihood status

Section 1.1.: Site and Location

Section 1: Demographics and Livelihood status							
Section 1.1.: Site and Location							
HH Code (Eight digit code: Province, District, Ward and Household number.							
1.1.1 Province		1.1.2. District		1.1.3. Enumerator's name		1.1.4. Date	
5. Respondent's Details		1.1.6. Village Name		1.1.7. Ward Name		1.1.8. Ward Number	
Sex (Optional): 1 = Male 2 = Female							
D.O.B (year of birth only e.g 1979)or AGE							
Marital Status (Optional) 1=Single/never married 2= Married 3= Divorced/ Separated 4= Widowed							
Section 1.2.: Demographics (write the appropriate response in the space provided)							
1.2.1.. What is the name of the HH Head?							
1.2.2. Sex of HH Head 1 = Male 2 = Female							
1.2.3. D.O.B of HH Head (year of birth only e.g 1979) or AGE							
1.2.4. Marital Status of HH Head (Optional) 1=Single/never married 2= Married 3= Divorced/ Separated 4= Widowed							
1.3 What is your primary occupation? <i>Basa ramunoita ndereyi? Wenza umsebenzi bani?</i> Choose one answer only DO NOT PROMPT RESPONSES (please adapt to your local context)							
a. Farming/agriculture						1	
b. Agricultural Labour/ farm worker						2	
c. Trading business/ buying and selling						3	
d. Formal employment- Government/public. Service						4	
e. Formal employment- Private Service						5	
f. Unemployed/not working						6	
g. Casual work/informal employment						7	
h. Self-employed						8	
i. Pensioner						9	
j. Housewife						10	
k. Student						11	
Other (specify)						12	
1.4	What is the highest level of formal school completed? <i>Igwaro ripi</i>	Pre-School	Primary School	Secondary School	Secondary School F4	High school A level	Tertiary (College/ University)

	repamusoro ramakadzidza mukapedza? Wacina kuluphi ibanga lemfundo? DO NOT PROMPT RESPONSES	1	2	3	4	5	6	
1.5	Are you able to read and write? Munokwanisa kunyora kana kuverenga here? Nxa ungazake uye esikolo, uyenelisa na ukubala lokubhala? (CIRCLE APPROPRIATE BOX) (Optional)	LANGUAGE a English b Shona c Ndebele d Other (Specify)		READ Yes No 1 0 1 0 1 0 1 0		WRITE Yes No 1 0 1 0 1 0 1 0		
1.6 Number of people in the Household								
Complete the table by sex and Age Group								
	Please write 0 if there are none	No. Of members aged under 5 years	No. Of members aged 5-17 years	No. Of Members aged 18-59	No. Of members aged 60+			
	Male							
	Female							
	Orphans (one or both parents dead)							
	Chronically ill (ill for 3 out of 12 or more months and unable to work)							
	No. Of physically/mentally challenged							
	How many household members are involved in agricultural activities?							

Section 2: Household Dietary Diversity

2.1 Please describe the foods (meals and snacks) that you ate over the last 24 hours during the day and night, whether at home or outside the home. Start with the first food eaten in the morning.

The household dietary diversity score is meant to reflect, in a snapshot form, the economic ability of a household to access a variety of foods. Therefore the **female head** of the household or the **female** in the household should be interviewed.

A period of the last 24 hours is chosen since information over longer time periods tend to be less complete and less reliable. Write down all food and drinks mentioned by the respondent. When the respondent has finished, **probe for food groups not mentioned**⁸⁷ (see list in Annex 1, Section 2.2). Include foods eaten by any member of the household, and **exclude foods purchased and eaten outside the home**. Once the respondent recall is complete, you may fill in the food groups based on the information recorded above. For more information see annex 1 of this document, section **“Instructions for administering the questionnaire”**. Additionally, while the enumerator administers the 24 hour recall (and at the same time, recording the answers in the Annex 1 food groups list) questions on **the source of procurement** and **the specification on cultivated or gathered crops**, should also be addressed simulatenously.

Breakfast	Snack	Lunch	Snack	Dinner	Snack

⁸⁷ Try to probe as much as possible with open question, and avoid asking “did you also eat porridge, or eggs”

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2.2 Food groups, the source of procurement and specification on cultivated or gathered crops:

Question number	Food group	Examples	YES=1 NO=0	Primary source for obtaining food (see <i>note below</i>)	Specify ⁸⁸ the crop, that is cultivated or gathered
1	CEREALS	corn/maize, rice, wheat, sorghum, millet or any other grains or foods made from these (e.g. bread, noodles, porridge or other grain products) + <i>insert local foods e.g.ugali, nshima, porridge or paste</i>			
2	WHITE ROOTS AND TUBERS	white potatoes, white yam, white cassava, or other foods made from roots			
3	VITAMIN A RICH VEGETABLES AND TUBERS	pumpkin, carrot, squash, or sweet potato that are orange inside + <i>other locally available vitamin A rich vegetables (e.g. red sweet pepper)</i>			
4	DARK GREEN LEAFY VEGETABLES	dark green leafy vegetables, including wild forms + <i>locally available vitamin A rich leaves such as amaranth, cassava leaves,kale, spinach</i>			
5	OTHER VEGETABLES	other vegetables (e.g. tomato, onion, eggplant) + <i>other locally available vegetables</i>			
6	VITAMIN A RICH FRUITS	ripe mango, cantaloupe, apricot (fresh or dried), ripe papaya, dried peach, and 00% fruit juice made from these + <i>other locally available vitamin A rich fruits</i>			
7	OTHER FRUITS	other fruits, including wild fruits and 100% fruit juice made from these			
8	ORGAN MEAT	liver, kidney, heart or other organ meats or			

⁸⁸ This section is intended to capture NUS

		blood-based foods			
9	FLESH MEATS	beef, pork, lamb, goat, rabbit, game, chicken, duck, other birds, insects			
10	EGGS	eggs from chicken, duck, guinea fowl or any other egg			
11	FISH AND SEAFOOD	fresh or dried fish or shellfish			
12	LEGUMES, NUTS AND SEEDS	dried beans, dried peas, lentils, nuts, seeds or foods made from these (eg. hummus, peanut butter)			
13	MILK AND MILK PRODUCTS	milk, cheese, yogurt or other milk products			
14	OILS AND FATS	oil, fats or butter added to food or used for cooking			
15	SWEETS	sugar, honey, sweetened soda or sweetened juice drinks, sugary foods such as chocolates, candies, cookies and cakes			
16	SPICES, CONDIMENTS, BEVERAGES	spices (black pepper, salt), condiments (soy sauce, hot sauce), coffee, tea, alcoholic beverages)			
17	Did you or anyone in your household eat anything (meal or snack) OUTSIDE the home yesterday?				

“Could you please detail the primary source for obtaining food for your household”

1= Cultivated

2= Gathering, hunting, fishing

3= Purchased

4= Borrowed, bartered, exchanged for labour, gift from friends or relatives

5= Food aid

6= Others

Section 3. Hunger Period

3.1. How many times has your household experienced inadequate food in the past year?

___ Never

___ once

___ 2 times

___ 3 times

___ 4 times

___ 5 times

___ more than 5 times

3.2. During which months do you usually experience inadequate food?

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC

3.3. How long does a period of food inadequacy usually last? _____ (number of days, weeks, months)

3.4. Who in your household mostly affected by this period of food inadequacy (tick):

Adult male ⁸⁹	Adult female	Young male	Young female	Elderly male	Elderly female	Whole household

3.5. Coping strategy

If any of the following coping mechanisms are mentioned, ask who among the household members is most affected:

Coping strategy ⁹⁰	Household members affected						
	Adult male ⁹¹	Adult female	Young male	Young female	Elderly male	Elderly female	Whole household
a. Rely on less preferred and less expensive foods?							
b. Borrow food, or rely on help from a friend or relative?							
c. Purchase food on credit?							
d. Gather wild food, hunt, or harvest immature crops? (note down any crops gathered)							
e. Consume seed stock held for next season?							
f. Send children to eat with neighbours?							
g. Limit portion size at mealtimes?							
h. Restrict consumption by adults in order for small children to eat?							
i. Feed working members of HH at the expense of non-working members?							
j. Ration the money you have and buy prepared food?							
k. Reduce number of meals eaten in a day?							
l. Skip entire days without eating?							

For coping strategy "d" above (gathering wild food), please note down any crop gathered from the wild or on the farm margins

3.6.	If yes to q 2.20, Why is it important to store food safely? <i>Sei muchiti zvakanosha?</i>	

⁸⁹ Please define, according to your local context, the age groups for each category

⁹⁰ List of generic coping strategies: i) Dietary change (a); ii) Increase Short-Term Household Food Availability (b to e); iii) Decrease Numbers of People (f); iv) Rationing Strategies (g to l). Reference: The Coping Strategies Index: Field Methods Manual. CARE / WFP (2003).

⁹¹ See 3.4.

3.7.	If yes to q2.22, Why are vegetables important to eat? <i>Muriwo wemashizha wakakosha chii pahutano hwedu?</i>	

END INTERVIEW BY THANKING RESPONDENT AND RECORD ENDING

Annex 1 on Household diversity study (question 2).

FAO uses a reference period of the previous 24 hours. The recall period of 24 hours was chosen by FAO as it is less subject to recall error, less cumbersome for the respondent and also conforms to the recall time period used in many dietary diversity studies. Moreover, analysis of dietary diversity data based on a 24-hour recall period is easier than with longer recall periods.

In situations where eating outside the home is very common, application of the questionnaire at the individual level may be preferred over the household level, since it will be more exhaustive and accurate.

Consumption patterns can be atypical during festive periods. It is recommended not to use the questionnaire during national holidays/celebrations, in which it is likely that food consumption does not reflect a typical diet. On the other hand, it is very important to repeat interviews on this question in order to compare responses in the hunger period and a more abundant period. For the assessment of the food security situation in rural communities, dietary diversity should be measured during the period of greatest food shortage, such as immediately prior to the harvest or immediately after emergencies or natural disasters. This may serve as a baseline for monitoring change resulting from our programme interventions.

Since our programme also promotes crop and livelihood diversification, repeated measures in order to assess impact of our interventions on the quality of the diet over time, conducted at the same time as the baseline, are an important measurement tool.

Activities to undertake before beginning data collection

Prior to beginning data collection the questionnaire needs to be adapted to the local survey context and a series of decisions need to be made by the survey planners or survey team members.

It is necessary to agree on a common meaning and translation of terms used to describe key concepts (such as household, meal and snack). Household should mean a group of persons living under the same roof and sharing the same food pot.

The translated questionnaire is reviewed by the survey team, including the enumerators conducting the fieldwork. The team should agree on the appropriate wording of the questions and fill in the food group lists with all locally available foods, translated into commonly used, locally recognized names for each. Italicized phrases in the questionnaire should be replaced by the names of locally available foods. If questions arise about how to categorize a certain food or whether it is considered, for example, a “vitamin A rich food”, it may be necessary to consult food composition tables or nutrition experts. Guidance on assigning individual foods to food groups is also provided in Annex 2 of the full GAO Guidelines (<http://www.fao.org/docrep/014/i1983e/i1983e00.pdf>).

The survey team should organize a series of meetings with key informants in each survey locality. Typical key informants are community leaders, agricultural or health extension workers at community level, women in the community who are responsible for food planning and preparation for the household. This phase of adaptation is used to gather several critical pieces of information, including to

- Review and add locally available food items to the food groups.
- Identify appropriate local terms for “food” and “meal”.
- Discuss issues of food availability (such as season for consuming a particular fruit, insect or other food item) during the season when the questionnaire will be administered.
- Gather information on ingredients used in local dishes, and local meal customs and terminology; for instance it will be useful to know if a dish is usually prepared with oil so that the respondent can be prompted for this ingredient if he/she did not mention it spontaneously.

There are a few technical issues that the team should discuss prior to beginning data collection.

1. Minimum quantities: the team will have to decide prior to data collection, whether or not to include foods consumed in very small quantities.

When information is collected at the household level, there is no need to set minimum quantities below which foods are not considered, so even small amounts of foods (for example, a very small portion of meat included in a mixed dish) will be counted. This is because the score is designed to reflect economic access to food, and therefore even small quantities of a food item reflect some ability to purchase that item. For women aged 15-49 years, dietary diversity scores were more strongly correlated with micronutrient adequacy of the diet when food quantities of approximately

one tablespoon or less (<15g) were not included in the score. For example, a dash of milk just to lighten the coffee may be considered too small an amount to include in the “milk and milk products” group, or a small amount of fish powder added to the cooking pot for flavouring should not be counted in the “fish and seafood” food group.

2. Individual food items that could be classified into more than one food group:

The team will have to decide on the most appropriate food group classification for foods which can be classified into more than one food group. Some common examples of food items that can be classified in more than one food group are hot pepper, which could be classified as “other vegetables” or “spices, condiments and beverages”, and fish powder, which could be classified as either “fish and seafood” or “spices, condiments and beverages”. These decisions are best made after taking into consideration the particular local context, including the typical amount of the food consumed. For example, many cultures use hot pepper as a spice or condiment added to meals. Depending on the context, this may mean that one small spoonful of dried hot pepper flakes is added to an entire dish, or that several spoonfuls of fresh hot pepper are eaten as an accompaniment to the meal. In the first case, the dried pepper is best included in the “spices, condiments and beverages” food group, while in the second case, as a larger quantity of fresh hot peppers is consumed, it is more appropriate to include this in the “other vegetable” food group. Once the decisions have been made, each individual food item for which there was uncertainty can be listed under the most appropriate group so that all enumerators are consistent in assigning this food item to the agreed upon food group.

3. Mixed dishes:

The team will need to agree on a way to disaggregate mixed dishes in order to record all of the individual components in their respective food groups. As a rule, some basic foods are listed only under their main ingredient. For example, bread is put into the cereals group even if oil, eggs or sugar are added in small amounts during the making. However, many cultures commonly prepare and eat mixed dishes (such as casseroles or sauces that accompany a staple). Particular attention should be given to certain ingredients that may not be spontaneously recalled, such as added fats or oils, or secondary ingredients such as small amounts of meat or vegetables. Prior to beginning data collection the team should identify commonly consumed mixed dishes and practise probing for and recording all ingredients in the mixed dish.

Instructions for administering the questionnaire

The approach for collecting information on dietary diversity described in these guidelines is a qualitative 24-hour recall of all the foods and drinks consumed by the household.

Since the questionnaire is administered at household level, the respondent should be the person who was responsible for meal preparation for the household the previous day. The respondent is asked about all foods eaten inside the home during the previous day and night, by ANY member of the household. It was found through fieldwork that the most effective way to elicit the information on dietary diversity was to allow the respondent to freely recall what was eaten the previous day.

This can be done as described below:

- Ask the respondent to mention all the foods (meals and snacks) eaten yesterday during the day and night. Start with the first food/drink consumed the previous morning. Record these items in the spaces provided at the top of the questionnaire.
- After the respondent recalls all the foods and beverages consumed, underline the corresponding foods in the list under the appropriate food group and write “1” in the column next to the food group if at least one food in this group has been underlined. If the food is not listed in any group, write it in the margin and discuss it with the supervisor.
- Probe for snacks eaten between main meals.
- Probe for special foods given to children or lactating/pregnant women.
- Probe for added foods such as sugar in tea, oil in mixed dishes or fried foods.
- If a mixed dish was eaten, ask about and underline all the ingredients of the dish.
- Once the recall is finished, probe for food groups where no food was underlined. It is not necessary to read out to the respondent the exact name of the food group, but simply ask (for example) about fruits, vegetables or tubers if these groups were not previously indicated. Write “0” in the right hand column of the questionnaire when it is certain that no foods in that group were eaten.

- 1) It takes less time.
- 2) It is less tedious for the respondent rather than having to saying Yes or No to each food.
- 3) It actively involves the respondent in the interview process.
- 4) It facilitates consideration of the ingredients used in mixed dishes.

Using the questionnaire, the proportion of households or individuals having access to vitamin A rich fruits and vegetables or iron-rich food products can be calculated. However, if no specific attention to the levels of vitamin A or iron in the diet are warranted, some food groups may be merged, in the case of the household dietary diversity score into twelve groups to provide an indication of household economic access to food, thus items that require household resources to obtain, such as condiments, sugar and sugary foods, and beverages, are included in the score. In contrast, individual scores are meant to reflect the nutritional quality of the diet at the level of the individual and the proposed grouping into nine groups is therefore different.

[illegible]101

c	Relatives	1	0
d	Government	1	0
e	NGOs	1	0
f	Churches	1	0
g	Business people	1	0
h	Neighbour	1	0
i	None	1	0
j	Other (specify).....	1	0

Section Climate Change⁹²

Have you ever heard about climate change

1= Yes, 2= No

2. If yes, do you believe that the climate of Zimbabwe is changing?

1=Yes, 2=No

3. In your view what is really changing?

1= Amount of rainfall

2= Average temperatures

3= Rainfall distribution in the season

4. What could be the natural indication of climate change in your area (circle all applicable)?

1=Disappearance of indigenous vegetation species

2= Drying up of perennial rivers

3= Disappearance of wetlands

4= Increase in frequency of droughts

5= Increase in frequency of floods

6= Warmer winter seasons

7= Extension of the winter season

8= Changes in length of growing period (LGP)

9= Heat waves

10= Increase in occurrence of animal diseases

11= Other (specify)

Do you think global climate change happens naturally over time

1=Yes, 2=No

Do you think human activity plays a role in climate change

1=Yes, 2=No

How often do you consider the impact that your activities have on climate change a week, 4=Weekly, 5= Monthly, 6=Other

1=Never, 2= Daily, 3=A few times

How important do you feel climate change is as a factor that affects your food and nutrition security?

1= Not important

2= important

3= very important

Do you think government should have a policy to address climate change

1= Yes 2= No

Have there been any changes in the month you receive your first rains?

1= Yes, 2=No

Do you normally experience intra-season dry spells?

1= Yes 2=No

7. If yes, how many dry spells do you experience in one season?

⁹² If the area of survey has similar agroecosystem and production system, a triangulation with previous Bioversity International/IFAD baseline survey is recommended.

- [illegible]

Have you experienced any floods in the past 10 years? 1=Yes 2= No

16. What do you think could have been the causes of floods?
1=Natural 2=Supernatural, 3=Human, 4= Climate change, 5=Do not know

What natural features do you use for forecasting the rainfall season? 1=Behaviour of animals

2=Trees

3=Pre-season heat

4=Wind direction

5=Cloud development

Rivers???? What about them?

6= Mountain fires

Others	
--------	--

Questions 3.8 to 3.11 are applicable for Zimbabwe

3.8	Are there any child headed households in your village/community? <i>Mune vana vane makore 18 zvichidzika vanogara voqa mumhuri dzavo munharaunda yenyu here?</i>	Yes	No	DK	If 2, go
		1	2	3	to q2.41

3.9	If yes to q2.36, who is providing food for child-headed households in your community? <i>Ndiani kana masangano api anopa vana ava chikafu?</i>		Mentioned?	
			Yes	No
	a	One of the children in the household	1	2
	b	Well wishers in the community	1	2
	c	Village head	1	2
	d	Maternal relatives	1	2
	e	Paternal relatives	1	2
	f	Government	1	2
	g	NGOs	1	2
	h	Churches	1	2
	i	Other (specify).....	1	2

3.9	Are there any needs of the child-headed households that you think are not being met? <i>Pane zvamunofunga kuti mumhuri idzi dziri kushaiwa?</i>	Yes	No	DK	If 2 or 3, go to q2.41
		1	2	3	

3.10	If yes to q2.38 what are the other needs that are not being met or satisfied? <i>Ndezvipi zvimwe zviri kushaikwa nemhuri idzi? (MULTIPLE RESPONSES POSSIBLE)</i>		Mentioned?		
			Yes	No	
	a	Clothing	1	0	
	b	Food	1	0	
	c	Educational support	1	0	
	d	Shelter	1	0	
	e	Financial support	1	0	
	f	Psychosocial support	1	0	
	g	Life skills training	1	0	
	h	Help with household work	1	0	
	i	Medical support	1	0	
	j	Blankets	1	0	
	k	Soap	1	0	
	l	Other (specify)	1	0	

3.11	Why are they failing to meet these needs? <i>Sei vanoriritira mhuri idzi vachitadza kuvapa zvavanoda zvose?</i>		Mentioned?		
			Yes	No	
	a	High cost of providing food	1	0	
	b	Shortage of farming inputs	1	0	
	c	Poor income sources/lack of financial resources	1	0	
	d	Unemployment	1	0	
	e	Time to provide proper emotional care	1	0	
	f	Other (specify).....	1	0	

ANNEX 2. COMMUNITY RESOURCE FLOW FOR NUS

Introduction⁹³

Neglected and underutilized species (NUS) and their wealth of associated traditional knowledge are strategic for sustainable and productive agro-ecosystems, contributing towards resilience in addressing climate change and food security, and supports traditional and healthy food systems (Cordoba Declaration 2012).

The International research and development community has difficulties on agreeing to a standard definition of NUS. The words “neglect” and “underutilized” are relative to the perspectives, behavior and values of social institutions. According to Bioversity International: *“Neglected and underutilized species are those to which little attention is paid or which are entirely ignored by agricultural researchers, plant breeders and policymakers. They are wild or semi-domesticated varieties and non-timber forest species that are not typically traded as commodities”* (Padulosi, Thompson and Rudebjer 2013). However, species that are classified under NUS, such as oca (*Oxalis tuberosa*), and mashua (*Tropaeolum tuberosum*), two of the hundreds lesser known NUS crops of the Andes, are highly important to the Andean communities of e.g. the Potato Park. For the communities of the Potato Park, Oca and Mashua are far from neglected; these crops are (nearly) sacred. Contrary to being underutilized, these crops play daily roles in people’s food security, cultural rites and identity. Oxfam and the SDHS consortium take on a constructivist perspective in understanding NUS. The scientific and commercial neglect of specific species exist mainly because the peoples, for whom these species are important, are neglected. The peoples who grow and utilized these crops are often marginalized and impoverished. Therefore, the central focus in defining and identifying NUS would be on peoples and their agro-ecology and food systems. SDHS partners work in multi-resource agro-ecologies; whether these be in rice-base or potato -base or small grains- base ecosystems, these agro-ecologies often contain a great biodiversity of food plants, many are semi and non-domesticated. NUS is part of the complex management of resources from PGR, farming systems and landscapes within social institutions. SDHD takes on a board working criteria where NUS:

- (1) Important to the food and nutrition security of indigenous peoples and small holder farmers (IPSHF), particularly as part of women’s integrated biodiversity management (on farm and in nature)
- (2) Part of the cultural identity and social relations within communities embedded in traditional knowledge (e.g. folk taxonomy, collection management, processing) where NUS often have multiple uses for human well-being (food, medicinal, spiritual)
- (3) Little or no research and commercial interests
- (4) Lack of seeds for propagation and multiplication
- (5) Maybe domesticated, semi-domesticated, and non- domesticated
- (6) Adapted to local conditions (often marginal areas), may be indigenous or naturalized and may be sourced from diverse locations: on farm, home gardens, grasslands, roadside at the margins of farms and in nature (forests, mangroves)

From the criteria above, NUS is thus, a moving target. Studies of “wild” food plants point to the phenomenon called “botanical-dietary paradox” where on one hand, the most intensively cultivated

⁹³ This section is taken from: Manicad (2012), “NUS: Fostering Resilience and Culture” presented at the “International Seminar “Old” and New Crops to Meet the Challenges of XXI Century”. Cordoba 2012.

<http://cultivosparaelsigloxxi.dispongo.com/en/objectives.html>

areas exhibits the highest loss of diversity. Yet, at the same time, here is where the most consumption of wild food plants occurs. People start to rely on eating the “weeds” of agriculture due to declining forest, suggesting that species that are considered local vegetables also change⁹⁴.

Objectives:

1. To identify the NUS and their roles as part of the biodiverse food source of IPSHF
2. To understand the peoples’ local knowledge on the nutritional value of NUS
3. To understand peoples’ local knowledge on their PGR management of NUS, including seed system, access, sharing and uses
4. To identify the most important NUS for the food and nutrition security of households from the women’s perspectives
5. To help identify the problems and challenges faced by women farmers in managing the seeds systems of the identified most important NUS species.

Methodology: Community Resource Flow for NUS⁹⁵

The NUS resource flow can be adapted to include the following (as appropriate):

- Parcel(s) of farm lots
- Home gardens
- Forest and surroundings
- Grasslands/meadow at the margins of the farms
- Ponds, swamps, lakes
- Roadsides
- Markets
- Access and use by gender and age, wealth and status

The material resource flow is an adapted form of systems diagramming that makes an inventory of the components in agriculture and food systems within a community and illustrates the corresponding linkages between them. When used as part of PRA, it is ideal to use farm sketches already drawn, and proceed with the steps described below. This version is specifically focused to identify NUS.

For the SDHS Pillar 3 baseline survey, this exercise can dig deeper and /or provide complementary information into the HDDS food groups and in crops, which are classified according to which ones are cultivated or gathered. The enumerators and the farmers can jointly classify which are NUS according to the 6 criteria mentioned in the Introduction of this paper. Or another process is to do the mapping exercise and the enumerators zero on the enumerator identified NUS.

Suggested Guidelines:

Throughout the procedure, discuss and clarify points using semi-structured interview techniques and FGDs. The final diagram is static, whereas input and output pathways are highly responsive to changing situations. Take note of these changes during the discussion. Material resource flow is an

⁹⁴ Crus-Garcia and Price 2011. “Ethnobotanical investigation of “wild” food plants used by rice farmers in Kalasin, Northeast Thailand. *Journal of Ethnobiology and Ethnomedicine* 2011,7:33.

⁹⁵ This section was adapted from: (1) Manicad, G. 2002. “PRA in Agricultural Research” in ISNAR, Engendering Participatory Research. A Learning Module in Facilitating the Agricultural Innovation Process. The Hague: ISNAR and from (2) Manicad, G. 2004. “People, Landscapes and Worldviews: A pilot study on analysing non-domesticated and semi-domesticated biodiversity for local use”. A study Commissioned by the Centre for Genetic Resources, Wageningen University and Research.

exercise conducted at individual level (interviews) but can also be adapted to Focus Group Discussions (FGDs), which can be segregated by gender, age and wealth⁹⁶.

Semi-structured interviews should ensure to prioritize women farmers; and to segregate FGD groups by gender, and by socio-economic status (to prevent the richer and more powerful from dominating the provision of data and community “analyses”).

Phase I (FGD)

1 Discuss the activity, objective and procedure with the farmers. Encourage farmers to draw their farms and various enterprises themselves. Emphasise that the researchers are there to learn from the farmers. When appropriate, separate discussions among men and women, youth and elders can take place.

2. Discuss with farmers their concept and definition of NUS. It may be a good starting point to show a common NUS in the area, or ask people what they consider to be “wild” food plants. For example, in the Deccan Development Society (DDS) areas, wild greens were traditional plants that re-appeared after farmers switched back to their traditional sorghums and millets using organic farming methods. These nutritious wild greens are sensitive to the herbicides used in intensive farming. It would be good to “pre test” the NUS concept with custodian farmers as key informants.

3. Use locally available materials, e.g. the soil as "drawing paper," ash as ink, etc. Remember to copy everything on paper afterwards. If the farmers allow it, also photograph the results. If farmers are comfortable with pen and paper, then this should be used. After the exercise, give the community a copy of whatever documents are produced.

4. When necessary, a member of the research team could **start the process of drawing, and** then let the farmers take over. It is helpful to start drawing from a point of reference that is well known to the farmers, e.g. a road, river, or a tree which is right in front of the meeting place.

Phase II

5. After drawing the farm, forest, grassland, market and house, **ask the farmers to enumerate the plants** they take from the farm, forest, grassland, market into their home for food. Ask what they take during periods of sufficiency.

6. Use one arrow per plant to indicate where it was taken from (e.g. forest, farm) into the direction of the home. Using **symbols for men, women** (youth and elders) indicate who gathers and bring the plants home for food. The farmers must be encouraged to list as many species and if these lists are too long, keep a separate one beside the map.

7. Now, ask the farmers to **add the plants they take during hunger periods**

8. For **NUS that are collected throughout the year**, this can be illustrated by bolder arrows

Phase III

⁹⁶ For groups several adaptations can be made. For example, within a group elect a household, which would be used as a case study. Conduct the material resource flow exercise with this farmer and his/her household. Afterwards stimulate a discussion within the group as to the similarities and differences amongst the different households. Encourage the group to analyze trends and deviations, as well as identify problems and potential solutions. Alternatively, 3 representative households can conduct the exercise separately and then this could be presented to a wider group and collectively compared and discuss.

9. Once most of the plants are identified, the enumerators with the communities **check on which plants can be classified as NUS**. The enumerators then make a list and explain to the farmers to check if they agree if this is NUS

10. Ask the **farmers to enumerate their most important nutrition and crop traits** related criteria for NUS

11. **Conduct a ranking of the 10 to 20 most important NUS** (a Diversity wheel can also be used here)

Phase IV (semi-structured Interview)

12. After the ranking of the 10-20 most important NUS, a **semi-structured interview using the list in the annex as guide**

13. Conduct a discussion on which **NUS to address propagation and multiplication** (seed system)

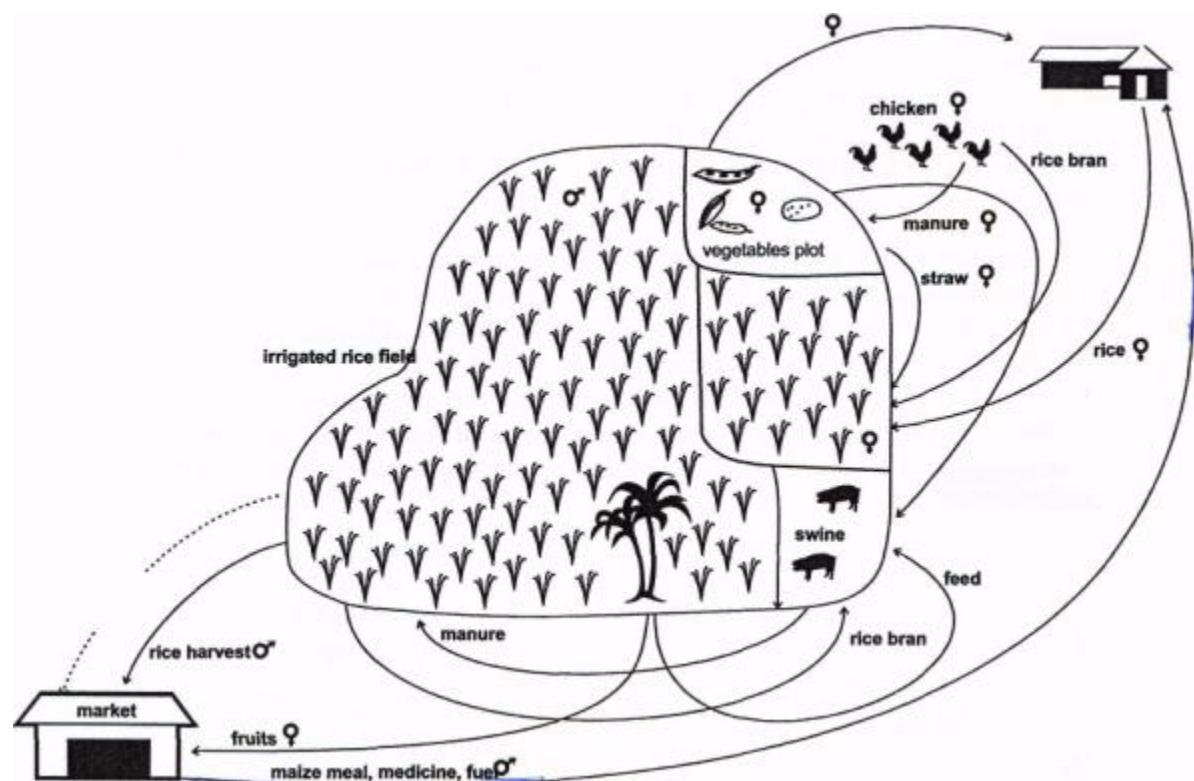


Figure 6: A sample of Material Resource Flow
(Manicad in ISNAR, 1996)

Semi-Structured Interview Checklist

NUS collected on farm, grasslands, and forests:

1. Past and present collecting activities
 - Local name
 - Folk taxonomy: source of name, method of identification
 - Growth location
 - Edible parts and other uses
 - Collector **(men, women, children)**
 - Perceived nutritional value **(men, women)**
 - Perceived preference for agronomic traits **(men, women)**
 - Seasonality: consumed during sufficient, hunger periods or throughout the year
 - Volume, frequency (difficult?)
2. Collection management
 - Rituals
 - Conservation practices
 - Processing and cooking
 - sharing of collection
 - perceived effect of collecting activities on the environment and plant
3. Seeds systems
 - Life cycle (annual, perennial)
 - Growth form (aquatic herb, terrestrial herb, climber, shrub, tree, bamboo, rattan)
 - Propagation
4. Knowledge systems
 - Source of knowledge
 - Ways of learning
 - Ways of sharing

ANNEX 3. WEALTH RANKING CRITERIA USED FOR TARGET HOUSEHOLDS DURING THE JUNE 2015 SURVEY

	Rich	Middle	Poor
Chiredzi	<p>20 cattle or more Harvests 20 bags of cereals (pearl millet) or more Lives off \$200 or more per month Average family size 4 At least 2 wives At least 1 car Owns a business (store) Owns several assets</p>	<p>Up to 10 cattle Harvests 10 bags of cereals (pearl millet) or more Lives off \$50 - \$200 per month Average family size 6 1 wife Own ox drawn scotch cart Have some assets</p>	<p>No cattle Harvests less than 5 bags of cereals (pearl millet) Lives off less than \$30 per month Average family size >6 1 wife No vehicle or ox drawn scotch cart No assets</p>
Goromonzi	<p>At least 3 bedroomed house 10 cattle or more Does not collect NUS Rarely eats NUS</p>	<p>2 bedroomed house 1 – 9 cattle Sometimes collects NUS Sometimes eats NUS</p>	<p>1 bedroomed house No cattle Collects NUS Eats NUS a lot</p>
Tsholotsho	<p>15 or more cattle 10 acres or more of land 3 children or less Food secure (eats well all year round) Live off \$150 or more per month Large granary Source of livelihood from employment or pension Does not collect NUS</p>	<p>1 – 9 cattle 3 – 5 acres of land 3 -5 children Relatively food secure \$50 per month from remittances Small granary Source of livelihood from vending and casual labour Sometimes collect NUS for consumption</p>	<p>No cattle Less than 3 acres of land 6 or more children No food (often receives handouts) 1 or 2 grass thatched huts No granary No stable source of livelihood Collect and sell NUS</p>
UMP	<p>> 5 cattle 4 roomed house on asbestos sheets buys meat at least</p>	<p>1-4 cattle 2 bedroomed house on asbestos sheets</p>	<p>No cattle one thatched room</p>

	<p>3 times per week They do not collect NUS</p> <p>rarely consumes wild fruits, animals or NUS Girls marry after completing tertiary education usually with age > 22 years</p>	<p>purchases meat once per week occasionally consumes wild fruits, animals & NUS consumes NUS collected by the poor Girls marry at 18 years of age</p>	<p>rarely buys meat</p> <p>rely on wild fruits, animals and NUS collects NUS for consumption fails to pay school fees and girls marry early</p>
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