



Sachra de Boer/Oxfam Novib

WOMEN, SEEDS AND NUTRITION

TECHNICAL REPORT OF THE BASELINE SURVEY
FOR MYANMAR, PERU, VIETNAM AND ZIMBABWE



OXFAM
Novib

Contact person

Gisella Cruz Garcia, gisella.cruzgarcia@oxfamnovib.nl

Partners

Oxfam Novib, the Netherlands

Community Technology Development Trust (CTDT), Zimbabwe

Southeast Asian Regional Initiative for Community Empowerment (SEARICE), Vietnam and Myanmar

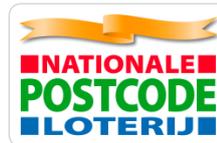
Asociación para la Naturaleza y el Desarrollo Sostenible (ANDES), Peru



Donors

Swedish International Development Cooperation Agency (SIDA), Sweden

National Postcode Loterij (NPL), the Netherlands



This publication is the result of activities and research conducted as part of the Sowing Diversity=Harvesting Security program

**SOWING DIVERSITY =
HARVESTING SECURITY**
www.SDHSprogram.org

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Acronyms

ANDES	Asociación Para la Naturaleza y el Desarrollo Sostenible
CTDT	Community Technology Development Trust
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus group discussion
FG	Food group
HDDS	Household Dietary Diversity Score
IPSHF	Indigenous peoples and smallholder farmers
NPL	Dutch National Postcode Lottery
NUS	Neglected and underutilized species
SD=HS	Sowing Diversity = Harvesting Security
SEARICE	Southeast Asia Regional Initiatives for Community Empowerment
Sida	Swedish International Development Cooperation Agency

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1. INTRODUCTION

1.1 PROJECT CONTEXT

The Phase 1 of the “Sowing diversity = Harvesting Security” (SD=HS) Programme, funded by the Swedish International Development Cooperation Agency (Sida) and the Dutch National Postcode Lottery (NPL) has been implemented from 2014 to 2018 (five years). The objectives of SD=HS 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 sustainable use of plant genetic resources for food security and nutrition under the conditions of climate change. In order to achieve that, the Programme helps to link diverse realities on the ground and feed this information into complex national and global policy processes. 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.

This report presents the consolidated findings of the baseline studies in Myanmar, Peru, Vietnam and Zimbabwe for Pillar 3 of the SD=HS Programme, which was 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.”¹ Pillar 3 has a special focus on neglected and underutilized species (NUS), as they have a potential to improve dietary diversity and nutrition, contribute to income generation, and increase the resilience of local farming systems in the face of climate change. In many traditional food systems, NUS are acknowledged to have a major complementary nutrient content as compared to global crop commodities, which are commonly produced and consumed. NUS also contribute to the cultural heritage of local communities.²

The implementation of the work under the SD=HS pillars started by establishing a baseline in order to obtain insights in the local conditions and trends, and thus help shape the vision and scenarios for the work in support of the pillars and the overall programme. To inform the work on Pillar 3, a baseline survey was carried out in Myanmar, Peru, Vietnam, and Zimbabwe in 2015/2016 with the following **objectives**:

- 1) To understand the current food supply conditions of communities, in particular the role of NUS in periods of hunger and food sufficiency, and the roles of women farmers in improving food biodiversity of the communities;
- 2) To generate data on the communities’ dietary diversity, on the basis of which it will be possible to assist them to develop their own plans to improve their diets;
- 3) To serve as an initial participatory diagnostic tool that facilitates the planning of programme interventions and policy agenda.

Additionally, the baseline aimed at answering the following **research questions**:

- 1) How do people understand nutrition?
- 2) Do communities suffer from hunger periods? If yes, what is the nature, time, duration, and frequency of the hunger period? Who are most affected by the hunger period within the household?

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) What are the sources of food and nutrition during both sufficiency and hunger periods at the household level?
- 4) Do households have diverse diets? What are the food groups that are present and lacking in the local diets?
- 5) What are the coping strategies to deal with hunger periods at household level?
- 6) 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 hunger periods?
- 7) What are the roles of women and men in safeguarding food and nutrition security at the household level?

The baseline surveys have been carried out by different SD=HS partners. In Peru it was conducted by the Asociación Para la Naturaleza y el Desarrollo Sostenible (ANDES). In Vietnam and Myanmar, the baseline survey was carried out by the Southeast Asia Regional Initiatives for Community Empowerment (SEARICE), and the local counterparts in the countries, the Plant Resource Centre (PRC) in Vietnam and the Metta Development Foundation in Myanmar. The Community Technology Development Trust (CTDT), in collaboration with the National University of Zimbabwe, Farmers' Association of Community Self-Help Investment Groups (FACHIG) Trust and Dabane Trust, conducted the survey in Zimbabwe.

The sample for the baseline in Peru included farming communities from the lower, middle and higher altitude areas of the district of Lares in the Calca province; in Vietnam households from indigenous communities in the Provinces of Lao Cai, Ha Giang and Son La were included in the research; and in Myanmar two districts in the Ayeyarwaddy Region and two in the Shan State were involved. For the baseline in Zimbabwe, households were initially sampled from the CTDT project districts of Goromonzi, Chiredzi, Tsholotsho and Uzumba-Maramba-Pfungwe (UMP) districts (Sida funded districts). However, the SD=HS programme received additional funding from NPL to scale up the activities in Zimbabwe and included four additional districts: Matobo, Mudzi, Mt Darwin and Rushinga districts (NPL funded districts). In these districts, the programme started one year later than in the districts funded by Sida. The baseline survey for these districts was conducted on a different moment, by different staff and with different methodological tools. Therefore, results for the Sida funded districts and NPL funded districts have been presented separately.

1.2 NUS DEFINITION

According to scientific literature, NUS are those plants to which little attention is paid or which are ignored by agricultural researchers, plant breeders and policy makers. Typically, NUS are not commercially traded as commodities. They include 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 rate³.

The SD=HS Programme takes on a constructivist perspective in understanding NUS. The scientific and commercial neglect of specific species exists mainly because the people, for whom these species are important, are neglected, often marginalized and impoverished. Therefore, from the SD=HS Programme perspective, the central focus in defining and identifying NUS is on people, their agro-ecologies and food systems. SD=HS partners work in multi-resource agro-ecologies – ranging from rice-based and potato-based to small grains-based ecosystems – which often contain a great biodiversity of food plants, many of which are semi-

³ Padulosi, S., Thompson, J., & Rudebjer, P. (2013). What are NUS? Why are they important. *Fighting poverty, hunger and malnutrition with neglected and underutilized species (NUS): Needs, challenges and the way forward*, *Biodiversity International*, Rome, 9-19.

or non-domesticated. NUS are subject to a complex set of management strategies that links plant genetic resources, farming systems and landscapes, within local social institutions.

In this context, the SD=HS programme has further elaborated this concept into a working definition consisting of the following criteria:

- NUS are important to the food and nutrition security of Indigenous Peoples and Small Holder Farmers (IPSHF), particularly in relation to women's integrated biodiversity management strategies (which occur in situ)
- NUS are part of the cultural identity and embedded in traditional social relations and knowledge systems (e.g. folk taxonomy, collection, management, processing); often having multiple uses for human well-being (e.g. food, medicinal, spiritual)
- There is little or no research on, commercial interests in, or interests for ex situ conservation of NUS species
- There is lack of technical knowledge, availability and access to seeds and other plant parts for their propagation and multiplication
- NUS include domesticated, semi-domesticated, and wild species
- NUS are often adapted to local environmental conditions, i.e. produced in traditional agricultural systems or gathered often in marginal areas; thus they may be sourced from a diverse range of anthropogenic and non-anthropogenic environments: e.g. on-farm (agricultural fields, agroforestry and silvopastoral systems, fallow fields, home gardens), grasslands, forests, wetlands, riversides, mangroves, and roadsides.

When the baseline was conducted, the classification of wild plants and minor crops as 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. In this context, the programme adopted the Food and Agriculture Organization of the United Nations (FAO) definition of minor crops⁴, where their categorization as major or minor is based on their relative importance in relation to global food security. It should be noted that some crops that are categorized as globally minor, are sub-regionally or nationally major.

1.3 FOOD SECURITY, SEASONAL HUNGER AND NUTRITION

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.⁵ 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, barter or harvest/gather food.
- 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

⁴ FAO. (2010). *The Second Report on the State of the World's Plant Genetic Resources for Food and Agriculture*. Rome: FAO.

⁵ FAO. (2002). *The State of Food Insecurity in the World 2001*. Rome: FAO.

techniques are employed, adequate knowledge of nutrition and child care techniques exist and are applied, and adequate health and sanitation services exist.

- Food stability: means that access cannot be compromised by fluctuations in weather or market prices, by seasonality, and by economic or political shocks.

Food utilization is deeply interrelated with nutrition, which refers to the use of food by the human body in order to conduct the functions of living, working, growing, protecting from diseases, and a healthy development. Nutrition is the process of utilization of food that includes digestion, absorption, assimilation and use of the nutrients present in food items.

A major concern related to food stability is the hunger period, which is a persistent and often silent cycle that affects farming families, 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 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, particularly affecting the mental and physical development of children. Seasonal hunger exacerbates peoples' vulnerability, especially of those who suffer from chronic poverty.

Linked 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, in particular the 24-hour recall of the Household Dietary Diversity Score (HDDS) survey, focused primarily on gathering data for the first two dimensions of food security: food availability and food access in relation to food groups. In addition, the survey included a module on the hunger period, which is related to the dimension of food stability. Food availability, access and stability are necessary for ensuring the adequate utilization of food for improved nutrition.

The SD=HS Programme acknowledges the complexity and interdependency of factors that influence nutrition status, such as water, sanitation and hygiene, access to health services, education, among others. 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.

1.4 NUS AND NUTRITION – GLOBAL CONTEXT AND CHALLENGES

One in five persons in the world is experiencing moderate or severe food insecurity, of whom approximately 650 million – one in 11 – suffer from severe food insecurity (Food Insecurity Experience Scale from 2015⁶). Remarkably, food insecurity rates appear to be slightly higher among women than men. Despite the worldwide concerted efforts to reduce hunger, still about 790 million people suffer from chronic hunger, including 156 million children under the age of five that remain chronically undernourished. More than 2 billion people are afflicted by one or more nutrient deficiencies⁷ (caused by diets lacking essential vitamins and minerals required for

⁶ FAO. (2016). *Methods for estimating comparable rates of food insecurity experienced by adults throughout the world*. Rome: FAO.

⁷ IFPRI. (2014) *Global Nutrition Report 2014: Actions and accountability to accelerate the world's progress on nutrition*. Washington DC.

proper growth and development, such as vitamin A, iron, zinc and calcium), whereas more than 1.9 billion adults are currently overweight.⁸

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, with negative social and economic consequences. Poor health also impacts 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.⁹

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; but 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.

Rapid agricultural intensification for combatting hunger, mostly focused on cropping systems based on cereals, roots and tubers – 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 developing countries, in which starchy staple foods are the main components of the diet and there is consumption of nutrition-rich food groups such as eggs, dairy, fruits and pulses. 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. 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.

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 on 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. 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 in a growing interest of many countries. 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 nutritious food crop species for greater livelihood resilience.¹⁰

⁸ WHO. (2016). *Obesity and Overweight Fact Sheet*. Geneva: WHO.

⁹ <http://www.unep.org/dewa/Assssmems/Ecosystems/iAAsTD/tabId/105853/Default.aspx/>

¹⁰ FAO. (2014). *Promotion of underutilized indigenous food sources for food security and nutrition in Asia and the Pacific*. Bangkok: FAO.

1.5 GENDER IN RELATION TO NUS AND NUTRITION

In many areas of the world, women are the ones who hold the traditional knowledge regarding NUS, incorporate NUS in the household's diet, and/or use NUS to generate additional income; whereas men focus on the production of commercial crops and staple foods. Since NUS have mainly been used by poor rural families, for example in times of famine, these plants can be stigmatised in some countries and evoke associations with low socio-economic status. The baseline survey of Pillar 3 of the SD=HS Programme aimed at exploring the interrelations between food and nutrition security, with specific focus on NUS and women's roles and perspectives, including the social dimensions.

2. METHODOLOGY

The methodological tools – a household survey questionnaire and focus group discussions – were shared within the consortium, commented on and agreed upon with all Pillar 3 partners, creating a joint ownership. In the spirit of respecting and building on diversity, it was also agreed that each partner could adapt the tools and include specific sections relevant to their own context, with the condition that such inclusions would not compromise the overall global framework. For example, in Peru, the tools were adapted to the indigenous worldview and its focus on biocultural heritage. In each of the target countries, the survey tools were adapted, translated and tested.

2.1 STUDY SITES

In **Myanmar** the study covered two districts, Patheingyi and Myingyan, in the Ayeyarwaddy Region; and another two, Taunggyi and Loilein, in the Southern Shan State (Table 1). The following townships were included: Patheingyi, Ngathayau, Kankyidaung in Patheingyi; Myingyan in Myingyan; Hsibsen and Hopong in Taunggyi; Nam San and Mai Naung in Loilein. A total of 179 men and women were interviewed for the survey. Participants in the study were selected using the following criteria: 1) representation in terms of socio-economic standing of households, and 2) diversity in terms of ethnicity and local situation (in relation to the consumption of food, main occupations, indigenous knowledge and culture).

For the baseline survey in **Peru**, there was a difference in sampling between the hunger period and the sufficiency period because lower altitude communities could not be included in the survey conducted during the hunger period due to impossible access (rainy season). The following communities participated in the baseline: Queyupay, Cacchin, Collana, Choquecancha, Rosaspata, Matinga, Lares and Lares Ayllu in the Keshua area (middle altitude range, 2300 to 3500 masl); Pampacorral, Pumapunku, Ancallachi, Quishuarani and Huallhuaray in the Puna area (higher altitude range, above 3500 masl). The design of the survey sample followed a statistically stratified approach in accordance with the study area characteristics, allowing the comparison of the results between the agro-ecological areas. For each surveyed community located in the lower, middle and higher altitude areas, 10% of the households were sampled.

In **Vietnam** the baseline was conducted in three provinces located in 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 targeted 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, nearly-poor, average, or rich. From this list, 30 households were randomly selected from the

poor and nearly-poor households to participate in the household survey in each of the six chosen communes. Women were selected as main respondents of the questionnaire, when possible.

The baseline survey for the Sida funded districts in **Zimbabwe** was conducted in: Chiredzi District in Masvingo Province; Goromonzi and Uzumba Maramba Pfungwe (UMP) Districts in Mashonaland East Province; and Tsholotsho District in Matabeleland North Province. In Sida funded districts, households were selected randomly for each village. It should be noted that the households surveyed in the hunger period were different from those surveyed in the sufficiency period. The baseline for the NPL funded districts was conducted in: Matobo District in Matabeleland South Province, Mudzi District in Mashonaland East Province, Mt Darwin and Rushinga Districts in Mashonaland Central province. In NPL funded districts, the study employed a three-step procedure of sampling. Firstly, the wards were purposefully selected as they are the sites where the project is already working. Secondly, the villages were purposefully selected based on accessibility. Finally, the households were selected using a wealth rank list compilation to ensure that the interviewees were representatives of the various wealth strata.

Table 1.

SURVEY INFORMATION FOR MYANMAR, PERU, VIETNAM AND ZIMBABWE

SURVEY INFORMATION	MYANMAR	PERU	VIETNAM	ZIMBABWE (NPL-FUNDED DISTRICTS)	ZIMBABWE (SIDA-FUNDED DISTRICTS)
Study sites	Ayeyarwaddy Region; Southern Shan State	Keshua; Puna; Yunga	Ha Giang; Lao Cai; Son La	Matobo; Mudzi; Mt. Darwin; Rushinga	Chiredzi; Goromonzi; Tsholotsho; UMP
Ethnic groups surveyed	Bamar; Rakhine; Kayin; Pa O, Shan; Le Su; Lar Hu	Kechua	H'Mong; Tay; Dao; Nung	Matabele; Shona	Kalanga; Ndebele; San; Shanganes; Shona
Population estimate in the target area	7702 people, in 1780 households	5027 people, in 1388 households	Around 3948 households	17611 farming households	728476 people, in around 139155 households
Participating households	179 (10%)	176 (13%) hunger period; 223 (16%) sufficiency period	180 (5%)	1563 (9%)	602 (0.4%) hunger period; 611 (0.4%) sufficiency period
Female respondents	Unknown	64.5%	73.5%	76.7%	78%

2.2 METHODOLOGICAL TOOLS

The following tools were included as part of the baseline survey in the global framework:

- 1) A household questionnaire, consisting of: socio-demographic questions, questions addressing the timing and duration of the hunger period, questions about coping strategies used for dealing with hunger periods, and questions for the calculation of an amended FAO 24-hour recall Household Dietary Diversity Score (HDDS, explained in the following paragraphs), and;
- 2) Focus group discussions (FGDs), which included the establishment of a community resource flow map for NUS (explained below) and a wealth ranking tool. In Myanmar, the community resource flow was replaced by other FGDs and surveys as described below. In Peru, additional semi-structured discussions and FGDs on factors that

influence well-being alongside an institutional analysis were conducted. However, this report only presents results of the tools applied across four countries.

2.2.1 AMENDED HOUSEHOLD DIETARY DIVERSITY SCORE (HDDS)

The HDDS reflects the ability of a household to access a variety of foods. It is based on the collection of data on household food consumption during the previous day¹¹. The total value of the HDDS per household was calculated by summing the individual values for all food groups included in the dietary diversity score. The average HDDS for the hunger and sufficiency periods were calculated by dividing the sum of the HDDS of each household in a specific area in a specific period by the total number of households. Studies have shown that an increase in dietary diversity is associated with socio-economic status and household food security¹².

The universal applicability of the HDDS made it 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. For example, in the Matobo, Mudzi, Mt Darwin and Rushinga districts of Zimbabwe, 12 food groups were used, ensuring that the score accurately reflects the consumption of micronutrients, carbohydrates and protein-rich foods. The other districts in Zimbabwe and countries followed the standard list of FAO, which is divided into 16 food groups. By disaggregating fruits, vegetables and tubers rich in vitamin A from other fruits, vegetables and tubers, the HDDS generated richer data on the type of micronutrients accessed by households. Table 2 lists the food groups that have been used in each of the four countries.

Table 2.

FOOD GROUPS USED IN MYANMAR, PERU, VIETNAM AND ZIMBABWE TO MEASURE HOUSEHOLD DIETARY DIVERSITY

FOOD GROUP	MYANMAR, PERU, VIETNAM AND ZIMBABWE (MUDZI, MT DARWIN, RUSHINGA AND MATOBO)	ZIMBABWE (GOROMONZI, TSHOLOTSHO, CHIREDDZI AND UMP)
FG1	Cereals	Cereals
FG2	White roots and tubers	Roots and tubers
FG3	Vitamin A rich vegetables and tubers	Vegetables
FG4	Dark green leafy vegetables	
FG5	Other vegetables	
FG6	Vitamin A rich fruits	Fruit and fruit juices
FG7	Other fruits	
FG8	Organ meat	Meat
FG9	Flesh meat	
FG10	Eggs	Eggs
FG11	Fish and seafood	Fish and seafood
FG12	Legumes, nuts and seeds	Legumes, nuts and seeds
FG13	Milk and milk products	Milk/dairy products
FG14	Oils and fats	Oils and fats
FG15	Sweets	Sweets
FG16	Spices, herbs and beverages	Spices, herbs and beverages

¹¹ FAO, 2010

¹² Hoddinot and Yohhanes, 2002; Hatloy et al., 2000 in FAO, 2010.

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 and the sources of collection.

In most cases the HDDS questionnaire was performed during the period of greatest food shortage as well as during the food-sufficiency period. In **Myanmar**, the surveys were conducted in the hunger and sufficiency period between March 2015 and August 2016. In **Peru**, where the SD=HS programme started one year later, the studies were conducted in the scarcity period from February to March 2016, and in the sufficiency period from June to August 2016. In **Vietnam**, the HDDS survey was conducted in March 2015 during the sufficiency period and in September 2015 which is in the period when there is not enough rice. In **Zimbabwe**, the HDDS survey in Goromonzi, Chiredzi, Tsholotsho and UMP districts was performed in November 2014, which is the period of greatest food shortage, and again in June 2015, just after the harvest. The survey in the Matobo, Mudzi, Mt Darwin and Rushinga districts was performed only in the hunger period between November and December 2015.

2.2.2 FOCUS GROUP DISCUSSIONS (FGD)

The community resource flow map, which was conducted during focus group discussions, started sharing with the communities the SD=HS Programme's working criteria on NUS, in order to identify which criteria resonated with them and to discuss with the participants their own concepts and definition of NUS. Then, participants were invited to sketch their farms and various enterprises, including the sources from which they derive their food. They were asked to identify and list the plants gathered or harvested and brought to their homes from various sources, and indicate that in their drawings. They started with the plants collected in the hunger period, followed by those collected in the sufficiency period, and then by those used throughout the year. Based on these lists of food plants, the participants were requested to point out which ones they consider as NUS.

In **Myanmar** the following activities were carried out instead of the resource flow map:

- 1) Transect mapping to determine the available resources and their location within the communities;
- 2) kitchen visits to observe the kind of food being prepared, food supplies/materials, food preservation, food grown in the garden and animals raised by the household;
- 3) market visits to find out the foods locally available and accessible;
- 3) FGDs;
- 4) key informant interviews with village leaders and elders to provide secondary data and validate the gathered information;
- 5) secondary data gathering.

In **Peru** four FGDs were held for the NUS resource flow map: two (one for women, another for men) in the Keshua zone, and two in the Puna zone. Interviews complemented the information collected with the resource flow maps. The interviewees were selected by the field coordinator and local technicians among focus groups participants, particularly elderly women with a deep knowledge and experience on NUS. Additional FGDs were organized for the wealth ranking and institutional mapping.

In **Vietnam**, important preliminary information on the communes selected by the Country Management Team¹³ was obtained through the commune authorities and union leaders. The

¹³ The Country Management Team for Pillar 3 in the North of Vietnam was comprised of multi-stakeholder institutions responsible for the establishment of the baseline and, eventually, programme implementation. It was led by the Plant Genetic Resources Center (PRC) and the Vietnam Academy of Agricultural Sciences (VAAS) of the Ministry of Agriculture and Rural Development (MARD), with the

commune authorities also coordinated the invitation of participants to the FGDs aimed at covering households from all hamlets within the jurisdiction of the commune. FGDs involved groups of 10-15 community members, including women, men and youth (regardless of ethnicity). Each group completed the same set of questions and presented the answers in a plenary to reach a consensus regarding the prevailing conditions in the commune. Commune authorities also participated during the plenary/validation sessions.

In **Zimbabwe**, two FGDs were conducted per district in Goromonzi, Chiredzi, Tsholotsho and UMP, in those wards where CTDT has been implementing project activities. In order to facilitate the logistics, participants from two wards gathered in a single location, but groups were formed by village so the responses would still reflect the situation of the village. Wealth rankings and additional Rapid Rural Appraisal tools were applied, including agro-ecological maps, to gain insights on the local food security. In Matobo, Mudzi, Mt Darwin and Rushinga districts, two FGDs were held in each of the selected districts (except Mudzi), with a total of six FGDs implemented. The majority of meetings were dominated by women.

3. RESULTS AND DISCUSSION

3.1 DEMOGRAPHIC AND BIOPHYSICAL DATA

In **Myanmar**, the project communities in Ayeyarwaddy include four lowland and two coastal areas (Table 3) that rely on both farming and fishing for their livelihoods. When farming activities end during the summer season, the men go to the forests and engage in logging, charcoal making and collecting stones as income-generating activities. On the other hand, the women collect firewood, fish, collect fruits and leaves from mangroves and sea weeds from the sea. Salt making is another economic activity of the communities in the district of Patheingyi. Contrarily, the villages in Southern Shan generally are situated in upland areas. The farms are mostly rain-fed, although there are lands that are irrigated and can be cultivated even during the winter season. All the villages are engaged in farming and some also rely on livestock raising and selling as another source of income. During the rainy season, home gardens are tended in almost all the villages. Generally, the communities are situated in relatively flat lands with slope and lowland parts. The village ecosystems include rain-fed and irrigated farms and mangroves. Crops grown are lowland and upland rice, corn, turmeric, garlic, groundnut and pigeon pea. Perennial plants can also be found on the mountains, particularly in Ayeyarwaddy villages.

In **Peru**, the educational level and literacy rates showed gender inequalities; 44% of the women heads of households reported having no education versus 14% of men. Some 41% of women attained primary education versus 68% of men¹⁴. The same inequality was observed in literacy rates: 81% of men and 47% of women read in Spanish, 75% of men and 44% of women write in Spanish, 67% of men and 56% of women read Kechua, and 55% of men and 44% of women write Kechua. The main activities of the women heads of household are farming (for 89% and 67% of the women heads of household in the lower Yunga zone and middle Keshua zone respectively) and taking care of the household (reported by 67%, 48%, 67% of the women heads of household in the Yunga, Keshua and Puna zones respectively). Only in the Puna zone, urban

participation of 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.

¹⁴ Only data for abundance period is presented, since the survey round in the abundance period included the three agroecological zones.

work was reported to be one of the main activities of women heads of households. Men heads of households are also involved in tourism and farming.

Table 3.

MAIN CHARACTERISTICS OF THE STUDY SITES, INCLUDING AGROECOLOGICAL ZONE, MAJOR CROPS, ANNUAL RAINFALL, ALTITUDE AND HOUSEHOLD SIZE

	STUDY SITES	AGROECOLOGICAL ZONE	MAJOR CROPS	ANNUAL RAINFALL (MM)	ALTITUDE (M ABOVE SEA LEVEL)	HOUSEHOLD SIZE
Myanmar	Ayeyarwaddy	Lowland; delta area.	Rice	3000	3-404	4.1
	Southern Shan	Highland extensive mix; hilly and mountainous area.	rice, wheat, corn, groundnut, pulses and beans, fresh fruits and vegetables as main crops. There are also cotton, coffee, tea and tobacco plantations.	1000-1600	1000-2673	4.7
Peru	Puna	High altitude range	mostly roots and tubers, beans, peas and Andean grains		>3500	4
		Middle altitude range	Corn, rice, barley		2300-3500	4
	Yunga	Low altitude range	Citrus fruits, bananas, cotton and squash		<2300	4
Vietnam	Ha Giang	Tropical climate	Rice, maize, cassava	2254	500-2000	4.8
		Very diverse – with areas of tropical and sub-tropical zones	Rice, maize, vegetables, fruits, medicinal plants	1800-2000	250 - 3143	5.35
	Son La	Tropical climate	Rice, maize, coffee	1400	600	4.48
Zimbabwe	Chiredzi	Vast semi-arid, drought-prone area (driest, agroecological region V) less than 500mm per year	Sorghum, maize, pearl millet	584	430	5.9
	Goromonzi	High potential agroecological zone II (high rainfall and moderate temperatures for crop production)	Maize, finger millet, sorghum, sweet potatoes	970	1380	4.7
	Tsholotsho	Low rainfall, high temperatures, low potential for crops but good pastures for livestock (agroecological zone IV), less than 650 mm of rainfall per year	Pearl millet	555	1060	5.3
	UMP	Agro-ecological zone IIB (16%), region III (20%) and region IV (majority of land)	Maize (Uzumba), sorghum, pearl millet (Maramba), and sorghum and pearl millet (pfungwa)	692	1160	5.3
	Matobo	natural region IV and V	Drought tolerant grains sorghum and millet	450	1000-1500	4,2
	Mudzi	natural farming region IV (low potential zone, high incidence of droughts and frequent, long mid-season and inin-season dry spells)	Ground nuts and maize	450-500	500-900	4
		natural region I	Maize, finger millet, pearl millet, sorghum	550-700	800-950	4,3
	Rushinga	natural region IV (seasonal droughts and severe dry spells)	Maize, finger millet, pearl millet, sorghum	450-500	1000	4,2

The survey 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 rice and cash crop farming, indicating that local livelihoods depend mostly on agricultural activities.¹⁵ The rice is primarily for home consumption, along with some cultivated vegetables. Secondary sources of income include various seasonal activities, such as 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.

In **Zimbabwe**, it was observed that agriculture is the main source of income for 73% in average of households in Goromonzi, Chiredzi, Tsholotsho and UMP districts. Tsholotsho District has the highest number of households (92%) deriving their main income from agriculture, followed by UMP (83%), Chiredzi (70%) and Goromonzi (50%). Despite high literacy rates (76% in English and 93% in Shona), almost 17% of the households in Goromonzi are formally unemployed, while 14% are involved in casual or informal work. Some 11.6% of respondents had no education, 22.4% attended high school up to ordinary level (form 3-4). Most farmers only produce crops for household consumption. According to key informants, most of the people within the working class are not employed because of the prevailing economic situation in Zimbabwe. Thus there are no significant sources of income in addition to farming in Goromonzi, Chiredzi, Tsholotsho and UMP districts. In Matobo, Mudzi, Mt Darwin and Rushinga districts, the levels of education were also assessed: 46.7% of the respondents have a recognized basic high school education. Education levels are lowest in Mudzi, where 23.4% of the respondents had no education at all. Income is generated from various sources of activities and each district showed to be unique in what brought in the most income. For instance, in Matobo vegetable production sales and remittance from friends and relatives were the highest at 17.5%, whereas in Mt .Darwin district cash crop production generated the highest source of income at 23%, in Mudzi district food crop production provided the highest income at 23.7%, and in Rushinga casual labour provided the highest income at 36.1%.

3.2 LOCAL PERCEPTIONS ON NUTRITION

Participants in both Myanmar and Peru indicated that malnutrition persists in their communities because of lack of government support and information. They expressed that they have too little knowledge on nutrition and the nutritional impact of their decisions. It seems that communities in Vietnam and Zimbabwe perceive to have certain understanding of nutrition, although the participants in Vietnam do not have knowledge on what nutrients are and what nutrients specifically contribute to their health.

In **Myanmar**, most of the participants cited insufficient food availability and inaccessibility to diverse diets as main causes of malnutrition in their communities. They are concerned about the safety of the food that comes from their farms and the markets as they are aware that this has an impact on nutrition. They mentioned several practices that contribute to malnutrition such as the use of vegetable seeds from Taiwan which are heavily applied with commercial pesticides and fertilizers, and the consumption of processed and canned foods that are cheaper compared to fresh meat and poultry. They also reported that malnutrition persists in their communities due to lack of government support on nutrition education in general. According to them, the limited support from governmental nutrition programs is focused on pregnant women and children. The rest of the community has limited access to governmental nutrition programs and, consequently, is less aware of the nutritional impacts of their food choices. The nutritional value of NUS, however, is more known by old people than the younger generation. Some old men and women attribute their good health to their consumption of NUS, which they also use for medicinal

¹⁵ The FGDs undertaken in Son La Province during the two periods provided different findings on household income.

purposes. NUS used as medicines are most helpful during hunger periods when money is tight. In general, however, the practice of using NUS as medicines has declined since people prefer to purchase medicines from pharmacies. In addition, communities also use NUS as shampoo, timber for furniture, firewood and charcoal, and animal feed.

The local perceptions on nutrition in **Peru** were based on FGDs about causes of malnutrition. The main indicated causes in the different communities were pollution, such as littering and animal faeces, lack of education and resources, such as lack of money, sanitary infrastructure and information on hygiene. Additional causes mentioned were lack of consumption of local wild foods and the occurrence of plagues and diseases in cultivars.

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 preservation 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**, women perceived to have 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. The women obtained their health and nutrition knowledge from the community health workers and caregivers.

Given these results, it is certainly necessary to develop an educational program on nutrition and healthy diets for the studyproject sites, where farmers could receive substantial information regarding proper nutrition and health, including campaigns on sanitation and proper food handling, reaching out to inclusive for all members of the community.

3.3 THE HUNGER PERIODS

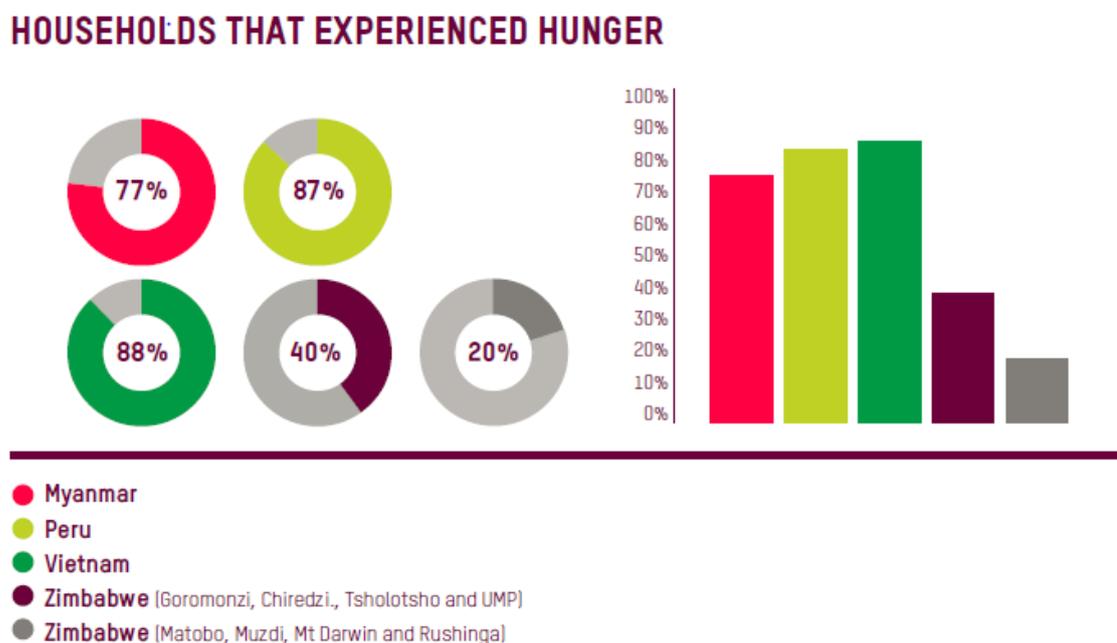
The findings show that the definition of hunger is invariably related to the staple food. For instance, in Myanmar and Vietnam, hunger was often defined as the absence of the staple food rice, whereas vegetables are used to 'substitute' the staple food. The interventions should therefore contribute to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

The meaning of the term "hunger" appeared controversial, and should therefore be understood as equaling food scarcity (while there is a shortage of the main staple food during the "hunger" period, there are coping strategies that allow households not to be hungry during this period). Despite this controversy the term "hunger" is maintained, since it was used in the questionnaires informing this technical report.

Communities in **Myanmar** consider a hunger period when rice, the staple food, is absent in their households. Rice is both part of their diet and a commodity which they sell, the income of which is used to buy or provide for their other needs. Hunger periods in the villages are in line with the harvest cycle of rice and other crops. The period is usually between the time when the products harvested from the previous cropping season have already been used and before the next harvesting will occur. Of the 179 surveyed households, 77% recalled to have experienced food

inadequacy at least once within the past five years, and 18% three times or more (Figure 1, Table 4). In **Peru**, most households (87%) reported that, during the last year, there was at least one hunger period and 30% reported that they experienced three or more hunger periods per year. In **Vietnam**, the proportion of households facing hunger periods in the past year was 88%. Participants generally agreed on the regular occurrence of the hunger period. According to the responses to the questionnaire, at least 2% 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. In **Zimbabwe**, when asked if they faced hunger periods in the past year, approximately 40 percent of the respondents replied positively in Goromonzi, Chiredzi, Tsholotsho and UMP districts. In Matobo, Mudzi, Mt Darwin and Rushinga districts, household food insecurity levels were only assessed over a 30 days period, using the Household Hunger Scale (HSS). Over 80% of the households in the sample reported that they had little or no hunger according to the HHS standards, although the data was collected in what they considered as the hunger period. This result might be related to the stigmatization of the word “hunger” among farmers. For instance, they explained that they suffer from food scarcity periods, whereas they consider hunger a more severe condition related to extreme poverty.

Figure 1¹⁶



¹⁶ Surveys in Myanmar asked about hunger during the last five years, while surveys in Matobo, Mudzi, Mt Darwin and Rushinga districts in Zimbabwe asked about hunger during the last 30 days.

Table 4 ¹⁷

TIMING AND DURATION OF THE HUNGER PERIOD

	JAN	FEB	MARCH	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	
Zimbabwe	RAINY SEASON			DRY SEASON								RAINY SEASON	
Chiredzi	[Grey]			[Grey]									
Goromonzi	[Grey]			[Grey]									
Tsholotsho	[Grey]	[Grey]									[Grey]		
UMP	[Grey]			[Grey]									
Vietnam	DRY SEASON			RAINY SEASON								DRY SEASON	
Ha Giang	[Grey]			[Grey]									
Lao Cai	[Grey]			[Grey]									
Son La	[Grey]			[Grey]									
Peru	RAINY SEASON			DRY SEASON								RAINY SEASON	
Middle Keshua zone	[Grey]			[Grey]									
Upper Puna zone	[Grey]			[Grey]									
Myanmar	DRY SEASON				RAINY SEASON					DRY SEASON			
Ayeyarwaddy, coastal	[Grey]			[Grey]									
Ayeyarwaddy, lowland	[Grey]			[Grey]									
Southern Shan	[Grey]			[Grey]									

3.4 HOUSEHOLD SOURCES OF FOOD

In all countries, except Myanmar, it was indicated that most food products were homegrown. Additionally, food was acquired through fishing, hunting and gathering from the wild. In Myanmar 41% of the respondents indicated that they obtained most food through purchasing, but also participants in the other countries regularly obtain foods from the local markets. In Peru an important and culturally imbedded way of acquiring a wider diversity of food is to barter. Respondents in Zimbabwe were the only ones that indicated that they also obtained food through food aid.

While farming and, in some areas, fishing are the main livelihood activities in the project communities in **Myanmar**, rice, corn and other vegetables are cultivated in farmers' own lands; and complemented by purchased food (41% of households reported that a common means of obtaining their food is by purchasing). Households purchase both fresh and processed foods such as noodles, bread, candies, cookies and juice. Meat like chicken, duck, pork and beef is mostly purchased, but there are households that raise poultry and livestock for their own consumption. During the summer season, rats that can be found in surrounding paddies are caught, fried and served with toddy palm liquid. Eggs are mostly bought. The relatively high level of food purchasing could be due to availability of varieties of foods that include ready-to-cook (pre-cut, marinated, etc.) and even cooked and prepared food that can be found in local markets. Mobile markets and ambulant vendors are considered as important channels to attain a more diversified diet. Cultivated food stemming from own farms is the second most common

¹⁷ Based on key informant interviews in Zimbabwe, and household surveys in Vietnam, Peru and Myanmar.

means of obtaining food (34%) followed by gathering, hunting and/or fishing (21%). Borrowing, bartering /exchanging is practiced by only 4% of the households.

For **Peru**, the results suggest that in the hunger period households with a high dietary diversity score combine more intensively self-production with purchase and barter to get a wider diversity of food. The amount of food items belonging to some specific food groups (cereals; vitamin A rich vegetables and tubers; spices, condiments and beverages and legumes, nuts and seeds) that are self-produced is higher in these households than in those households with a lower dietary diversity score. The main foods provided through barter are vegetables, fruits and spices, condiments and beverages. The same information was assessed for the abundance period and the results once again showed that households with a high HDDS combine more intensively self-production with purchase to get a wider diversity of food. During the abundance period the barter market seems to be used only to obtain fruits by the households with the highest HDDS and spices and condiments by all households. However, the main source of vegetables is purchase for several reasons: July and August are the months of abundance because the harvest of the staple foods just took place, but it is also the dry season, so it is harder to grow vegetables. Also, this is the period when the households diversify their activities, especially with tourism and making handicrafts, and thus have a higher income.

The communities in the three communes of **Vietnam** identified four major sources of food: homegrown, collected from the wild, purchased, and purchased on credit. 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* Pierre), bitter vegetable, red sour vegetable, centella (*Centella asiatica* [L.] Urban), *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. 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 FG 16), which they purchase. They also purchase bread, which is consumed on very rare occasions, as well as rice during the hunger period when own stocks from the harvest run out (either with cash or credit).

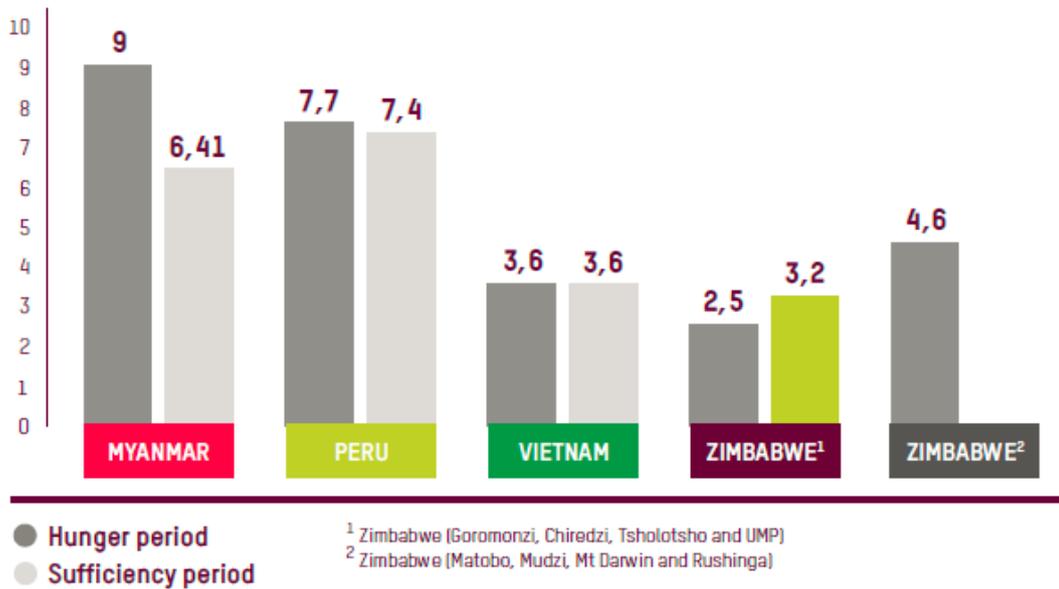
In **Zimbabwe**, the results indicated three sources of food: produced at household level, obtained through food aid, and obtained from the market. Most of the foods found in the daily household diet are produced at the household level. However, due to recurrent droughts and related food insecurity, many affected households receive food aid from the government and aid agencies. Certain types of food are not locally produced and must be bought in 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%) followed by sales from crop production (13%) and sales from poultry production (7%). The people in UMP normally gather wild fruits. It was also pointed out by key informants that people could be encouraged to make use of locusts, *nhowa* (a type of caterpillar), okra, blackjack, wild okra 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. Maize is grown by 90% of the baseline respondents from Matobo, Mudzi, Mt Darwin and Rushinga districts, because it serves both as a food and cash crop.

3.5 DIETARY DIVERSITY

The results of the household dietary diversity scores showed that cereals and vegetables were present in the diet of surveyed households in all four countries, but meat and dairy products were consumed by 50% or less households.¹⁸ When comparing the average HDDS between the four countries some differences can be observed (Figure 2, Table 5). It seems that people in the surveyed communities in Myanmar and Peru have a significantly more diverse diet than the people from communities surveyed in Vietnam and Zimbabwe. This does not correlate with the perceived local knowledge levels on nutrition described in the previous paragraphs. A possible explanation for the lower HDDS scores could be that the people in Vietnam have a limited consumption of white roots and tubers, vitamin A rich vegetables and tubers, and fruits; while farmers in Zimbabwe do not have adequate access to organ meat, eggs, fish and sea food. It seems that people in Myanmar actually increased their dietary diversity during hunger periods as compared to the sufficiency period from 6.4 to 9, which could be related to the increased consumption of NUS as part of their coping strategies. In Vietnam and Peru the dietary diversity score remained similar in both periods, averaging 3.6 and 7.6 respectively, although there was a reduction in the consumption of animal protein in the hunger period. Table 5 gives an overview of the main food groups that are consumed per country per period.

Figure 2.

AVERAGE HDDS SCORE BY COUNTRY DURING HUNGER AND SUFFICIENCY PERIODS



¹⁸ The absence of dairy products in Myanmar and Vietnam might partially be explained by the lactose intolerance of many Asian people.

Table 5¹⁹

MAIN FOOD GROUPS CONSUMED DURING THE SUFFICIENCY PERIOD (SP) AND HUNGER PERIOD (HP).

NUMBER	FOOD GROUP	MYANMAR		PERU		VIETNAM		ZIMBABWE (GOROMONZI, CHIREZI, TSHOLOTSHO AND UMP)		ZIMBABWE (MATOBO, MUDZI, MT DARWIN AND RUSHINGA DISTRICTS)
		SP	HP	SP	HP	SP	HP	SP	HP	HP
F61	Cereals									
F62	White roots and tubers									
F63	Vitamin A-rich vegetables and tubers									
F64	Dark green leafy vegetables/									
F65	Other vegetables									
F66	Vitamin A-rich fruits									
F67	Other fruits									
F68	Organ meat									
F69	Flesh meat									
F610	Eggs									
F611	Fish and seafood									
F612	Legumes, nuts and seeds									
F613	Milk and milk products									
F614	Oils and fats									
F615	Sweets									
F616	Spices, herbs and beverages									

In **Myanmar** the top five food groups consumed during both periods were cereals (FG 1), other vegetables (FG 5), vitamin A-rich vegetables and tubers (FG 3), dark green leafy vegetables (FG4) and fish and seafood (FG11). These food groups comprise the regular diet in Myanmar. Organ meat (FG 8) and milk/milk products (FG 13) were the least consumed.

In **Peru** all participants indicated the use of spices, condiments and beverages (FG16) and almost all households indicated that they consumed other vegetables (FG5) and white roots and tubers (FG2). The fourth most mentioned food group was cereals (FG1). No differences have been found in the HDDS, depending on whether the head of household is a man or a woman.

In **Vietnam**, cereals (FG1), dark green leafy vegetables (FG4) and oils and fats (FG14) were the most consumed groups.

¹⁹ All study sites used 16 food groups for the calculation of the HDDS, except for Goromonzi, Chiredzi, Tsholotsho and UMP districts in Zimbabwe that used only 12 food groups. Only food groups that were consumed by 50% or more households are highlighted in the table; with the exception of Myanmar that presents the most consumed food groups during each period.

In **Zimbabwe**, the lowest HDDSs were observed in Goromonzi, Chiredzi, Tsholotsho and UMP districts with an average of 3.2 in the sufficiency period and 2.5 in the hunger period; i.e. the already limited consumption of meat and vitamin A rich fruits were eliminated during times of hunger. The lower scores of these districts may be explained by the fact that the calculations were done on the basis of 12 FGs instead of 16. In Matobo, Mudzi, Mt Darwin and Rushinga districts the survey was only performed during the hunger period.

3.6 COPING STRATEGIES TO DEAL WITH HUNGER PERIODS

In **Myanmar**, the most common coping strategies during hunger periods were: relying on less preferred and less expensive foods; purchasing food on credit; borrowing food or relying on help from friends or relatives; and gathering wild food, hunting, or harvesting immature crops (Table 6). During hunger times, adult women are the most vulnerable members of the household, as they are usually the ones who forgo meals or consume less just to ensure that the households are not totally without food.

The main reported food coping strategies facing hunger periods in **Peru** were the use of barter markets, *ayni* (a reciprocal exchange of food and work time between family and community members) and borrowing from relatives. These strategies are both based on the traditional principles of solidarity and reciprocity between the community members; as well as on the socio-ecological complementarity between communities located in different altitudes. Additionally, especially in the communities located at higher altitudes, households generate extra money to buy food. As potato, which is the staple crop, can only be cultivated once a year, many households have a member who takes up work outside the community to have additional income before and after the potato harvest. In order to supplement meals, households purchase what they cannot produce themselves. In Peru, the survey results also showed that, apart from increased consumption of wild plants, another coping mechanism during periods of scarcity was to consume parts of regular crops (in particular, leaves) not consumed in the sufficiency period. 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 leaves) in household diets showed the importance of these stigmatized plants in households' food security in periods of stress.

In **Vietnam**, the three most common coping strategies identified in the baseline survey were: to borrow food, or rely on help from a friend or relative; to purchase food on credit; and to gather wild foods, hunt or harvest premature crops. Other strategies used by farmers were to look for paid work, to sell local products, and to consume substitute foods such as corn, cassava and forest products. In general, in the hunger period, all family members in the three sites are affected by food shortage.

Table 6²⁰

COPING STRATEGIES TO DEAL WITH SEASONAL HUNGER

COPING STRATEGIES	MYANMAR		PERU	VIETNAM		ZIMBABWE
	adult male	adult female	household	adult male	adult female	household
Rely on less preferred and less expensive foods?	●	●	●	●	●	●
Borrow food, or rely on help from a friend or relative?	●	●	●	●	●	●
Purchase food on credit?	●	●	●	●	●	●
Gather wild food, hunt, or harvest immature crops?	●	●	●	●	●	●
Consume seed stock held for next season?	●	●	●	●	●	●
Send children to eat with neighbours?	●	●	●	●	●	●
Limit portion size at mealtimes?	●	●	●	●	●	●
Restrict consumption by adults in order for small children to eat?	●	●	●	●	●	●
Feed working members of HH at the expense of non-working members?	●	●	●	●	●	●
Ration the money you have and buy prepared food?	●	●	●	●	●	●
Reduce number of meals eaten in a day?	●	●	●	●	●	●
Skip entire days without eating?	●	●	●	●	●	●
Other/undefined	●	●	●	●	●	●

● Mentioned by 10% or more households ● Mentioned by less than 10% of households ● Not mentioned

²⁰ Only the questions included in the questionnaire are presented in the table; some communities mentioned additional coping strategies. In Zimbabwe, the exercise was conducted only in Goromonzi, Chiredzi, Tsholotsho and UMP districts, and the questions were answered only by households that indicated perceiving the presence of a hunger period.

The majority of the respondents in Goromonzi, Chiredzi, Tsholotsho and UMP districts in **Zimbabwe** did not specify their coping strategies²¹. Among those who did specify their coping strategies during the hunger period, the three most used strategies were: to reduce the number of meals eaten in a day; to borrow food, or rely on help from friends or relatives; and to limit portion sizes at meal times. In addition to these coping mechanisms, a highly varying number of the people in these districts received food aid and several households indicated that they receive remittances from family members living in Botswana or South Africa. The findings from this research question were not strong for Matobo, Mudzi, Mt Darwin and Rushinga districts either. The questions in the household survey asked respondents to reflect only on hunger experienced and coping mechanism during the last 30 days²², so the results are not presented in the comparative table. The most frequently mentioned livelihood coping strategies were begging; reducing non-food expenses in order to buy food; sell animals (more than usual); and withdraw children from school.

Overall it seems that especially Peru has a very well-established cultural system to deal with both periods of hunger, as well as the general fluctuations in food production and availability in the different agro-ecological zones of a region. The other countries showed a more *ad hoc* adaptation to food insecurity, where food could be borrowed from friends and relatives or where food can be bought on credit. Additionally, all of the surveyed regions use the gathering of wild foods as a coping strategy for periods of food insecurity, showing that NUS can be an essential part of the diet during the hunger period.

3.7 GENERAL ASPECTS OF NUS

The findings in Myanmar, Peru, Vietnam and Zimbabwe clearly show that communities rely on a number of wild plants²³ and minor crops²⁴ for households' food and nutrition security throughout the year. Furthermore, an 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 crops (such as cowpea and pumpkin leaves), were observed particularly during the period of 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 social stigma, the communities resort to using such plant parts (e.g. leaves) as food only when other vegetables are scarce. The survey also noted that, as a coping mechanism, communities use 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 Myanmar, Peru, Vietnam and Zimbabwe produced an extensive list of wild plants and minor crops that are important during both periods of hunger and sufficiency: 66 in Myanmar; 78 in Peru; 43 in Vietnam and 46 in Zimbabwe. Besides plants, these numbers include a wide variety of edible mushrooms and animals as well, such as boletes, Guinea fowl, rabbits, locusts and other insects. Additionally, participants frequently mentioned medicinal

²¹ The question on coping mechanisms was preceded by a question on whether households experience hunger periods. 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.

²² It is important to note that 'gathering food plants from the wild' was not among the options included in the questionnaire, so it could not capture this information in NPL districts.

²³ E.g. *wild vegetables* such as wild banana flower in Vietnam and cat's whiskers in Zimbabwe.

²⁴ E.g. mustard green in Vietnam and moringa and okra in Zimbabwe.

plants and honey as NUS. There was no clear information for all recorded NUS about what food groups they belong to.

In **Myanmar**, 31 of the NUS were reported to be cultivated, 30 to be collected and 5 to be cultivated as well as collected. Among the species mentioned, there were several common crops such as millet, sweet potato, eggplant, cherry tomato and cucumber, alongside many indigenous NUS (however, these have not been identified yet). In **Peru** most of the NUS were collected from the wild. Several Brassicaceae species and edible mushrooms figure as part of the lists of NUS that are most important for the communities. In **Vietnam** many of the NUS that could be identified were food plants. Some examples of important food plants in the programme areas in Vietnam include wild banana flower (*Musa acuminata* Colla) and centella (*Centella asiatica* [L.] Urban), as well as mustard green (*Brassica juncea* L.). According to participants, they do not cultivate NUS because they are plentiful in nature (e.g. fern vegetable and bamboo shoot); and NUS plants that are grown in home gardens do not grow as well as, and do not have the good taste of NUS growing in forests. The surveys in Goromonzi, Chiredzi, Tsholotsho and UMP districts in **Zimbabwe** listed the NUS according to tree larger groups: animals/birds/insects; vegetables; and wild fruits. Black jack (*Bidens Pilosa* L.) and cat's whiskers (*Cleome gynandra* L.), both collected, were ranked by the communities as the most important vegetables. For Matobo, Mudzi, Mt Darwin and Rushinga districts there was no list with NUS produced. However, other results showed that the FG "other fruits", followed by "spices, beverages and condiments", "sweets" and "white roots and tubers", included plants gathered from the wild.

In general, 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).

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.²⁵ Species that are classified as NUS, such as *oca* (*Oxalis tuberosa* Molina) and *mashua* (*Tropaeolum tuberosum* Ruiz and Pavón), 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. In Zimbabwe, when communities were asked what is understood as NUS and requested to identify which of the food plants are NUS, they associated the word 'neglect' with those food plants that were rarely consumed and have almost or totally disappeared locally. 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.

3.8 A GENDER PERSPECTIVE

Although in several communities both men and women have responsibility for the food security of the families, it is often that women are in charge of the collection and preparation of most of the NUS, as well as the crops that grow close to the home. Men would be responsible of the cash crops, hunting, and collection of NUS that are difficult to access.

²⁵ According to the SD=HS Programme's working criteria of NUS.

According to the research participants in **Myanmar**, both men and women are responsible for their families' economic needs. They are both involved in ensuring that there is food in the kitchen though their roles are different. Men are responsible for providing for the family through farming or fishing. They make the decisions on what to plant, and on crop management (e.g. watering, fertilizing, control of pests and diseases). Women, on the other hand, decide on what the family eats and ensure that there is enough diversity in the household's diet. They are also responsible for food preparation, including food processing (e.g. fermented mustard, dry chili and other NUS that can be preserved), raising and selling livestock and poultry, growing vegetables and keeping vegetable seeds for the next planting season. Collection of NUS is done by both husband and wife but the selling is done by women.

In **Peru** there is a network of barter market places where women from the highest communities exchange food products with women from the middle and lowest communities. These markets, that take place once a week, enable households getting diversified foods growing in different agro-ecological areas. The way these barter markets work enhances the traditional social relationships that have been crucial for the local resilience of Andean inhabitants to the environmental and economic disturbances. These relationships are still based on kinship systems, family alliances, social networks and ancient practices of reciprocity and redistribution.

The gender roles related to agriculture varied among ethnic groups that participated in the survey in **Vietnam**. In the Dao and Tay families the division of labour was equal, while within the H'Mong families, women performed more tasks than men. According to participants, while both men and women collect NUS plants, women played a more important role because collecting some NUS (e.g. small shrubs) requires patience and meticulous work. Besides, women know deeply about which NUS plants are used for medicine and making wine, especially female elders of the Dao and Tay ethnic group. In food preparation, women cook dishes from vegetables and NUS very well while men often know how to cook dishes from meat. Additionally, men often collect NUS that are abundant in the wild such as bamboo shoots, and from tall trees (they explained that women cannot climb them).

In **Zimbabwe**, crops grown in home gardens – such as vegetables, sweet potatoes, cow peas, peanuts – are classified as women's crops. Gender roles in crop and variety selection differ from district to district, although in general the FGDs agreed that most of the household seed issues are handled by women farmers. Both men and women discuss possible crops to grow depending on the climate predications as well as the availability of seed. But men, who may consult women, have the final say on crop and variety selection. Women tend to follow after whatever crops the male family member has decided. In men-headed households, men give women the piece of land where they can plant women's crops. In some instances, men may chip in with their labour. Women control most food crops but when it comes to cash crops, men do the marketing and 'banking' of the money. Women also have the responsibility to store seed safely, e.g. in kitchens and the granary.

4. CONCLUSIONS

The baseline survey helped to understand the current food supply conditions of communities, in particular the role of NUS in periods of hunger and sufficiency, and the role of women farmers in improving food biodiversity of the communities. It provided knowledge on the communities' dietary diversity, and this knowledge was used for planning the programme interventions and policy agenda during Phase 1 of SD=HS.

The baseline survey observed that the majority of the participants in the study feel that they have too little knowledge on nutrition and the importance of a diverse diet, although they suffer from hunger periods, particularly before the harvest of the staple crop. This is supported by the findings from the household dietary diversity score, which showed that several of the participating communities had a focus on the intake of staple food, while other nutritionally important food groups were not prevalent in their diets. It was actually during the hunger periods that some people diversified their diets, partially because of wild food gathering. Certainly, NUS play an important role as part of the coping strategies that households use to deal with hunger periods, but many of the wild plants and minor crops cited in Myanmar, Peru, 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. Further research into the use of NUS is therefore necessary. This lack of attention might be because most of the knowledge on NUS is held by women, who – although responsible for the diet and nutrition of their families – are often neglected by agricultural agencies.

The focus of SD=HS' Pillar 3 'Women, Seeds and Nutrition' on empowering women as catalysts for biodiversity-based diets is a crucial strategy for ensuring the adequate nutrition of IPSHF. The baseline once confirmed that the Programme has to build on the position and agency of women as managers of biodiversity in household and community food security, and their knowledge on NUS, food sources and nutrition.

5. RECOMMENDATIONS

5.1 FUTURE STUDIES AND INTERVENTIONS

This report concludes with some recommendations for future interventions. The Programme can play a significant role in raising awareness of and appreciation for the value of wild plants and minor crops, and the value of maintaining the associated knowledge, as well as for countering the social stigma attached to the use of certain wild plants, minor crops and certain parts of regular crops that are consumed during the hunger period. Programme interventions should build on women's knowledge and skills in relation to NUS and nutrition, and help them to address the challenges they face. Women should also be involved in identifying and addressing options to increase the processing, preparing and 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.

In addition to dealing with hunger periods which occur every year and at an expected time or season, there should be measures that would increase community resilience when facing hunger periods caused by (or exacerbated by) climate-related disasters. Heavy storms, extreme droughts, diseases and pests can impact heavily on community and household food supplies. In disasters like these, the hunger period may last almost indefinitely. Household food reserves may run out, external sources may become inaccessible or even wiped out, and materials or resources to grow food may be in short supply. Thus, interventions that will result

in improved management of complementary community resources and preparedness need to be in place.

Based on the baseline findings, the implementation of the following activities is recommended:

- To explore the potential of NUS to address the nutrient gaps at the household level. For example, household access to fruits through homestead production could be an important pathway for 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 additional critical food groups currently lacking in the diet in order to increase dietary diversity, both during the hunger and the sufficiency periods.
- To conduct farmer field schools on NUS production, preparation and management. As NUS are part of the diet and livelihood of the communities and play a key role during the hunger period, it is in the communities' best interests to properly conserve and sustainably manage them. In case certain NUS may be freely and readily available in areas accessible to the communities, measures must be taken to ensure that they remain to be in abundance.
- To develop a programme on nutrition and health for all, where farmers could learn about nutrition and identify problems and solutions for healthy diets. These trainings should be participatory and experiential, reaching out to all members of the community. The program could include campaigns on sanitation and proper food handling, inclusive for all members of the community and not limited to a specific audience only.
- To enhance women's knowledge, skills and agency. Women need to be empowered in order to maximize the resources they have. By providing them with appropriate knowledge and skills on NUS, their cultivation, management, food processing and preparation, among others, women will be better equipped in managing their households' food security. However it is important to take into account that such interventions must be gender-transformative rather than gender-confirmative, to avoid strengthening any existing power imbalances.
- To identify and support the implementation of legal frameworks, policies and financial incentives that promote the use of NUS and encourage agricultural diversification.

Further studies are recommended on the following:

- The documentation of NUS, their nutritional values and dietary benefits. The NUS identified by the communities as the most important to them need to be studied further to determine what species they are, what their current and potential value and contribution to nutrition is.
- The linkages between the communities' knowledge of NUS and their cultural values in the different natural ecosystems or agro-ecosystems where they grow, in order to promote their further use in culturally fitting ways;
- The limited access of farmers to certain NUS because of entitlements (access to private and communal land) and cultural barriers (stigmatization, cultural norms), taking a gender approach.
- The assessment of options to increase the market competitiveness of certain NUS, given the importance of NUS for the generation of additional income or alternative cash through their sale during periods of scarcity.
- The understanding of more specific gender roles related to NUS (which could vary per species, environment and socio-cultural group), and intra-household distribution of food.

5.2 METHODOLOGICAL RECOMMENDATIONS

Lastly some recommendations are made regarding the improvement of the methodologies:

- The application of the same methods, sampling strategy and reporting structure within and across countries allows for a better comparison of the results. This can be done by preparing a global database and a reporting template, while also leaving space for country-specific information and adjustments.
- Voucher specimen collections should be made to ensure the taxonomical identification of NUS used by the communities.
- Furthermore, the identification of the scientific names of NUS will be useful for finding information about their nutritional values. When information about nutritional values is not available, laboratory analysis should be conducted.
- Indices such as the Months of Adequate Household Food Provisioning (MAHFP) and the Household Food Insecurity Access Scale (HFIAS) could be used to measure aspects of food and nutrition security, alongside the assessment of the nutrient adequacy of local diets, and use of anthropogenic indicators to define the incidence of stunting, wasting and underweight among children.
- It is also necessary to capture the diversity of food items within each food group, and the role that NUS play to diversify the diet: not only by increasing the number of food groups, but also by ensuring diversity of food products within each food group during both hunger and sufficiency periods.
- The term “food scarcity period” could be preferred to “hunger period” for future surveys, given sensitivity around the connotations of “hunger” for some IPSHF.
- The list of coping strategies provided in the household questionnaire has to be revised to include other strategies (e.g. participation in barter markets) that are also important for IPSHF.
- As the term “NUS” is confusing for local communities, it would be useful to better understand how IPSHF classify local food plants and how local classifications are related to the Programme’s definition of NUS.

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For more information, or to comment on this publication, please email gisella.cruzgarcia@oxfamnovib.nl

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Published by Oxfam Novib. December 2018.

Oxfam Novib
P.O. Box 30919
2500 GX The Hague
The Netherlands
T +31 (0) 70 3421621
info@oxfamnovib.nl
www.oxfamnovib.nl