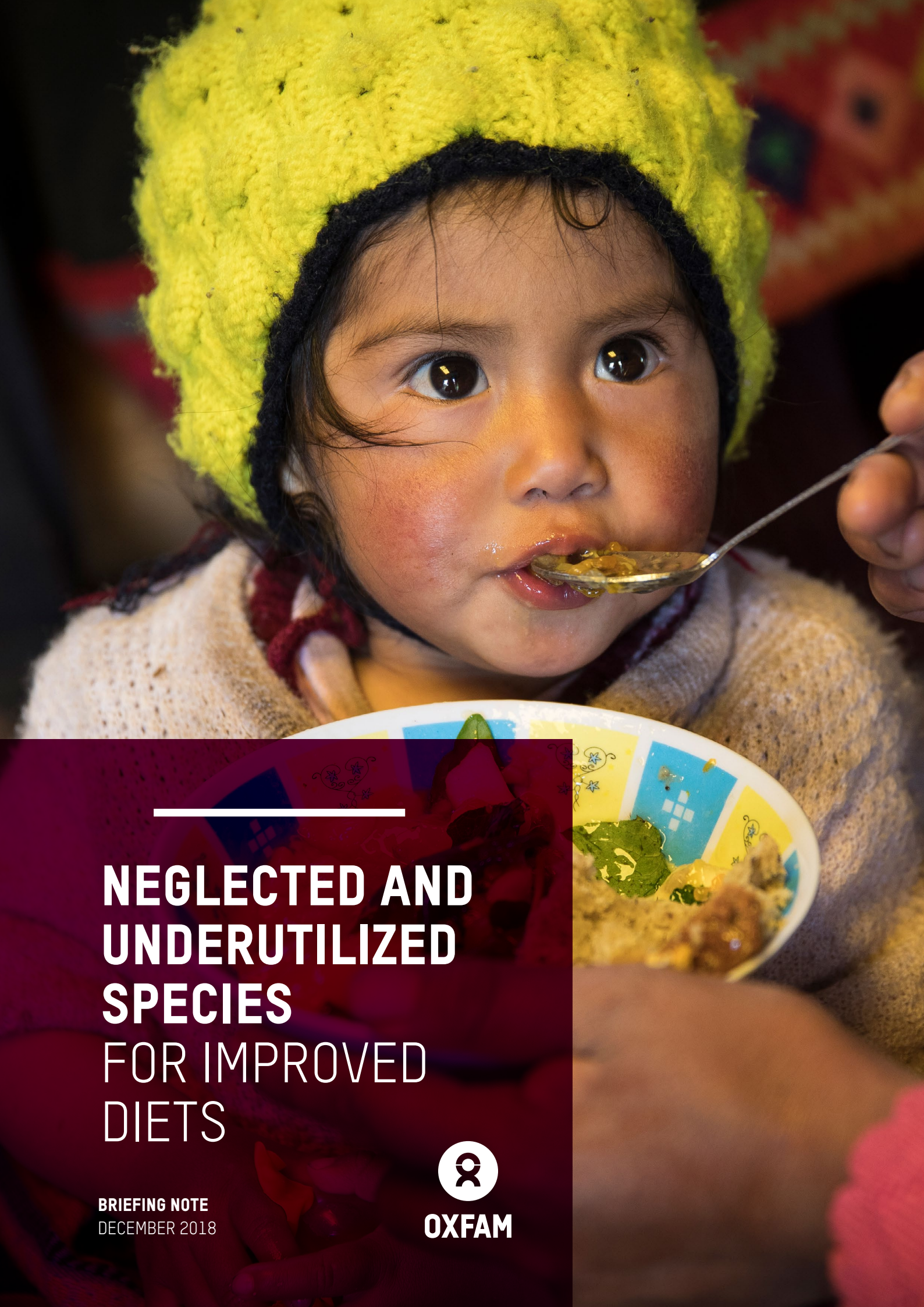

NEGLECTED AND UNDERUTILIZED SPECIES FOR IMPROVED DIETS

BRIEFING NOTE
DECEMBER 2018

OXFAM

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Photo cover

Ilvy Njiokiktjien/Oxfam Novib
Santusa Hualpa participates in nutrition trainings. This training is focused on increasing the nutritional value of local dishes. At the end of the training, Santusa feeds her daughter Yony.

Design

Sazza

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The findings of the baseline survey conducted in Myanmar, Peru, Vietnam and Zimbabwe during the first phase of the Sowing Diversity = Harvesting Security (SD=HS) Programme (2014-2018) showed that indigenous peoples and smallholder farmers (IPSHF) from surveyed communities feel that they have insufficient knowledge on nutrition and the importance of diverse diets, although they suffer from hunger periods, particularly before the harvest of the staple crop. This is supported by the results of the household dietary diversity score exercise, which showed that IPSHF mainly focused on consuming staple food, with other nutritionally important food groups present in their diets only to a limited extent. It was during the hunger periods that some of them diversified their diets, for example by including wild food plants.

This study highlights that neglected and underutilized species (NUS) play an important role in diversifying the diets of IPSHF, in particular as part of their coping strategies during the hunger season. However, many of the wild plants and minor crops cited by participants in the study have not yet been covered by mainstream agricultural research, and are frequently not recognized in the context of food and nutrition policies at the national level. Although the use and value of these plants – including their potential role in ensuring food and nutrition security – are clearly familiar to the communities concerned, more needs to be done to enhance knowledge. The current lack of attention might be influenced by the fact that most of the knowledge on NUS is held by women: although responsible for the diet and nutrition of their households, they are often neglected by agricultural agencies.

The study suggests ways to build on people's traditional knowledge on NUS to strengthen their food and nutrition security and resilience in the face of climate change. It recommends providing better education on nutrition to IPSHF, taking into account their local resources and being respectful of their cultural identity. Finally, the findings emphasize the need to empower women as catalysts for more biodiversity-based diets to ensure adequate household nutrition.

INTRODUCTION

Women play a key role in safeguarding the nutrition of their households, and a portfolio of NUS diversifies their food and nutrient sources. Several NUS are rich in particular nutrients, such as vitamin A, that might otherwise be absent from the diet; examples include "berro" *(Nasturtium officinale* R.Br.), which is traditionally consumed by local communities in the Peruvian highlands. Gender mediates relations among people, and between people and the environment, by determining the knowledge and values related to plant genetic resources in general, and to NUS in particular, and their use and management. For example, women's and men's roles, status and expectations would influence who holds knowledge about the characteristics of "berro", how to gather it, and who prepares it as part of a meal. Although NUS have great potential for improving the diet and nutrition of IPSHF, especially during the hunger season, there is a scientific and commercial lack of interest in them, mainly because the people for whom these species are particularly important are marginalized and often impoverished.

The SD=HS programme's working definition of NUS includes these characteristics:

- NUS are important to the food and nutrition security of IPSHF, particularly in relation to women's integrated biodiversity management strategies.
- NUS are part of people's cultural identity and their use is embedded in traditional social relations and knowledge systems (e.g. folk taxonomy, collection, management, processing of NUS); NUS often have multiple uses for human well-being (e.g. food, medicinal and spiritual purposes).
- There is little or no research into, commercial interest in, or interest in *ex situ* conservation of NUS species.
- There is a lack of technical knowledge and access to seeds and other plant parts that would be necessary for the propagation, multiplication and sustainable harvesting of NUS.
- NUS include domesticated, semi-domesticated and wild species.
- NUS are often adapted to local environmental conditions, i.e. produced or gathered from a diverse range of traditional anthropogenic[1] and non-anthropogenic environments, which include not only the farming system (agricultural fields, agroforestry and silvo-pastoral systems, fallow fields, home gardens), but also grasslands, forests, wetlands, riversides, mangroves and roadsides.

[1] Anthropogenic environments are the ones influenced by humans, i.e. through management.

SD=HS Pillar 3, 'Women, Seeds and Nutrition', focuses on empowering women as catalysts for more biodiversity-based diets. This is crucial for ensuring the adequate nutrition of IPSHF, but requires answers to the following questions: What do IPSHF understand by the term nutrition? Do IPSHF suffer from hunger periods? What strategies do households use to cope with hunger periods? What are their sources of food and nutrition? To what extent do IPSHF have diverse diets?[2] What is the role of NUS in the food and nutrition security of their communities? What are the roles of women in safeguarding food and nutrition security at the household level?

A baseline survey to attempt to answer these questions was conducted in 2014-2016 by the *Asociación Para la Naturaleza y el Desarrollo Sostenible* (ANDES) in Peru, the Community Technology Development Trust (CTDT) in Zimbabwe, the Southeast Asia Regional Initiatives for Community Empowerment (SEARICE), the Metta Development Foundation in Myanmar, and the Plant Resources Center (PRC) in Vietnam, in collaboration with Oxfam Novib. Its objectives were to better 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 diversity in their communities; and to generate data on the communities' dietary diversity, on the basis of which it would be possible to assist them to improve their diets. The baseline survey served as a major input in defining the programme interventions of Oxfam Novib and partners in IPSHF communities, and developing a policy agenda during the programme's first phase.

The detailed results of the baseline survey were consolidated in a global technical report. This Briefing Note is based on its main findings. The aim is to raise awareness, stimulate discussions and trigger feedback from a wider audience of stakeholders on the role of women in improving nutrition by increased use of NUS.

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

During a training day in Zimbabwe, women cook and eat together. With local nutritionists, they discuss the importance and cooking methods for diverse and healthy food. The women in the picture are cooking *sadza* (grain porridge).

Photo: Sacha de Boer/Oxfam Novib

INDIGENOUS PEOPLES AND SMALLHOLDER FARMERS IN THE PROGRAMME

Indigenous peoples and smallholder farmers (IPSHF) surveyed in Ayeyarwaddy region, Myanmar, live in lowland and coastal areas and rely on rice farming and fishing to sustain their livelihoods. During the summer women engage in fishing and collecting firewood, fruits and leaves from mangroves and sea weeds from the sea. The farmers from Southern Shan State who participated in the survey generally inhabit upland areas, where farms are mostly rain-fed and winters are very cold. Their home gardens are richer during warmer summers and monsoon seasons.

The IPSHF surveyed in the Peruvian *Puna* (a high-altitude zone, more than 3500m above sea level) mostly cultivate roots and tubers, beans, peas and Andean grains; whereas farmers from the *Keshua* (a middle-altitude zone, between 2300 and 3500m above sea level) mainly grow corn associated with pumpkin, peas and faba beans, among other crops. Agriculture is rainfed, but IPSHF use every ecological niche. Most of their harvest is used for subsistence, with only a small part set apart for selling.

The IPSHF in Vietnam participating in the programme live in tropical and sub-tropical zones, and are mainly engaged in rice and cash crop farming. The rice is primarily for home consumption, along with some cultivated vegetables.

The IPSHF in Zimbabwe live mainly in semi-arid zones, some prone to droughts, and are mainly subsistence farmers involved in farming of maize and small grains such as sorghum, pearl millet and finger millet.

The educational level and literacy rates of the surveyed IPSHF showed a large variation, as did gender inequalities. For example, in Peru, 44% of female heads of households reported having no education, compared to 14% of men. Women in the surveyed areas are mainly engaged in farming and household reproductive tasks. Although in some communities both men and women have responsibility for the food and nutrition security of their households, it is more often observed that mainly women are in charge of the collection and preparation of NUS, and the crops grown in their home gardens. Men are generally responsible for hunting, cash crop farming and the collection of NUS in difficult-to-access places such as remote forests.

Indigenous women participating in a Farmer Field School session in North Vietnam.

Photo: Hoang Huy/Oxfam Novib

SURVEY METHODOLOGY

The baseline survey used two tools at community level: (a) a household questionnaire that included a socio-demographic module, questions addressing the hunger period, questions about coping strategies in hunger periods, and questions to enable the Household Dietary Diversity Score (HDDS) to be calculated (Table 1); and (b) focus group discussions that included the establishment of a community resource flow map for NUS. The concept, tools and units of measurement were jointly developed and agreed upon with all partner organizations. Each partner could adapt and test the tools and include specific sections relevant to their own context. Local enumerators were trained by country partners.

For the questionnaire, households were selected randomly in Zimbabwe and Vietnam,[3] by a stratified sampling approach in Peru,[4] and by explicit sampling in Myanmar.[5] In all cases the questionnaires were carried out in both the food sufficiency and hunger periods.[6]

The HDDS reflects a household's ability to access a certain variety of foods.[7] Information on household food consumption during the previous day was collected, and the HDDS score was determined by counting the number of food groups from which food had been consumed. The community resource flow map for NUS consists of a diagram in which focus group participants sketched their farms and the location of additional food sources, and indicated from where they bring each NUS in both the hunger and sufficiency periods.

Country partners analysed the survey and verified the results with the local communities that participated. All baseline country reports were aggregated at global level in a technical report. The general limitations of the methodology are presented in the last section of this briefing note, along with recommendations for their improvement.

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3 From the households that were classified as poor and nearly-poor by the government.

4 Ten percent of the households located in each surveyed community were sampled, allowing comparison of results between the Puna and Keshua zones.

5 Households were selected according to the following criteria: (a) representation in terms of socio-economic standing; and (2) diversity in terms of ethnicity and local situation (in relation to the consumption of food, main occupations, indigenous knowledge and culture).

6 With the exception of Matobo, Mudzi, Mt Darwin and Rushinga in Zimbabwe, where the survey was conducted only in the hunger period.

7 Food and Agriculture Organization (FAO). 2010. Guidelines for measuring household and individual dietary diversity. http://www.fao.org/3/a-i1983e.pdf

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%

Source: Technical Report of the Baseline Survey for Myanmar, Peru, Vietnam and Zimbabwe (Oxfam Novib, ANDES, CTDT and SEARICE, 2018).

TRAININGS ON THE IMPROVEMENT OF NUTRITION ARE NEEDED

Surveyed farmers in Myanmar and Peru indicated that they have insufficient knowledge on nutrition and the nutritional impact of their farming decisions. They argued that malnutrition persists in their communities because of lack of information and government support for activities to improve nutrition and health. Surveyed IPSHF in Vietnam and Zimbabwe perceived that they have a certain understanding of nutrition, although the farmers in Vietnam seemed not to know what nutrients are and which nutrients specifically could contribute to their health. Given these results, it is necessary to develop an educational programme on nutrition and healthy diets for the project sites, 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.

Women focus group discussion on NUS in Myanmar, prior to the development of the resource flow map for NUS.

Photo: Metta Development Foundation

INDIGENOUS PEOPLES AND SMALLHOLDER FARMERS SUFFER FROM HUNGER PERIODS

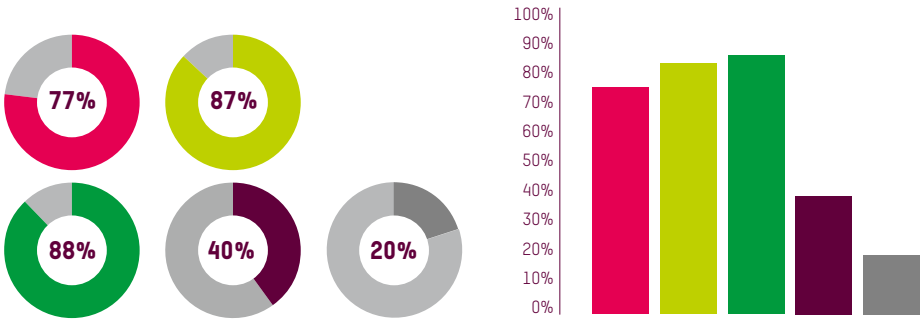
Seasonal hunger is a recurrent, persistent and often silent cycle that affects farming families, especially the poorest of the poor. It usually occurs between seasons, often just before the next harvest when the previous year's food stocks have dwindled, food prices are high and purchasing power is low. Seasonal hunger exacerbates the vulnerability of IPSHF: during this period they either recover or lose assets and slip further into chronic poverty and undernutrition. This cycle is predictable and avoidable, but tends to be overlooked by policy makers and not factored into food insecurity statistics.

Surveyed farmers' definition of hunger appeared to be directly related to the lack of staple food. IPSHF in Myanmar and Vietnam[8] explained that they use vegetables to "substitute" the staple food when it is not available. Future interventions should raise awareness about the importance of a diversified diet, including not only the staple but also other crops and foods that are needed to ensure the intake of a wider range of nutrients. Such a strategy is also crucial to counter another problem – "hidden hunger" related to the lack of vitamins and minerals due to the low quality of food consumed in both the hunger and sufficiency periods.

The survey findings showed that more than 70% of the households in the surveyed communities in Myanmar, Peru and Vietnam have regularly experienced periods of hunger (Figure 1 and Table 2). The number seems to be lower for communities in Zimbabwe, but this result might be related to a different understanding of the word "hunger", including a stigmatizing association with poverty.[9] IPSHF from Myanmar emphasized that adult women are the most vulnerable household members: they are usually the ones who forgo meals or consume less adequate food to make more food available for other household members.

FIGURE 1

HOUSEHOLDS THAT EXPERIENCED HUNGER[10]

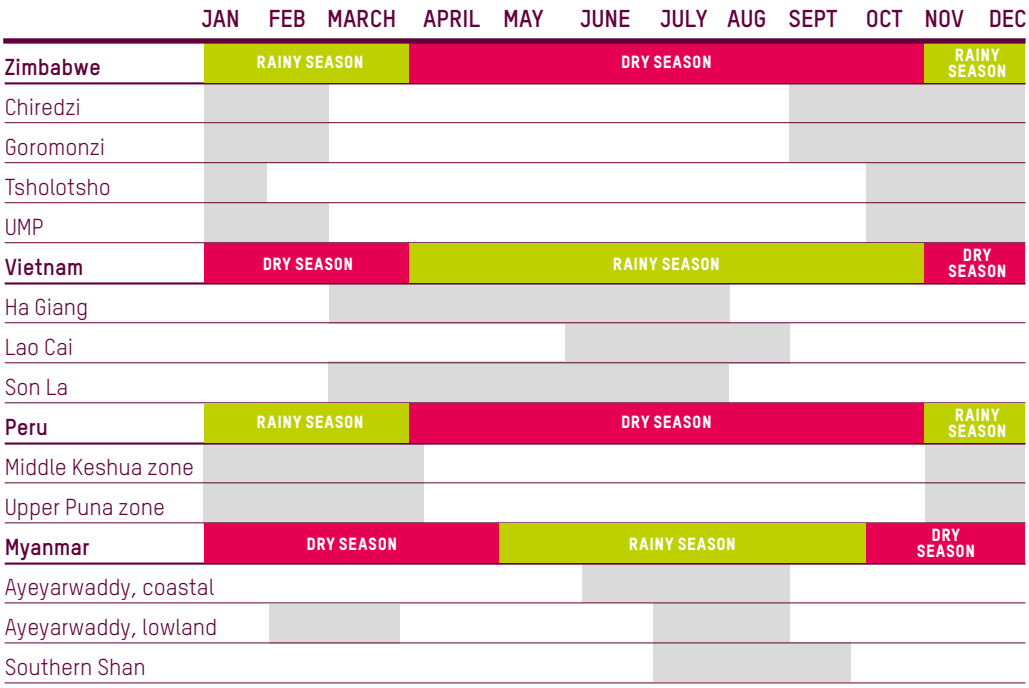


- **Myanmar**
- **Peru**
- **Vietnam**
- **Zimbabwe** (Goromonzi, Chiredzi., Tsholotsho and UMP)
- **Zimbabwe** (Matobo, Muzdi, Mt Darwin and Rushinga)

Source: Technical Report of the Baseline Survey for Myanmar, Peru, Vietnam and Zimbabwe (Oxfam Novib, ANDES, CTDT and SEARICE, 2018).

TABLE 2

TIMING AND DURATION OF THE HUNGER PERIOD[11]



Source: Technical Report of the Baseline Survey for Myanmar, Peru, Vietnam and Zimbabwe (Oxfam Novib, ANDES, CTDT and SEARICE, 2018).

Households employ various strategies to cope with hunger periods (Table 3). Peruvian IPSHF have a well-established cultural system based on traditional principles of solidarity and reciprocity among community members, such as *ayni*; they also take advantage of the socio-ecological complementarity of different agro-ecological zones through participation in barter markets. Surveyed IPSHF in the other countries mainly highlighted ad hoc strategies such as borrowing food from friends and relatives, buying on credit, or relying on cheaper, less preferred foods. Some strategies are serious threats to the nutrition of vulnerable household members, such as limiting the size of food portions, restricting adults' food consumption, feeding working members of the household first, and reducing or skipping meals. All surveyed communities from Myanmar, Peru, Vietnam and Zimbabwe indicated that gathering of wild foods is an important additional coping strategy to deal with seasonal hunger, showing that NUS can be an essential part of the diet during the hunger period. The survey results also showed that communities may sell wild plants and minor crops in local markets, as a source of income to buy other kinds of food.

Many of the strategies mentioned depend on the availability of social, financial and/or environmental resources, which is not always the case for people living in poverty. This poses great stress on women, who – as emphasized by most communities – are primarily responsible for households coping with lack of access to sufficient and appropriate food.

8 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 briefing note.

9 Farmers explained that they suffer from food scarcity periods, whereas they consider hunger as a more severe condition related to extreme poverty.

10 Surveys in Myanmar and Vietnam 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.

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

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TABLE 3

COPING STRATEGIES TO DEAL WITH SEASONAL HUNGER[12]

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

Source: Technical Report of the Baseline Survey for Myanmar, Peru, Vietnam and Zimbabwe (Oxfam Novib, ANDES, CTDT and SEARICE, 2018).

[12] 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.

UNDERSTANDING LOCAL DIETS

In Peru, Zimbabwe and Vietnam, surveyed IPSHF indicated that most food products they consume are homegrown; in Myanmar, 41% of respondents indicated that they purchase most food, except for rice and some vegetables. Food is also acquired through fishing, hunting, gathering from the wild, and from local markets. In Peru, barter is an important and culturally embedded way of acquiring more diverse food. Only Zimbabwean farmers indicated that they also obtain food through food aid.

The household dietary diversity scores showed differences among the surveyed farmers in the four countries (Figure 2, Table 4). Whereas cereals and vegetables were present in the diet of surveyed households in all four countries, dairy products and meat were consumed by 50% or less households.[13] IPSHF from Myanmar and Peru showed a substantially more diverse diet than those from Vietnam and Zimbabwe. The lower scores in Goromonzi, Chiredzi, Tsholotsho and UMP may be explained by the fact that the calculations were done on the basis of 12 different food groups instead of 16.

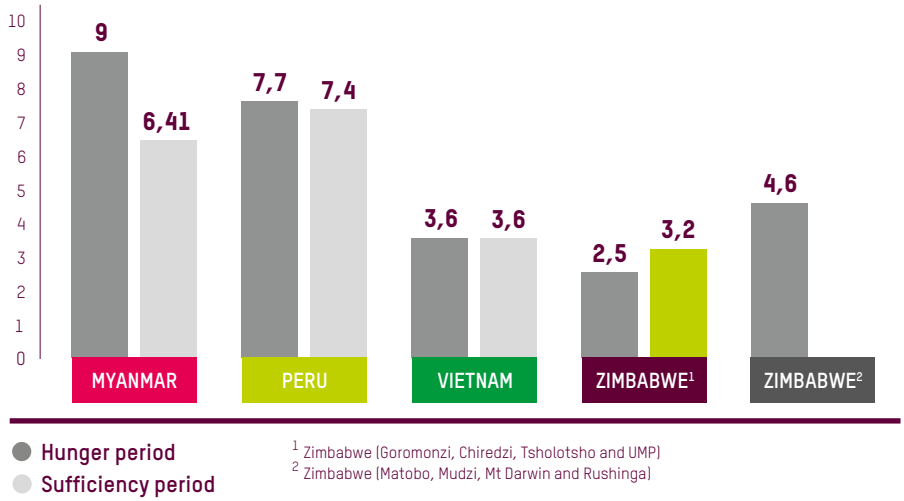
The results suggested that surveyed farmers in Myanmar increased their dietary diversity during the hunger period as compared to the sufficiency period (from 6.4 to 9). This was mainly related to the increased use of NUS, particularly vegetables, as a coping strategy. In Vietnam and Peru the dietary 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. In Goromonzi, Chiredzi, Tsholotsho and UMP districts in Zimbabwe, dietary diversity was lower in the hunger period than in the food sufficiency period, with averages of 2.5 and 3.2 respectively – that is, the already-limited consumption of meat and vitamin A-rich fruits were eliminated during times of hunger.

These results highlight that future interventions should pay closer attention to the role of NUS in diversifying the diet, particularly their potential to fill in the nutritional gaps caused by the reduced consumption of certain food groups during both hunger and sufficiency periods. In this regard, the development of strategies focused on the long-term food preservation of key nutritional NUS is crucial.

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

FIGURE 2

AVERAGE HDDS SCORE BY COUNTRY DURING HUNGER AND SUFFICIENCY PERIODS



Source: Technical Report of the Baseline Survey for Myanmar, Peru, Vietnam and Zimbabwe[14] (Oxfam Novib, ANDES, CTDT and SEARICE, 2018).

Smallholder farmers in Myanmar, holding their preferred food plants.

Photo: Sanne Bakker/Oxfam Novib

TABLE 4

MAIN FOOD GROUPS CONSUMED DURING THE SUFFICIENCY PERIOD (SP) AND HUNGER PERIOD (HP).[15]

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

Source: Technical Report of the Baseline Survey for Myanmar, Peru, Vietnam and Zimbabwe (Oxfam Novib, ANDES, CTDT and SEARICE, 2018).

[14] In (Matobo, Mudzi, Mt Darwin and Rushinga the survey was only performed during the hunger period.

[15] 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.

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NEGLECTED AND UNDER-UTILIZED SPECIES PLAY A KEY ROLE IN IMPROVING DIETS AND COPING WITH SEASONAL HUNGER

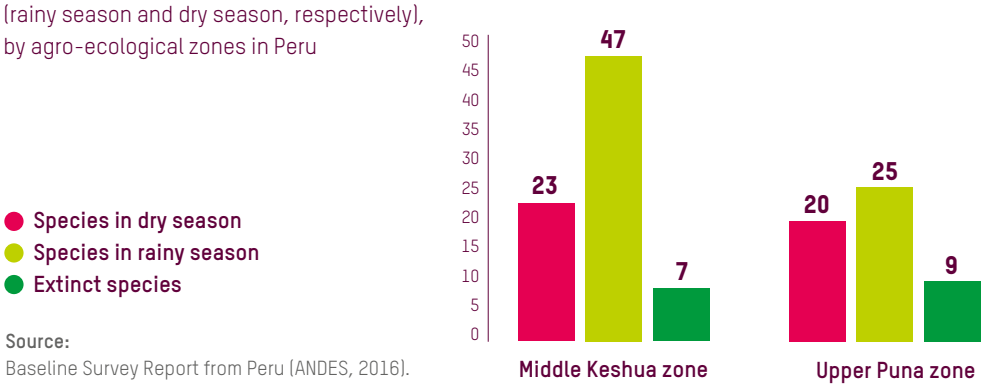
The baseline in Myanmar, Peru, Vietnam and Zimbabwe produced extensive lists of wild plants and minor crops: 66 in Myanmar, 78 in Peru, 43 in Vietnam and 46 in Zimbabwe. Besides plants, these lists include a wide variety of edible mushrooms and animals, such as boletes, guinea pigs, rabbits, locusts and other insects. Farmers also frequently mentioned medicinal plants and honey from wild bees that could be regarded as NUS.

It is clear that NUS play, or have great potential to play, a key role in improving the nutrition of IPSHF in surveyed communities. The findings clearly showed that they relied on a number of wild plants and minor crops to contribute to their households' food and nutrition security throughout the year. Increased consumption of a number of wild plants and uncommonly consumed parts of regular food crops[16] was observed during the period of seasonal hunger. For example, the number of NUS consumed by surveyed IPSHF from the Keshua zone in Peru doubled during the hunger period (Figure 3).

FIGURE 3

AVERAGE NUMBER OF NUS COLLECTED PER COMMUNITY DURING HUNGER AND ABUNDANCE PERIODS

(rainy season and dry season, respectively), by agro-ecological zones in Peru

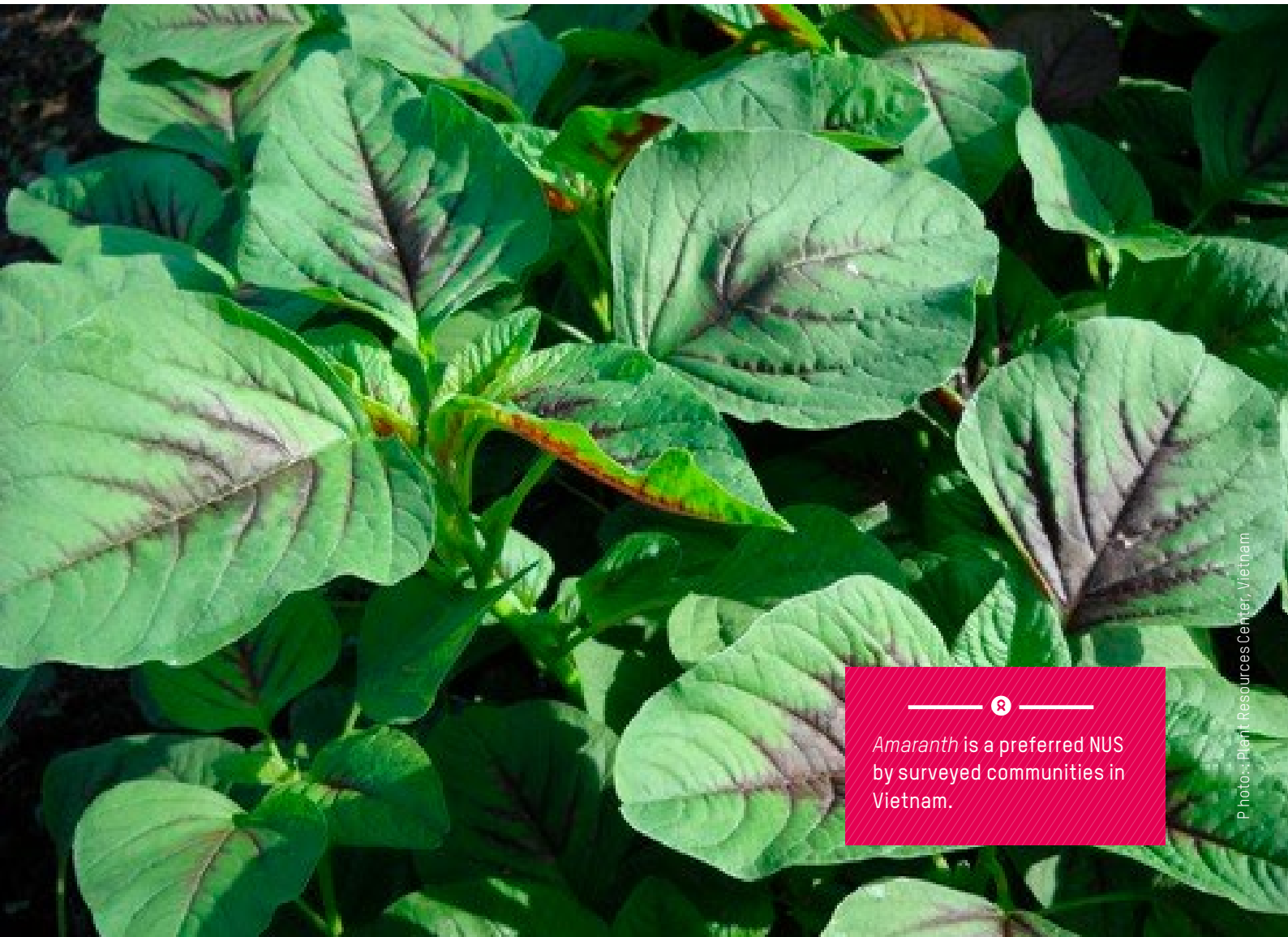


Source:
Baseline Survey Report from Peru (ANDES, 2016).

[16] Although regular crops do not fit the programme's working definition of NUS, the target communities perceived less-consumed parts of these regular crops as minor vegetables. It should be emphasized that due to social stigma, the farmers resort to using such plant parts (e.g. leaves) as food only when other vegetables are scarce.

Most plants reported on the NUS list were wild, as the surveyed communities associated NUS with plants under limited or no crop management that are freely accessible and can be gathered, such as amaranth in Vietnam and cat's whiskers *(Cleome gynandra* L.*)* in Zimbabwe. IPSHF in Zimbabwe understood that the word 'neglected' referred to food plants that were rarely consumed or had almost disappeared locally (Table 5). In contrast, some species that are classified as NUS according to the programme's working definition are highly important to the diets of IPSHF in Peru, such as *oca (Oxalis tuberosa* Molina) and *mashua (Tropaeolum tuberosum* Ruíz and Pavón), crops that are frequently consumed and even sacred in the Andes but not well known at the national and global level. These farmers were confused by the term NUS, as *oca* and *mashua* are far from neglected and underutilized to them.

To facilitate communication with IPSHF on NUS, future work could try to understand how communities conceptualize and classify food plants, and recognize how local concepts relate to the programme's working definition of NUS. To facilitate dialogue between technical and traditional knowledge, it is recommended that the programme develops a guideline for discussing its working definition of NUS with local enumerators, facilitators and IPSHF; capturing IPSHF's classifications of food plants with a gender approach; and finding and agreeing on the intersections among the different concepts. This would vary per IPSHF group, since they may have different ways to conceptualize their relationship with their environment.



Amaranth is a preferred NUS by surveyed communities in Vietnam.

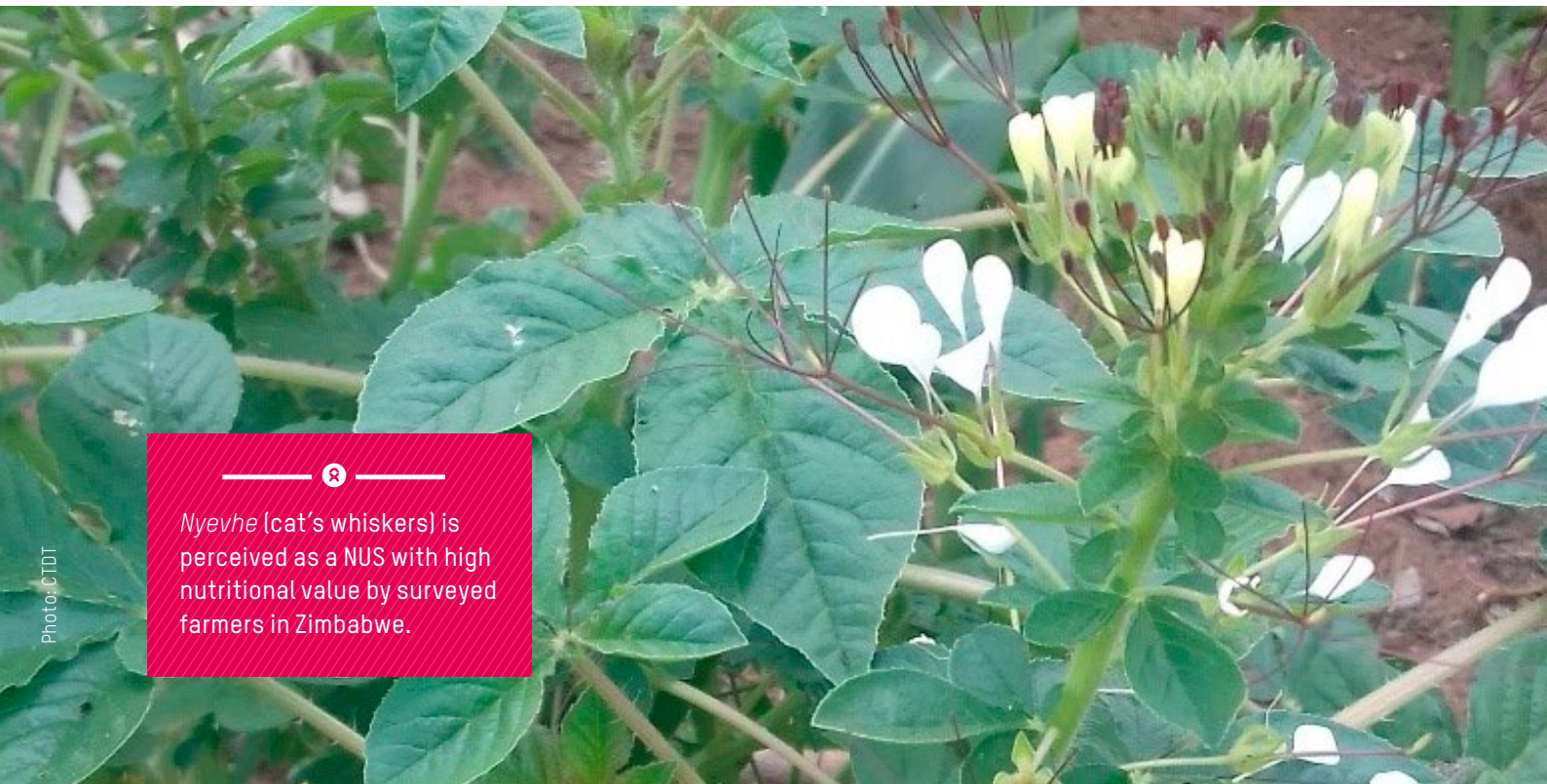
Photo: Plant Resources Center, Vietnam

TABLE 5

CATEGORIES OF PLANTS LOCALLY CLASSIFIED AS NUS: AN ILLUSTRATION FROM ZIMBABWE

CATEGORIES OF PLANTS CLASSIFIED AS NUS BY COMMUNITIES	EXAMPLE OF NUS IN THIS CATEGORY	PROPAGATION
Food plants easily accessible in the wild; the collection of seeds is not required due to abundance	Nyevhe (cat whiskers) – easily found in maize fields, even considered as a weed Bonongwe (amaranth) –easily found 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. grow for a limited period of time during the summer), with limited availability of seeds These plants cannot be preserved (they are normally eaten fresh)	Manyanya and mutangyetyange	Natural propagation
Crops with limited availability due to low yields; seeds or propagation materials are not sold in markets	Rapoko (finger millet)	Cultivated
Labour-intensive for cultivation and processing		
Limited marketing opportunities		
Species perceived as poor people's food but important during hunger periods	Tsine (black jack)	Natural propagation
Perceived as a curative food for people living with HIV		
Species deeply rooted in local culture, and in the realm of women's knowledge	Nyevhe (cat's whiskers)	Natural propagation
Species with medicinal value, e.g. for treating sore throats	Okra	Cultivated

Source: Baseline Survey Report from Zimbabwe (CTDT, 2015).



Nyevhe (cat's whiskers) is perceived as a NUS with high nutritional value by surveyed farmers in Zimbabwe.

Photo: CTDT

TABLE 6

TRENDS AFFECTING THE CONSERVATION AND AVAILABILITY OF NUS IN THE LARES VALLEY, PERU

NEGATIVE DRIVERS	MIDDLE KESHUA ZONE	UPPER PUNA ZONE
Availability		
Scarcity due to changes in land use (cattle grazing)	Yes	No
Scarcity due to changes in climate (increase of extreme temperatures)	Yes	Yes
Extinction of some species	Yes	Yes
Time allocation		
Longer distances to collect NUS	Yes	Yes
Use and knowledge		
Less use of NUS (medicinal and nutritional uses)	Yes	Yes
Loss of knowledge on their use and collection	Yes	Yes
Opportunities		
Emerging local interest in their nutritional and medicinal benefits	Yes	Yes
Still-living elders have local knowledge on their collection and use	Yes	Yes

Source: Baseline Survey Report from Peru (ANDES, 2016).

The baseline indicated socio-cultural barriers to the consumption of NUS. For example, surveyed farmers from Zimbabwe explained that certain nutritious NUS are perceived to be generally consumed by people with HIV (Table 5), so others are ashamed to eat them. Alarmingly, surveyed communities from Peru explained that the environmental availability and traditional knowledge related to NUS are decreasing (Table 6).

It is necessary to take initiatives to raise awareness about the importance of NUS for food and nutrition security, and to look for bottom-up strategies to make them more available, accessible and desirable for IPSHF in the face of climate change. An important starting point would be engaging youth, for instance through educational programmes in coordination with local schools. Such programmes could include seed and food fairs, and cooking demonstrations using NUS.

CONCLUSIONS AND GENERAL RECOMMENDATIONS

Beyond having served as a basis for the implementation of the SD=HS programme, the results of the baseline survey may also be relevant for a wider audience of stakeholders involved in agrobiodiversity conservation, food security and nutrition. Most findings agree with those of other studies, confirming that biodiversity plays a key role in a healthy and nutritious diet. The results also showed how NUS, in particular, can improve the food and nutrition security of IPSHF in the surveyed communities during the hunger period. Future interventions are crucial to:

- diversify diets, filling in the gaps caused by the reduced consumption of certain food groups in both sufficiency and hunger periods;
- safeguard the intake of a wider range of macro- and micro-nutrients, particularly those that are deficient in local diets; and
- strengthen the strategies that households apply to cope with seasonal hunger.

To be successful, such interventions should:

- Look into bottom-up and participatory approaches that can be embedded in local culture, to build on IPSHF's traditional knowledge on NUS.
- Strengthen IPSHF's access to NUS in a wide range of landscapes, from agricultural fields and home gardens to forests and other natural environments, taking into account that access to certain NUS may be limited by factors such as gender, entitlement to access private or communal land, stigmatization and cultural norms.
- Empower women to catalyse the adoption of more biodiversity-based diets, given that – although they are the most vulnerable members of the household in times of food scarcity – women are responsible for food preparation and the main implementers of strategies to cope with the hunger season.
- Develop an educational programme on nutrition and healthy diets for IPSHF, in which all household members may participate.
- Identify and promote the implementation of legal frameworks, policies and financial incentives that encourage the use of NUS and agricultural diversification.
- Incorporate research programmes on the nutritional value, propagation and sustainable harvesting of NUS.
- Include activities that raise awareness of NUS and aim at countering the social stigmatization of nutritional NUS.
- Improve the market access for NUS as an alternative source of income for IPSHF, while ensuring their environmental sustainability.

Finally, the following general recommendations for improving the methodology used for the

Oca (Oxalis tuberosa) is a favorite NUS in Peru.

Photo: : Asociación ANDES

baseline survey are suggested:

- The application of identical sampling strategies, methods and reporting structures within and across countries would allow a better comparison of the results and the testing of research hypotheses.
- Voucher specimen collections should preferably be made to allow the taxonomical identification of NUS used by the communities.
- The identification of the scientific names of NUS will be useful for finding information about their nutritional values. When this information is not available, laboratory analysis may be conducted.
- The folk taxonomy of NUS should be assessed and understood, alongside their ethnobotanical characterization (e.g. how, when and where to harvest).
- 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.
- The diversity of food items within each food group should be captured, as it is relevant during both hunger and sufficiency periods.
- 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.
- The term "food scarcity period" could be preferred to "hunger period" for future surveys, given sensitivity around the connotations of "hunger" for some IPSHF.
- A tool for monitoring and evaluating the programme's continuous learning processes should be developed to assess its contributions to the food and nutrition security of IPSHF and the empowerment of women as catalysts for healthy and biodiversity-based diets.

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