



# FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



## Participatory Impact Assessment of Lutheran World Federation Emergency Seed Interventions in Adjumani District, Northern Uganda



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**Cover page photo credit:** Ed Walters (CRS). Angelo Ruga operates an LSB and has also opened an agrodealer store in Pamela, Adjumani District.

### **DISCLAIMER**

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## Abbreviations and Acronyms

|         |   |
|---------|---|
| BftW    | Bread for the World   |
| CRS     | Catholic Relief Services  |
| DAO     | District Agricultural Office  |
| DFA     | District Farmers Association  |
| DRC     | Democratic Republic of Congo  |
| FAO     | Food and Agriculture Organization of the United Nations                 |
| FFS     | Farmer Field School   |
| FGD     | Focus Group Discussion  |
| FSNA    | Food Security and Nutrition Assessment                                  |
| FSP     | Farmer Seed Producer  |
| ISSD    | Integrated Seed and Sector Development (Uganda)                         |
| KII     | Key Informant Interview   |
| LSB     | Local Seed Business   |
| LWF     | Lutheran World Federation   |
| MBA     | Master of Business Administration                                       |
| MoH     | Ministry of Health  |
| NAADS   | National Agricultural Advisory Services                                 |
| NARO    | National Agricultural Research Organization                             |
| NGO     | Non-governmental Organization   |
| NURI    | Northern Uganda Resilience Initiative                                   |
| OPM     | Office of the Prime Minister  |
| OWC     | Operation Wealth Creation   |
| PIA     | Participatory Impact Assessment   |
| PRELNOR | Project for the Restoration of Livelihoods in the Northern Region       |
| PRM     | Bureau of Population, Refugees, and Migration (USAID)                   |
| QDS     | Quality Declared Seed   |
| Re-LiVE | Reconnecting Lives, Vision, and Empowerment                             |
| RWC     | Refugee Welfare Committee   |
| RQ      | Research Question   |
| S34D    | Feed the Future Global Supporting Seed Systems for Development activity |
| UNDP    | United Nations Development Program                                      |
| UNHCR   | United Nations High Commission for Refugees                             |
| USAID   | United States Agency for International Development                      |
| VSLA    | Village Saving and Loan Association                                     |

# Executive Summary

## Introduction

This report presents the findings of a participatory impact assessment (PIA) of emergency seed interventions implemented by Lutheran World Federation (LWF) in Adjumani District, Northern Uganda. The assessment was designed and carried out by the Feed the Future Global Supporting Seed Systems for Development (S34D) activity, led by CRS. S34D is funded by the Feed the Future Initiative through the Bureau for Resilience and Food Security (RFS) and by USAID through the Bureau for Humanitarian Assistance (BHA). The aim of the assessment was to generate evidence on the impacts of selected emergency seed interventions on community beneficiaries and on local seed systems. Such evidence is currently lacking and is needed to inform and improve future humanitarian and development work.

## Context

Adjumani District has been hosting refugees since 1990 and has a refugee population of 245,289 (April 2022), of which over 80% are women and children (under 18 years)<sup>1</sup>. The refugees almost all come from South Sudan and constitute over 50% of the total population of the district. On arrival, each refugee household is allocated a small plot of land in one of 19 refugee settlements, but the plot size (either 50mx50m or 30mx30m) is often too small to produce sufficient food for the household without additional food aid. The area has limited opportunities for alternative income generating activities beyond farming.

Although South Sudan is a strongly patriarchal society in which women and young people (men and women aged 18 to 35 years) are largely excluded from decision-making, the experience of displacement has impacted the gender and power dynamics among both refugee and host communities. The majority of refugee households are headed by women, and aid agencies tend to prioritize women over men as aid recipients. Previous expectations and roles for women and men are still evolving, often leading to increased tensions and violence within families and between hosts and refugees, but also creating new opportunities, especially for women.

The assessment explored the impact of seed interventions implemented by LWF under two projects: (i) Promoting Sustainable Livelihoods, Environmental and Psychosocial Support in Adjumani (2018-21), funded by Bread for the World (BftW), and (ii) Reconnecting Lives, Vision, and Empowerment (Re-LiVE) (2020-22), funded by USAID's Bureau of Population, Refugees, and Migration (PRM). Both projects provided support to new and existing farmer groups, including seed and training in good agricultural practices and establishment and strengthening of Village Saving and Lending Associations (VSLAs), among other activities.

## Methodology

Data collection was purely qualitative comprising focus group discussions with farmer group members and key informant interviews with district-level officials, registered agro-input dealers, various officials in the refugee settlements, Local Seed Businesses, and officials at the Sub-County level. Five refugee settlements (Pagirinya, Ayilo, Nyumanzi, Baratuku, Elema) and two local community sub-counties (Dzaipi, Arinyapi) targeted by the two projects were visited by the assessment team. A total of 200 farmers from 14 different farmer groups participated in the assessment. The farmer groups were selected by LWF staff to ensure a balance between refugee groups, host groups, and mixed refugee and host groups that had received seed

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<sup>1</sup> The total refugee population includes 53% women and 47% men. Children aged under 18 constitute 63% of the total population with a roughly even gender breakdown. The adult population (aged 18 or over) constitutes 37% of the population (22% women, 15% men). The total proportion of youth (aged 15-24 years) is 26%.



support in 2021. Participants included women (approx. 70%), men (approx. 30%), and people with disabilities, with two discussion groups being exclusively women.

Participatory Impact Assessment (PIA) tools were used across nine focus group discussions to determine the impacts of the seed interventions on crop production, household food security, and livelihoods. PIA tools used included historical timelines, before and after scoring, proportional piling, and seasonal calendars. Additional focus group discussions (without PIA tools) were carried out in the same communities to understand the effects of the emergency seed interventions on community seed management practices, including changes in the crops and varieties cultivated over time, and changes in the seed acquisition channels for different crops.

## Conclusions

The conclusions below provide answers to the research questions that guided the assessment (in italics below).

*How have emergency seed interventions impacted on household food security of male and female refugee and host community smallholder farmers?*

It was difficult to draw any firm conclusions on the impacts of the seed interventions on food security, mainly due to low production caused by the low rainfall levels experienced in the project area since 2021. The apparent increase in food security (as indicated by a decrease in the number of hunger months in a year) was not matched by increases in crop production for all farmers. Host farmer households reported increases in production for all key crops after the intervention as compared to before the intervention, while refugee households reported decreases for all key crops except for tomatoes. Different results were reported by men and women, e.g., women's groundnut production increased, whereas that for men decreased. Planting times, rainfall, soil fertility, management practices and climate change are key influencing factors on productivity. Increased access to fertile land contributed to increase in production among host farmers, while refugee farmers did not report such due to challenges in accessing additional land.

*How have emergency seed interventions impacted on the livelihoods of male and female refugee and host community smallholder farmers?*

Livelihood impacts were assessed according to changes in expenditure from the income from crop sales for the seeds provided. Based on this indicator, there was some evidence of increased investment in education, and an increase in financial investments by host and refugee households, notably savings in VSLAs, especially by women.

*How have emergency seed interventions impacted on male and female refugee and host seed management practices?*

Seed distributions over many years have allowed for the regular introduction of new varieties into local cropping systems, giving farmers an appreciation of a range of different varieties and their particular characteristics (e.g. drought resistance, marketability, duration to maturity, etc). LWF's program has generated interest, awareness and appreciation of new varieties among the farmers. In some cases, the seed support provided a free input that farmers would have otherwise had to buy for themselves. In addition, the intervention supported the farmer groups (generally mixed or refugee groups made up of both men and women) to expand their cropping area and learn to work together. However, the assessment revealed that for an emergency seed intervention to achieve long-term production and livelihood impacts, the seeds provided must not only be locally appropriate new varieties, but should also be preferred by both farmers and the local markets.

*How have emergency seed interventions impacted on informal and formal seed systems (including seed markets) in the local area?*

The introduction of new and appropriate varieties into informal seed systems is considered to be a positive impact, effectively strengthening the resilience of local cropping systems in the face of drought, floods, pests, diseases and climate change. Within formal seed systems, emergency interventions (along with agricultural development projects) have created considerable demand (on the part of NGOs and government projects) for certified seed and quality declared seed (QDS). This has led to an increase in the number of agro-input dealers and possibly also Local Seed Businesses (LSBs) and Farmer Seed Producers (FSPs). However, there appears to be a disconnect between many of these agro-input dealers and the majority of smallholder farmers, who rarely – if ever – purchase seed from agro-input dealers. Whilst the capacity and seed sales of many agro-input dealers have increased, there are concerns about market distortions due to over-dependence on NGO/project demand, displaced seed sales, and weak seed marketing efforts. There are also concerns over the sustainability of the current LSB and FSP models, though both have important roles to play in providing affordable seed to farmers.

### *Lessons and recommendations*

1. For food security and livelihoods impacts, the design of seed interventions should always include more than just access to seeds. Other factors such as access to **land, financial capital and appropriate agricultural knowledge and skills** are also essential.
2. Issues relating to **land access** by refugees must be addressed more effectively and consistently, and with gender sensitivity. Mutually beneficial linkages between refugees and host communities must continue to be encouraged.
3. Future seed interventions should shift their focus from seed per se to appropriate **varieties**. This would involve a greater understanding about the range of seed varieties being cultivated by male and female farmers, which varieties have market value, and which types of varieties will likely be needed to meet future needs, particularly given the realities of climate change, as well as changing gender roles.
4. Work with traders and farmers (especially women), who produce and sell own-grown seeds, to enhance the **quality of informal sector seed available in local markets**
5. Recognize the role of **Farmer Seed Producers (FSPs)** in supplying uncertified seed (“farmer seed”) of new varieties, but do not expect them to function as commercially viable enterprises.
6. Enhance the availability of appropriate **vegetable seed and seedlings** in local markets and communities. There are various ways in which this might be achieved, and it is recommended to start with a pilot project to test different approaches.
7. Reinforce the importance of **farmer-saved seed** and create opportunities for male and female farmers to learn from each other as well as opportunities to learn from external sources about seed selection and seed-saving practices and technologies.
8. Given that women play a particularly important role in informal seed systems, it is necessary to understand the **gender-related aspects** of household seed management and informal seed markets. It is essential that a gender lens is applied to all recommendations listed here.
9. NGO interactions with suppliers of QDS or certified seed (i.e. **LSBs, agro-input dealers**) must avoid creating market distortions. They should instead be re-oriented to promote market linkages, resilience and sustainability, especially through linkages between formal, intermediary and informal seed systems.
10. Continued free seed distribution should not be used as a response to chronic poverty or weather events associated with long-term climate change. **Chronic poverty** must be addressed through other means. To

avoid negative unintended consequences such as creating dependency, seed interventions must be based on a **better understanding of local seed systems** and seed markets, including the nature of seed demand by male and female smallholder farmers and the factors (e.g. climate change, new markets) that are driving changing needs.

## 1. Introduction

This report presents the findings of a participatory impact assessment (PIA) of emergency seed interventions implemented by Lutheran World Federation (LWF) in Adjumani District, Northern Uganda. The seed interventions were implemented under two projects: (i) Promoting Sustainable livelihoods, Environmental and Psychosocial Support in Adjumani, funded by Bread for the World (BftW), and (ii) Reconnecting Lives, Vision, and Empowerment (Re-LiVE), funded by USAID’s Bureau of Population, Refugees, and Migration (PRM). The assessment was designed and carried out by the Feed the Future Initiative and USAID-funded Feed the Future Global Supporting Seed Systems for Development (S34D) activity, led by Catholic Relief Services.

The aim of the assessment was to generate evidence on the impacts of selected emergency seed interventions on beneficiaries and local seed systems. Such evidence is currently lacking and is needed to inform and improve humanitarian and development work. The specific research questions (RQ) addressed were:

- RQ1: How have emergency seed interventions impacted male and female refugee and host community seed management practices?
- RQ2: How have emergency seed interventions impacted household food security of male and female refugee and host community smallholder farmers?
- RQ3: How have emergency seed interventions impacted the livelihoods of male and female refugee and host community smallholder farmers?
- RQ4: How have emergency seed interventions impacted informal and formal seed systems (including seed markets) in the local area?

Another underlying aim of the fieldwork was to develop, test and refine a methodology that can be replicated elsewhere to assess the impacts of emergency seed interventions. Methodological findings and reflections will be reported in a separate report that synthesizes the findings from the three assessments<sup>2</sup> undertaken by the S34D team.

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<sup>2</sup> In addition to the assessment of LWF interventions in Adjumani District, S34D also undertook similar assessments of emergency seed interventions implemented by World Vision in Adjumani District and by Catholic Relief Services (CRS) in Central Kasai Province, Democratic Republic of the Congo.

## 2. Geographical and Project Context

### 2.1 Adjumani district

Adjumani District is located in the West Nile sub-region of Northern Uganda. Adjumani Town, the main administrative and commercial centre is 115 km northwest of Gulu, the largest city in Uganda's Northern Region. The current refugee population (April 2022) is 245,289, of which 63% are children (under 18 years), 22% are women and 15% are men.<sup>3</sup> In 2017, the refugee population constituted 59 percent of Adjumani's population. Adjumani District currently has 19 refugee settlements, each established in different years. Some are relatively small and old while others are big. Refugees from South Sudan arrived in Northern Uganda in two different waves, the first of which was in the 1990's. Many of these refugees returned to what is now South Sudan in the early 2000's. The second wave of refugees arrived after a renewed outbreak of civil war in South Sudan in 2013.

**Land allocation:** On arrival in Uganda, new refugees are usually allocated a small area of land in a designated refugee settlement area where they can establish a homestead and plant backyard crops, especially vegetables, as a supplementary source of food. Land is allocated by the Adjumani District local government, Office of the Prime Minister (OPM) and UNHCR. Up to 2016, the size of land was 50mx50m but, after 2016, the land area allocated was reduced to 30mx30m. Some refugees, both men and women, have rented additional land through informal negotiations with the host community, but this has often led to problems because many landowners subsequently claim back the land after it has been cleared, or after just one season. A study on gender and displacement undertaken by Saferworld (2020) reported that male landowners prefer to lease land to female refugees, possibly because it is seen to be easier to evict a woman, and also because women are vulnerable to sexual exploitation. The same report also notes that some refugee women enter into intimate relationships with landowners through their own choice.

Refugee and humanitarian organisations have helped groups of refugees to negotiate access to block farms. Some of these block farms are farmed entirely by refugees while some are farmed with host community members. Mixed groups of host and refugee farmers (in which the host farmers are also landlords) strengthen peaceful coexistence and allow easy access to land for refugees.

The average land size per refugee household is 0.23 acres (UNDP, 2018). This amount of land cannot support household food sufficiency in the absence of food aid. The allocation of land is guided by availability and not land productivity. The quality of land therefore varies across settlements. Some settlements such as Mungula I and II in Adjumani are reported to have fertile soils while others are reportedly rocky, infertile and unproductive (e.g., Alere in Adjumani) (*ibid.*).

**Livelihoods and food security:** Almost all the refugees in Adjumani come from South Sudan. The refugee population is composed of many different tribes, including Dinka, Nuer, Kuku, and Madi. Culturally, the Dinka and Nuer are pastoralists, whereas Kuku and Madi are predominantly crop farmers. Land allocation and associated crop production cannot support household food sufficiency in the absence of food aid. There are limited opportunities for alternative income generating activities beyond farming. A reduction in the number of meals per day is a common coping mechanism. Data collected in 2017 showed that 73.5% of refugee and 39.0% of host households had reduced their number of meals in the seven days preceding the survey (UNDP, 2018).

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<sup>3</sup> The total refugee population includes 53% female and 47% male. Children aged under 18 constitute 63% of the total population with a roughly even gender breakdown. The adult population (aged 18 or over) constitutes 37% of the population (22% women, 15% men). The total proportion of youth (aged 15-24 years) is 26%.

The Food Security and Nutrition Assessment of 2020 shows that 11.5% of refugee children in Adjumani District are moderately or severely stunted (MoH et al., 2020). There had been no significant change in the level of stunting since the previous assessment of 2017. The 2020 assessment put the prevalence of Global Acute Malnutrition by weight for height z-scores at 8.3% (reduced from 11.8% in 2017). This represents an improvement from 'high' prevalence to 'medium' prevalence<sup>4</sup>, but the figure for Adjumani district remains well above the average of 5.1% for all refugee settlements in Uganda.

**Agriculture:** Among the sites visited by the assessment team, there is a diverse and dynamic cropping system, with changes in recent years due to the arrival of the refugees, changing diets, and new produce markets. The main food crops grown by farmers in the areas visited are maize, beans, cassava, sorghum, rice, sweet potato, and groundnuts, which are marketable, while soybean and sunflower are grown as cash crops among host farmers. Vegetables such as sukumawiki (collard greens), onion, okra, tomato, eggplant, sweet pepper and cabbage are grown both for home consumption and for sale. The traditional cultivation methods practised by both hosts and refugees are highly dependent on rainfall. Adjumani District has an average annual rainfall of 750-1500mm, spread across two rainy seasons.

Both the diversity and scale of vegetable production has increased in recent years due to increased demand for local consumption and widespread vegetable seed distribution. The local production of okra has grown considerably since the arrival of the refugees because dried okra is a common ingredient in South Sudanese cooking. Soybean was introduced as a new crop in recent years and is being promoted (along with sunflower) among host farmers by various donor-funded value chain projects linked to commercial oil seed processing companies in Gulu and Lira.

Data collected by FAO in 2017 and analyzed by UNDP (2018) appear to show that access to seeds of improved high yielding varieties was limited, and that refugees were more likely to use improved seeds than the host communities. The FAO data cited by UNDP for Adjumani District suggest that about 80 percent of refugees reportedly use improved seeds compared with less than 10 percent of hosts. Our assessment was unable to confirm this finding.

**Gender dynamics<sup>5</sup>:** Although South Sudan is a strongly patriarchal society in which women and young people (men and women aged 18 to 35 years) are largely excluded from decision-making, the experience of displacement has impacted the gender and power dynamics among both refugee and host communities. The majority of refugee households are headed by women, and aid agencies tend to prioritize women over men as aid recipients. Previous expectations and roles for women and men are still evolving, often leading to increased tensions and violence within families and between hosts and refugees. As noted above, the gender dynamics involved in renting land from the host community leaves women vulnerable to sexual exploitation. However, the shifting gender roles has also created new opportunities, especially for women. Many women shoulder the double burden of being the main income provider while still taking care of the household. In some cases, this has given them a degree of freedom, allowing them to acquire decision-making powers on how to use the income that they generate.

## 2.2 The LWF emergency seed interventions

This section provides brief information about the two LWF projects that included emergency seed distributions which formed the focus of the assessment. The information below comes from the project

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<sup>4</sup> WHO-UNICEF (2018) Classification of Public Health Significance for U5 Children: Global Acute Malnutrition <2.5% (very low), 2.5 - <5% (Low), 5- <10% (Medium), 10 - <14% (High), ≥15% (Very High).

<sup>5</sup> The information about gender dynamics presented here comes from a report published by Saferworld (Watson and Figueras, 2020).

documents provided by LWF and additional insights from LWF staff. Additional details are provided in Annex 1.

### 2.2.1 Promoting sustainable livelihoods, environmental and psychosocial support in Adjumani

This three-year project was funded by Bread for the World (BftW) to increase food security, enhance environmental protection and to increase access to psychosocial support services among South Sudanese refugees and the host community in Adjumani District from April 2018 to March 2021. The project was implemented in five settlements and assisted 4,200 South Sudanese refugee and Ugandan host community families through support to 140 farmer groups (80 percent women). Participants were selected with the help of the refugee committees, UNHCR and the Office of the Prime Minister (OPM). The most vulnerable refugee and host community households were prioritised – female heads of household, pregnant and lactating women, disabled people and the elderly i.e. the households with the least possible labour.

To achieve the objective of increased food production, LWF trained community-based facilitators to support the farmer groups, and provided seed and training in good agricultural practices to the groups. Earlier phases of the project involved seed distribution through seed fairs and vouchers, but this was not possible in 2021 due to Covid restrictions, so seed was distributed directly. Outstanding groups were given work oxen. Kitchen gardens were established for model households, and group members were given vegetable seeds. To achieve the objective of increased incomes, training in farming as a business was provided to the farmer groups, as well as Village Saving and Lending Association (VSLA) methodologies and business management skills. Project outputs relating to these objectives are presented in Annex 1. Additional activities were undertaken relating to environmental protection and psychosocial support.

A ten-member, self-initiated local seed producer group was trained in seed multiplication and provided with foundation seed. Group members have been multiplying seed since 2017 on their own individual farms. Since that time, LWF has facilitated linkages with NARO (Abi ZARDI) for the supply of foundation seed and with the District Agricultural Office for official registration and seed quality checks. In 2018 and 2019, the seed producer group took part as a seed vendor in the seed fairs organized by the project, but seed fairs were not possible in 2020 and 2021 due to Covid restrictions. Seed produced by the group is sold to farmer groups (through the Sub-County Local Government office), to NGOs and to individual farmers.

### 2.2.2 Reconnecting Lives, Vision, and Empowerment (Re-LiVE)

Funded by USAID's Bureau of Population, Refugees, and Migration (PRM), the Re-LiVe project was implemented in Adjumani District, as well as Palorinya, Palabekand Kyangwali from 2020 to 2022. In Adjumani District, the project targeted approximately 8,000 South Sudanese refugees and Ugandan host community members in four refugee settlements (Nyumanzi, Pagirinya, Ayilo I and II) and the surrounding areas. The overall project goal was to empower refugee communities to reduce their vulnerabilities, and to prevent and respond to their protection risks by enhancing their well-being, self-reliance, and peaceful coexistence within, and with the host communities. The two project objectives were: 1) to strengthen the protective environment, psychosocial well-being and social cohesion, and 2) to provide skills for durable Solutions through empowering refugees and host communities to rebuild and sustain their livelihoods. The project built on the successes of an earlier PRM-funded project known as SALIMA.

Using the Farmer Field School (FFS) approach, the project worked with 100 existing and new farmer groups – 60 groups had been established in 2017 by the earlier PRM project – and the current project trained an additional 35 groups. Training was provided on modern agronomic practices, farming as a business production technology, group dynamics, nutrition, post-harvest handling, value addition and marketing to expand group enterprises and increase food production levels and food security. Production was also expanded through opening of additional acres of land (each group received a minimum of 5 acres tillage services from LWF for

group-based production), and training in 'Farming as a Business', bulking and marketing, to enable the groups to branch out and expand their agricultural enterprises. Training in the Village Savings and Loan Association approach (VSLA) was expected to enable farmer groups to have capital to expand, improve and/or diversify their farming enterprises. See Annex 1 for the project outputs relating to these activities. In addition, a small number of youth groups and 300 extremely vulnerable individuals were supported to benefit from opportunities for commercial farming, backyard gardening and greenhouse gardening, though these were not included in the assessment.



### 3. Methodology

Data collection was purely qualitative comprising focus group discussions (with and without PIA tools) and key informant interviews, as described below. A literature review was undertaken of project documents and various other studies. The data collection tools were tested in Boroli Settlement and then refined prior to starting the fieldwork in the project area.

Five refugee settlements (Pagirinya, Ayilo, Nyumanzi, Baratuku, Elema) and two sub-counties (Dzaipi, Arinyapi) targeted by the two projects were visited by the assessment team. A total of 14 farmer groups were met by the assessment team, this being the maximum number of groups that could be interviewed by the assessment team in the time available. These were selected by LWF staff to ensure a balance between refugee groups, host groups, and mixed refugee / host groups that had received seed support in 2021. The assessment team requested that approximately 8 to 10 group members should be invited to take part in the discussions, with a representative sample of men, women and people with disabilities. A total of 200 farmers (approx. 70% women) took part in the focus group discussions.

#### 3.1 Participatory Impact Assessment (PIA) tools

PIA tools were used with approximately 100 male (approx. 30%) and female (approx. 70%) farmers from nine LWF-supported groups (six refugee groups, and three host groups) to determine the impacts of the seed interventions on crop production, household food security, and livelihoods. See Annex 2 for a general overview of PIA and the approach used by the assessment team.

- (i) **Historical timelines** were developed by group participants to determine significant and memorable events in the community and to establish exactly when the intervention started. The discussions following the exercise also established and prioritised, by consensus for the group as a whole, the most significant activities and seed types provided by LWF and when.
- (ii) **Proportional piling**<sup>6</sup> with 20 counters (small stones) was used to establish the production levels of each crop “before” and “after” the intervention. Where there was a decrease in production, the reasons for this were noted. In cases where there was an increase, a discussion then followed to determine what the farmer did with any additional production and what impacts this had on the farmer and/or their household. The results were disaggregated by gender and status (i.e. host or refugee).
- (iii) **A seasonal calendar** was used to establish changes in household food security. This was done by allowing the five respondents to use the counters to show which months their households had staple foods (mostly maize, sorghum, cassava, sweet potato, beans) from their own harvest and which months there was no stock of staple food in the household, before and after the intervention. The months without stock of staple food were recorded as “hunger months”. Reasons for changes were discussed and noted. The results were disaggregated by gender and status (i.e. host or refugee).
- (iv) Finally, the respondents were asked to score, through **proportional piling**, how they spent the income from the sale of crops for which seed had been provided, comparing before and after the intervention. The reasons for any changes were discussed, along with the impacts that the

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<sup>6</sup> Proportional Piling is a participatory method that helps to visualise relative proportions. It is useful for working with people who are not used to quantifying data. The method aims to collect information, generate discussion and facilitate consensus and decision making.

changes had on the farmer and/or their household. The results were disaggregated by gender and status (i.e. host or refugee).

Within each group, the scoring for the proportional piling exercises was carried out by five individuals (30 women and 10 men in total), chosen for their involvement in the project and their ability to articulate their experiences. Though aided in recall by other group members, the scores represented the situation at the participant's individual household level. These scores were then averaged to represent the overall score. The scoresheet used to record the data collected by the PIA teams is presented in Annex 3. Additional explanatory information about the reasons for changes and the impacts on individuals and households were recorded in notebooks and then typed into an Excel spreadsheet and later converted into a single Word document for analysis.

### 3.2 Focus Group Discussions (FGDs)

Separate focus group discussions were carried out in the same communities as the PIA in order to address the effects of the emergency seed interventions on community seed management practices. The FGDs gathered detailed information relating to changes in the crops and varieties cultivated over time, and changes in the seed acquisition channels for different crops. See Annex 4 for the checklist used to guide the FGDs. Nine FGDs were conducted: three with mixed refugee/host farmer groups; four with host farmer groups, and two with refugee farmer groups. The number of participants in most discussions varied from 8 to 13, comprising both male and female farmers. There were two women-only discussion groups (one of 14 participants, the other of 21 participants). Overall, the gender breakdown of farmers taking part in these discussion groups was approximately 80% women and 20% men. Responses were recorded by sex where this was thought to be important. Notes from the FGDs were typed up into Word documents and subsequently organised into an Excel sheet to allow for comparison and triangulation across groups and locations. The Word files were merged into a single file to allow for keyword searches of particular topics and themes at the analysis stage.

### 3.3 Key Informant Interviews (KIIs)

Key informant interviews (KIIs) were undertaken with district-level officials and registered agro-input dealers<sup>7</sup>, with the various officials in the refugee settlements (OPM Assistant Camp Commandants, Refugee Welfare Committee Chairpersons), Local Seed Businesses, and with officials at the Sub- County level (RCIII, LWC 3, LWC 1 Agricultural Officers), as summarized by Table 1. A list of those interviewed is provided in Annex 5, and the interview guides are provided in Annex 6. As for the FGDs, the notes from the KIIs were typed up into Word documents and merged into two files (one for agricultural officials, organisations and companies, the other for area-based officials) to enable theme-based analysis and key word searches. The KII information was also summarised into two Excel sheets to allow for comparisons and triangulation across different informants at different levels and locations.

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<sup>7</sup> Lists of registered agro-input dealers were provided by LWF and by the District Agricultural Officer. Those interviewed included those considered by key informants to be of good repute and those mentioned by the farmers that we met.

Table 1: Key informants interviewed

| <b>Informant</b>                  | <b>Number</b> | <b>Informant</b>             | <b>Number</b> |
|-----------------------------------|---------------|------------------------------|---------------|
| Registered Agro-dealers           | 8 (4 female)  | LWF staff                    | 6 (2 female)  |
| Refugee Settlement Officials      | 8 (2 female)  | Other NGOs                   | 1 (0 female)  |
| Sub-County Officials              | 8 (0 female)  | Local Seed Businesses (LSBs) | 4 (0 female)  |
| Ministry of Agriculture Officials | 4 (1 female)  | Market traders               | 6 (6 female)  |

## 4. Impacts on Crop and Varietal Diversity and Seed Management Practices

### 4.1 Seeds and varieties received by LWF farmers included in the assessment

All the groups met had received seed through either seed fairs or direct distributions from LWF, and also from other NGOs in some cases. The seeds received from LWF included sesame, soya bean, groundnut, maize, bean, greengram, and rice. Vegetables included tomato, cabbage, onion, amaranth, watermelon, okra, green pepper, carrot, sukumawiki and eggplant. Groups received specific crops depending on their preferences<sup>8</sup>. Seed support was received from LWF between 2018 and 2022 with specific crops provided in a particular year and different crops provided the next year. Annex 7 provides information about different crops and crop varieties, as described by farmers.

Different crops can be seen to have different types of impact, e.g. on household consumption, nutrition and income, also on resilience and soil fertility (Annex 7). The level of impact also depends on the specific variety provided. Sesame was considered to be one of the most impactful seed types provided: the variety (possibly *Sesim 2*) was appropriate to the local conditions, high yielding and fetched a good price in the market (double the price of the local variety). Groundnuts can be used for both home consumption and for sale and improve soil fertility. One of the varieties provided (possibly *Serenut 10*) was good for eating, early maturing, drought tolerant and marketable. However, another variety provided by LWF (possibly *Serenut 2*) was reported by farmers not to be well adapted to the local conditions, suffered from low yields, and the seed deteriorated over time – see below for further details. Maize is a major source of food and income that can be used for paying school fees and loan repayment. LWF reportedly brought *Longe 5* (also known as *Katumani*) which had previously been provided to host communities by the National Agricultural Advisory Services (NAADS). Refugee farmers had also already planted it before, having selected the seed from their food rations. Tomatoes can be grown continuously throughout the year and produce well, even on a small plot of land. They are a source of nutritious food and also have a readily available market. The variety provided by LWF was drought resistant, early maturing, high yielding and marketable. Carrots are not used for local consumption and lack local markets, and therefore farmers chose not to incorporate them into their cropping systems.

### 4.2 Impacts on crop and varietal diversity

The seed interventions introduced a new crop (sukumawiki) and new varieties of sesame (for some host farmers), okra and greengram (Annex 7). In the case of sesame, the variety was well-liked and led to positive impacts. In the case of okra and greengram, however, the varieties were not suited to local markets.<sup>9</sup> The greengram variety was cultivated instead for home consumption, thus having impact on varietal diversity and household food and nutrition, but no impact on income. The okra variety, however, was abandoned altogether and thus had no impact after it had been abandoned. These varietal details were reported by both women and men.

Many of the varieties provided were not new to farmers, having been introduced by the NAADS project which started in 2000. As with the NAADS approach, LWF used group demonstration plots for seed

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<sup>8</sup> At the seed fairs, farmer group leaders could choose their preferred seed types. When planning for direct distribution, LWF field staff asked each farmer group which crops they wanted, but the specific variety was selected on the advice of the DAO.

<sup>9</sup> The variety of okra provided by LWF was a short-statured, quick-maturing variety that did not meet the market requirements and the farmers in one location abandoned the variety in favour of the taller marketable variety. For greengram, the variety provided by LWF was a big-seeded type for which there was no market because people prefer to eat the small-seeded type.

multiplication purposes, allowing individual farmers to acquire the multiplied seed of the varieties provided. In cases where there was high demand for specific varieties (e.g. white sesame), farmers were able to select this as an enterprise to support not only income generation but also access to the variety by other farmers.

Discussions with farmers revealed increased awareness about the importance of new varieties, especially among some of the host farmers. A small number of farmers (notably host farmers, both women and men), mentioned that they had specifically bought seed of improved varieties from an agro dealer and had since saved the seed. These farmers, however, were the exception rather than the rule – across all seven FGDs, involving some 73 farmers and countless crops and varieties, there were less than 10 instances in which farmers had reported to have ever bought seed from agro dealers<sup>10</sup>.

Among the refugee farmers, it was interesting to note their strong liking for some of their local varieties from South Sudan. Seed of a favoured tall, brown, big-headed sorghum variety, for example, was sent by relatives from South Sudan after the refugees had arrived in the settlements and seen the local terrain. In addition to eating the grain, the canes can be used for chewing (like sugar cane) and also as a fuel for cooking. It was reported that host farmers had obtained the seed of this variety from the refugees, and they were growing it partly because the canes can be sold in the market. A yellow-seeded short-duration maize variety had similarly been brought from South Sudan to the refugee settlements. In addition, refugees brought a tall variety of okra from South Sudan with them that is greatly preferred to the varieties provided by LWF. There is a high demand for this variety of okra, both from refugees and to export to South Sudan. Hosts have obtained both seed varieties from the refugees to produce for the market. The introduction of varieties through informal seed systems works in both directions between South Sudan and Uganda; some of the women who travelled back to South Sudan took seed of some of the vegetables that they received in the settlements back with them for planting in South Sudan.

One of the key informants (from the OPM) expressed concern that the provision of improved varieties among host communities is causing the local varieties to become extinct, though this point was not explored in detail by the assessment team.

### 4.3 Seed saving by farmers

Seed of almost all crops is generally saved from one season to the next, and farmers (notably women) described some of the different methods and containers used for selecting and storing seed (see Annex 8). For maize, for example, female farmers reported selecting the best cobs at harvest time and hanging these above the kitchen fire to preserve the seed and discourage pests. As a cross-pollinated crop, farmers claimed they recycle maize seed for two or three years before replacing the seed (as they would have been trained to do), but discussions revealed little replacement of seed stock in practice. Most of the LWF groups who were cultivating a plot together reported to have saved seed for subsequent re-planting by the group, with the exception of groundnut. Drought during the 2021 season resulted in failure of most of the groundnut harvest, so most groups were not able to save any seed. For maize, one group reported not saving any seed because LWF advised them not to save the maize seed – presumably this is because the seed was of a hybrid variety<sup>11</sup>.

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<sup>10</sup> A conservative estimate would be that each farmer cultivates an average of 5 different crops / varieties. Over a five-year period (i.e., since the most recent wave of refugees), with two planting seasons per year, this means that 73 farmers would have planted 3,640 seed 'lots'. The ten reported cases of seed purchases from agro-input dealers represents less than 0.3% of the total seed 'lots' planted.

<sup>11</sup> *Longe 5* is a hybrid variety. However, one LSB reported that he recycles the seed because despite being a hybrid, it retains its characteristics from season to season.

For vegetables, only okra, local varieties of tomato, sukumawiki, cowpea, and eggplant are typically saved from one season to the next. Onion, cabbage, improved tomato varieties, and green pepper seed was reported not to be saved and is occasionally bought from agro-input dealer shops in Adjumani, though most farmers appear to rely on NGO seed distributions for these seeds. Some farmers were not aware of where vegetable seed could be purchased.

Some key informants expressed concerns that repeated distributions by NGOs appear to be eroding seed-saving practices, and this was confirmed by some farmers, but not all. One refugee focus group in Ayelo Settlement, for example, reported that only some farmers save seed from one season to the next since they get seed each year from partners. Another refugee group said that they do not bother with local seed saving methods<sup>12</sup> because they rely on the treated seed from NGOs, which they know will germinate well. However, when asked about seed for this year (because LWF did not bring seed this year to the old farmer groups to encourage self-sufficiency), they said that they had kept seed from the previous harvest. In general, poorer farmers find it more difficult to save seed at harvest time because there are so many competing household needs to be met from the small amount of harvested output. It is likely that poorer refugee farmers rely more on the NGO seed distributions than better-off host farmers. However, if farmers do not have own-saved seed, then they can buy from other farmers or the local market.

Apart from the seed multiplication groups and LSBs, it appeared that farmers had not received any training on seed saving practices, apart from being advised to refresh own-saved seed every few years (depending on the crop). As far as could be determined, little effort had been made to compile local knowledge or local practices on seed selection and seed saving.

Farmers reported various problems with own-saved groundnut seed. Some farmers described how the groundnut seed received through NGO distributions did well at first, but then deteriorated over time, becoming less productive. Groundnut has also been particularly susceptible to drought and because of this saving seed has been challenging. Three varieties of groundnut are grown in the zone: Serenut 2, 3, and 4. Serenut 2 is drought tolerant. One group reported that Serenut 2 is no longer yielding as well as it used to, saying that they would be abandoning that variety. However, one of the successful LSBs multiplies and sells the seed, indicating that demand remains strong for the variety. Subsequent discussions with staff from the National Agricultural Research Organization (NARO) revealed that they stopped the multiplication of Serenut 1 and 2 in 2002, Serenut 3 and 4 in 2010, and Serenut 5 and 6 in 2011 because they had developed better varieties that were bred to overcome the challenges of these varieties. Such challenges include susceptibility to pests, rosette disease, drought, poor taste, long maturity, and long dormancy period for some of the seed. Because there has been no production of foundation seed of these varieties since 2011, one assumes that any seed of these varieties purchased from any source would have been multiplied from recycled foundation seed. The varietal integrity of this recycled seed is likely to have deteriorated due to mixtures, poor seed handling practices, or decline in performance due to susceptibilities to biotic and abiotic stresses.

#### 4.4 Off-farm seed sources and acquisition

Female refugees explained that, after fleeing and arriving in Uganda (having left their own-saved seed behind in South Sudan), they typically purchased seed from host farmers in the local market or selected the best grains from their food rations (maize and beans) that they planted as seed. They reported that they were able to buy all types of seed and vegetative material from hosts - banana, cassava, beans, groundnut, maize. When asked about whether any seeds were collected from the wild, some women refugee farmers mentioned that they had

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<sup>12</sup> They described how, in South Sudan, they used to mix seed with ash and keep it in a clay pot (sealed with clay) to protect it against pests.

collected sweet potato, cassava and okra seed / planting material from other farms (presumably without permission of the owners).

Up to now, refugees go to host farms to buy seed, and hosts also go to refugee markets to sell. In Boroli, the RWC described how, during planting season, hosts would set up an informal seed market around sites where refugees received their monthly cash allotments. In some cases, the seed sold in this way had been selected and saved as seed by the host farmers; refugee farmers reported that they knew it was seed because it was black with smoke from having been stored above the kitchen fire. In other cases, however, it is likely that what was being sold was grain from the farmer's harvest rather than seed that had been selected and saved as such. Host farmers explained that these sales are one-off, whenever they need cash. Hosts do not regard these types of opportunistic seed sales as a business, and quantities are generally small because they lack transport to take large quantities.

Seed acquisition from other farmers in the same community is also common in cases where a farmer has been unable to save their own seed. Seed acquisition appears to be dominated by cash transactions among refugees, though loans and exchanges were mentioned among host farmers. While seed sharing among female farmers (for free) was common in South Sudan, it is less common among refugee groups in Uganda. Male and female host farmers explained that seed can be exchanged for anything agreed, e.g., other seed types, grain or a small goat; if loaned, then double the quantity will typically be returned at harvest. Among host farmers, seed providers can be either male or female.

Some grain traders also sell (uncertified) seed in local markets at planting time. Further details of seed that is sold by traders in local markets is provided in Section 7 and Annex 8.

Agro-dealers were rarely frequented by the farmers that took part in the discussions, and were generally regarded as a last resort for seed acquisition, partly because of the travel needed to access them (in Adjumani Town), and partly because the cost of certified seed is simply beyond the reach of most smallholder farmers. Among the few farmers who said they had purchased seed from agro-dealers, most had not actually travelled themselves to the agro-dealer shop, but had instead purchased the seed through another trader or another farmer or by sending someone on a motorbike. Across all the focus group discussions, only maize, beans and vegetables were cited by a handful of FGD participants (both male and female) as being occasionally purchased from agro-dealers. For maize and beans, the seed was purchased once in order to obtain a specific variety, and then recycled. Although farmers are aware of the existence of agro-dealer shops in Adjumani Town, they prefer instead to source seed from farmers or local markets.

## 5. Impacts on Food Security

Food security occurs when people can afford adequate amounts of necessary food items at all times and is influenced by access, availability, affordability and stability. Two indicators were used to measure food security: changes in crop production and the number of hunger months.

### 5.1 Production trends of priority crops

As illustrated by Figure 1, average scores for all farmers indicated slight increases in the production of sesame and groundnut, and a slight decrease in the production of maize. However, as this section will show, these production gains mainly benefitted host farmers. Refugee farmers saw decreases in production for all crops except tomatoes. Gender-based differences were also observed. Scores were given on a scale of one to ten. All scores were generally low, because farmers did not consider their production levels to be optimal in relation to their expectations. The low production overall was mainly due to drought.

There was an observed increment in sesame production from 2018 (prior to receiving support) to 2021 (after receiving support) due to favourable weather conditions, increased land size, agronomic training support, timely weeding, and superior seed of an early maturing and high yielding variety. In some cases, farmers, especially in host communities, moved their production to newly-opened fallow lands to benefit from more fertile soils. Use of ox ploughs increased the land size for production, while acquisition of money from VSLAs helped some (mainly women) to open up more land for production and access labour for farm operations. Some farmers registered a reduction in sesame production even after interventions due to a prolonged drought, destruction of crops by animals, and reduction of field size.

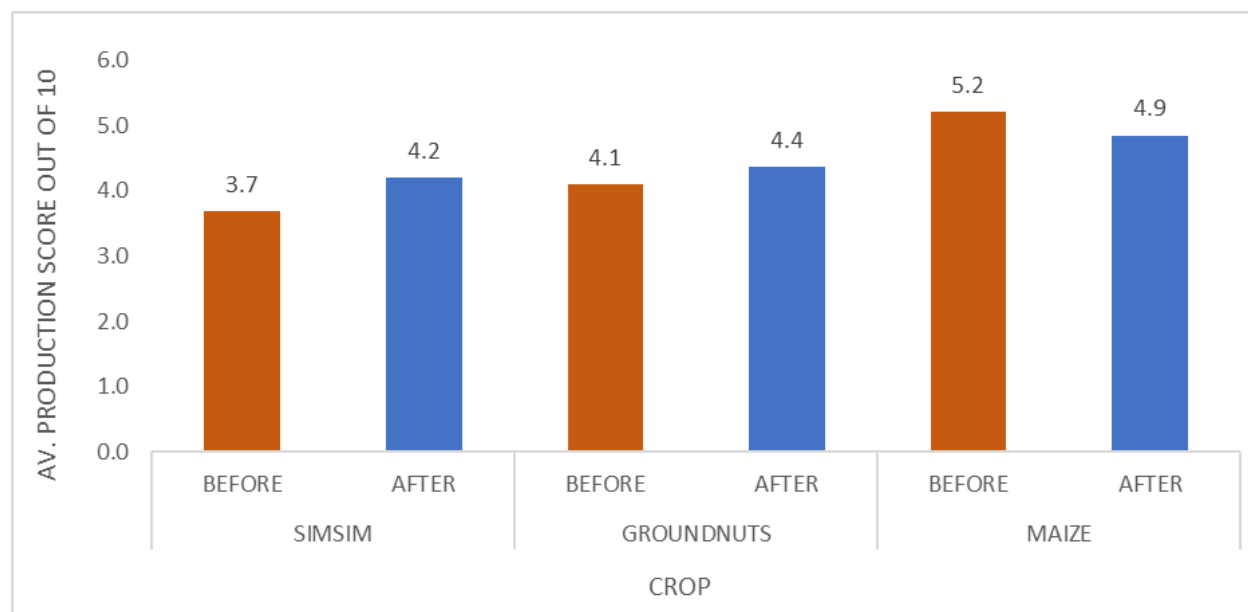


Fig 1. Average production of key crops before and after interventions (N=40)

Although Figure 1 shows a slight increase in groundnut production overall, this masks the gender-based and status-based differences that can be seen in Figures 2 and 3. Production increases were reported to be due to agronomic training given by LWF. For instance, many were advised to change fields where their yields were persistently low (possibly due to the poor quality groundnut seed described above). Improvement in production



was attributed by some farmers to improved seed quality of fast maturing and better yielding varieties, timely planting and weeding, favourable weather conditions, and increased land size, among others. Support with ox ploughs and funds from VSLA helped some groups open more land and increase their production. There was a very prolonged drought in many of the LWF-supported communities that affected production of groundnuts in 2021 and 2022, even with the recommended agronomic practices and improved seeds received from LWF. Some farmers indicated that the seed they received was not adapted to the soil conditions.

While there was a small decline in maize yields, where maize yields were reported to have increased, this was attributed to access to pest resistant varieties, agronomic training, early planting, the use of ox plough, and the ability to invest in labour during production, allowing for increased land size. Some farmers borrowed money from their VSLAs to support production processes. For some farmers, declining maize production was recorded due to a number of factors including floods, drought, and army worm invasion.

Some host farmers planted soybeans and observed lower yields than expected due to pest and disease attack, delayed planting, exacerbated by the long dry spells. On the other hand, increased soy production was attributed to increased field size, good quality seed of an early maturing and high yielding variety, early planting and weeding, line planting, appropriate spacing, and pest management. Training in agronomic practices was also important as soybean production was new to most of these farmers. Increased production in some cases was attributed to increasing the area cultivated.

Tomato production increased due to agronomic training, including planting in lines, timely planting, timely weeding, mulching, irrigation (by using watering cans), and staking. Some of the challenges faced in tomato production affecting the production included drought, a low yielding variety and diseases. A few groups also observed that borehole water used for watering the plants was inappropriate due to being salty, thus affecting the growth of the tomatoes.

Figure 2 shows that, generally, men scored their production higher than the women's scores for all crops before the interventions. After the intervention, women reported higher scores for maize and groundnut than men. This better production is reported for crops which were indicated to be most affected by drought, so it appears close monitoring and management (e.g. timely planting) contributed to safeguarding plants from adverse drought effects. In general, women are more closely involved in crop production than men in the local farming systems of Northern Uganda (and also of South Sudan).

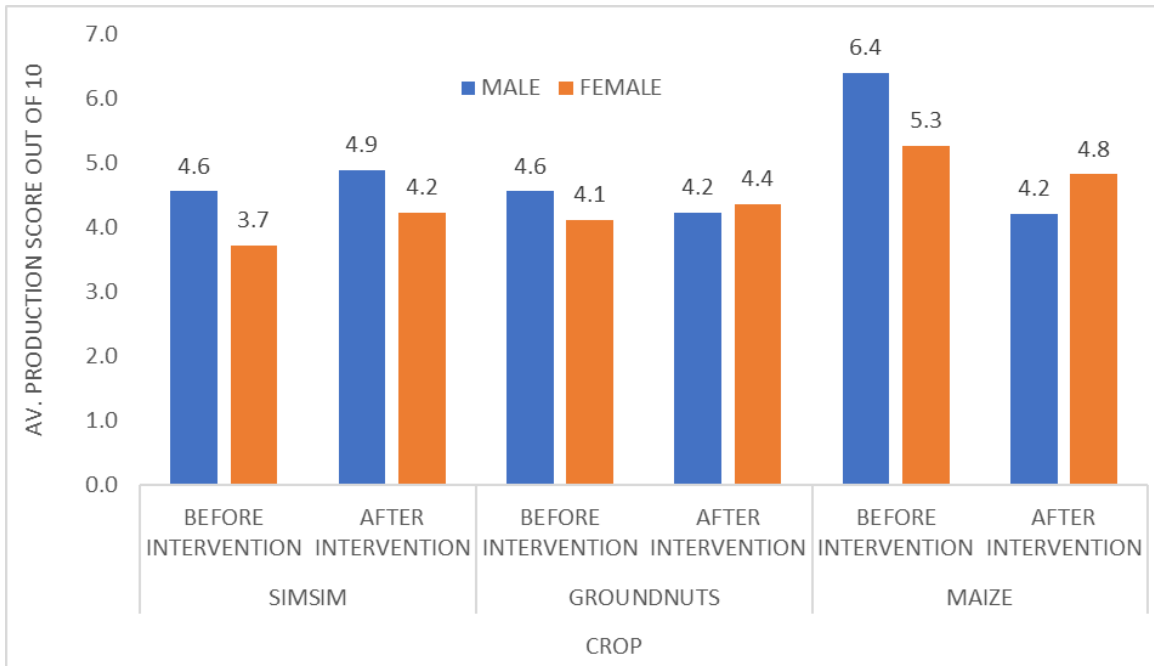


Fig. 2. Average production of key crops by gender before and after interventions (N=40; 30 female, 10 male)

Hosts showed increases in production for all crops, whereas refugees only saw an increase in the production of tomatoes (Figure 3). The changes in tomato production were attributed to the fact that before interventions, the farmers used rudimentary methods of extracting seed from market-purchased tomatoes. After the interventions, the farmers used improved seed and recommended agronomic practices.

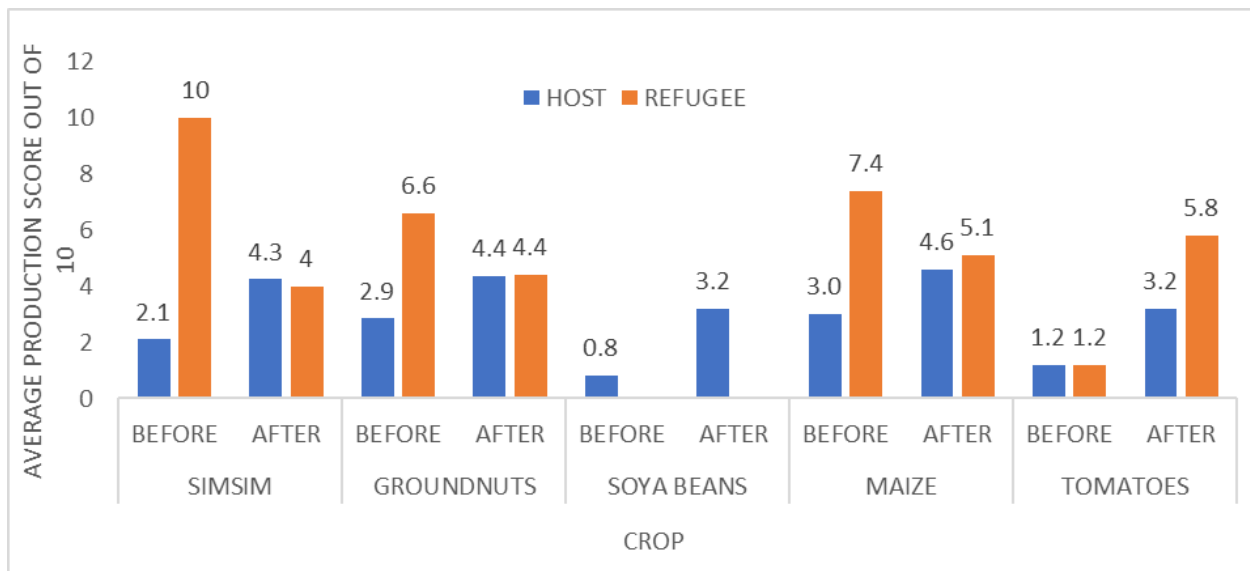


Fig. 3. Average production of key crops by status before and after interventions (N=40; 25 host, 15 refugee)

## 5.2 Hunger months

Farmers in both host and refugee households reported between one and two hunger months (generally May and June, though the exact months varied – see below), with main causes of the hunger months being low production due to drought, pests and disease affecting crop production. In some instances, even though there was adequate production, the farmers sold their produce to pay school fees and medical bills making them food insecure. Inadequate production forced poorer farmers to sell their crops at harvest time (when prices are low), implying that they then had to purchase preferred food types later in the season (when prices are higher). In some instances, savings were utilised for buying food during the hunger months. Some of the refugee farmers noted that the most food insecure months are at the beginning of the year when they sell off all or part of their harvest for school fees, even though the next harvest is not expected until about July.

There was a general reduction of hunger months after the interventions. Although this might be attributed to improved production among host farmers, it is difficult to explain how food security had apparently increased among the refugee farmers who suffered a decline in production for most crops, as described above. In addition to the VSLAs, farmers reported that they were trained in better management - both of their harvested produce and the incomes from their crop sales. While both the VSLAs and training may have helped to improve food security, they are unlikely to have made a big difference without being accompanied by an increase in income and/or production.

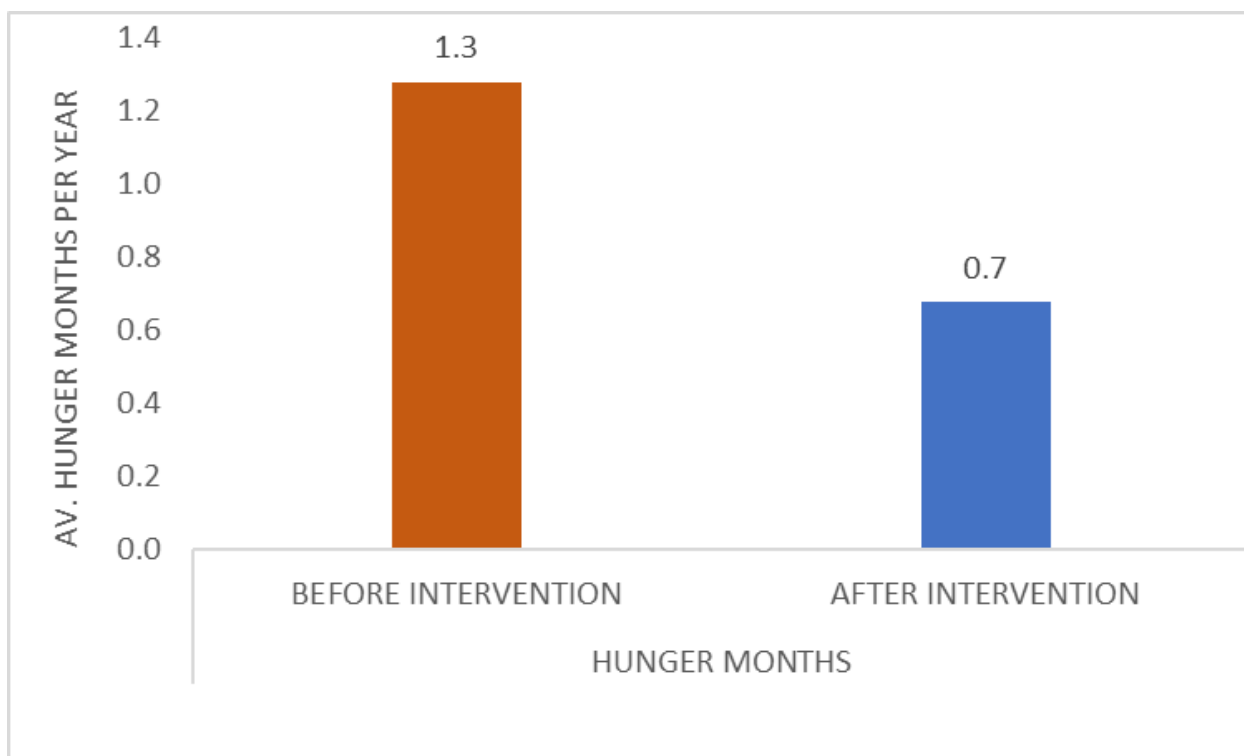


Fig. 4: Hunger months before and after the LWF interventions (N=40)

There was a general decrease in the hunger months reported among both the males and females although it was more pronounced among the women, which could be due to men focusing on cash crops while women focused on food crops.

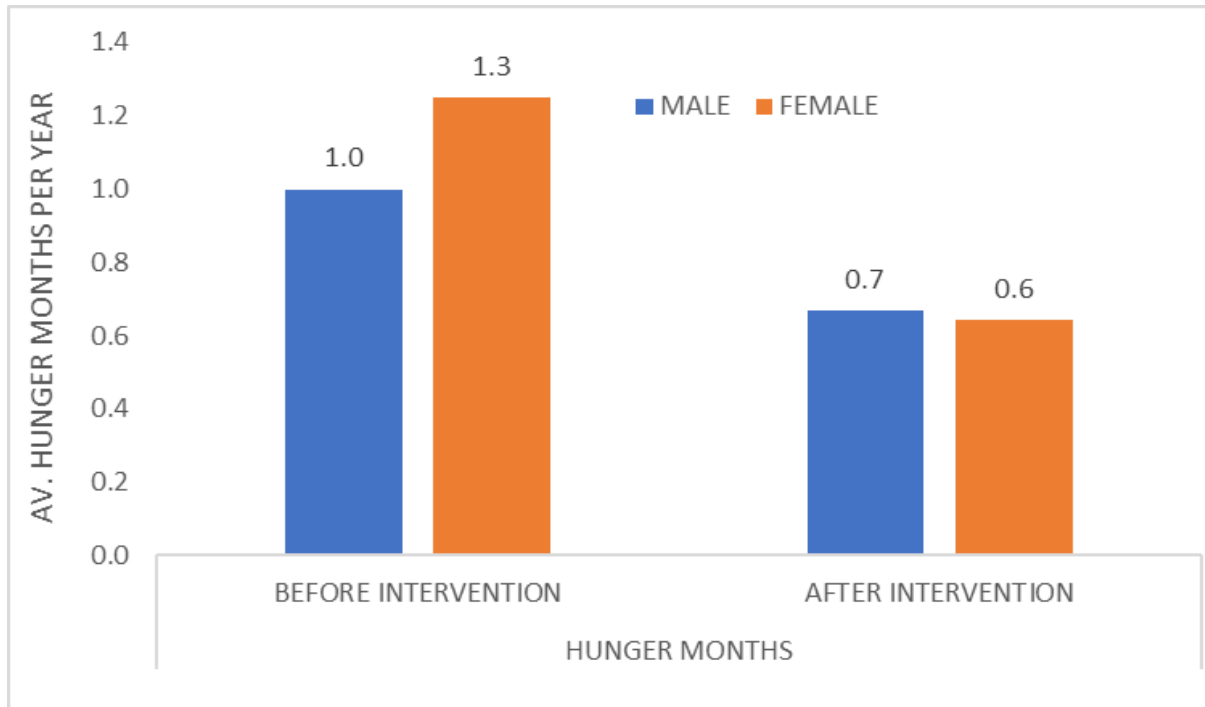


Fig. 5: Hunger months among males and females before and after LWF seed interventions (N=40; 30 female, 10 male)

Host farmers reported to have experienced more hunger months before the intervention than the refugees and this declined greatly after the interventions. This may be attributed to the regular monthly food / cash distributions to refugees (potentially allowing for income-generation among hosts due to purchasing power of refugees), and the increased production by the hosts through increased land for production through oxen support and the seed and agronomic training. The decline in hunger months among the refugees was not as great because the value of monthly food / cash distributions had decreased and access to extra land for production was limited due to conflicts between refugees and host communities.

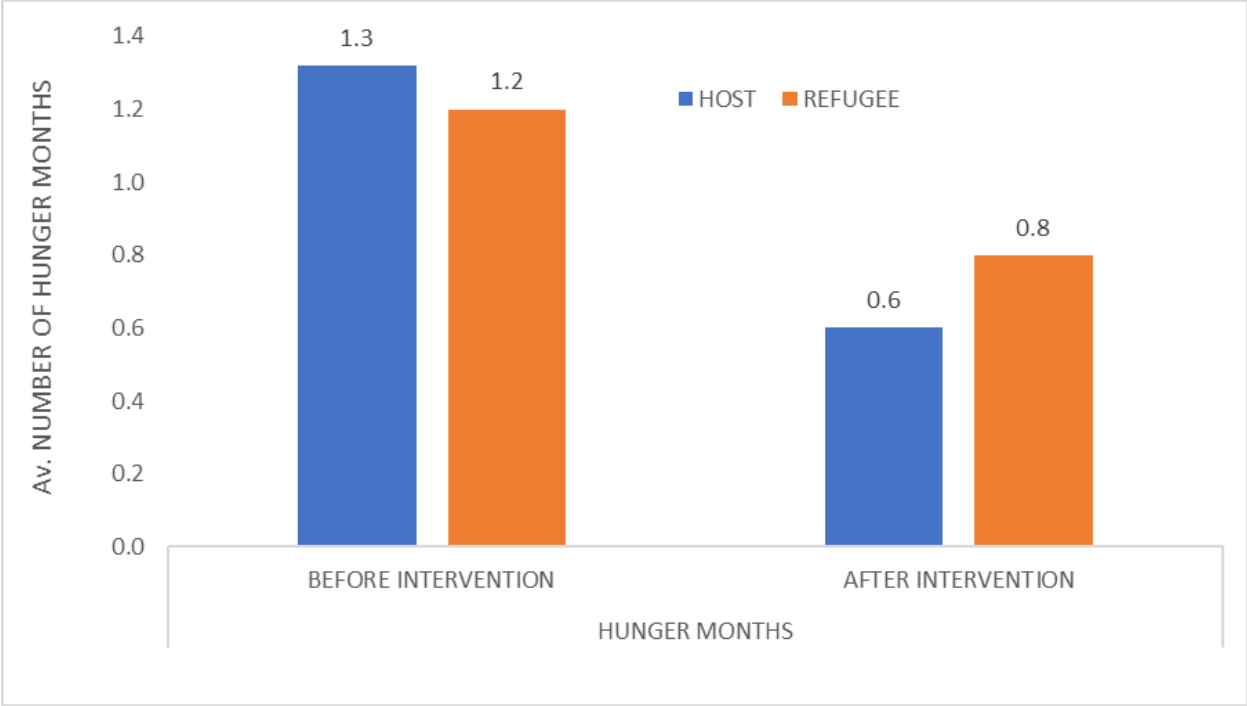


Fig. 6: Hunger months among host and refugee households before and after LWF seed interventions

One of the coping mechanisms that occurred during the hunger months was borrowing from the VSLAs to buy food. Farmers also reported that they sometimes undertook casual labour to meet their food needs, and some engaged in income-generating activities.

## 6. Impacts on livelihoods

To establish the impact of the seed support on livelihoods, farmers were asked how they spent the income from the sale of the crops harvested from the seeds received. The study used the Sustainable Livelihoods Approach as the organising framework to categorise farmers' responses regarding their spending patterns before and after the intervention. A livelihood comprises the capabilities, assets, and activities required for a means of living. It is deemed sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities, assets, and activities both now and in the future, while not undermining the natural resource base<sup>13</sup>. The LWF projects which formed the focus of this assessment had livelihood development goals in their naming and design. The BftW project, "Promoting Sustainable livelihoods, Environmental and Psychosocial Support in Adjumani", had the singular goal to contribute to improved livelihoods for South Sudanese refugees in Adjumani, as measured by increase in food all year round, and a targeted 50% increase in income.

### 6.1 The Sustainable Livelihoods Framework

The sustainable livelihoods framework helps to organise the factors that constrain or enhance livelihood opportunities and shows how they relate to one another. A central notion is that different households have different access to livelihood assets, which the sustainable livelihood approach aims to expand. The livelihood assets, for which the poor must often make trade-offs and choices, comprise:

- a) Human capital, e.g., health, nutrition, education, knowledge and skills, capacity to work, capacity to adapt;
- b) Social capital, e.g., networks and connections (patronage, neighbourhoods, kinship), relations of trust and mutual understanding and support, formal and informal groups, shared values and behaviour, common rules and sanctions, collective representation, mechanisms for participation in decision-making, leadership etc;
- c) Natural capital, e.g., land and produce, livestock, water and aquatic resources, trees and forest products, wildlife, wild foods and fibres, biodiversity, environmental services
- d) Physical capital, e.g., infrastructure (transport, roads, vehicles, secure shelter and buildings, water supply and sanitation, energy, communications), tools and technology (tools and equipment for production, seed, fertiliser, pesticides, traditional technology)
- e) Financial capital, e.g., savings, credit and debt (formal, informal), remittances, pensions, wages.

### 6.2 Findings

The largest spending of household income generated by the seed provided was investment in human capitals of health, food and nutrition for the family, and education of children. Overall, according to the scores, human capital was the highest expenditure for most households both before and after the intervention, with a slight increase after the intervention. Financial capital experienced the highest increase which could suggest the priority the households put into growing their financial capital base as indicated in Figure 7 below. The subsequent figures disaggregate the findings by gender (Figure 8) and status (Figure 9), though it must be noted that this data comes from just 15 households (6 male-headed, 9 female-headed) and may not be representative. As an essentially qualitative evaluation methodology, PIA emphasizes the descriptive, explanatory feedback

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<sup>13</sup> The Sustainable Livelihoods Approach (adb.org)

from farmers in response to open-ended questions. The accompanying text below provides additional notes, highlighting the findings from the discussions with farmers.

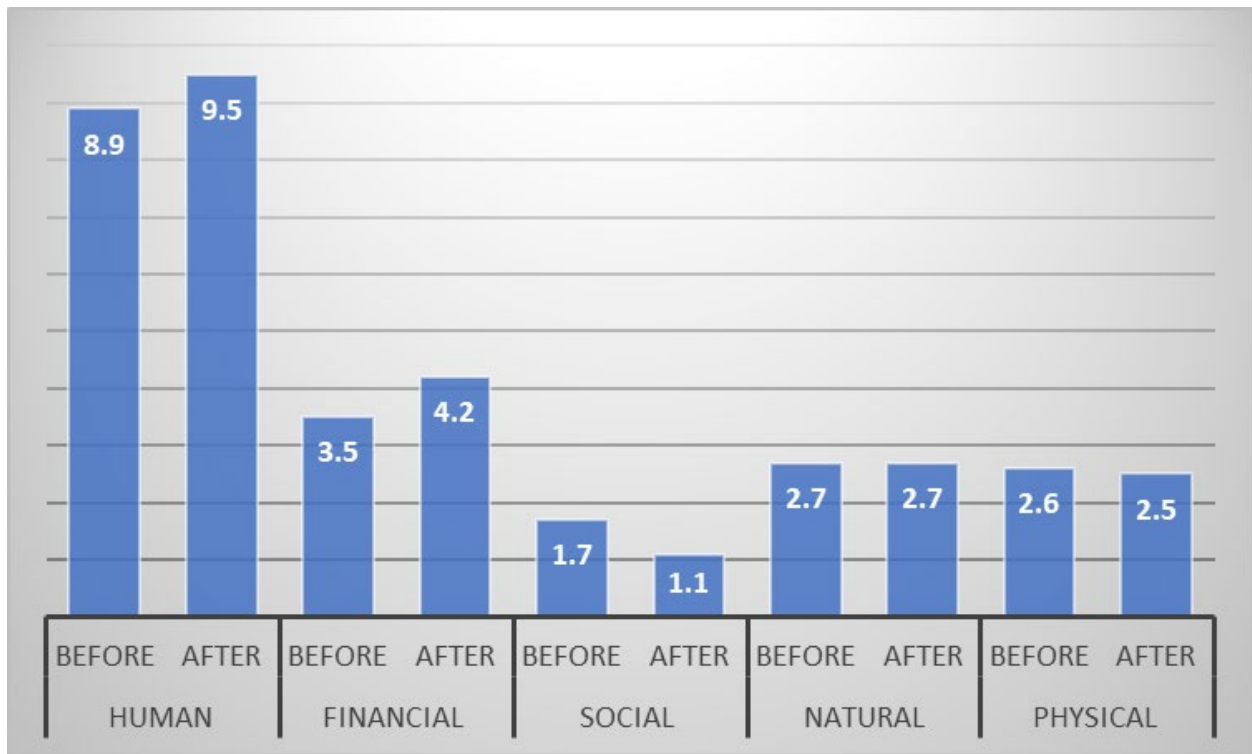


Fig. 7: Average expenditure scores for different livelihood capitals at household level (N=15: 9 female, 6 male)

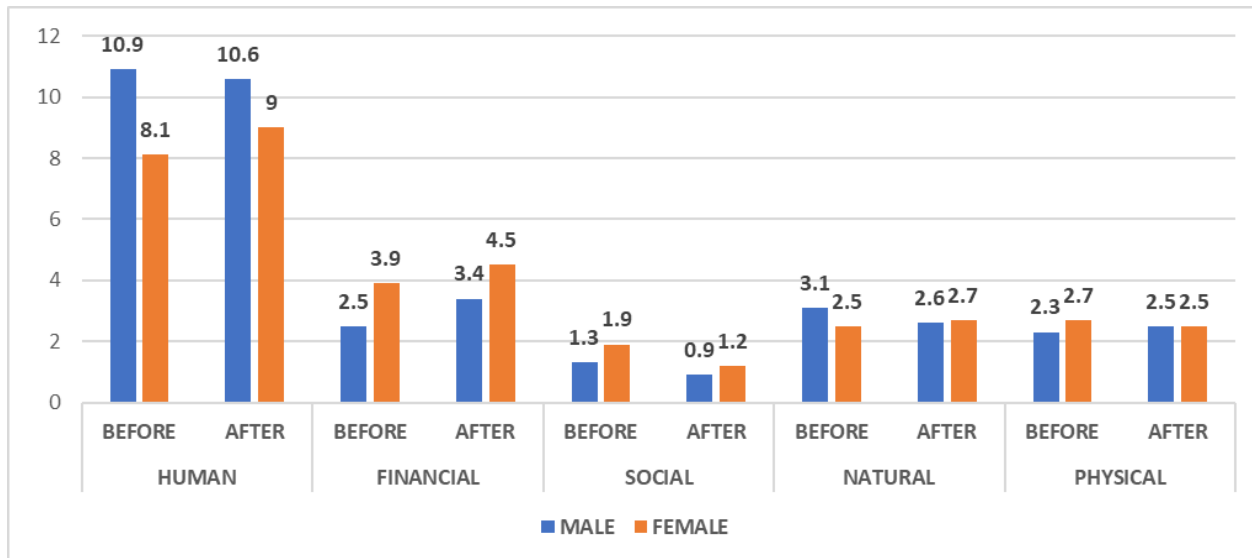


Fig. 8: Average expenditure scores for different livelihood capitals for male- and female-headed households. (N=15)

When analysed by gender (Figure 8), men scored their household spending on human capital (mostly food) higher than their female counterparts. Spending on human capital (school fees, health, food) remains the highest among the five capitals with a slight drop by male respondents and a significant increase by the female

respondents. The next major spending by both male and female respondents was investment in financial capital which increased by about a third, mostly savings in VSLAs with male respondents reflecting a more significant change in this area than female respondents. Investment in natural capital (mostly farmland and small livestock) remained unchanged in total, dropping for men and increasing marginally for women. The result is surprising considering that most respondents indicated that money invested in livestock always gave good returns when time came to sell the animals. Social capital attracted the least investment by both male and female respondents and dropped significantly after the intervention due to competing priorities for the basic needs of food, education and health.

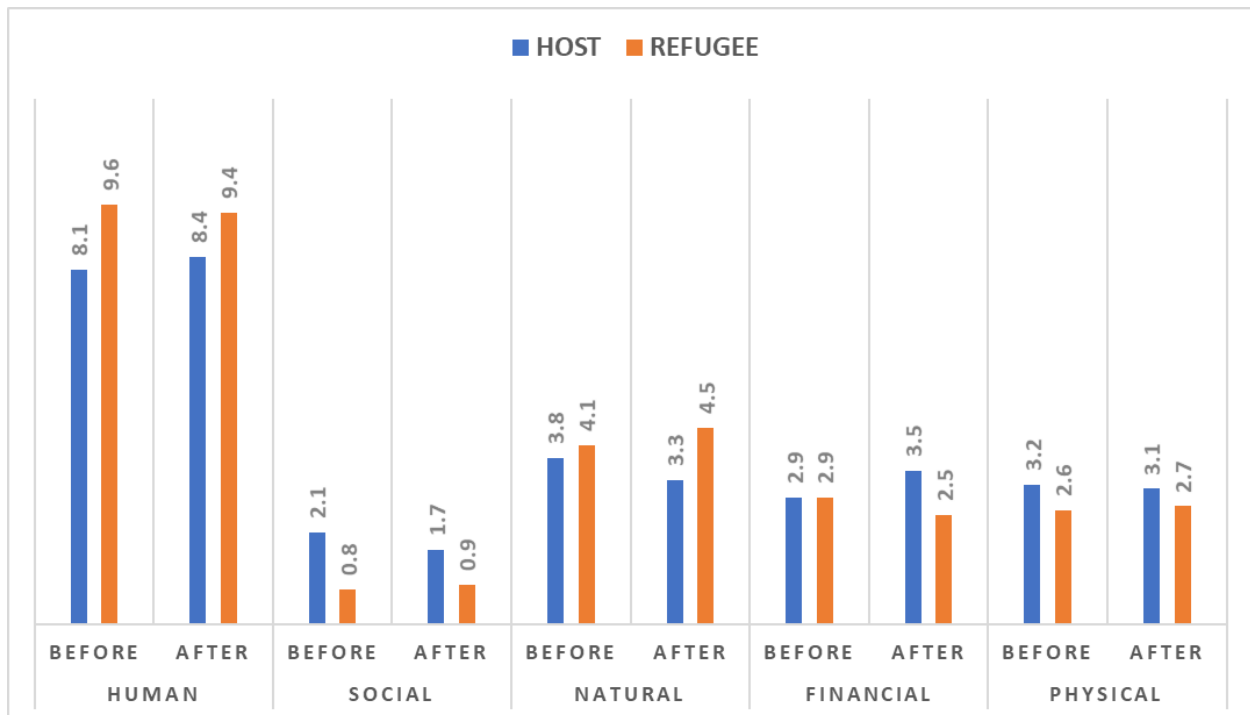


Fig. 9: Average expenditure scores on different capitals for refugee and host community households (N=15: 9 female, 6 male)

Figure 9 shows some interesting differences between the refugee and host community household scores: the host scores show increases in expenditure on financial capital and human capital, whereas the refugee scores show a slight decline for these capitals. However, when the different types of human capital expenditure are examined (Figure 11), refugee's expenditure on education actually increased quite substantially. Refugee scores also show slight increases for natural and social capital expenditures, whereas host expenditure shows a decline for these capitals. The changes in expenditure on physical capital are very slight for both groups.



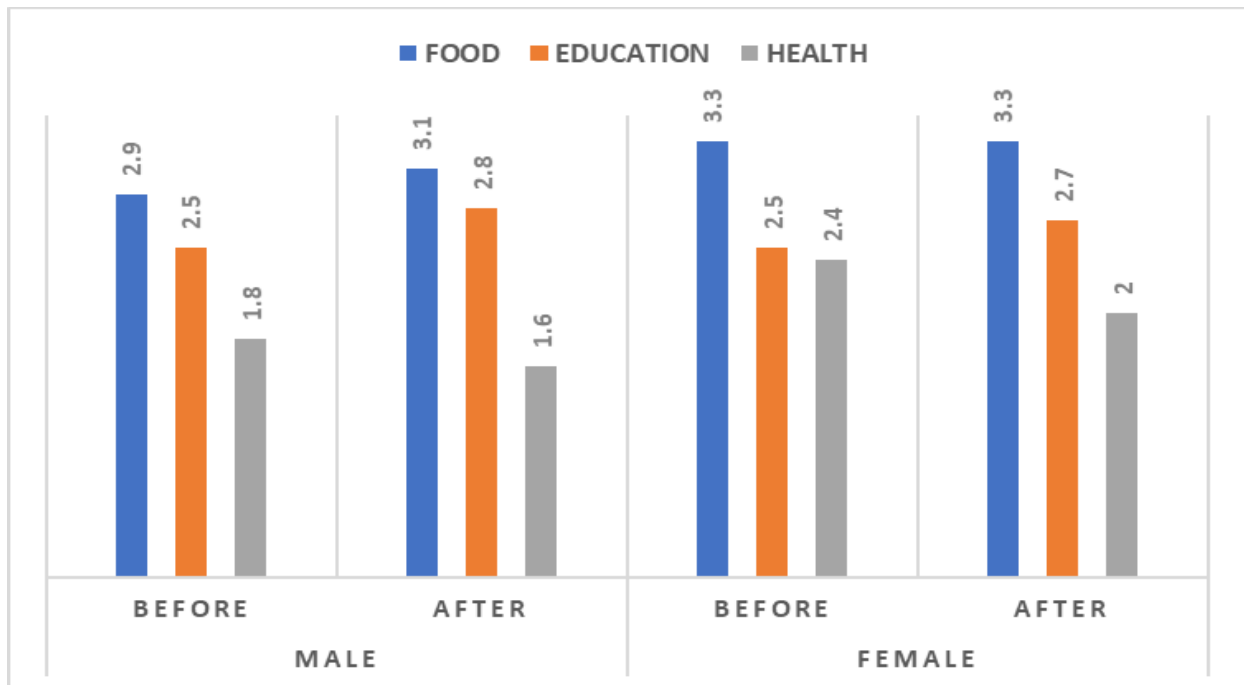


Fig. 10: Human capital expenditure disaggregated by gender and type (N=15)

Spending on education went up marginally after the intervention for both male and female respondents. That education takes the second highest portion of household income from crop sales is testament to the value the refugee households put on education. In the follow up questions for reasons for the higher scores, many respondents mentioned that families consider the quality of education in Uganda to be better than in South Sudan. Some respondents reported that they were looking after the children of relatives in South Sudan to allow the children to benefit from quality education in Uganda. The proportion of spending on health went down after the intervention.

Investment in financial capital which included saving with VSLA went up proportionally for both men and women after spending on food.

It is noteworthy that most of the groups started out as VSLA groups before the seed intervention meaning that the members had more confidence in using the VSLA approach to mobilise financial resources for business and for household needs.

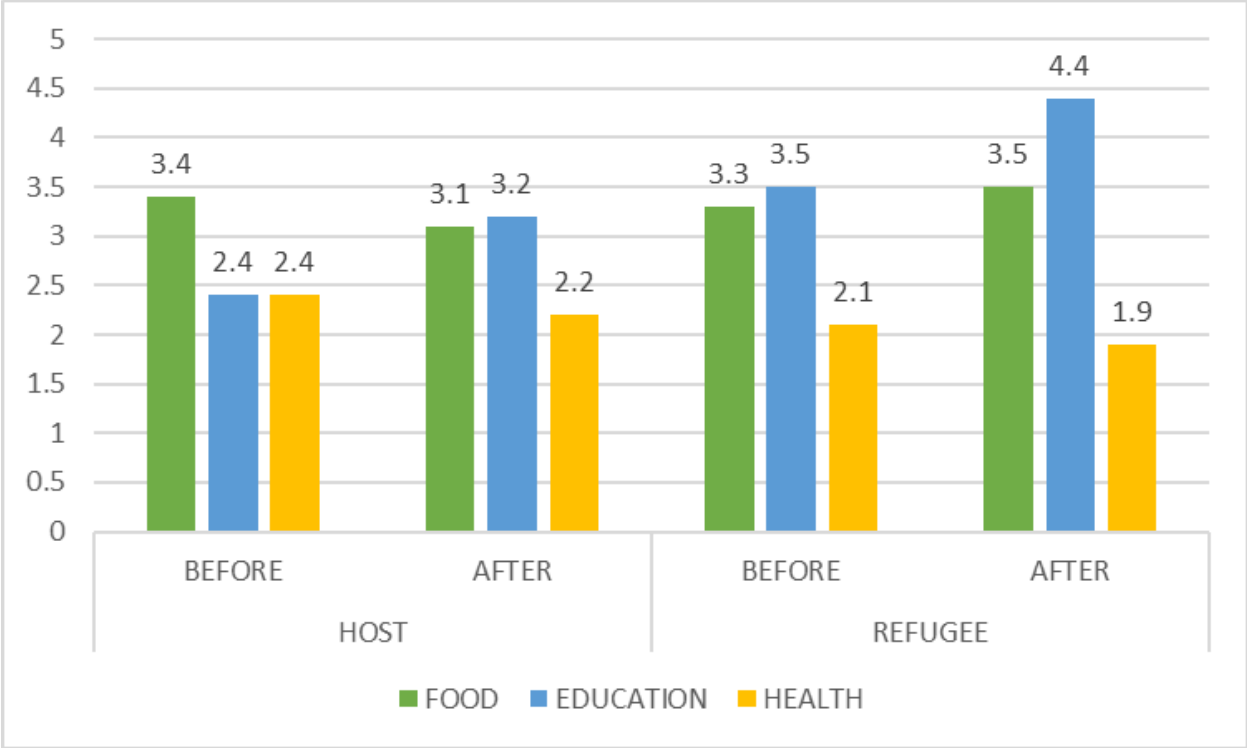


Fig. 11. Comparative expenditure on human capital by refugee and host community households (N=15)

Spending on education rose by about a quarter after the intervention for both refugee and host community households, suggesting an increase in disposable income for both groups. The drop in food expenditure by the host community is likely due to the increase in crop production which enabled households to reduce food purchases. At the same time, expenditure on food rose marginally for refugee households, most likely reflecting the drop in the food ration/cash transfer from WFP, combined with the fall in production for key crops, as reported above.

## 7. Impacts on Seed Systems Actors

A description of informal, intermediate and formal seed systems is provided in Annex 8, which also describes the key seed system actors in Adjumani District. This section explores the impacts of the LWF intervention on informal seed system actors (mainly market traders), intermediary system actors (Farmer Seed Producers and Local Seed Businesses) and formal seed system actors (agro-input dealers).

### 7.1 Impacts on Informal Seed System actors

As described in Section 4, the local informal seed system has incorporated new crops and new varieties over time. Some of these have been provided through emergency seed interventions, some originated from government schemes and development projects, and others were introduced by refugees (e.g. specific maize and sorghum varieties). The informal seed system relies largely on farmer-saved seed, local markets, and seed sales and seed exchanges among farmers. Hosts commonly sell small quantities of own-saved seed, vegetative planting material and potential seed (i.e. grain) to refugees; such sales are opportunistic rather than being regarded as a business<sup>14</sup>.

Within the two local markets visited by the assessment team, there is a distinction between traders' own-saved seed, trader-sorted seed, and grain (potential seed). Box 2 provides details of two female traders in Pakele Market who produce and sell own-saved seed; the seed is multiplied on their own farms and is selected and managed separately from grain. In Nyumanzi market, several female traders explained how they purchase good quality grain of maize, beans and simsim from local farmers at harvest time and then clean this by winnowing and removing shrivelled or poor-quality grains and off-types. In the case of simsim, the grain was sourced from the trader's brother. Another trader dealing in red sorghum sourced grain from other markets and then cleaned it to sell as seed. Such seed is typically sold at twice the price of grain. Finally, any grain, regardless of source or management measures, can potentially be sold for planting – such grain is commonly referred to as 'potential seed' and is indistinguishable from grain. If farmers use such grain for planting, they typically clean and sort it themselves.

Apart from smallholder farmers, the assessment did not find any evidence to suggest that the LWF intervention had impacted informal seed system actors, such as locally recognised farmer seed providers or market traders.

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<sup>14</sup> In Boroli Settlement (not a WV area), an informal market is often created during refugee cash distributions in the planting season. During the cash distribution (when WFP provides UGX 19,000/person/month), hosts will bring seed and other goods and create a temporary market around the distribution site to sell to refugees.

**Example 1: Lucy**

Lucy is a young woman trading in grain of maize and beans and dried cassava. She has her own farm and rents a store in Pakele market. During the planting season she also sells maize and bean seed to farmers. Both beans and maize are sourced, stored and sold separately from grain. She produces the seed on own farm. Maize is “Katumani” (Longe 4) variety. Cobs are selected at harvest; the shucks are left intact and the cobs are hung above the fire to prevent pests. Bean seed is also stored separately from grain to avoid pests. This seed is sold at a 30% to 40% premium.

**Example 2: Josephine**

Josephine is an elderly woman who was selling fresh okra in Pakele market. During the planting season she sells seeds of okra, pumpkin, maize and sorghum as well as teak tree seedlings. She supplies two varieties of okra seed and two varieties of pumpkin seed, all of which are grown by Josephine herself on her own farm. The varieties of each crop are sold at different prices by using a different measure – one variety is measured in jerrican lid and the other in a small cup. She cultivates Katumani maize on her own farm and she manages and sells the seed and grain separately.

## 7.2 Impacts on Farmer Seed Producers (FSPs)

Farmer Seed Producer groups appear to operate at different levels, with some being more commercially oriented than others. The groups are not officially registered and their seed is not certified, though they have received training in seed production. At one level - as with the earlier NAADS approach - improved seed is provided for a group demonstration plot with the expectation that the group (often a farmer field school) will multiply the seed to allow individual group members to acquire the seed. At another level, other FSPs (which may have been initiated as a VSLA) sell seed and planting materials to farmers within the local community as an income-generating activity. Some FSPs might eventually become Local Seed Businesses (LSBs).

The main impact of emergency seed interventions on FSPs is in providing new markets for seed sales, notably through seed fairs organised by NGOs, and – in the case of vegetative planting material of cassava and sweet potato – to agro-input dealers who have contracts to supply to NGOs for seed distribution projects. These new sales outlets have helped to build the capacity of FSPs and allowed them to become more commercially oriented. One FSP ventured beyond local demand and established contact with private seed/grain traders from Gulu who bought their groundnut seed at Ug. Sh. 1,500 per kilo – a price not only above the going rate for grain, but also above the average for FSP-produced seed.<sup>15</sup> The assessment team was unable to verify whether such sales of non-certified seed to private traders were a common occurrence.

## 7.3 Impacts on Local Seed Businesses (LSBs)

A Local Seed Business (LSB) refers to an individual or a registered group (normally of 25-30 farmers) that produce Quality Declared Seed (QDS) (see Annex 7). Typically, an LSB is formed and promoted by a specific NGO, government project or development partner to enable farmers to multiply seed on a commercial basis. In Adjumani District, LSBs have largely been promoted by the Integrated Seed and Sector Development (ISSD) Project, LWF<sup>16</sup>, World Vision, Project for the Restoration of Livelihoods in the Northern Region (PRELNOR) and the District Farmers Association (DFA). It was reported that many LSBs cease to exist once external support from an NGO or project comes to an end. The assessment team also identified two cases of farmer-initiated LSBs which were considered (by both the assessment team and various key

<sup>15</sup> Unfortunately, in this instance, FSP members felt that they were cheated because weighing scales (belonging to traders) under weighed their seed.

<sup>16</sup> LWF has mainly supported LSBs under the DINU-LEWA project (which was not the focus of the assessment), but the BftW project also supported local seed producers, including the Ori-Limi Seed Producer Group.

informants) to be more business-oriented than those initiated by NGOs and other projects<sup>17</sup>. Though the exact number of LSBs in the district could not be ascertained, there are probably between 15 and 25, and increasing with on-going support.

LSBs play a specific role in the multiplication and distribution of QDS for true breeding (self-pollinating) crops such as beans, rice and groundnuts for which private sector seed companies may not be able to make profit, also crops with vegetative planting material (cassava, sweet potato) which is perishable and difficult to transport. Much of the seed produced by LSBs in Adjumani District is sold to NGOs (for emergency seed interventions) and projects such as PRELNOR, the Northern Uganda Resilience Initiative (NURI) and Operation Wealth Creation (OWC) (often through the sub-county agricultural office). In some cases, it is also sold directly to farmers and traders. Vegetative planting material is often sold to agro-input dealers for onward supply to NGOs and agricultural development projects.

Emergency interventions have impacted on LSBs in three main ways: (i) In some cases, the VSLAs established by LWF and other emergency interventions have themselves become LSBs<sup>18</sup>; (ii) Interventions involving seed fairs have provided LSBs the opportunity to sell their seed to farmers in exchange for vouchers provided by the implementing NGO; and (iii) Emergency seed interventions have created considerable demand for QDS, allowing LSBs to sell some of their seed outputs to NGOs. The two most successful LSBs are both male-owned and self-initiated; one works as an individual to produce seed, the other has six seed producers (2 women, 4 men) who produce seed on individual plots. Since most LSBs have relied on NGO and institutional demand for their business, this puts into question their sustainability over the long term if NGO emergency seed interventions are to be scaled down in future. This is further discussed below, in Section 8.4.

#### 7.4 Impacts on agro-input dealers

As described in Section 4, agro-dealers play a minor role as a seed source for smallholder farmers who participated in the assessment. Despite this, the number of agro-dealers has reportedly grown from one (for livestock) in 2013 to over 10 now in Adjumani town, most of which sell seed. This impressive increase in agro-input dealers has been stimulated by the growing demand for seed that is attributed to the seed relief market by NGOs and to programs such as OWC, NURI, and PRELNOR. Out of the eight agro-input dealers interviewed by the assessment team (4 male-managed; 4 female-managed), six reported to have had supply contract(s) with an NGO or development program. NGOs were considered to be ‘good customers’ because they buy in bulk and generally pay within reasonable time from the time of supply. The seeds most in demand by these NGO/projects were vegetables, followed by cereals (maize), pulses (beans) and oil seed (soybean, groundnuts, sunflower, sesame). There was also demand for cassava cuttings and potato vines which the agro-input dealers sourced from Farmer Seed Producers and Local Seed Businesses. Certified seed is bought from Kampala-based seed companies such as Simlaw, House of Seeds, East African Seeds, Syova, Starke Ayers, and BRAC, among others.

Emergency seed is purchased from agro-dealers through a formal competitive bidding and contracting process. This has led participating dealers to improve their internal capacity not only to write competitive bids

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<sup>17</sup> One of these was the Ori-Limi Seed Producer Group located in Angwarapi East, Dzaipi Sub County. The other was Agrumundo Mixed Farm which had also established an agro-input shop in Pakele Town; see Box 4 for details. Apart from these two cases, most LSBs tend to be highly dependent on NGOs for most of their value chain such as accessing foundation seed, capacity building, payment of inspection fees, and accessing markets. This poses a critical question of LSB sustainability, particularly when donor funds cease to support their activities. It was reported that many LSBs cease to exist after external support ends.

<sup>18</sup> These LSBs have both male and female members (with a majority of females) and produce their seed on a group plot, not individual plots.

but also to manage the contracts and meet the contract terms. Contracted agro-input dealers must also conduct germination tests as a requirement for NGO contracts. Some NGO or project contracts include the provision of training to farmers by agro-dealers, and this has reportedly encouraged agro-dealers to expand the services offered to farmers<sup>19</sup>. On the other hand, due to the existence of a big NGO/project seed market, some input dealers have reportedly made less effort to develop/ tap into farmer seed markets, making them more vulnerable to unfavourable changes in NGO/project demand for seed (see below). A few smaller agro-dealers who do not have sufficient capacity to qualify for NGO/project contracts complained about free seed distributions taking away their business because they sell directly to farmers and farmer groups. One such agro-dealer remarked that “farmers cannot refuse free seed offered by NGOs and go to buy from the dealer where they are required to pay”.

One agro-dealer asserted that “the [formal] seed sector has failed in delivering its mandate”. The private sector has concentrated on cash crops and neglected low value staple crops. Because of high delivery costs and low price, staple crop seed is often kept for lengthy periods in storage, losing viability. LSBs and FSPs can help redress this failure in the formal system by multiplying and diffusing improved varieties self-pollinating staple crops. FSPs can operate at lower costs than LSBs and provide a quality seed at minimal cost to resource-poor farmers.

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<sup>19</sup> It is likely that the expansion of services by agro-dealers is not solely due to NGO contracts but more closely related to the need for agro-dealers to develop stronger relationships with farmers for marketing purposes and to promote customer loyalty. A number of agro-input dealers reported that they were offering additional services to farmers in the form of extension and advisory services, market information (including market prices and market trends) and market linkages, e.g. for vegetables and sunflower. At least two of the input dealers maintained an up-to-date database of farmer customers for follow up, while others indicated that they kept the contacts of regular customers for referencing and updates on stock availability.

## 8. Analysis: Impacts on seed systems and seed markets

This section combines the fieldwork findings with documented knowledge about seed systems to analyse the impacts on seed systems and seed markets.

### 8.1 Impacts on farmers' seed management and informal seed systems

Feedback from farmers presented in Section 4 and analysis by the assessment team suggest that the seed from the LWF intervention may have served various different purposes within local seed management practices. Some of these have not been fully validated, especially those towards the end of the list. The seed received may have served to provide: (a) a new variety or even a new crop (e.g. some vegetables) that is incorporated into a farmers' planting repertoire because it is appropriate to the local agroecology as well as the preferences of farmers and local markets – such seed will be saved after the harvest for subsequent planting; (b) seed that is planted because it is free and farmers (especially poorer farmers) would otherwise have had to find the money to acquire seed – the variety in this case is less important, and farmers may or may not decide to save the seed after the harvest for subsequent planting; (c) an input for which the main aim is to support a group activity, allowing farmers to establish a block farm, apply good agricultural practices, and work together for shared benefit; (d) quality seed of a variety that is already being cultivated locally – in this case the seed might offer fresh (replacement) seed stock that can subsequently be recycled for several seasons.<sup>20</sup>

The previous section suggests that seed from emergency interventions impacts on informal seed systems in different ways, depending on whether the variety provided is a new, appropriate (or inappropriate) variety, or one that is already locally available:

- When seed of new, appropriate varieties has been provided, these varieties have been fully incorporated into informal seed systems, and are subsequently available through seed-saving, from other farmers, and from local markets. What is appreciated by farmers is not the seed per se – both refugee and host farmers can readily access seed through informal seed systems<sup>21</sup> – but the addition of new varieties into the seed system.
- When seed of new, inappropriate or less preferred crops or varieties has been provided, these were abandoned by farmers after planting them for one or two seasons, and they were not incorporated into informal seed systems.
- When seed of locally available varieties has been provided, feedback from farmers suggest that there is little lasting impact on informal seed systems. However, it is possible that such seed might usefully serve as replacement seed within the local seed system, particularly for cross-pollinating crops such as maize.
- In the case of groundnuts, the varieties provided by LWF and other aid agencies (Serenut 4, also Serenut 2 and 3) had been discontinued by researchers and the seed was of poor quality. There also

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<sup>20</sup> Note that although farmers have been trained to replace their (maize) seed stocks every two or three years, this does not happen in practice. It is not clear whether or not farmers recognize any advantages in replacing their seed stocks. For self-pollinating crops such as beans, groundnut, and sorghum, seed can be recycled for considerably longer and still maintain its genetic quality, particularly if farmers practise seed selection and/or rogue out off-types or inferior seeds.

<sup>21</sup> In a small number of cases, farmers mentioned that the provision of seed meant that they did not have to spend their own money to purchase seed. In general, it was reported that farmers who did not have money to buy their own seed would find some casual work to earn the money needed to buy seed.

appears to be a very limited range of groundnut varieties available in local seed systems<sup>22</sup>, such that farmers had no alternative but to cultivate the varieties provided. As a result, farmers suffered production losses over time from the seed provided by aid agencies<sup>23</sup>.

## 8.2 Understanding seed markets

It is important to note that the majority of seed planted by smallholder farmers is seed that they have saved for themselves from the previous season. As such, the quantity of seed that is acquired through seed markets is considerably smaller than the total quantity of seed planted. Table A4 (Annex 9) explains the nature of seed demand by farmers. The main types of seed demand among refugee and host farmers in the project area currently stem from chronic poverty, periodic emergencies due to drought and floods, crop-specific constraints, and the occasional need for variety change. The different types of seed demand may be continuous (e.g. relating to poverty), recurrent or more sporadic, applying to different farmers, in different locations at different times, and different crops.

Table 2 provides an analysis of the differentiated nature of seed markets in Adjumani District. Broadly speaking, there are two distinct types of seed (uncertified and certified, including QDS) and three different types of seed markets: (1) informal sector seed markets in which uncertified seed is supplied by farmers and traders, and purchased by farmers; and (2) intermediate sector seed markets in which uncertified seed and QDS is produced by FSPs and LSBs and purchased by farmers, NGOs and projects, traders and agro-dealers; and (3) formal sector seed markets in which QDS and certified seed supplied by LSBs and agro-input dealers is purchased mainly by NGOs and projects and some more commercially-oriented farmers.

There are important differences between the seed sectors as to whether seed is sold commercially or opportunistically. In the informal seed market, uncertified seed is generally supplied on an opportunistic basis through non-commercial channels, or through grain traders for whom it constitutes a side-business rather than their main form of income. In the intermediate market, uncertified seed and QDS is supplied on a commercial basis, but the commercial viability of FSPs and LSBs is not certain. The commercial viability of the formal seed market appears to depend largely on sales to NGOs and projects<sup>24</sup>.

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<sup>22</sup> Although there are over 20 different improved varieties of groundnut in Uganda (not including the discontinued Serenut varieties 1 – 6) (<https://naads.or.ug/varieties-of-groundnuts/>), farmer discussions suggest that only three or four improved varieties are available through local seed systems in Adjumani District (Annex 7).

<sup>23</sup> Note that not all groundnut seed provided by all agencies was of inappropriate varieties. In Baroli Settlement, the assessment team found cases where farmers had received seed of *Serenut 11*, and this variety was in very high demand by farmers.

<sup>24</sup> This is also true at the national level: in 2015, NARO estimated that 50% to 70% of all certified seed available for sale in Uganda (approx. 11,500-16,000 MT) was distributed for free through Operation Wealth Creation (OWC) (Longley et al, 2022). After OWC began winding down, the level of certified seed production dropped dramatically from 28,000 MT in 2017 to just 8,000 MT in 2018, suggesting the close connection between formal seed markets and project purchases (*ibid.*).



Table 2. Different seed market types in Adjumani District

|                    |                 |   |  |
|--------------------|-----------------|---|--|
| Non-certified seed | Informal        | Farmer-grown seed   | This market consists of sales or exchanges by better-off or more meticulous farmers and opportunistic sales by farmers in need of cash. Such sales are not regarded as a reliable source of income. Seed is generally considered by farmers to be of good quality, especially in cases where the grower is known to the buyer. Farmer-grown seed includes all crops except for onion, cabbage and green pepper.  |
|                    |                 | Trader-grown seed, trader-sorted seed and potential seed  | Three different categories of seed found in local markets - trader-grown seed, trader-sorted seed and potential seed. This constitutes a seasonal business sideline for some grain traders, depending on their knowledge and capacity for managing seed as distinct from grain. Such seed is purchased by farmers only. The quality of trader-grown seed is likely to be comparable to farmer-grown seed, but the quality of trader-sorted seed and potential seed is likely to be poor. Trader-grown seed, trader-sorted seed and potential seed theoretically includes all crops except for onions, cabbage and green peppers, though this has not been verified. It is unlikely that all seed types for all crops are available in all markets. |
|                    | Intermediary    | FSP-grown seed and LSB-grown seed (not certified as QDS) <sup>25</sup>  | Produced on a commercial basis by farmers who have been trained in seed production. It is sold to farmers in the local community (sometimes through seed fairs). The source seed should (theoretically) be of known origin, and the quality of seed should be good, though this is not externally verified. FSP-grown seed and uncertified LSB-grown seed includes mainly cassava, sweet potato, beans, groundnuts, soybean, and rice.   |
| Certified seed     | Formal          | Quality Declared Seed (QDS)   | Produced on a commercial basis by trained and registered LSBs. Seed is certified as QDS and is generally sold to NGOs/projects, to traders and agro-input dealers (e.g. cassava and sweet potato planting material), and to farmers in the local community (sometimes through seed fairs). The source seed is foundation seed from one of the research institutions, though in practice this has sometimes been recycled <sup>26</sup> . In Adjumani District, QDS includes cassava, sweet potato, beans, groundnuts, soybean, sesame, greengrams and rice.  |
|                    |                 | Certified seed  | Produced on a commercial basis by seed companies located outside Adjumani District. Seed is sold by agro-input dealers to more commercially-oriented farmers and to NGOs/projects. Some seed companies also have contracts to sell directly to NGOs/projects. The source seed is foundation seed and the certification standards are more stringent than for QDS. Despite this, however, Uganda faces major challenges in ensuring the quality standards of certified seed. Certified seed includes mainly hybrid and OPV maize and vegetables <sup>27</sup> , with smaller, variable quantities of beans, groundnuts, rice, and sorghum. Small but increasing quantities of sesame and sunflower are also produced.                               |
|                    | Foundation seed | Produced by research institutions located outside Adjumani District. Seed is mainly sold to seed companies and LSBs for the purpose of seed multiplication, though one of the agro-dealers reported to sell foundation seed to commercial farmers for grain production because they did not trust the quality of certified seed. Quality control standards and certification are more stringent than for certified seed. Foundation seed includes those crops that are sold as QDS and certified seed, as listed above. |  |

The nature of seed demand by farmers presents a number of challenges in terms of commercial seed supply to smallholder farmers in the district:

- The most significant, continuous level of demand for most crops stems from chronic poverty, yet poor farmers lack purchasing power and are therefore unlikely to buy more expensive certified or QDS seed, choosing instead to purchase less expensive seed through the informal seed system.

<sup>25</sup> In some cases, it might take a year or two for LSBs to be registered and for their seed to reach the required quality standards for QDS certification. In other cases, established LSBs might not be able to afford to pay for the costs of annual registration and seed certification.

<sup>26</sup> It is allowed for foundation seed to be recycled

<sup>27</sup> Many vegetable seeds are imported rather than produced in-country.

- Demand created by emergencies such as drought or flood is not only difficult to plan for due to the unpredictable nature of these events, but the local production of commercial seed (whether certified as QDS or not) will likely also be affected by the same weather events. Thus, for planting seasons that follow an emergency, local commercial seed producers may not have sufficient production to meet the level of demand, whereas in ‘normal’ seasons they may not be able to sell all of their seed.
- The sporadic, one-off nature of demand that is driven by the need for a new variety is insufficient to ensure continuous sales of the same variety because farmers can save the seed of the variety after they have acquired it, and as soon as a critical mass of farmers have acquired the variety then it can be supplied through the informal seed system.

Given these challenges, the most reliable source of demand that can potentially sustain a commercial seed business is either seed of specific crops that are difficult for farmers to save (e.g. soybean, onion, cabbage, cassava) or crops for which farmers recognize the need for replacement seed stocks because they are hybrids (mainly hybrid maize and some vegetables). Only some of these crops are suitable for production by FSPs or LSBs, others must be sourced from seed companies and agro-input dealers.

### 8.3 The impacts of emergency seed interventions on seed markets

Seed supplied through emergency seed interventions is either QDS or certified seed purchased from LSBs, agro-input dealers in Adjumani or other input suppliers that operate at national level, or seed companies. The increase in demand for certified seed for emergency seed interventions and agricultural development projects has led to a big increase in the number of agro-input dealers in Adjumani Town. Whilst this has been positive in many ways (see section 7.3), not all agro-input dealers have benefitted from NGO/project contracts, and there are concerns that the free distribution of seed may have ‘crowded out’ or displaced seed purchases by farmers who would have bought certified seed. There are also concerns that some agro-input dealers become dependent on seed sales to NGOs and development projects and do not make the effort to develop their marketing strategies to promote sales to farmers. If emergency seed distribution and other projects were to come to an end, some of these agro-dealers may not have the necessary structures or capacities to sustain their business through seed sales to farmers. In this scenario, some agro-dealers may be forced out of business, or to re-locate to other districts where they can continue to rely on seed sales to NGOs and development projects.

The high demand for emergency seed has reportedly also contributed to seed quality challenges relating to the adulteration of seed. Key informants attributed seed quality issues both to seed companies that supply the input dealers or the input dealers themselves. For large orders of emergency seed, it was reported that the seed companies and input dealers may include expired seed, or grains packaged as seed. Recognition of the problem of adulteration has led to the need for agro dealers to conduct their own germination tests on seed supplied by seed companies (as described above), and for the District Agricultural Office to conduct additional checks. While there is widespread awareness of the contamination of the seed supply by adulterated seed, the seed can often pass germination tests and hence go undetected by both the agro dealers and the agricultural officers, resulting in low productivity. Over time, there is a concern that farmers will lose confidence in certified seeds and resort to home-saved seeds or even QDS, as reported by one LSB (Box 4).

Emergency seed interventions have also created demand for QDS because certified seed cannot meet the level of NGO demand for all crops, and informal sector seed lacks the necessary quality assurance protocols. There is a growing number of LSBs in the district, but their growth has also been accompanied by concerns over their sustainability. Much of the QDS produced by LSBs is sold to NGOs and development projects. Both district and sub-county agricultural officers assist in creating linkages between LSBs and NGOs / development projects for seed sales. In some cases, LSBs may be linked to agro-dealers who have supply

contracts with NGOs / projects to supply QDS. Although LSBs are trained on how to effectively market their seed directly to farmers within the local area, the team found little evidence of such marketing efforts.

As described above for agro-dealers, unless LSBs are able to re-orient their sales away from NGOs and development projects, many will cease to exist when such projects come to an end. One of the most successful LSBs in Adjumani District has targeted its seed sales to respond to other types of seed demand (Box 4). Rather than focusing solely on seed for NGO emergency interventions or for farmers' acquisition of new varieties, Agrumundo Mixed Farm LSB responds to farmers' crop-specific constraints to seed-saving through the supply of cassava and soybean. This example suggests that the sustainability of LSBs depends on their ability to tap into various different types of seed demand (Table A1, Annex 8).

*Box 4. An LSB success story*

Angelo Ruga of Agrumundo Mixed Farm sells an estimated 46% of his seed to individual farmers. Cassava cuttings make up the largest sales. Because cassava is drought resistant, demand has increased as the impacts of climate change are being felt. Recycling of planting material by farmers is difficult because roaming livestock destroy cassava stems, so farmers need to regularly plant fresh stems.

Mr. Ruga even sells QDS soybean seed to commercial farmers who are reluctant to buy certified seed because of issues with adulterated seed and poor germination.

## 9. Conclusions and recommendations

This final section of the report is organised according to the five research questions (RQs) that formed the focus of the assessment, plus some additional lessons that emerged out of the findings.

### 9.1 Conclusions

#### **RQ1: How have emergency seed interventions impacted on male and female refugee and host seed management practices?**

- *Many seed distributions over many years have allowed for the regular introduction of new varieties into local cropping systems, giving farmers an appreciation of a range of different varieties and their particular characteristics (e.g. drought resistance, marketability, duration, etc). LWF's program has generated interest, awareness and appreciation of new varieties by farmers. In such cases, the seed may have provided a free input that farmers would have otherwise had to buy for themselves, and/or helped to support a farmer group to expand their cropping area and learn to work together. For an emergency seed intervention to achieve long-lasting production and livelihood impacts, the seed provided must be of new varieties that are locally appropriate and preferred by both farmers and local markets.*

Farmer seed systems are effective in allowing farmers to access seed. Newly-arrived refugee farmers relied on host farmers, local markets and food rations to acquire seed. Specific varieties of different crops can be traced to particular UN and NGO seed distributions, which have since been incorporated into local seed systems. Future seed interventions should focus on varieties (Recommendation 3). Farmers – particularly women – have considerable knowledge about different varieties, seed selection and seed saving, and they are interested to learn more. Conversations about varieties, however, are hampered by the various local names for varieties in some cases, and an apparent lack of local names or lack of knowledge about names for varieties in other cases. Different farmers have different types and levels of knowledge and experience about varieties, seed selection and seed saving, and there are opportunities for farmers to learn from each other, as well as from modern or improved agricultural practices and technologies. See Recommendations 7 and 8 in relation to participatory learning and gender-related aspects of seed management.

#### **RQ2: How have emergency seed interventions impacted on household food security of male and female refugee and host community smallholder farmers?**

- *It is difficult to draw any firm conclusions on the impacts of the seed interventions on food security, mainly due to low production caused by on-going low rainfall levels experienced in the project area since 2021. It is thought that the on-going drought has negatively affected the areas and soils cultivated by refugee farmers more than the land cultivated by host farmers. The apparent increase in food security (as indicated by a decrease in the length of the hungry season) cannot be attributed solely to crop production, particularly for refugee farmers. Host farmers reported increases in production for all key crops, but refugees reported decreases for all key crops except for tomatoes. Different results were reported by men and women, e.g. women's groundnut production increased, whereas that for men decreased. Planting times, rainfall, soil fertility, management practices and climate change are key influencing factors on the productivity of seed. Increased access to fertile land contributed to the increase in production among host farmers, but not all refugee farmers were able to access additional land.*

The length of the hunger months (time in the year when households were food insecure) was reported to have decreased for both male and female refugee and host smallholder farmers, but the data did not show corresponding increases in crop production for all farmers. This suggests that other factors contributed to increased food security, especially among refugee farmers. Such factors may have included casual labour and income-generating activities, VSLAs, and better management of household resources.

Tomato was the only crop for which refugees reported an increase in production. This increase was not only due to the seed provided (an early-maturing, drought-resistant and high-yielding variety) but also due to agronomic training (including mulching, irrigation with watering cans, and staking). Sesame was considered to have had a good impact, especially among host farmers who reported an increase in production levels. The increase in production was reportedly due to the variety provided (for which both the seed and the grain were highly marketable and fetched a higher price than the local variety), favourable weather, agronomic training, timely weeding, and an increase in the cultivated area (by host farmers).

Planting times, rainfall and climate change are key influencing factors on the relative productivity of the seed provided. In general, seed has little or no impact when it is delivered late. Both drought and in some cases flooding reduced the productivity of the seed. NGO staff are aware of recent changes in the seasons due to climate change, and they are trying to take these changes into consideration in their planning. See Recommendation 9 in this regard.

Loans from the VSLAs have been key to investment, especially by women, in land and labour for agricultural production (including access to ox ploughing), as well as meeting food needs during the hunger months. Increased crop production among refugee farmers has been constrained by their limited access to land and challenges with the lease arrangements. Mixed host / refugee groups are being promoted by the NGOs, and both host and refugee group members agree that greater interactions between the communities have led to greater access to land for refugees and improved trust and social relations (Recommendation 2). Seed exchanges between host and refugee farmers can also potentially help to promote social relations between the communities.

### **RQ3: How have emergency seed interventions impacted on the livelihoods of male and female refugee and host community smallholder farmers?**

- *Livelihood impacts were assessed according to changes in expenditure from the income from crop sales for the seeds provided. Based on this indicator, there was some evidence of increased investments in education, and an increase in financial investments by host and refugee men and women, especially in VSLAs by women.*

The proportionate high spending of income from crop sales on human capital - food and children's education - means that the seed intervention met a basic need that would otherwise have led to greater vulnerability of the households. That the highest proportion of spending was on food also suggests that although the food produced may not have covered household food needs, the extra income was able to bridge the shortfall in the types and quantity of food.

Sesame and vegetables (especially tomato, okra, sukumawiki and onions) were the crops considered by farmers to have had the greatest impact on livelihoods. These crops play an important role in terms of household consumption, and – provided that the right varieties are made available – they can readily be sold for a good price in local markets. The widespread distribution of vegetable seed to both refugees and hosts helped both create and fill local demand for vegetables that was minimal beforehand. Vegetables are now regarded by farmers as their “cash account”. Given the importance of vegetables, combined with the observation that some seed types are not available in local markets, it is recommended that a particular effort is made to ensure that such seeds are made available through informal seed systems (Recommendation 6).

Investment by households on financial and natural capital, although low compared to the human capital spending, was quite significant. Many farmers acknowledged the role played by VSLAs in mobilisation of capital for farming as well as securing social capital.

**RQ4: How have emergency seed interventions impacted on informal and formal seed systems (including seed markets) in the local area?**

- *The introduction of new, appropriate varieties into informal seed systems is considered to be a positive impact, effectively strengthening the resilience of local cropping systems in the face of drought, floods, pests, diseases and climate change. Within formal seed systems, emergency interventions (along with agricultural development projects) have created considerable demand for certified seed and QDS. This has led to an increase in the number of agro-input dealers and possibly also Local Seed Businesses (LSBs) and Farmer Seed Producers (FSPs). Whilst the capacity and seed sales of many agro-input dealers have increased, there are also concerns about market distortions due to over-dependence on NGO/project demand, displaced seed sales, and weak seed marketing efforts. There are also concerns over the sustainability of the current LSB and FSP models, though both have important roles to play in providing affordable seed to farmers.*

Informal seed systems have benefitted in cases where emergency interventions have introduced quality seed of new, appropriate varieties. In such cases (e.g. sesame), new varieties have been fully incorporated into informal seed systems. Where good quality seed of varieties that are already locally available have been provided, this might usefully serve as replacement seed within informal seed systems, particularly for maize, allowing for the genetic purity of a variety to be retained over time. However, since smallholder farmers themselves generally do not recognize the need to replace their seed stocks (with the exception of hybrid maize), the benefits of such seed replacement could not be ascertained through discussions with farmers.

Formal seed systems have benefitted from the increase in the number of agro-input dealers in Adjumani Town and farmers' increased awareness about new, improved varieties. However, there appears to be a disconnect between many of these agro-input dealers and smallholder farmers, raising concerns about the sustainability of agro-dealers in case support from NGOs and development projects were to end. The expansion of agro-dealers in the district has been heavily dependent on emergency seed interventions and agricultural development projects. As these interventions / projects are eventually phased out, agro-dealers will need to adjust their strategies and there will be an inevitable consolidation in the market. There is little evidence that once free seed ends, LWF beneficiaries will patronise agro-dealers on a regular basis. Given this conclusion, it seems inevitable that some agro-dealers will go out of business.

There are questions regarding the sustainability of the LSB model currently being promoted by NGOs and other LSB supporters; most of the NGO-initiated LSBs lack the business acumen and entrepreneurial drive to succeed. The LSB model has clearly failed in the case of groundnuts, in which varieties such as Serenut 2 and 4 are being multiplied long after they have been discontinued by researchers. This example suggests that there is a need for stronger links between researchers, foundation seed producers and LSBs, and more effective verification of QDS seed sources at the district level.

In general, there seems to be a limited understanding of the nature of smallholder seed demand, combined with unrealistic expectations of the extent to which certain types of seed demand (especially unpredictable or occasional demand) by smallholder farmers (especially those in chronic poverty) can be addressed through commercial supply of QDS and/or certified seed. Informal seed markets, in contrast, are more opportunistic and do not rely to the same extent on commercial seed production. Rather than aiming to formalise seed markets, NGOs should aim to support the creation of resilient and sustainable seed markets, both in the formal and informal seed systems. Following the example of the District Farmers Association, one way in which this can be encouraged is by linking LSBs to more informal Farmer Seed Producers (including traders who produce their own seed) to ensure that farmer and trader seed producers have access to QDS of appropriate new varieties for their own informal multiplication (not necessarily on a commercial basis) – see Recommendation 5.

## 9.2 Lessons and recommendations

The ten recommendations below emerge from the assessment findings as to what worked well in terms of impact as well as what changes are needed for more impactful interventions. As such, some of the recommendations highlight existing practices that should continue.

**Recommendation 1:** *For food security and livelihoods impacts, the design of seed interventions should always include more than just access to seeds: access to **land, financial capital and appropriate agricultural knowledge** are also essential.*

Increased food security and better livelihood outcomes were attributed more to land access, savings in and investment from VSLAs, and training on improved agricultural practices than to seed alone. VSLAs, in particular, have been a way of mobilising local resources for further investment in agriculture. Land access has been a severe constraint for refugee agricultural production, and various partners have developed a range of ways to address this (see Recommendation 2). The study demonstrated that increased cropping area was a major factor in increasing crop production. However, it was ambitious to expect that a one-year emergency seed intervention would have a significant impact on livelihoods.

**Recommendation 2:** *Issues relating to **land access** by refugees must be addressed more effectively and consistently. Gender-sensitive, beneficial linkages between refugees and hosts must continue to be encouraged.*

Given that access to land is the main way in which refugees can increase their production, problems relating to land access must be addressed as a matter of priority and in a gender-sensitive manner that prevents the sexual exploitation of refugee women. This can be achieved by continuing to support the efforts of the OPM and local authorities to encourage written, signed and witnessed lease agreements between refugee farmers and landowning families. Mixed refugee–host groups have been seen to be effective in promoting good relationships between the two groups and should continue to be supported.

**Recommendation 3:** *Future seed interventions should shift their focus from seed per se to **varieties**. This involves a greater understanding about the range of varieties currently being cultivated by male and female farmers, which varieties have market value, and which types of varieties will likely be needed to meet future needs, particularly given the realities of climate change, as well as changing gender roles.*

The current assessment has provided some information about local seed systems and local seed markets, and this can be further elaborated by a better understanding about the range of varieties already being cultivated by male and female farmers, which varieties are preferred by local markets, and which types of varieties will likely be needed in response to climate change and other adversities (e.g. drought, flood, pests, disease). Farmers are already moving cropping from the secondary to the primary season as rainfall is now more reliable in the primary season. In addition, they are adjusting their crop mix by planting more resilient crops such as cassava. LWF can support these adjustments by promoting more drought-resistant and climate resilient crops and varieties<sup>28</sup>. Rather than seed distributions, varieties can be promoted through variety fairs, small test packs of specific varieties, and demonstration plots. Changing gender dynamics among both refugee and host communities are such that there may be income-generating opportunities for women farmers and traders through sales of both produce and seeds of specific varieties.

**Recommendation 4:** *Enhance the **quality of informal sector seed available in local markets** by working with traders and farmers (especially women) who produce and sell own-grown seed.*

Many poorer farmers rely on local markets to acquire seed, yet the seed available in local markets is of variable quality. Some traders, notably women, produce seed on their own farms and sell it at a premium at

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<sup>28</sup> This is already being done (e.g. by providing drought-resistant varieties for multiplication by LSBs) and should continue.

planting time. These traders can be supported to provide reasonably-priced, good quality (non-QDS, uncertified) seed of improved varieties. Such support should be tested through a pilot project, but might include linkages with LSBs for access to QDS of improved varieties as source seed, knowledge about seed storage technologies, and loans to enable access to appropriate and locally-available storage technologies (e.g. insecticide, storage drums). As a pilot, the project should be co-designed with traders who are willing to participate and who have prior experience in seed management and seed sales. It will also be necessary to work closely with district agricultural officers and ensure that they understand and support the rationale for the approach.

**Recommendation 5:** *Recognize the role of **Farmer Seed Producers (FSPs)** in supplying uncertified seed (“farmer seed”) of new varieties, but do not expect them to function as a commercially viable enterprise.*

Whether farmer seed producer (FSP) groups are viable as commercial enterprises is questionable. The advantage of FSPs is in their ability to produce seed of good quality from a known source (e.g. QDS or certified seed) without incurring the costs of group registration and seed certification. This allows them to sell seed of improved varieties to local farmers at an affordable price, provided there is farmer demand for the varieties in question. As such, they are an effective means of allowing farmers to access seed of improved varieties. Once the varieties have been adopted by local farmers, however, it is unlikely that they will be able to continue to sell seed of the same varieties and they will either need to sell the output as grain (with occasional, opportunistic sales of seed) or switch to a different variety for which there is high demand for seed. Well-established and successful FSPs might consider transitioning to more commercially-oriented LSBs, but the developmental role of FSPs in supporting the dissemination of affordable (uncertified) seed of improved varieties also needs to be recognized.

**Recommendation 6:** *Enhance the availability of appropriate **vegetable seed and seedlings** in local markets and communities. There are various ways in which this might be achieved, and it is recommended to start with a pilot project to test different approaches.*

Information collected by the assessment reveal that farmers can save their own seeds of okra, sukumawiki, and local tomato varieties but that they rely on NGOs for access to seed of improved tomato, onions, cabbage and green pepper. Some of these seeds are particularly difficult to produce (e.g. onions<sup>29</sup>, cabbage<sup>30</sup>), whereas other might be hybrids (e.g. improved tomato, green pepper<sup>31</sup>), or even both. Given that farmers tend to seek to acquire seed from other farmers and local markets before resorting to agro-input dealers, it is recommended that a pilot project might involve the identification of suitable market traders (i.e. those already dealing with vegetables who also have knowledge and experience in handling seed) – often women – who could be trained (and registered by the District Agricultural Office) to act as sales agents for agro-input dealers. Another approach might be to work with some of the more successful vegetable producer groups to test the level of local demand and profitability of selling vegetable seedlings. Given the delicate nature of vegetable seedlings, it is unlikely that they could be transported far, and suitable packaging (seed trays) using locally available materials would need to be found.

**Recommendation 7:** *Reinforce the importance of **farmer-saved seed** and create opportunities for male and female farmers to learn from each other and others about seed selection and seed-saving practices and technologies.*

Farmer-saved seed constitutes the main source of seed planted by smallholder farmers. The importance of seed saving should be reinforced to ensure that farmers continue to save their own seed, and to ensure that

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<sup>29</sup> Onions are super cross-pollinating (up to 5 km) and require two cycles of planting to produce pure seed.

<sup>30</sup> Cabbage only produces seed in certain altitudes due to the need for vernalization (exposure to cold).

<sup>31</sup> There is no reason why farmers should not be able to produce own-saved see of non-hybrid green pepper varieties.



seed is available from other farmers within the community for those who are unable to save their own seed due to poverty. Farmers from different ethnic groups may have different seed-saving practices, creating a wealth of diverse local knowledge among host and refugee communities that both men and women can share and learn from. Local traders who regularly produce their own seed can also take part in such learning opportunities. This recommendation emphasises participatory learning among farmers and others, rather than top-down training by agricultural officers, though there are also opportunities to learn from scientific knowledge.

**Recommendation 8:** *Given that women play a particularly important role in informal seed systems, it is necessary to understand the **gender-related aspects** of household seed management and informal seed markets. It is essential that a gender lens is applied to all recommendations listed here.*

The study confirmed that women have considerable knowledge and experience in seed management at the household level, including seed selection at harvest time, seed storage, as well as seed exchange and seed acquisition. All of the traders who were found to sell seed in local markets were women, illustrating the important role that women play in informal seed markets. The roles of women in informal seed systems must be understood through a gender lens to identify both the constraints and opportunities available to them, particularly given the dynamic nature of gender relations among both refugee and host communities in the district.

**Recommendation 9:** *NGO interactions with suppliers of QDS or certified seed (i.e. **LSBs, agro-input dealers**) must avoid creating market distortions. They should instead be re-oriented to promote market linkages, resilience and sustainability, especially through linkages between formal, intermediary and informal seed systems.*

The assessment has highlighted various unintended negative consequences of large-scale seed purchases from agro-input dealers, and unrealistic expectations regarding the growth and commercial viability of FSPs, LSBs and agro-input dealers. Future seed and seed system interventions must be based on a realistic understanding of the nature of seed demand among poor smallholder farmers and should aim to strengthen the resilience and sustainability of informal, intermediary and formal seed systems. For LSBs, it is essential that they have good links with foundation seed suppliers who themselves are closely linked with researchers<sup>32</sup>. LSBs can potentially tap into informal seed markets by providing QDS to market traders who produce their own seed and by providing QDS to Farmer Seed Producers (see Recommendation 7 above). Where there is sufficient demand, agro-input dealers need to market appropriate seed types to farmers, e.g. through vegetable seed sales agents in local markets (see Recommendation 6 above).

**Recommendation 10:** *Continued free seed distribution should not be used as a response to chronic poverty or weather events associated with long-term climate change. **Chronic poverty** must be addressed through other means. To avoid negative unintended consequences, seed interventions must be based on a **better understanding of local seed systems** and seed markets, including the nature of seed demand by smallholder farmers and the factors (e.g. climate change, new markets) that are driving changing needs.*

The ongoing demand for seed by NGO emergency interventions and other development projects is having negative consequences on the development of a formal seed system (for both certified seed and QDS) that is oriented towards the needs of farmers. Emergency seed interventions are not an appropriate response to chronic poverty or recurring weather events associated with climate change. A better understanding of local seed systems, seed markets, and the nature of seed demand by smallholder farmers can help in designing appropriate, long-term seed system interventions.

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<sup>32</sup> It might be necessary for the DAO and/or LSB supporter to ensure that these linkages are in place by contacting the relevant NARO research center regarding each crop for which seed is multiplied by a specific LSB.

## Annex 1. Additional details of the projects included in the assessment.

**Table A1. Promoting Sustainable livelihoods, Environmental and Psychosocial Support: Project outputs**

| Planned  |   | Achieved  |
|--|---|---|
| <b>Output 1.1 Increased food production among 4200 targeted households</b> |   |   |
|  | Train community-based facilitator in a 3-day Farmer Field School approach. The approach was a departure from earlier agricultural extension programs, formulated by specialists from outside the community. | Trained 40 CBFs in agronomy, to support 140 farmers groups. Provided tools Groups also trained in postharvest handling and storage  |
|  | Organize annual seed fairs with local agri-business, ahead of the planting season. The fairs were open to all farmers in the area, who were able to purchase seed with vouchers or cash.                    | Project staff briefed participants on the voucher system over the radio. Ten local vendors participated, allowing farmers to choose the seed variety, quality, and quantity of maize, groundnuts, sesame, green grams and beans.                                |
|  | Organize 2 learning and exposure visits for 70 farmers and 10 LWF BftW staff. Sitesselected based on good practice and learning opportunities   | 2 learning and exposure visits were conducted (One in year 1 and one in year 2).  |
|  | Support establishment of kitchen gardens to model households to improve on food and nutrition security.   | 140 farmer groups given seed - sukuma wiki, onion, eggplants, tomatoes, carrot, amaranthus, water melon and green pepper.   |
|  | Provide oxen support to outstanding farmer groups each year during the farmer field day   | 12 farmer field days (6 in year 1 and 6 in year 2) and best performing groups were identified. The winning groups received oxen to expand agricultural activities. They could also be hired out as an income generating activity                                |
| <b>Output 1.2: Increased income amongst 4200 Households</b>                |   |   |
|  | Identify, train and support - ten (10) local seed producers   | Seed producers were connected to farmer groups Foundation seed provided - 12 bags of Groundnuts (Serenut 8), 500 Kgs Green grams (Narogram), 335Kgs of sesame (Sesame 3), and 75 bags of Cassava (NaROCAS 1) cuttings to establish seed multiplication gardens. |

**Table A2. Reconnecting Lives, Vision, and Empowerment (Re-LiVE): Project outputs**

| Planned            |   | Achieved   |
|--------------------|---|--|
| <b>Output 1.1</b>  |   |  |
|                    | Using the Farmer Field School (FFS) approach, LWF will work with 65 farmer groups to increase food production levels and food security by training them in modern agronomic practices   | Training completed. Assistance to open 5 acres/group for 10 farmer groups. The same groups also assisted with hand hoes, panga, wheelbarrows, tarpaulins for drying and seeds like sesame, cassava cuttings, groundnuts, soya bean seeds and maize seeds. All aimed at improving and expanding production. |
|                    | The project will also train an additional 35 groups in FFS methodology and in Village Savings and Loan Association approach (VSLA) to improve and/or diversify their enterprise.  | Training completed   |
|                    | LWF will offer FFS training in climate adaptation, environmental management, and sustainable agricultural technologies in order to improve food production, build their resilience and nurture peaceful coexistence.                      | Training completed   |
|                    | 5 youth groups trained in greenhouse farming in Adjumani to produce vegetables year-round   | 2 greenhouses were constructed   |
|                    | 300 extremely vulnerable households will be supported to establish backyard gardens to meet consumption needs and diversify their diets with year-round vegetables. Each HH will receive assorted vegetable seeds, and technical support. | 300 EVI supported and vegetable seeds distributed – tomato, onion, egg plants etc  |
| <b>Output 1.2:</b> |   |  |
|                    |   | The project constructed one storage facility to enable farmer groups to collect and market their produce. Since storage was a major challenge for the farmer groups and marketing their products.  |

## Annex 2. Participatory impact assessment approach

### Overview (extracted and adapted from Catley et al, 2013)

Participatory impact assessment (PIA) involves adapting participatory methods to measure changes in people’s livelihoods over time, and to understand how different factors caused these changes. In contrast to many traditional project monitoring and evaluation (M&E) approaches, PIA aims to measure the real impact of a project on the lives of project participants. This differs from evaluation because many evaluations focus on measuring project objectives, the extent to which they were achieved, and if they weren’t, why not. PIA goes beyond typical evaluation and the measurement of objectives, and examines how project activities actually benefited the intended recipients, if at all.

There are three main types of PIA methods – ranking or scoring, visualization, and informal interviews. Conventional statistics can be used to summarize and analyze the numerical data produced by standardized ranking, scoring and visualization methods, and this can include comparisons of different types of activity or support. Measures of project impact can be translated into economic values, which, in turn, support benefit–cost analysis. These aspects of PIA are particularly useful when engaging in policy reform processes, or developing good practice guidelines.

Information and numbers from participatory methods are validated through triangulation, and analysis of a project’s technical plausibility. The question of attribution is addressed through different types of comparisons. Using comparisons in PIA can be very useful for improving the credibility of the findings, but needs a good understanding of the project design and activities, and the wider context in which the project took place. When PIA is well-designed, with a good understanding of local context and the systematic use of comparisons and triangulation, it seems to produce evidence that is of reasonable quality and which a range of people – from community members to policy makers – can understand and use.

**Table A3. Design of the PIA used for the LWF seed intervention, Adjumani District**

| PIA STAGE   | RESPONSE IN THE CONTEXT OF THE PROJECT  |
|---|---|
| <b>Stage 1:</b> Define the questions to be answered by the PIA            | <ol style="list-style-type: none"> <li>1. How have changes in food production and productivity impacted HH food security? This was done through use of SEASONAL CALENDAR for select cereals to establish hunger months.</li> <li>2. How have beneficiaries invested income from sale of crops to bring about HH livelihood gains? [The study used the Sustainable Livelihoods Framework (SLF) to score on Social, Financial, Human, Physical, Natural capitals].</li> </ol>   |
| <b>Stage 2:</b> Define the geographical and time limits of the project    | <p>Time Boundaries were established through the use of Historical timeline to establish significant and memorable events in the community as well as when the interventions started. Through conversation, each community group was able to place the start date of the intervention on their historical timeline.</p> <p>Geographical boundaries: This exercise was not done due to limitation of time and also because the areas of project coverage were relatively well defined by the agencies as well as the refugee settlement leadership.</p> |
| <b>Stage 3:</b> Identify and prioritise locally defined impact indicators | <p><b>Quantitative Indicators:</b></p> <p>Two main indicators understood by the farmers were used for the conversations:</p> <ol style="list-style-type: none"> <li>1. Production of crops and</li> </ol>   |

| PIA STAGE  | RESPONSE IN THE CONTEXT OF THE PROJECT  |
|--|---|
|  | <p>2. Expenditure of Income from crop sales</p> <p><b>Qualitative indicators:</b></p> <ol style="list-style-type: none"> <li>1. Improved knowledge &amp; skills of agricultural practices or technologies, savings and investment</li> <li>2. Gender inclusion in decision-making at HH level</li> </ol>  |
| <p><b>Stage 4:</b> Decide which methods to use for measuring change, and test them</p> | <p><b>IMPORTANT NOTE:</b> Data collection was undertaken in mixed-gender and single gender groups. The ideal number was 10 people per group but this was often exceeded. Where more than 10 community members came to the venue of the meeting the study team allowed the additional members to stay and listen to the conversation but not to participate. In the FGD groups of 10, only five participants were invited to score. The five were chosen carefully from the group of 10 to include individuals who had a considerable history in the project and were also able to articulate the history of the community. The participation of the 10 or more individuals in conversations about the intervention aided recall even for the scorers and was a very empowering experience for the participants .</p> <p><b>PIA ACTIVITIES/METHODS</b></p> <ol style="list-style-type: none"> <li>1. The focus group discussions happened within the context of already established socio-economic groups either formed or adopted by the agencies for purposes of undertaking the project intervention. They were all farmer groups particularly involved in crop production. The interview venues were mostly in common community facilities such as under a tree at a community centre or compound.</li> <li>2. Once everyone was comfortable, the chief investigator, working with two assistants who were conversant with the local language and etiquette then introduced the subject and started by drawing the community <b>historical timeline</b> and encouraging conversation around the main events in the community’s recent history. The meeting also established and prioritised by consensus the most significant intervention and seed provided by World Vision.</li> <li>3. The investigators then used <b>proportional piling</b> method (20 counters) to establish the production of each crop “Before” and “After” the intervention. Each of the 5 individuals selected to score in each group were then given the opportunity to score and requested to explain the reasoning behind the proportions. The responses were carefully recorded by the study team in the note books and prepared score-sheets (See Annex).</li> <li>4. Next, the investigators used the <b>Seasonal Calendar</b> to establish household food security. This was done by allowing the five respondents to use the counters to show which months their households had food (mostly grains – cereals and legumes) and which months there was no food in the household, before and after the intervention. The “Hunger Months” were then recorded</li> <li>5. Finally, the respondents were requested to score through <b>proportional piling</b> what they did with the income from sale of crops – before and after the intervention.</li> </ol> |
| <p><b>Stage 5.</b> Decide which sampling method and sample size to use</p>             | <p>The sampling of the various settlements to visit was purposive and was done in consultation with the agency staff guided by the following factors:</p> <ol style="list-style-type: none"> <li>1) Focus on the five settlements and associated sub-counties</li> <li>2) Focus on crop farmers (not pastoralists)</li> <li>3) Representativeness</li> </ol>  |

| PIA STAGE  | RESPONSE IN THE CONTEXT OF THE PROJECT  |
|--|---|
|  | <ul style="list-style-type: none"> <li>● Gender (and age if possible) – male headed/female headed Hhs</li> <li>● Balance between Refugee HHs (70%) and vs Host Community HHs (30%)</li> <li>● Veg garden groups and block farm groups</li> <li>● Individually targeted farmers vs group members (how to sample?)</li> </ul> |
| <p><b>Stage 6.</b> Decide how to assess project attribution</p>  | <p>It was established prior to the field work and with the farmers during data collection that there were various similar interventions by other agencies. However, the methodology ensured that conversations were focused on the specific activities sponsored by LWF, allowing for project attribution.</p>              |
| <p><b>Stage 7.</b> Decide how to triangulate results from participatory methods with other information</p> | <p>The data from the PIA conversations was triangulated with information from the FGDs and Key Informant Interviews undertaken during the assessment and with information from previous project monitoring reports.</p>   |
| <p><b>Stage 8.</b> Plan the feedback and final cross-checking of results with communities</p>              | <p>Feedback was provided to LWF at field-level in Adjumani and later to members of the LWF national team.<br/>The draft final report was shared with LWF staff for their review prior to finalisation.</p>  |

## Annex 3. PIA Score Sheet

### S34D PARTICIPATORY IMPACT ASSESSMENT

#### FIELD SCORE SHEET

#### INFORMED CONSENT

**Enumerator, to seek consent along**

Hello, my name is \_\_\_\_\_.

We are interested to learn about your experience with the LWF / WV project and the impacts that it has had on your household. This information will help us understand how LWF / WV and other NGOs can provide better support in the future. You can choose to be part of the discussion or not, as you please. Whether or not you participate in this discussion, the current support that you receive from LWF / WV will not be affected in any way. The discussion will take about 2 hours. Do you agree to take part in this discussion and to answer our questions?

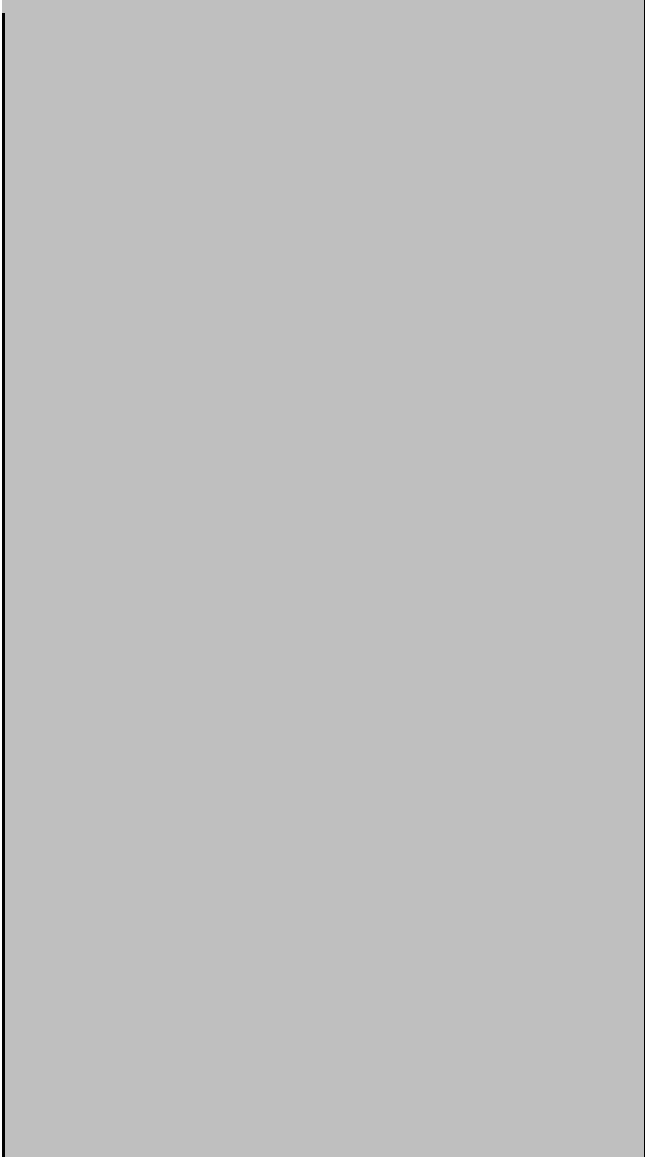
| DESCRIPTION   | SCORES |    |    |    |    |  |
|---|--------|----|----|----|----|--|
|   | R1     | R2 | R3 | R4 | R5 |  |
| Partner organisation: World Vision/LWF  |        |    |    |    |    |  |
| Site/Community:   |        |    |    |    |    |  |
| GROUP DESCRIPTION:  |        |    |    |    |    |  |
| RESPONDENT PROFILES   |        |    |    |    |    |  |
| · Age: Adult [A] Youth [Y]  |        |    |    |    |    |  |
| · Gender: Male [M] Female [F]   |        |    |    |    |    |  |
| Married with spouse at camp [M] Married with spouse away (A) Widowed [W] Single [S] |        |    |    |    |    |  |
| · HH size (How many are in your HH and Feed from the same pot?) [NUMBER SCORE]      |        |    |    |    |    |  |

|   |  |  |  |  |  |  |
|---|--|--|--|--|--|--|
| <p>· Who makes decisions about what seeds are planted in your HH? (Self (M), Spouse (S), both of us (B), All in HH including children (A))</p>  |  |  |  |  |  |  |
| <p>Persons with Special Needs: Disabled [ D], Elderly (E), Caregiver (C)</p>  |  |  |  |  |  |  |
| <p>· Refugee (R), Host (H)</p>  |  |  |  |  |  |  |
| <p>PERIOD OF SEED INTERVENTION (from Tool 1 and agency briefing):</p>   |  |  |  |  |  |  |
| <p>TOOL1: DRAW HISTORICAL TIMELINE AND PLOT KEY EVENTS AND INTERVENTION IN THE COMMUNITY TO AID THE CONVERSATION [NOT FOR SCORING BUT FOR CONVERSATION.<br/>SOME QUESTIONS:<br/>1) WHEN WAS GROUP FIRST FORMED?<br/>2) WHAT ACTIVITIES HAVE YOU DONE?<br/>3) WHAT ELSE HAS HAPPENED IN THIS COMMUNITY THAT YOU CAN REMEMBER AND WHEN DID THEY HAPPEN?<br/>4) WHEN DID YOU RECEIVE SEED INTERVENTION?<br/><br/>NOTE ANY KEY POINTS HERE:</p> |  |  |  |  |  |  |



TOOL 2: NGO SUPPORT & AGREEMENT ON 3 MOST IMPACTFUL SEED TYPES

1. WHAT TYPES OF SUPPORT DID LWF/WVI PROVIDE [LIST ALL SUPPORT]
  
2. WHAT CROP-SEEDS DID YOU RECEIVE FROM WVI/LWF?
  
3. FOR EACH SEED, WHAT HAVE BEEN THE BENEFITS?
  
4. WHICH WERE THE 3 MOST IMPACTFUL SEED TYPES AMONG THOSE YOU RECEIVED?



TOOL 3: PRODUCTION /PRODUCTIVITY IN THE 3 ENTERPRISES [Tell them to focus the 3 crops for the next bit of the conversations]



CROP 1:



|        |  |  |  |  |  |  |
|--------|--|--|--|--|--|--|
| BEFORE |  |  |  |  |  |  |
| AFTER  |  |  |  |  |  |  |

|  |  |  |  |  |  |  |
|--|--|--|--|--|--|--|
| CROP 2:  |  |  |  |  |  |  |
| BEFORE   |  |  |  |  |  |  |
| AFTER  |  |  |  |  |  |  |
| CROP 3:  |  |  |  |  |  |  |
| BEFORE   |  |  |  |  |  |  |
| AFTER  |  |  |  |  |  |  |
| PROBES: What reasons would you give for the increase/decrease in production/productivity?  |  |  |  |  |  |  |
| REASON FOR INCREASE <ul style="list-style-type: none"> <li>· New crop (didn't plant this before the project) [ ]</li> <li>· Good rainfall [ ]</li> <li>· Fertile soils/ fertilizer application [.....]</li> <li>· Accessed more land through the project [.....]</li> <li>· Accessed more land for myself; [.....]</li> <li>· Variety provided is higher-yielding; [.....]</li> <li>· Varieties provided were more resistant to pests, diseases, and weather challenges [.....]</li> <li>· Agronomic training from the project; [.....]</li> <li>· Motivation / support from group; [.....]</li> <li>· Cash from VSLA paid for farm labour [.....]</li> <li>· Other (specify) [.....]</li> </ul> |  |  | REASON FOR DECREASE <ul style="list-style-type: none"> <li>· Drought/ poor rainfall [.....]</li> <li>· Waterlogging [.....]</li> <li>· Poor/ infertile soils [ ....]</li> <li>· Land was small [.....]</li> <li>· Pests and Diseases [ .....]</li> <li>· Seed not adequate [.....]</li> <li>· Other (specify) [.....]</li> </ul> |  |  |  |

|   |        |  |  |  |  |  |  |
|---|--------|--|--|--|--|--|--|
| <b>TOOL 4: HUNGER MONTHS</b><br>How many months of the year would you have the LEAST amount of food in your Household from your garden/ fields harvest? |        |  |  |  |  |  |  |
| BEFORE  |        |  |  |  |  |  |  |
| AFTER   |        |  |  |  |  |  |  |
| PROBE: What were the reasons for this lack of food?   |        |  |  |  |  |  |  |
| <b>TOOL 5: WHERE INCOME FROM THE SALE OF PRODUCE OF THE 3 FOCUS CROPS WAS USED IN THE HH?</b>   |        |  |  |  |  |  |  |
| SCHOOL FEES   | BEFORE |  |  |  |  |  |  |
|   | AFTER  |  |  |  |  |  |  |
| MEDICAL NEEDS   | BEFORE |  |  |  |  |  |  |
|   | AFTER  |  |  |  |  |  |  |
| BRIDE PRICE   | BEFORE |  |  |  |  |  |  |
|   | AFTER  |  |  |  |  |  |  |
| LAND/LIVESTOCK  | BEFORE |  |  |  |  |  |  |
|   | AFTER  |  |  |  |  |  |  |

|  |        |  |  |  |  |  |  |
|--|--------|--|--|--|--|--|--|
| INVEST IN BUSINESS   | BEFORE |  |  |  |  |  |  |
|  | AFTER  |  |  |  |  |  |  |
| SAVED IN VSLA  | BEFORE |  |  |  |  |  |  |
|  | AFTER  |  |  |  |  |  |  |
| FOOD FOR MY FAMILY   | BEFORE |  |  |  |  |  |  |
|  | AFTER  |  |  |  |  |  |  |
| LOAN REPAYMENT   | BEFORE |  |  |  |  |  |  |
|  | AFTER  |  |  |  |  |  |  |
| HOUSING/HH ITEMS & CLOTHING  | BEFORE |  |  |  |  |  |  |
|  | AFTER  |  |  |  |  |  |  |
| In your Household, who makes the decision on how this income is spent?<br><br>(Self (M), Spouse (S), both of us (B), All in HH including children (A)) |        |  |  |  |  |  |  |
| PROBE:   |        |  |  |  |  |  |  |

## Annex 4. Checklists used for Focus Group Discussions

### A. Introductions:

- Self-introductions of team members
- Self-introductions of farmers [Note number of women and men and whether youth or adult]<sup>33</sup>
- Purpose of visit & informed consent

We are interested to learn about how you manage the seeds for some of the crops that you grow. This information will help us understand how LWF and other NGOs can provide better support in the future. You can choose to be part of the discussion or not, as you please. Whether or not you participate in this discussion, the current support that you receive from LWF will not be affected in any way. The discussion will take about 2 hours and refreshments will be provided. Do you agree to take part in this discussion and to answer our questions?

### B. Identify focal crops: I want to understand which crops are most important in this area, whether grown as a group or as individuals:

- a) which crops contribute the most to household consumption?
- b) which crops generate the most income from sales?
- c) are there any other crops that are important to you? Why?
- d) agree on three or four most important crops from (a) (b) and (c) to focus the remaining discussion. Check that these crops are grown individually, not only on group farm.

### C. For each focal crop:

1. Is it a “new” crop (compared to what you cultivated in South Sudan, or compared to before the refugees arrived)?
2. How many varieties of this crop are commonly grown locally?
3. Describe each variety:
  - i. Is it a local variety (from their grandparents), a variety brought from South Sudan, or an improved variety.
  - ii. What was the original seed source / when was it introduced?
  - iii. What were the seed sources for last season?
  - iv. Has anyone sold or shared seed with others? Provide examples if so.

### Specific points of interest for probing / follow-up:

- Any changes in seed saving practices and quantities / frequency of seed saving
- Seed sales / exchanges between hosts and refugees
- New crops or varieties from NGOs or other sources
- Information about local seed markets and informal traders
- Sources and frequency of purchase
  - Which crops and why
  - Agro-dealers (where, who, which crops)
  - LSBs / FSPs (where, who, which crops)

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<sup>33</sup> The number of participants by the end of the meeting will likely be different (as others may join later), so the number of participants should also be noted at the end of the meeting.

## Annex 5. List of key informants interviewed.

| Date   | Position / Place / Organization / Company   | Name       | Gender |
|--------|---|------------|--------|
| 29-Jun | OPM Assistant Commandant, Boroli Settlement | [REDACTED] | Female |
| 29-Jun | RWC1, Boroli 1 Settlement                   | [REDACTED] | Female |
| 29-Jun | LC1 Chairperson & VSLA Group member         | [REDACTED] | Male   |
| 30-Jun | District Agricultural Officer               | [REDACTED] | Male   |
| 30-Jun | Omia Agri Business Development Group        | [REDACTED] | Female |
| 30-Jun | Apiviva Agro-dealer                         | [REDACTED] | Female |
| 30-Jun | Farmers Hive Agro-dealer                    | [REDACTED] | Female |
| 1-Jul  | District Production Officer                 | [REDACTED] | Male   |
| 1-Jul  | District Commercial Officer                 | [REDACTED] | Female |
| 1-Jul  | Kamart Ville Consultants Agro-dealer        | [REDACTED] | Male   |
| 1-Jul  | Oruba AgriLink Agro-dealer                  | [REDACTED] | Male   |
| 1-Jul  | Planet Agro Inputs                          | [REDACTED] | Female |
| 1-Jul  | District Farmers Association                | [REDACTED] | Male   |
| 8-Jul  | Pagarinya OPM                               | [REDACTED] |        |
| 8-Jul  | LC 1  | [REDACTED] |        |
| 8-Jul  | Ayelo Settlement RWC 1                      | [REDACTED] |        |
| 8-Jul  | RWC3 Secretary General Adjumani District    | [REDACTED] | Male   |
| 8-Jul  | Pagirinya Assistant Settlement Commandant   | [REDACTED] | Male   |
| 8-Jul  | RWC2 Ayilo 1 Settlement                     | [REDACTED] | Male   |
| 8-Jul  | Ayilo Assistant Settlement Commandant       | [REDACTED] | Male   |
| 9 Jul  | LC1 Ovuvu West Arinyapi Sub County          | [REDACTED] | Male   |
| 9 Jul  | LCI 1 Eggi Dzaipi Sub County                | [REDACTED] | Male   |
| 9 Jul  | Nyumanzi RWC 1 Acting Chairperson           | [REDACTED] |        |
| 9-Jul  | RWC1 Nyumanzi Settlement                    | [REDACTED] | Male   |
| 10-Jul | KII Numanzi Market grain dealers            | [REDACTED] | Female |
| 11-Jul | KII OPM ass't commandant Nyumanzi           | [REDACTED] | Male   |
| 11-Jul | KII LCI Chairman Angwarapi East _Dzaipi     | [REDACTED] | Male   |
| 11-Jul | LSB Angwarapi East_Dzaipi                   | [REDACTED] | Male   |
| 11-Jul | LSB Pagirinya                               | [REDACTED] | Male   |
| 12-Jul | KII Agrodealer/LSB Pakele                   | [REDACTED] | Male   |
| 12-Jul | Agro input dealer                           | [REDACTED] | Male   |
| 12-Jul | Pakele Market traders                       | [REDACTED] | Female |

## Annex 6. Checklists used to guide key informant interviews

At the start of each interview, introduce yourself and explain the purpose of the project:

- I am working for Catholic Relief Services on a USAID-funded project called Supporting Seed Systems for Development (S34D)
- We are undertaking a study to determine the impacts of Emergency Seed Interventions on farmers and seed systems in Adjumani District.
- I have some questions that I would like to ask you about [seed systems in Adjumani / seed interventions in this area / your company and your involvement in seed projects / as appropriate]
- The information you provide will help us to understand the broader context relating to seed systems / how refugee and host communities can access seed / how seed interventions can create more sustainable seed systems and encourage greater self-reliance among refugees]
- This interview will take approximately [30 minutes / 1 hour].
- Do you agree to proceed with the interview?
- I can provide the email contact of the Team Leader in case you need this: [kate.longley@crs.org – if requested]

### **A. Interview checklist for OPM Assistant Settlement Commandant**

1. What is your name?
2. Which Settlements are you responsible for?
3. How long have you been working in this / these Settlements?
4. Which agencies have been involved in seed distributions that you're aware of?
5. What are the different ways in which they've provided seed? (e.g. direct or in-kind distribution; seed fairs and vouchers; other)
6. Do they provide to groups or individual farmers? Refugees and/or hosts? Mixed refugee/host groups, or separate groups?
7. What would you say is the main objective of the seed support?
8. What other types of support or complementary activities are provided with the seed?
9. What are the different ways in which land can be accessed by refugee farmers?
10. Are you aware of any land that has been cleared but not planted due to lack of seed, or late delivery of seed? Describe if so.
11. What are some of the other ways that farmers in this area can access seed, apart from the seed provided by NGOs and government projects? [Probe for details about markets, traders and other seed providers, including gender]
12. Are there any Local Seed Businesses (LSBs) or Seed Producer Groups in the Settlement?
  - a. If yes, when were each of these established and how do they operate, who do they sell seed to?
  - b. What have been their successes?
  - c. What have been their challenges?

### **B. Interview checklist for Refugee Welfare Committee Chairperson (RWC 1 or 2)**

1. What is your name?
2. What are your responsibilities?
3. How long have you been in this Settlement?
4. Which agencies have been involved in seed distributions that you're aware of?
5. What are the different ways in which they've provided seed? (e.g. direct or in-kind distribution; seed fairs and vouchers; other)
6. Do they provide to groups or individual farmers? Refugees and/or hosts? Mixed refugee/host groups, or separate groups?
7. What would you say is the main objective of the seed support?
8. What other types of support or complementary activities are provided with the seed?
9. What are the different ways in which land can be accessed by refugee farmers?

10. Are you aware of any land that has been cleared but not planted due to lack of seed, or late delivery of seed? Describe if so.
11. What are some of the other ways that farmers in this area can access seed, apart from the seed provided by NGOs and government projects? [Probe for details about markets, traders and other seed providers, including gender]
12. Do you know of any Local Seed Businesses (LSBs) or Seed Producer Groups in or near the Settlement?
  - a. If yes, when were each of these established and how do they operate, who do they sell seed to?
  - b. How have they benefitted the farmers?
  - c. What have been their challenges?

**C. Interview checklist for Host Community LC1 Chairperson**

1. What is your name?
2. How long have you been LC1?
3. Are you involved in any NGO or government projects involving seed? Describe if so.
4. Which agencies have been involved in seed distributions that you're aware of since the refugees came to this area?
5. What are the different ways in which they've provided seed? (e.g. direct or in-kind distribution; seed fairs and vouchers; other)
6. Do they provide to groups or individual farmers? Refugees and/or hosts? Mixed refugee/host groups, or separate groups?
7. What would you say is the main objective of the seed support?
8. What other types of support or complementary activities are provided with the seed?
9. What are the different ways in which land can be accessed by refugee farmers?
10. Are you aware of any land that has been cleared but not planted due to lack of seed, or late delivery of seed? Describe if so.
11. What are some of the other ways that farmers in this area can access seed, apart from the seed provided by NGOs and government projects? Does the host community provide seed to refugee farmers? [Probe for details and provide examples, including gender details]
12. Do you know of any Local Seed Businesses (LSBs) or Seed Producer Groups in or near the Settlement?
  - a. If yes, when were each of these established and how do they operate, who do they sell seed to?
  - b. How have they benefitted the farmers (members / non-members / hosts / refugees)?
  - c. What have been their challenges?

**D. Interview checklist for Sub-County LC3 Chairperson, Agricultural / Extension Officer and /or Community Development Officer**

It might be necessary to interview these together as a group due to time constraints

1. What is your name?
2. Name of sub-county. Which Settlements are located in this sub-county?
3. How long have you been working in this sub-county?
4. **For Agricultural / Extension Officer: What is your role in seed projects?**
5. Which agencies have been involved in seed distributions since you've been working here?
6. What are the different ways in which they've provided seed? (e.g. direct or in-kind distribution; seed fairs and vouchers; other)
7. Do they provide to groups or individual farmers? Refugees and/or hosts? Mixed refugee/host groups, or separate groups?
8. What would you say is the main objective of the seed support?
9. What other types of support or complementary activities are provided with the seed?
10. What are the different ways in which land can be accessed by refugee farmers?
11. Are you aware of any land that has been cleared but not planted due to lack of seed, or late delivery of seed? Describe if so.



12. What are some of the other ways that farmers in this area can access seed, apart from the seed provided by NGOs and government projects? [Probe for details about markets, traders and other seed providers, including gender]
13. Are there any Local Seed Businesses (LSBs) or Seed Producer Groups in the Settlement?
  - a. If yes, when were each of these established and how do they operate, who do they sell seed to?
  - b. What have been their successes?
  - c. What have been their challenges?
14. For Agricultural / Extension Officer:
  - a. Based on your experience, what have been some of the positive impacts of the seed interventions? What are the key factors that contribute to positive impacts?
  - b. Have there been any negative impacts or unintended consequences?
  - c. How can refugee farmers have sustainable access to seed in the future?

**E. Interview checklist for Agro-input dealers**

1. Name of AD Shop, name Interviewees
2. What's your position / gender – years in this position / shop
3. Gender of Owner
4. Years in business in Adjumani
5. Other branches in Uganda
6. Other sales outlets / sales agents in Adjumani
7. Products and services sold: what types of seed; what other services? (e.g. training, extension, tractor services, etc). Do you sell QDS or other seed classes (e.g. foundation seed)
8. Who do you sell seed to – different customer types, e.g. NGO / Govt projects; Other Agro-input retailers; Large commercial farmers; smallholder farmers; project-supported farmers; institutional buyers (e.g. schools, prisons – specify)
9. Size of business - Options in order of preference:
  - a. Compared to other agro-dealers in Adjumani
  - b. Annual Sales
  - c. # of individual clients + # of institutional (including NGO's buyers)
10. For the different crops, what proportion of seed sales are purchased by the different customer categories?
11. Do you help to link your farmer customers to (grain) output markets in any way? Examples
12. How is seed supplied to NGOs / govt programmes, e.g. delivery to office, deliver to farmers, seed fair / vouchers, collection from AD shop.
13. Any other processes or services involved in seed purchases / contracts from NGOs / govt projects?
14. How has demand for seed from NGOs / govt projects affected your business? Have seed sales gone up or down? Quantify if possible. Any other changes in the way you do your business?
15. Have any NGOs or govt project helped you to establish or strengthen links with refugee farmers / host community smallholders for continued sales? E.g. gaining clients through seed fairs or subsidy programs. Please provide examples
16. Challenges to business
17. Opportunities

**F. Interview checklist for Farmer Seed Producer Groups / Local Seed Businesses (LSBs)**

1. Name of interviewee(s) and position in Group / LSB
2. Type and name of Group / LSB
3. Location, incl. sub-county:
4. How long have you / your group been multiplying seed?
5. How many group members / seed growers are there (male / female)? Do you have a group farm and / or individual plots? How many farms? How many plots? Approximate total area for seed production.
6. Describe how your group / LSB was established. What types of support did you receive, from which agencies / projects? Is the support on-going? If no, when did this support end?

7. Does your group have any certification / registration? Describe if so.
8. Which crops and varieties do you multiply?
9. What type of source seed do you use? How and from where do you obtain your source seed for the different crops / varieties?
10. Have you had any challenges in obtaining source seed? Describe if so.
11. What are the quality checks that are done and who does these – both during the growing season and after harvest / processing?
12. Do you package your seed in any way? Describe.
13. Who are your customers? (Different customer types)
14. How do you link to customers / market the seed that you produce?
15. Please provide approximate percentages of seed sold to different customer types (by crop).
16. Please summarize production and sales (by crop / variety) for recent years, including sale price.
17. Have you had any challenges in selling your seed? Describe if so.
18. How has your business benefited farmers, both group members and non-group members?

**G. Interview checklist for Informal Traders (*Awara*)**

1. Name
2. Name of business
3. Number of years in this business
4. Are you a member of any Traders Association or Co-operative or other Group? Which one, if so. What support does this provide to your business?
5. Please describe your business – products sold, where/ how purchased, where / how sold
6. Do you differentiate seed from grain? Describe how you differentiate, e.g. sourcing, quality assurance / quality checks, handling, processing, packaging, storage, price, etc.
7. Who are your preferred seed suppliers? How do you find your seed suppliers?
8. What are the purchasing arrangements? Any advance arrangements, e.g. advance loans, input supply, etc.
9. Who do you sell your seed to? (Customer types)
10. How do you market your seed? How do you find your customers?
11. Do your customers ask for specific varieties or crop types?
12. Where do you sell? Do you have any sales outlets or agents? Describe if so
13. What are the sale arrangements, e.g. do you provide seed on loan basis?
14. What are the challenges that you've experienced in the seed business?
15. What are your ideas for how can these challenges be overcome?

## Annex 7. Information from farmers about different crops and varieties

The crops and varieties supplied by LWF in late March 2021 under the Bread for the World (BftW, BROT) project included: Okra (Pusa Suwani) - 50gms; Kale Sukuma Wiki (Georgina, 1000 headed) - 50gms; Eggplant (Black beauty) - 50gms; Onion (red creole) - 50gms; Amaranthus – (Dodo) -50gms; Carrot (Nantes variety) - 50gms; Tomatoes (Cal J Variety) - 50gms; Water Melon (Sukari F1) - 50gms; Green Pepper (California wonder) - 50gms; Groundnuts (Serenat-11)<sup>34</sup>; Greengram (Narogram-2)<sup>35</sup>; Maize (Longe-8 Quality Protein Maize); sesame (Sesame-3); Rice (Namse-5); Cassava

Information from farmers regarding crops and varieties locally cultivated:

**Sesame:** This was considered as one of the most impactful crop types as farmers noted that their soil type is favourable for sesame. Sesame is good for food, highly marketable, resistant to most pests and diseases, and drought tolerant. The white variety that was provided is preferred because it has high yield, big seed-size and matures quickly. They observed that when planted on time, the yield is higher than the local variety and the income is also higher in return. A kilogram of the sesame variety provided by LWF fetches UGX 4,000 compared to UGX 2,000 per kilogram of the local variety. In some locations, the variety provided by LWF was already available locally, but elsewhere it was said to be a new variety. The seed of the variety was in high demand; one farmer seed producer group remarked that other farmers had come to them to buy the seed to the extent that the group had not needed to sell in the market. Income from sesame (grain) can be used for paying school fees and loan repayment. The local variety is a brown variety known as *Gure* – this was said by some farmers to yield better than the white variety, but demand (and price) is low. Farmers are still cultivating this variety despite the introduction of the white variety.

**Groundnuts:** In general, groundnuts were indicated to be adaptable to the environment and aid improvement of soil fertility. They are highly marketable, providing a source of income for paying school fees and loan repayment. Groundnut seed is typically saved by farmers and can also be bought in local markets. Groundnut seed is kept intact, with the shells. There is no distinction between seed and grain in local markets<sup>35</sup>, i.e., no selection of seed by traders, and no price differences other than seasonal price changes.

- One of the groundnut varieties provided by LWF (e.g. a variety locally known as *Egola*) was reported to be soft and sweet, good for eating, early maturing, drought tolerant, and marketable. *Egola* was reported (by a host group) to have been provided originally by the UN to Kuku refugees in 1992.
- Another variety provided by LWF (a 4-month variety, possibly Serenut 2), however, was not well-liked by farmers because it was not adapted to the climate and suffered from low yields. Over time, the seed size had decreased to the point that farmers in one host community stopped saving the seed. The assessment team later learned from NARO staff that the multiplication of Serenut varieties 1 to 6 had been discontinued<sup>36</sup> because better varieties had been bred to overcome the challenges of these varieties. Such challenges include susceptibility to pests, rosette and leaf spot diseases, drought, poor taste, long maturity, and long dormancy period for some of the seed.

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<sup>34</sup> In 2022, LWF had planned to provide Serenut 5, but was unable to procure the seed, so they provided Serenut 2 instead.

<sup>35</sup> Groundnuts with their shells can be either food or seed. Shelled groundnuts can only be used for food.

<sup>36</sup> Serenut 1 and 2 were discontinued in 2002, Serenut 3 and 4 in 2010, and Serenut 5 and 6 in 2011. Since these times, there has been no production of foundation seed of these varieties, implying that any seed of these varieties purchased from any source would have been multiplied from recycled foundation seed that is likely to have deteriorated due to mixtures, poor seed handling practices, or decline in performance due to susceptibilities to biotic and abiotic stresses.

- In another location, the variety brought by LWF was said to be Serenut 10 (also referred to as *Egola*, confusingly) – this had earlier been introduced through a church project and was well-liked by the farmers. In a different location, farmers reported that they had heard about Serenut 10 (white seeds, big pods, high yields) but farmers did not know where they could get it, though it was very much in demand.

Other varieties that are grown locally in different locations:

- *Kapoto* – a small-seeded type that was reported by host farmers to have been grown since their grandparent’s time
- Another small-seeded type (no name) that used to be planted by host farmers, but not so common now
- Red Beauty was also mentioned by farmers in different locations. Red beauty is an improved variety that was originally released in Uganda in 1969.

**Soyabeans:** The seed type provided by LWF is good for food (soya milk, roasting and eating) and nutrition. When mixed with maize flour and groundnut paste, soya provides a very nutritious meal. Soya beans are very marketable, and can be planted in two seasons because they are early maturing (matures within three months).

**Maize:** Maize is a major source of food and income that can be used for paying school fees and loan repayment among others. LWF reportedly brought Longe 5 (also known as *Katamani*<sup>37</sup>) which had previously been provided to host communities by NAADS. Refugee farmers had also already planted it before, having selected it from the UN food rations. Dinka farmers referred to it as “UN Maize” (*Anyuol UN*). The variety was described as tall, white, 2.5 months’ duration, yielding 2 cobs per plant. Farmers tend to plant two or three different varieties in each site visited by the assessment team. Other varieties include:

- Yellow, short duration variety, grown by refugees within the homestead. Seed was originally brought from South Sudan by relatives, and/or those who made a trip back to South Sudan after displacement
- Short white variety (2 month duration), possibly Longe 4. Among host farmers, this variety was originally provided by NAADS some 15 years ago. The seed has been saved since that time.
- Among host farmers, there is another long variety that was grown by their ancestors.
- Longe 7 – tall variety, more recently introduced among host farmers, not sure from where

**Beans:** Beans are regarded as priority because of being nutritious and marketable. At least 6 or 7 varieties are grown locally:

- Lokiri (brown/white mottled) – this is the variety brought by LWF; it was first brought by NURI.
- Small-seeded black type was also reported to have been brought by LWF – Dinka refugee farmers in Nyumanzi liked it and kept the seed
- yellow;

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<sup>37</sup> In one host community, *katamani* was said to be a short variety that had been grown by their grandparents. This illustrates the way in which the same name can be used to refer to different varieties.

- white;
- 2 black varieties; and
- Red.

**Greengrams:** Greengrams are used for home consumption and for sale. The variety provided by LWF was a big-seeded type for which there was no market because people prefer to eat the small-seeded type. The farmers in question reported to have saved a small amount of the seed so that they could grow the variety for home consumption. Other varieties that are cultivated locally:

- *Mobile* variety is named so because it spreads well. Recent variety, seed in neighbouring community and bought from market (selected from grain) or from other farmers (selected from grain).
- Small-seeded variety (local type) is preferred for eating and for market
- Yellow variety came from ancestors

**Tomatoes:** They are a source of nutritious food, both as a condiment and in salad, and can also be sold as a source of income as they have a readily available market. Tomatoes can be grown continuously throughout the year which sustains household nutrition and stabilises household income. Tomatoes thrive in the swampy areas during the dry spells. The variety provided by LWF was a new variety that is liked by farmers for being drought resistant and early maturing, high yielding (100 fruits from one plant) and can produce well even on a small plot of land. Farmers saved the seed to plant again. Other varieties that are grown are *Kali* (plum tomato) that is resistant to drought, and *Moneymaker*.

**Onions:** Onions are preferred for having a ready market and being highly demanded by consumers especially the refugee population. They are highly profitable.

**Eggplants:** They have high yields, are drought resistant, have ready market and are highly profitable.

**Sukumawiki:** This is a new crop that had not been cultivated at all before the refugees came. Host farmers reported to have been planting it since 2014, when LWF first brought the seed, and they grow it because it can be sold to the refugees.

**Okra:** Although this was cultivated in small quantities before the refugees arrived, it is now grown in much larger quantities because there is a very high demand for okra from the refugees. The variety of okra provided by LWF, however, was a quick-maturing, short-statured variety that did not meet the market requirements and the farmers in one location abandoned the variety in favour of the marketable variety. There are at least two varieties cultivated locally: a tall variety, and a hairy variety.

**Sorghum:** various varieties are cultivated:

- White variety (possibly Longe 5) has been grown since 2016 or 2018
- Tall, brown, big-headed variety from South Sudan - in addition to eating the grain, the canes can be used for chewing (like sugar cane) and also as a fuel for cooking. The seed was acquired from South Sudan (sent by relatives), after the refugees had arrived in the settlements and seen the local terrain. Hosts reported to have obtained the seed from the refugees, and they grow it partly because the canes can be sold in the market.

- Short white variety grown by host farmers was introduced some 25 years ago. Dinka refugees reported that they do not like the local variety of sorghum available in Uganda – it's considered tasteless so they don't eat it, and you cannot chew the canes.
- Red, traditional variety planted by host farmers is used for making alcohol.

## Annex 8. Understanding seed systems in Adjumani District.

This annex combines the fieldwork findings with relevant documented knowledge to characterize and describe seed systems and farmer seed management practices among refugees and host communities in Adjumani District.

Smallholder farmers access seed through a variety of channels. The major ones fall into two categories: formal and informal seed systems, with additional intermediary seed systems that have emerged through integrated seed sector development efforts and by the activities of NGOs. These are described below and illustrated by Figure 1.

The **formal seed system** provides farmers with new ‘modern’ varieties that are offered as ‘high quality’, certified or quality-declared seed (QDS). Formal channels include government bodies and commercial companies. Within formal systems, seed and grain are produced differently, with clear standards dictating what may or may not be labelled as seed.

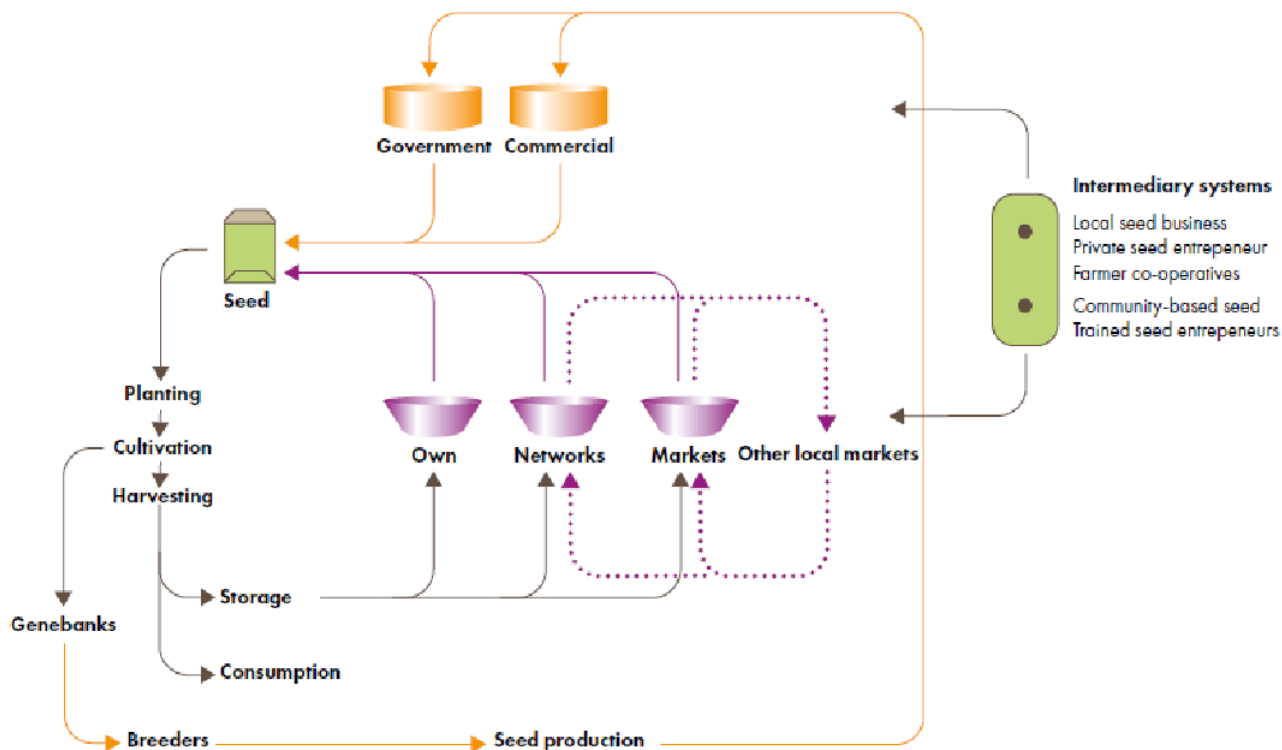
The **informal seed system**, also known as the ‘local’, ‘traditional’ or ‘farmer’ seed system, centers on farmer or local varieties. The informal system includes most of the ways farmers and traders themselves produce, select, disseminate, and procure seed: directly from home harvest, through barter or sale among friends, neighbors, and relatives, and through local grain markets and traders. In the informal system, seed is mainly produced or sorted as an integral part of grain production. Despite its name, the informal seed system also plays a role in disseminating modern varieties, sometimes labelled ‘improved’, that have been further multiplied on farm.

**Intermediary seed systems** refer to varied, small-scale enterprises, often local or community-based, including community seed production, farmer cooperatives, smallholder seed enterprises, Local Seed Businesses (LSBs), and local seed system development programs (see Walsh *et al.* 2015). They integrate elements of both formal and informal seed systems.

Smallholder farmers routinely tap these multiple sources for their different seed needs. For example, in Southern Africa, farmers typically procure maize hybrids through agro dealers (formal) and sorghum seed from their own harvest or from neighbors (informal). Smallholders might also use multiple channels even for a single crop. Bean farmers in much of East Africa, for example, obtain some seed from their own stocks, some from markets, and might also get seed of new varieties from an extension agent or research station.

Evidence shows smallholder farmers in Africa access over 90% of their seed from the informal system, with own-saved seed and local markets being particularly important. Seed from the formal system accounts for only about 3% of what is sown (dominated by maize), and the rest comes from a variety of sources, including aid projects and the intermediary seed system (McGuire and Sperling, 2016).

Figure 1 Seed systems and their interconnections



Channels through which farmers obtain seed are depicted by the cylinders. Farmers' own seed stocks, social networks, and local seed/grain markets constitute informal channels. Commercial seed companies, and government or research outlets are formal channels. Intermediary forms vary, but can include farmer cooperatives and other community based seed sources.

Source: modified and expanded from Almekinders and Louwaars, 1999

Source: Sperling et al, 2022: p.9.

### A8.1 Informal seed systems and farmer seed management practices in Adjumani District

As mentioned above, the informal seed system includes the selection, production and diffusion of seed by farmers. Varieties can be either 'local' (i.e. inherited from one's grandparents) or introduced from elsewhere (e.g. by farmers, by government, NGO or church projects, or by relief interventions). As such improved varieties are commonly incorporated from the formal seed system into the informal seed system.

One of the main differences highlighted by refugees in their seed management practices between their crop farming in South Sudan and Uganda was that new varieties are made available with much greater frequency in Uganda as compared to South Sudan, allowing them to adopt new varieties. Farmers' decision-making on whether or not to incorporate a new crop or a new variety into their cropping repertoire depends on a wide range of factors, including its adaptation to the local agro-ecology (including drought tolerance), the consumption preferences of the household, the marketability of the crop and variety, and its duration as compared to other crops and varieties to ensure that the harvest season is staggered to some extent by having



a combination of early-maturing and late-maturing crops and varieties<sup>38</sup>. These factors are illustrated by Annex 7 which captures some of the comments made by farmers about specific crops and varieties.

**Seed saving by farmers.** Across Africa, most farmers keep seed from one season to the next, though levels of seed saving vary across different crops and different farmers. In general, poorer farmers find it more difficult to save seed at harvest time because there are so many competing household needs to be met from the harvested output. Better-off or more meticulous farmers, on the other hand, are able to save enough seed for themselves and for others. Such farmers are often known by others within the community for their seed-saving ability and might be locally regarded as model or master farmers. Women are often especially knowledgeable about seed saving, particularly in agro-pastoral communities where men tend to take responsibility for livestock and women are responsible for crop farming.

The amount of seed saved by a farmer from one season to the next is generally determined by the amount of seed needed for planting the following season, not according to the amount harvested, as is often assumed to be the case (as reported in project documents that are used to justify the need for emergency seed interventions). After the harvest, the proportion of seed saved as compared to the amount of grain that is used for consumption or sold is generally relatively small, though this varies for different crops, depending on both the multiplication rate and the seeding rate of the crop<sup>39</sup>. As mentioned above, some farmers regularly save more seed than they need for themselves. In some cases, if a farmer has a small quantity of seed of a variety of which they would like to grow more, they will make a concerted effort to bulk or increase the amount of seed saved over successive harvests until they have the quantity required.

The focus group discussions explained that a challenge in seed saving across all crops for both host and refugee farmers is if the seed is not dried properly the viability is compromised. Rats and weevils were commonly reported as an issue in storage, but no chemical products were used to protect the seed. Some farmers mentioned the use of neem in storage to deter insects. For maize, cobs selected for seed are commonly hung above cooking fires to preserve the seed and discourage pests. Sesame is often kept in a jerry can. Groundnut is kept in a sack and stored on the floor. For vegetables, seed can be kept in plastic bags or plastic bottles and kept in a warm place, e.g. in the ceiling. Challenges of vegetable seed saving include caterpillars and weevils. Seed of local varieties of tomato is commonly mixed with ash for storage. For okra, some stored the seed in sealable containers, while others hung the seed from the kitchen ceiling. Challenges of vegetable seed saving include caterpillars and weevils.

**Informal sector seed markets.** In cases where farmers are unable to save their own seed, they generally acquire it from other farmers or purchase it from the local grain market. In the grain markets visited by the assessment team (in Pakele and Nyumanzi), there were two distinct types of “seed” reported for maize, beans and sorghum. A small number of traders had their own farms where they cultivated both grain and (uncertified) seed for the market. The seed was selected at harvest time and stored separately, taking particular care to avoid pests and damage in storage. Such seed (referred to here as ‘trader-grown seed’) was sold at a premium at planting time. A market trader selling fresh okra also explained how she regularly sold seed of okra (two varieties) and pumpkin (two varieties) that she cultivated herself. Other traders simply selected and cleaned their best grain by hand and sold this at a premium at planting time (referred to here as ‘trader-sorted seed’). Farmers will pay a premium knowing that the seed came from a known variety from a reliable source and that the seed would be fresh. It is also recognized that farmers buy grain which they then clean and select

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<sup>38</sup> This was apparent from the focus group discussions, and has also been documented by Doss (2006) and Fisher et al (2015), among others.

<sup>39</sup> Cereal crops such as sorghum or maize have high multiplication rates and low seeding rates, so the proportion of seed saved out of the total amount harvested is relatively small. Legumes (e.g. beans, groundnut), on the other hand, have lower multiplication rates, so the proportion of seed saved out of the total amount harvested will be higher.

good-looking grains for planting. This is commonly referred to as 'potential seed'. In effect, almost any grain can be potential seed.

## A8.2 Formal seed systems in Adjumani District

Under the formal seed system of Uganda, four dominant seed classes exist: pre-basic seed which is produced by a breeding unit in small quantities for multiplication; basic seed (also known as foundation seed) which is produced by a multiplication unit that is one or two generations after pre-basic seed; certified seed which is the progeny of basic seed produced according to the standards prescribed for the crop being certified; and quality declared seed (QDS) which is also derived from basic seed and certified to less stringent standards. QDS is seed produced by a registered seed producer (individual or a group of farmers) from basic seed and conforms to the minimum standards for variety purity and germination. It particularly offers farmers access to better quality seed than is available through the informal seed system especially for improved groundnuts, soybean, beans, green gram, beans, simsim and sunflower.

In Adjumani District, the main formal seed system actors include Abi ZARDI, the District Production Office, the District Agricultural Office and District Commercial Office, MAAIF, farmers and farmer organizations, development partners, and agro-input dealers. Though seed companies play a key role as primary suppliers of certified seed, they do not have a physical presence in the district. The main private sector players in the formal seed sector are agro-input dealers, who also act as agents, representing multiple seed companies.

Quality control within the formal seed system is regulated through the certification process, with additional checks and seed testing at the District level (see below, Section A1.5).

## A8.3 Intermediary seed systems in Adjumani District

The intermediary seed system (also referred to as the semi-formal seed system) is particularly well-developed in Uganda, largely due to government's support for community-based seed multiplication (Mubangizi et al, 2012) and the subsequent efforts of the Integrated Seed Systems Development (ISSD) program (2012–2021). Since its establishment in 2001, the public National Agricultural Advisory Services (NAADS) was training farmers and farmers' groups in seed production and linking them to seed users (*ibid*). The ISSD approach contributed to the development of the intermediary seed system by promoting the production of Quality Declared Seed (QDS) by Local Seed Businesses (LSBs), as described below. In Adjumani District, another type of seed producer in the intermediary seed system is Farmer Seed Producers

**Local Seed Businesses (LSBs).** There are currently thought to be between 15 and 25 LSBs in Adjumani District, promoted initially by ISSD, and subsequently by LWF, WV, PRELNOR and the District Farmers Association (DFA). The LSBs are initially trained by the sub-county agricultural officer and must pass the quality tests before registration by the District Production Office. The LSBs are further trained in all relevant aspects of running the business, including leadership and governance, financial literacy, record keeping, seed production planning, cost benefit analysis (CBA), seed production, post-harvest handling, seed demand forecasting, and marketing, among others. The LSB training approach aims to ensure that LSBs are technically well equipped, professionally organized, market oriented, and strategically linked. In general, seed from individual farmer group members is bulked and then sold, though two out of the four LSBs interviewed stated that they lacked adequate storage facilities. In one case, the LSB was using a store that had originally been constructed by NAADS.

QDS production involves oversight by the District Agricultural Production Department, under supervision and in collaboration with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). QDS fields are inspected prior to planting and during the growing season. LSBs are supported to access foundation seed

(basic seed) through links with NARO and other research institutions such as Makerere University. QDS is produced through multiplication of foundation seed, which can only be obtained from NARO, its Zonal institutes e.g. Abi ZARDI and Makerere University. The production level of foundation seed is generally low, and LSBs have to compete with seed companies and private individuals for the limited supply. One LSB reported a year waiting period after they ordered foundation seed.

LSBs are trained on how to effectively market their seed directly to communities. Their marketing efforts are supported by District Agricultural Offices who are also involved in promoting the uptake of quality seed of improved varieties. Also, LSB promoters create market linkages for farmers e.g. LWF links farmers to LSBs; and agricultural officers link qualified LSB to development projects such as NURI (for the sale of groundnut seed) and to NAADS (for sale of cassava cuttings). In some cases, LSBs may be linked to agro-dealers who have supply contracts with NGOs for QDS through the District production office or NGOs.

LSB supporters help to create linkages between farmers and LSBs, including through seed fairs that sometimes form part of emergency interventions. These marketing efforts are also supported by agricultural officers and others who promote the uptake of quality seed of improved varieties. The District Farmers Association, for example, also links LSBs to farmer seed producer groups (FSPs) for the supply of quality source seed. Such efforts are aimed to respond to farmers' demand for seed of new varieties. However, it must be noted that such demand is sporadic and will wane over time, as more farmers acquire the variety and it becomes incorporated into local seed systems.

#### A8.4 Emergency seed interventions and associated activities by implementing partners in Adjumani District

Interviews with the local authorities in each of the refugee settlements and the two sub-counties visited by the assessment team revealed that seed has been provided by a range of nine different international and local NGOs and three large-scale projects involving the Government of Uganda.<sup>40</sup> Direct distribution was reported as the main modality through which seed has been provided, though LWF and ACF have conducted seed fairs, providing farmers with vouchers to access the seeds. A range of different crops has been provided by the agencies, mainly vegetable seeds, maize, and beans; but cassava, sweet potato, groundnuts, cowpeas, sesame, soybean, rice, and tree seedlings have also been provided.

Seed interventions implemented among refugee and host farmers typically also involve the provision of agronomic training for farmer groups, as well as support for Village Savings and Loans Associations (VSLAs), land access for refugee households, ploughing, and market linkages. Such assistance is consistent with Pillar 3 (Resilience and Self Reliance) of the Government of Uganda's Comprehensive Refugee Response Framework.

Key informant interviews revealed that the perceived purpose of emergency seed distributions is to promote household food security and nutrition through self-reliance; some key informants also indicated that the seed interventions were also intended to increase household income, alleviate poverty and promote more sustainable livelihoods. Longer-term value chain initiatives that provided soybean seed to host farmers were considered to be development interventions (e.g. PRELNOR) and were not the focus of the discussions and interviews undertaken by the assessment team. Interestingly, none of the key informants mentioned the

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<sup>40</sup> These include World Vision, Self Help Africa, Action Against Hunger (ACF), Lutheran World Federation, Caritas, Food for the Hungry, Danish Refugee Council, Community Empowerment for Rural Development (CEFORD, a Ugandan NGO), Alliance Forum for Development (AFOD, a Ugandan NGO), GIZ, and the Northern Uganda Resilience Initiative (NURI). Outside the refugee settlements, seed has additionally been provided by the Red Cross, Project for the Restoration of Livelihoods in the Northern Region (PRELNOR), and Operation Wealth Creation (OWC). NARO also supports Local Seed Businesses for seed multiplication.

promotion of improved crop varieties as the aim of emergency seed distributions – this is typically a more development-oriented objective.

In addition to the activities under the WV intervention to link smallholder farmers to agro-input dealers, Action Against Hunger (ACF) implemented a one-year project (2021 – 2022) to support agro-input dealers in Adjumani District to link with smallholder farmers. This was done through the provision of extension services, trade shows, trade fairs, and training. After one year, it was reported that out of 120 farmers who had participated in the project, a total of 10 had purchased inputs from the agro-input dealers.

### A8.5 Steps to ensure seed and varietal quality in Adjumani District

In general, seed quality was reported to be an issue for emergency seed interventions, both in terms of the physical quality of the seed itself, as well as the appropriateness of the varieties provided. In terms of physical quality, there have been cases where the seed provided to farmers failed to germinate. The problem of so-called “fake” or counterfeit seed, combined with low quality certified seed (including expired seed) is widespread in Uganda, particularly in emergency seed distributions (Longley et al, 2021).<sup>41</sup> The authorities in Adjumani District have tried to address this in the past two years by multiple inspections and quality tests which are carried out both at the point of supply<sup>42</sup> and at the point of distribution. These tests are undertaken by the District Agricultural Office (DAO) and sub-county agricultural officers respectively. In addition, some NGOs who procure seed from agro-input dealers require that the dealer undertakes their own seed germination tests. In the refugee settlements, seed distributions are witnessed by representatives from the Office of the Prime Minister (OPM) and the Refugee Welfare Committee (RWC) to ensure that the seed quality inspections are undertaken and that the correct seed is distributed in the correct quantities. Although it was generally felt that these controls had led to improvements in seed quality, senior-level officials reported that counterfeit or adulterated seed is very difficult to detect and is still being distributed to farmers. The implication was that this issue must be addressed at a higher level.

In terms of varietal appropriateness, it was reported that some seed distribution projects failed to consult with farmers as to their preferred crops and varieties. In the case of LWF seed fairs, farmer group leaders could choose their preferred seed types at the fair, based on their own prior consultations with their group members. When planning for direct distribution, LWF field staff asked each farmer group which crops they wanted, but the specific variety was selected on the advice of the DAO.. In general, various cases in which the wrong variety was provided to farmers were noted from both the key informant interviews and the farmer group discussions. For example, although the NARO CAS1 cassava variety has some level of disease tolerance, farmers do not like it because it rots easily and must be dried before cooking.

### A8.6 Understanding farmers’ seed demand

Drawing on the findings from the assessment and existing literature (Tripp, 2000), Table A4 summarises the nature of off-farm seed demand by farmers. The nature of seed demand is further explored in Section 8.2.

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<sup>41</sup> Fake seed is generally defined to be a combination of expired certified seed, some QDS that has been illegally purchased and re-packaged and in the worst case, grain that is cleaned, packed and sold as certified seed. The government estimates that fake seed in Uganda accounts for 30-40% of all seed offered for sale (GoU, 2018).

<sup>42</sup> Seed is tested for germination, homogeneity and cleanliness before it is approved by the DAO for supply.

Table A4. Types of seed demand by smallholder farmers in Adjumani District

| <b>Origin of demand</b>  | <b>Crop type, level and frequency of demand</b>   |
|--|---|
| <i>Emergency</i> : seed shortage due to displacement, drought or flooding              | Large-scale displacement led to high level of seed demand for all crops in first year after re-location, with levels reducing in subsequent years. Scale and frequency of drought / floods determine scale and frequency of seed demand; different impacts on different crops according to timing and extent of drought and floods and multiplication / seeding rates of crops affected.  |
| <i>Poverty</i> : shortage due to low harvest and/or sale/ consumption of seed stocks   | On-going, continuous shortages due to chronic poverty affect poorest households only, among both refugees and hosts. Despite training, harvests may remain low due to small farm size and competing labor demands which result in late planting and late weeding. Pressing demands for food and income at harvest time make it difficult for poor farmers to set aside seed for most crops, especially those with low multiplication and high seeding rates.  |
| <i>Seed quality</i> : hybrid seed use; market standards for grain require quality seed | Occurs mainly in more commercial farming systems, where farmers recognise the need to replace seed stocks for some crops and have the necessary purchasing power to do so. Hybrid maize is the main crop in this category that is relevant to the target farmers, also hybrid vegetables (e.g. some varieties of tomato, green pepper, onion, cabbage). This category also applies to cash crops for which market standards for grain quality encourage the regular purchase of seed; apart from possibly soybean (which is also difficult to store), the assessment team were not aware of such crops grown by the target farmers. |
| <i>Crop-specific constraints to seed-saving</i>  | Applies to crops for which the seeds are difficult to store (e.g. soybean) or difficult to extract (e.g. onion, cabbage). Seed demand for these crops is recurrent. This may also apply to cassava planting material which is challenging to maintain in large quantities on-farm throughout the dry season because it is reportedly often trampled by grazing livestock after other crops have been harvested.   |
| <i>Variety change</i> : seed as a source of new variety                                | This type of demand is one-off or occasional rather than continuous; once a farmer has acquired seed of a new variety, then the seed can be saved from one season to the next. Depending on the crop, demand may be constrained by the limited number of varieties available.   |

Source: Adapted from Tripp (2000).

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