Value Chain Assessment

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Graduating to Resilience

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Graduating to Resilience is implemented by AVSI Foundation in partnership with

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LIST OF EXHIBITS

LIST OF ACRONYMS

ADRA	Adventist Development and Relief Agency
AIR	American Institutes for Research
AVSI	Association of Volunteers in International Service Foundation
BHA	Bureau of Humanitarian Assistance
CBT	Community-based Trainers
COVID-19	Coronavirus Disease 2019
DCO	District Commercial Officer
DLO	District-Level Officials
DPO	District Production Officer
F&M	Foot and mouth (disease)
FFBS	Farmer Field Business School
FGD	Focus group discussion
FSP	Financial service providers
HQCF	High-quality cassava flour
ICT	Information Communications Technology
ILRI	International Livestock Research Institute
IRB	Institutional Review Board
IPA	Innovations for Poverty Action
KAP	Knowledge, attitudes, and practices
KII	Key informant interview
LC	Local Council
LMA	Labor Market Assessment
M&E	Monitoring and evaluation
MUREC	Mildmay Uganda Research and Ethics Committee
NARO	National Agricultural Research Organization
NGO	Non-governmental Organization
ODK	Open Data Kit
PII	Personally Identifiable Information
PO	Program officer
PPD	Postharvest physiological deterioration
QCS	Qualitative case studies
R&I	Refine & Implement
RCT	Randomized controlled trial
RWC	Refugee Welfare Council
SCR	Sub-County Representatives
SPO	District Secretary for Production
TSC	Technical Steering Committee
UGX	Ugandan shillings
UN	United Nations
UNHCR	United Nations High Commission for Refugees
USAID	United States Agency for International Development
VC	Value Chain
VCA	Value Chain Assessment
VSLA	Village Savings and Loans Association
WASH	Water, Sanitation and Hygiene
WFO	World Food Organization

EXECUTIVE SUMMARY

The United States Agency for International Development (USAID) Bureau of Humanitarian Assistance (BHA) funded Graduating to Resilience Activity (the Activity) is implemented by the AVSI foundation, in partnership with the American Institutes for Research (AIR) and Trickle Up (the consortium). The Activity aims to help extremely poor refugee and Ugandan households in the Kamwenge district graduate from food insecurity and fragile livelihoods to self-reliance and resilience. The Activity works methodically with 13,200 economically active but chronically poor households using a woman-plus-household graduation approach to provide integrated interventions, including farmer field business school (FFBS), village savings and loans associations (VSLAs), consumption support, asset transfer, and business coaching.

The Activity conducted a Value Chain Assessment (VCA) in 2019 to provide monitoring and evaluation (M&E) data on the three targeted value chains (VC) selected for the cohort (maize, beans, and groundnuts).

AIR has conducted a second VCA is to examine how the program activities affected household access to information and markets, as well as impacts on income-generating activities chosen among program participants in cohort one, to reevaluate which value chains have the strongest potential for improving household wellbeing and adjust and refine cohort two programming accordingly. Although we have descriptive data on livelihood outcomes of the Activity, this VCA aims to improve understanding of the contextual factors behind the observed outcomes. This VCA also seeks to provide insight to support the ways in which the Activity can adjust program implementation for the chosen cohort two value chains and promote greater livelihood improvements among cohort two participants. Exhibit 1 provides specific objectives of this VCA.

Exhibit 1. VCA Objectives

VCA Objective 1	Identify value chains for cohort two programming based primarily on profitability analysis, but also considering other priority criterion (e.g., food security).
VCA Objective 2	Create VC maps for cohort two programming for each of six selected VCs.
VCA Objective 3	Report on linkages, revenues, harvest, and rearing data that is specific to the six VCs of interest for cohort two programming.
VCA Objective 4	Conduct context analysis based on desk review.

To implement the assessment, we used a mixed-methods approach – including quantitative and qualitative data collection and analysis – to assess the livelihood outcomes and opportunities of participants and their households during the final 3 months of cohort one. As part of our quantitative approach, we conducted a household survey and complemented it with Activity M&E data. While this household survey was primarily used for the Labor Market Assessment (LMA), it also provided valuable insights into specific value chains of interest: cassava, potatoes, groundnuts, pigs, goats, and chickens. AIR collected qualitative data in focus group discussions (FGDs) with key stakeholders at the District and Sub-County levels. For each of the objectives described in Exhibit 1, we devised relevant research and learning questions (see Annex III).

Section 2 provides further details on our methodology, including information on sampling, fieldwork, ethical considerations, data analysis, and limitations.

Exhibit 2. Assessment Methodology

2 Focus Group Discussions (FGDs)

783 Responses to Cross-Assessment Household Survey

Desk Review

Exhibit 3 presents the key insights from each of the six selected VCs from the analysis of primary data and relevant secondary data sources. All six of these VCs were found to be profitable. Section 3 provides further details on these findings.

Exhibit 3. Summary of VCA Findings by Value Chain

Values Chains
Potatoes
▪ Overall, 24% of the cohort one households (HHs) that were interviewed cultivated potatoes. ▪ There was a significant difference between host and refugee HHs who cultivated potatoes (34% and 15%, respectively). There was no significant difference by age group. ▪ The majority of potatoes were set aside for the farmers' own consumption (78%). Selling potato harvest to middlemen was the second largest use reported (32%). ▪ When disaggregated by buyer type, local trading centers tended to offer the best price/kilogram of potatoes. ▪ When disaggregating by host or refugee community responses from the household survey, the majority of host households (65%) reported no challenges in selling potatoes, whereas 38% of refugee households reported no challenges. This may be linked to high rates of households reporting setting aside some of their harvest for their own consumption. However, 35% of host households reported unstable selling prices as a challenge, compared to only 6% of refugee households. ▪ The challenges impacting potatoes (described by participants in FGDs) included diseases, lack of seed and/or seed multipliers, small land plots, poor quality soil, and poor postharvest handling. ▪ Benefits described in the FGDs included multiple potato varieties, short maturation period, and ease of cooking that may be appealing to time-constrained poor buyers/consumers looking for quick and easy to prepare foods.[1] A key opportunity for improving the potato VC includes cultivating varieties with a specific market in mind, such as chip varieties for restaurants.
Cassava
▪ Overall, 31% of households cultivated cassava. There was a significant difference in the share who cultivated cassava when we disaggregate by host versus refugee household status (35% and 28%, respectively). There was no significant difference by age group. ▪ 79% of households set cassava aside for their own consumption; 20% sold to other households and 15% sold to middlemen. No cassava farmers (0%) reported selling to big buyers, cooperatives, or contract buyers. There was little difference between prices for each buyer type. ▪ A key challenge in cultivating cassava was the additional care and longer maturation periods relative to other crops (an average of 8 to 12 months), impacting farmers' ability to allocate land to other crops, such as potatoes, which take about 10 weeks to mature. Other challenges included poor soil quality and cuttings, price fluctuations, land shortages, small land plots, and high disease incidence. FGD participants stated that

[1] Hollinger, F., Staatz, J.M. (2015). Agricultural Growth in West Africa: Market and Policy Drivers. *Food and Agriculture Organization of the United Nations and the African Development Bank,* 173-177.

cassava is advantageous because it is drought-resistant and easy to cook, and new developments of disease-resistant cassava varieties are a key opportunity to improve production.

Groundnuts

- Overall, 23% of households grew groundnuts. Similar to the other crops, there was a significant difference in cultivation rates between refugee and host households (6% and 39% respectively), as well as adults versus youth (25% and 16%, respectively).
- The majority (80%) of groundnut farmers were using groundnuts for their own consumption, allocating about 64%, on average, of their total harvest to this purpose.
- The biggest challenge faced by farmers, specially hosts, was unstable selling price. There were no significant differences between youth and adult farmers.
- In addition to small plot size and poor soil quality challenges, FGD participants noted that groundnut farmers have limited access to quality seeds, and some available seed varieties are ill-suited for the region.

Chickens

- Overall, 60% of households reared chickens. While there was no significant difference between the rates of host and refugee households rearing chickens, adults were significantly more likely than youth to engage in chicken-rearing (63% versus 54%, respectively).
- The majority of farmers purchase chickens from friends or neighbors, and the average price was about 43,000 UGX/chicken. Livestock farmers offered the lowest price for chickens (about 30,000 UGX).
- More than half of farmers report no challenges when selling chickens. However, 24% of host households and only 14% of refugee households report not receiving market price as a selling challenge. Youth and adults were also different. More youths than adults reported no challenge selling chickens.
- The challenges (identified by FGDs) for rearing chickens included diseases impacting chicken health and high mortality rates among exotic breeds.
- The benefits included minimal land requirement and an already established market.

Goats

- Overall, 38% of households reared goats. Goat-rearing was more popular among host households than refugee households (52% versus 24%, respectively) and less popular among youth compared to adults (28% versus 42%, respectively).
- Goat farmers reported purchasing goats from the regular market on market days (40%) at an average price of about 238,000 UGX (the cheapest reported price from vendors), and only 4% reported purchasing from middlemen at the highest average price (about 475,000 UGX). The three most popular vendors to which to sell goats were the local market (51%), friends or neighbors (36%), and middlemen (28%).
- Among the selling challenges reported in the household survey, 40% reported no challenge, 26% reported not receiving market price, and 23% reported distance to market. Compared to 15% of refugee households, 32% of host households reported not receiving market price.
- Key challenges shared during the FGDs were accessing good quality breeds and good quality breed suppliers, along with diseases and land requirements.

Pigs

- Overall, 44% of households reported that they reared pigs. Pig-rearing was more popular among host households than refugee households (63% versus 25%, respectively) and was more popular among adults than youth (47% versus 36%, respectively).
- Most pig farmers reported buying pigs from friends or neighbors, with the least amount purchasing pigs from the local market in trading centers. Pig-rearing yielded strong returns on investment, as sale prices were roughly double the purchase prices.
- 54% of pig farmers reported no challenges selling pigs, followed by 23% reporting not receiving market price.
- Whereas 50% of host households reported no challenge, and 64% of refugee households do not report a challenge.
- Key challenges for rearing pigs included accessing linkages to medical stores and veterinary services.

Given these takeaways, we have developed the following recommendations to improve Activity components in cohort two (see Section 5 for further details):

Cross-Cutting

Engage private sector actors early and regularly. In line with USAID's Private Sector Engagement (PSE) Strategy Principle 1,[2] we encourage early and regular interaction and face time between local private sector actors and cohort two participants. Our research shows that there are opportunities to connect participants to crisp manufacturers for potatoes, cassava cutting suppliers for cassava producers, and restaurants and cheese manufacturers for goats and other value chains. AVSI could offer incentives to the private sector, such as guaranteeing that participants will buy seeds from one service provider in exchange for support from the same private sector actor on climate smart planting techniques or post-harvest handing. Private sector enterprises can set up demonstration sites within the community to ease farmers' learning and further interaction.

Promote group selling or cooperatives for improved bargaining power. Current farming practices are not allowing farmers to capture the potential earnings that they could achieve through collective bargaining. If farmers created formal (or informal) groups, it would allow farmers to negotiate better prices and would assist in stabilizing revenue. If necessary, AVSI could facilitate the formation and sustainability of farmer groups by mitigating group formation challenges such as government registration and group bylaw creation.

Promote literacy for women to help them engage with the business side of crop and livestock value chains. Additional efforts to provide literacy and enable marginalized women to engage with the financial aspects of selling goods could promote equity in the community.

Assist in bookkeeping for farmers on profitability. Better bookkeeping of inputs/expenditures and revenues could assist with farmers' understanding of earnings. As illustrated in the qualitative findings, pig farmers, for example, have trouble keeping track of how much they are feeding pigs, thus hindering the assessment of feeding costs.

Reduce barriers to land rental by providing information on rental costs. VCs like cassava and goats require more acreage to unlock greater profits. If AVSI can assist households by providing information on rental costs, it could improve participants' negotiating power and reduce the likelihood that they accept an unfair deal. The added confidence in understanding the reasonable rate to rent additional land may result in farmers investing in these high-profit VCs that require greater land access.

Potatoes

Provide linkages to local trading centers. Unstable selling price was a common challenge cited among cohort one households engaging in potato farming. Building a stronger connection between participants and local trading centers could represent improved opportunities to provide farmers with reliable buyers for their harvest, particularly when selling in bulk.

Promote specific seed varieties of potatoes to cater to restaurant demand. District Level Officials (DLOs) stated that restaurants buy specific varieties of potatoes for chips, so the Activity could promote those varieties in demand from restaurants as an opportunity for farmers to sell more directly to a processor or distributor and earn a better price per potato.

[2] USAID. 2018. *Private Sector Engagement Policy*. https://www.usaid.gov/sites/default/files/documents/1865/usaid_psepolicy_final.pdf

Promote improved postharvest handling practices. Better education on postharvest handling and storage practices could increase revenue, as well as food security.

Cassava

Provide linkages to livestock feed suppliers to purchase cassava. Livestock feed suppliers sometimes purchase cassava to bolster the nutritional value of livestock feed. Linkages with these suppliers could present a reliable buyer for cassava farmers.

Promote specific seed varieties of cassava that perform better. The National Agricultural Research Organization (NARO) introduced new disease-resistant cassava varieties: NAROCass 1 and NAROCass 2. Using disease-resistant varieties could help mitigate crop loss, which is especially important given the additional amount of time, land and care needed to grow cassava.

Promote improved postharvest handling practices. Commonly, poor postharvest handling results in lost goods for cassava, given their rapid deterioration once harvested. Improved storage or handling practices could reduce these losses. Cooking cassava by frying or boiling it can also serve to extend the shelf life.

Explore and carefully encourage the use of cassava leaves for nutritional value. Cassava leaves are an excellent source of protein and micronutrients. However, raw cassava also has antinutrients that could cause disease, so careful detoxification and processing of cassava leaves is required before consumption.[3] We recommend that AVSI consult a nutritionist/ health professional with knowledge about cassava and local processing methods as they engage in activities, such as cooking demonstrations that teach recipes incorporating cassava leaves.

Groundnuts

Promote groundnuts in refugee communities. The cohort one programming to promote groundnuts had less of an influence on refugee households' crop selection than host households' selection. Additional understanding of refugee community households can help explain why they were less enthusiastic about growing this value chain and provide insight on how to address their reluctance to engage in this VC.

Provide linkages to local trading centers. Unstable selling prices was a common challenge cited among cohort one households engaging in groundnut farming. Local trading centers (LTCs) represent opportunities to provide farmers with reliable buyers for their harvest. Therefore, the Activity should look into opportunities to facilitate sustainable relationships with these LTCs.

Make sure seeds varieties are high-quality and tailored to the region. Some seed varieties were described as not suitable for certain regions. For example, the groundnut variety Serenuts were listed as ill-suited for the Kamwenge district. It is therefore recommended that the Activity connect participants with reliable seed sellers, work with participants to understand which varieties are appropriate in their district, and to teach them the physical characteristics of high-quality versus low-quality seeds.

[3] Latif, S., & Müller, J. 2015. *Potential of cassava leaves in human nutrition: a review*. Trends in Food Science & Technology, 44(2), 147-158.

Chickens

Provide linkages to local restaurants for selling chicken. Local restaurants are willing to pay more on average per chicken than many other buyers. Despite this likely advantage relatively few farmers sell to them.

Provide linkages to veterinary services. Many participants noted that their Chickens were affected by diseases, with exotic varieties experiencing a high mortality rate. To reduce disease infection and mortality, AVSI should promote preventative care and provide reliable veterinary service connections to farmers.

Goats

Promote crossbreed goats and provide linkages to veterinary services. Crossbreed goats produce higher meat yields but are also more susceptible to diseases and parasites. To prevent these downsides, promotion of crossbreed goat varieties should always be paired with linkages to veterinary service providers and the additional cost of these added vet services should be included in any profitability analysis. Otherwise, sick crossbreed goats could be a liability rather than an asset.

Provide linkages to purchase goats from the regular market on market days and to sell goats at the local market, where the average prices are most favorable to farmers. Purchasing goats at lower prices will improve profit margins on rearing goats, and regular markets on market days offer the lowest purchase price on average, according to cohort one households. Selling prices for goats are most favorable at local markets, and linkages with reliable buyers would address concerns of not receiving market rate for their livestock.

Pigs

Provide linkages to veterinary care providers and medicinal drug sellers. African Swine Fever and other diseases present a persistent hurdle for those rearing pigs. Additional training to identify symptoms of common diseases and linkages to veterinary care providers could help to protect pig farmers' livestock investments. At the same time, there are valid fears that medicine stores are providing counterfeit products, so ensuring the quality of these suppliers is critical. The Activity should identify reputable medicine stores and seek out veterinary care providers that hold formal certifications.

Provide linkages to local restaurants or promote selling to friends or neighbors. The average sale price to local restaurants is higher than that of the more common choices (middlemen or the local market) and could represent an untapped opportunity for higher earnings for pig-rearing households. Despite being sold to more commonly, middlemen offer the lowest price when buying pigs from farmers.

Promote best practices on the proper amount to feed pigs. Education on best practices for feeding amounts could prevent overfeeding and cut costs while still maximizing meat production yields.

1. INTRODUCTION

The Graduating to Resilience Activity (the Activity) aims to help extremely poor refugee and Ugandan households in the Kamwenge district graduate from conditions of food insecurity and fragile livelihoods to self-reliance and resilience. The Activity works methodically with 13,200 economically active but chronically poor households to gradually expand their livelihood capabilities so that they can improve their overall food security, nutrition, and resilience to shocks. Using a woman-plus-household graduation approach, the Activity aims to provide an integrated mix of interventions, including farmer field business school (FFBS), village savings and loans associations (VSLAs), consumption support, asset transfer, and business coaching.

The Activity team carried out an initial Value Chain Assessment (VCA) in the first award year (2018/2019) as part of the Refine & Implement (R&I) period. USAID/BHA leverages this approach so that implementers can use the first award year to refine the content of the original proposed activity. The second iteration of the VCA will be used to inform any potential redesigns to Activity components with the second cohort in the Rwamwanja Refugee Settlement (the settlement) and surrounding sub-counties in Kamwenge district. AIR has conducted this second VCA to examine how the Activity can more effectively promote high-profitability value chains to Activity participants. While the initial VCA for cohort one was focused on maize, beans, and groundnuts, this VCA aims to increase understanding of a new set of value chains—groundnuts, cassava, potatoes, goats, pigs, and chickens—and how the project can best improve participant livelihoods through these crops or livestock. This VCA also seeks to improve understanding of the contextual factors behind the observed outcomes as well as ways in which the Activity can adjust implementation to promote positive behaviors and reduce the barriers to improving livelihood outcomes in cohort two.

Exhibit 4 lists the specific objectives of the second VCA.

Exhibit 4. VCA Objectives

VCA Objective 1	Identify value chains for cohort two programming based primarily on profitability analysis, but also considering other criterion (e.g., food security).
VCA Objective 2	Create VC maps for cohort two programming for each of six selected VCs.
VCA Objective 3	Report on linkages, revenues, harvest, rearing data that is specific to the six VCs of interest for cohort two programming.
VCA Objective 4	Conduct context analysis based on desk review.

2. METHODOLOGY

The overarching objective of the study is to support the Activity to develop and operationalize appropriate interventions for effectively improving the earnings and food security of extremely poor households. AIR's mixed-methods approach used a cross-sectional research design that drew upon quantitative and qualitative data collection, analysis, and triangulation to understand each of the VCA objectives outlined in Exhibit 4. This section presents the methodological design of the study, including the overall study design and sample size. As part of our quantitative approach, we conducted a household survey and complemented it with M&E data. Qualitative data collection were collected through FGDs. Within each of the objectives described in Exhibit 4, we devised relevant research and learning questions. Annex III provides the full table of objectives and the corresponding questions.

2.1 Desk Review

Prior to data analysis, the research team conducted a document and literature review to establish the context for the instrument development and to supplement our quantitative and qualitative data collection. Given the objectives of this study, the assessment team reviewed literature from research and assessments with similar goals to understand local labor markets and value chains. This review provided insights into key metrics for measuring household livelihoods and the surrounding labor market, such as number and types of livelihoods, earnings, and profitability. The literature review also informed indicators of the challenges that households might regularly face in improving their livelihoods in key value chains and how the consortium can adjust programming for the second cohort to address those barriers. This review provided key context for designing the group discussion guides, and also helped to contextualize the findings and, in combination with the VCA data, develop evidence-based recommendations. The assessment team reviewed the following sources during the initial desk review:

- 5Capitals: A tool for Assessing the Poverty Impacts of Value Chain Development[4]
- Activity documents including:
  - Programming Guide
  - Indicator Performance Tracking table
  - Standing Committee Reports
  - Qualitative Case Study Summaries
- Cohort One Value Chain Assessment
- Cohort One Value Chain Assessment Protocol
- Cohort One Value Chain Assessment Survey Tools
- Meta-Analysis of the Graduating to Resilience Activity's Initial Refinement Phase

An assessment in Ethiopia used measures of food security, income sources, and productive assets owned (land, livestock, and tools) over time to examine the relationship of household resilience to

[4] International Food Policy Research Institute (IFPRI). (n.d.). 5Capitals: Value Chains Knowledge Portal (tools4valuechains.org). 5Capitals: A tool for assessing the poverty impact of value chain development. Retrieved from http://tools4valuechains.org/node/191.

income seasonality and economic shocks.[5] The data collection instrument for the VCA employs similar indicators on nutrition to capture food security, as well as individual household members' economic activity and household assets. Determining how households engage with key value chains will allow the consortium to promote specific programming in cohort two to address limitations.

We also performed value chain-specific context assessments, studying the existing research landscape for value chains of interest to AVSI. In June of 2021, the assessment team presented preliminary findings on the profitability of the twenty value chains featured in the Household Survey (Section 2.4 discusses this survey in greater depth). After this presentation and an initial discussion by the Technical Steering Committee (TSC), the consortium identified six value chains of interest (cassava, potato, groundnuts, goats, pigs, and chickens). The assessment team proceeded to investigate the existing research on each of the six value chains and identify key barriers that the Activity could combat through cohort two programming. This research was originally intended to help narrow the value chains that the Activity would promote in cohort two.[6] Based on recommendations from the Nutrition and Water, Sanitation, Hygiene (WASH) Knowledge, Attitudes, and Practices (KAP) Assessment, promoting small ruminants can have numerous benefits as they are, "… less vulnerable to weather changes, reproduce quickly, can act as a household safety net, and can be reared in infertile or marginal land."[7] The TSC resolved to perform an assessment on each of the six value chains, and the Activity would promote them all in the FFBS. The assessment team continued to research opportunities and challenges in each of the value chains of interest, and to create and validate value chain maps. The approach concentrated on searching scholarly journals and articles for detailed reports on value chain development or efforts to map these six value chains in the Ugandan or East African regional context. This research is presented throughout the report, with contextual understanding presented in the Background subsection for each value chain discussed below.

2.2 Qualitative Data Collection

Because of a second COVID-19 countrywide lockdown from June 18 to July 30, 2021 (detailed in the Fieldwork Section 2.5), the assessment team decided to simplify the qualitative data collection to expedite the process. AVSI staff conducted two FGDs in October 2021 (see Exhibit 5 for details). DLO, UNHCR, OPM, and NGO representatives were invited for one FGD, while sub-county officials, including Agriculture and Livestock Extension Workers, were invited for the other. Participation was voluntary, and we obtained verbal consent.

[5] Vaitla, Bapu; Tesfay, Girmay; Rounseville, Megan; Maxwell, Daniel. 2012. Resilience and Livelihoods Change in Tigray, Ethiopia. Feinstein International Center. https://fic.tufts.edu/assets/Resilience-and-Livelihoods-Change-in-Tigray-FINAL-30-10-12.pdf.

[6] At the end of June, we agreed with AVSI to do a major assessment of each of the cassava, potato, and goat value chains, as well as a minor assessment of each of the groundnut, pig, and chicken value chains. As delays to fieldwork progressed and forced us to abandon another round of data collection specific to these value chains, the teams decided to only perform abbreviated assessments of each of the six value chains.

[7] Nutrition and Water, Sanitation, and Hygiene (WASH) Assessment for Cohort Two. 2021. IMPAQ International LLC.

Exhibit 5. Qualitative Sample

Government Participants by Gender				
Stakeholder	Qualitative Modality	Number Male	Number Female	Total Participants
Sub-County Representatives (SCR)	FGD	6	1	7
District-Level Officials (DLO)	FGD	9	0	9

After preparing draft interview protocols for each group, the assessment team shared the drafts with Activity staff to ensure questions would meet the needs of the Technical Advisors when designing cohort two activities. The FGDs with DLO, NGO, UNHCR, OPM, and sub-county representatives were asked to provide insight on how AVSI can support and engage producers working in the value chains of interest to increase productivity and profitability. The FGD participants also validated each VC map found in Annex VI.

2.3 Quantitative Data Collection

The assessment team gathered quantitative data through a household survey conducted in May 2021 to examine the patterns for the six VCs of interest for both Ugandan and refugee communities. The household survey for the VCA incorporates questions from the Labor Market, Nutrition, Gender, and Youth assessments occurring concurrently with the same population. This broader household survey features questions related to the five assessments, which were combined in the interest of efficiency and reducing demands on respondents' time.

The assessment team conducted the quantitative survey with Activity participants in the Biguli, Bihanga, Bwizi, and Nkoma sub-counties, the Nkoma/Katalyeba town council, and within the Rwamwanja Refugee Settlement. The survey, administered to the households' primary participant and their spouse, explored a breadth of topics (see Exhibit 6). For the purposes of the VCA, the household survey provided quantitative data and contextual information to understand participants' experiences with numerous value chains of interest, as well as their relationships with various buyers. It also captured general information on participants' access to productive assets, value chain inputs, and supporting extension services.

The full questionnaire is included in documentation for the quantitative instruments.

Exhibit 6. Quantitative Survey Topics

Survey Section	Respondent	Topics
1	Primary Participant and Spouse (or another opposite-gendered member of the household, if no spouse or spouse unavailable)	Household Demographics Role in Household Decision Making Access to Productive Capital Access to Credit Time Allocation Group Membership Perceptions of Gender Equality Gender and Information Communication Technology
2	Primary Participant (primary participant provides responses for herself and up to 3 additional household members)	Education and Skills Gender Roles Livelihood Activities On-Farm Crop Activities (including crops, crop labor, and agricultural inputs, assets, harvest, and information) Salaried Employment Casual Labor Off-Farm Activities
3	Primary Participant	Livestock Activities (including livestock raised, inputs, and assets) Transportation Self-Efficacy Food Security and Nutrition Water, Sanitation, and Hygiene (WASH) Health Status Gender-Based Violence

2.4 Household Survey

Sampling

The assessment team utilized a two-stage random stratified sampling process to select the quantitative sample. For the **first stage**, the assessment team randomly sampled households from the current list of all active participant households. Because more than 92% of Graduating to Resilience households include women (who are the focus of the Activity) as primary participants, we focused on households with a female primary participant. We stratified our household sample by geography, age, and nationality of the female primary participant to ensure equal representation of respondents across these characteristics.

For the **second stage** of our sampling, we selected the female primary participant in each household to act as the principal survey respondent for the household. We then randomly selected up to three additional members from the household.[8] Within households, we excluded children (those younger than 18) and short-term visitors (residing in the household for less than 6 months). The primary participant was asked to respond to a subset of questions about each household member (part 2 of the survey). Spouses[9] of the female primary participant were also asked to separately answer a subset of questions (part 1 of the survey).

[8] If the household had fewer than four eligible members (primary participant and other adults), then all eligible members were selected.

[9] If the primary participant did not have a spouse, or if the spouse was not available to be surveyed, then another adult male member of the household was asked to complete the spouse's portion of the survey.

The assessment team aimed to recruit a sample size of 800 households. Evidence from the Monitoring and Evaluation to Assess and Use Results Demographic and Health Surveys (MEASURE DHS)[10] shows that a household sample size of 800 for woman-based indicators in high fertility countries like Uganda can deliver a reasonable precision for a wide range of demographic and economic variables. Our sample size is further justified by an influential food security and livelihood assessment guide[11] for statistical random sampling that recommends between 150 and 250 households to be visited for each reporting group to be compared. Thus, our sample size of 800 was deemed large enough for us to conduct statistical *t*-tests of differences for the outcomes of interest – at a 95% level of confidence – between host versus refugee households, youth versus adult, and men versus women. Even within host (N = 400) and refugee (N = 400) communities, our survey was designed so that sample sizes were expected to be within the 150 to 250 range to allow comparison between adult versus youth and men versus women for a range of outcomes.

To allow for non-responses, refusals, or other factors that prevent a household from being surveyed, the assessment team provided the field team with an additional 80 households, for a total sampling frame of 880 households. We instructed the field team to end data collection once a total of 800 households were surveyed. Annex II shows the sampling frame used to inform data collection for the quantitative household survey.

Sample Characteristics

During fieldwork, enumerators attempted to reach as many of the primary participants as time and funding would permit. Exhibit 7 shows the final sample used for the survey. The total number of primary participants interviewed was 783. Among these, 384 were from refugee households and 392 from host community households; 562 respondents were adults (31 years of age or older) and 214 were youth (18–30 years); and 776 of the 783 primary participant respondents were female.[12] Moreover, in total, we were able to collect data on 1,643 individual household members, including non-primary participants. This sample is well distributed across demographic groups of interest to provide a representative sample of cohort one participants for the purposes of this assessment.

Exhibit 8 further analyzes the demographics of our primary participants and their respective households. Overall, in both host and refugee communities, the average household size is about seven. Our household survey reveals that refugee primary participants are significantly more likely (82%) to be currently married than hosts (73%) and are more likely to be youth (36%) than hosts (19%). However, host community respondents in our sample are significantly more likely (45%) to have female-headed households than refugees in the settlement (29%).

[10] ICF International. 2012. *Demographic and Health Survey Sampling and Household Listing Manual*. MEASURE DHS, Calverton, Maryland, U.S.A.: ICF International. https://dhsprogram.com/pubs/pdf/DHSM4/DHS6_Sampling_Manual_Sept2012_DHSM4.pdf

[11] ACF International. April 2010. *Food Security and Livelihoods Assessment: A Practical Guide for Field Workers.* https://www.actionagainsthunger.org/sites/default/files/publications/acf-fsl-manual-final-10-lr.pdf

[12] Age information could not be linked to male primary participants, so disaggregation by age group omits these 7 cases.

Exhibit 7. Household Survey Actual Sample Collected

Demographic Group	N Size Overall (Household – primary participants)	N Size Individual-Level (Up to four household members per household)
Overall	783	1643
Refugee	384	745
Host	392	898
Adult	562	992
Youth	214	651
Male	7[13]	701
Female	776	942

Note: There was drop-off of respondents throughout the fielding of the survey, with some respondents completing only earlier parts of the survey. This drop-off was less than 5% of the overall sample and did not affect the overall distribution of respondents.

Exhibit 8. Primary Participant Household Demographics, by Community Type

	Overall	Refugee	Host
Number of Household Members	7.02	6.92	7.13
Currently Married (%)	78%	82%	73%***
Female-Headed Households (%)	37%	29%	45%***
Youth Primary Participants (%)	28%	36%	19%***
N	776	384	392

*Note: Statistical significance is shown for t-test differences between refugee and host. Significance markers are always placed on the host values (*p < 0.10; **p < 0.05; ***p < 0.01).*
Data on the number of household members are from the M&E Annual Survey, administrated by AVSI.

2.5 Fieldwork

The team chose to rely on AVSI coaches to collect data for the cohort two assessment because the coaches possessed existing knowledge of the Activity, had existing relationships with participants, and could easily identify the locations of participants' homes. These factors create an efficiency gain compared with using external enumerators, thereby reducing the number of interactions between data collectors and people in Activity communities and allowing data collection to safely continue in person while minimizing the risk of spreading COVID-19.

The team conducted a training and pilot of the quantitative survey with 50 coaches, 25 from the host and 25 from the refugee community, between 15 to 18 March 2021. The coaches were trained on how to use the survey tools, the purpose of the tools, proper data collection practices, and ethical considerations. A second training was conducted with an additional 156 coaches on 24 to 25 March to prepare these additional enumerators for fieldwork. During this training, concerns were identified regarding the functionality of the household survey and how data were stored after collection. To reduce the risk of error during full-scale data collection, the team chose to recode the survey during

[13] There were seven males who were primary participants but answered only part three.

the first 3 weeks of April 2021, after which all 206 enumerators participated in a refresher training to orient the coaches to the new tool on 26 April.

With issues in the survey tool fixed, the team launched data collection on 27 April. The field team divided the coaches into nine regional teams, overseen by program officers (POs) with support from M&E officers. The M&E officers visited the field throughout data collection to answer any questions the coaches had and to resolve issues with the operation of the survey or mobile phones used in data collection. The field staff attempted to address all issues in the field as they were identified, and POs were encouraged to identify workable solutions that did not require major logistical changes. For instance, POs were able to fix occurrences of the survey not pulling participant information by updating the enumerator's tablets and survey software in the field. Fieldwork delays created scheduling conflicts between data collection and maternity or scheduled annual leave for some coaches, which increased the survey load on the remaining personnel. To account for the increased workload, the POs reassigned the households allocated to the coaches on leave equally among the remaining coaches. The length of the survey tool created some issues for the field team, causing some participants to complain and grow uninterested during the interview, whereas others (especially spouses) found it difficult to honor their scheduled interview because of scheduling delays and competing priorities. The number of interviews that had to be rescheduled reduced the number of interviews that could be completed each day, which affected the size of the final sample.

The coaches conducted surveys through 14th May 2021, at which time the team concluded that we had achieved an appropriately large sample size and further days in the field would not yield significantly more data because of the issues described above.

AVSI field staff also conducted two FGDs in October 2021. Data collection was delayed because of a second COVID-19 countrywide lockdown from 18 June to 30 July 2021. Because of the inability to conduct data collection, we decided to simplify the qualitative data collection to expedite the assessment process. As such, all KIIs were merged into two FGDs and participant FGDs were cancelled. The assessment team also prepared in-depth farmer and private sector enterprise surveys that would have been delivered to control households as cohort two participants would be selected from this population. However, due to COVID-19 and funding limitations, these intended surveys were also cancelled.

COVID Mitigation

The assessment team was informed by local staff on 16 June that four AVSI staff in Kamwenge district tested positive for COVID-19 and that the overall case positivity rate in the district was over 20%. We used our prior experience adapting data collection in this context by requiring all coaches to wear masks while conducting surveys and FGDs; providing participants with face masks if they did not have them; providing hand sanitizer; maintaining social distancing during interviews and focus groups; and holding all interviews and focus groups in a private, outdoor location, where feasible.

2.6 Ethical Considerations

Institutional Review Board

The team outlined the ethical considerations of the study and our processes for protecting participants' privacy and confidentiality and reducing potential harm in our application to the Mildmay Uganda Research Ethics Committee (MUREC) Institutional Review Board (IRB) in Uganda. We submitted the IRB package, encompassing the study proposal, protection of human subjects plan, data collection instruments, and informed consent forms, to the review board on 11 January. MUREC

returned the IRB protocol with clarification questions on 1 February, and the assessment team responded to the questions and resubmitted the IRB package on 17 February. We received final approval from MUREC to conduct the assessment on 15 March.

Informed Consent

We informed all survey and FGD participants that their responses would be confidential prior to their agreement to participate. The consent process allowed us to inform participants that they may refuse to answer any question or leave the interview or discussion at any time. Participants were assured that refusing to participate or leaving any interview would not harm them in any way.

During the informed consent process, the interviewer explained the study and the goals of participation. Individuals who agreed to participate were required to sign a written consent form – either signature or thumbprint – before each survey, while FGD participants provided verbal consent. The interviewers then ensured that the surveys and FGDs were conducted in a private setting to ensure confidentiality of responses, including those conducted remotely. Interviewers ensured that surveys were conducted one-on-one with the respondent or spouse (where applicable) so no one else could hear the respondent's answers. Group discussion facilitators ensured that the FGDs were held where respondents felt free to discuss openly so community members outside the group could not overhear their responses. Interviewers and facilitators were instructed during training on how to request informed consent.

2.7 Data Analysis, Quality, and Value Chain Selection Methods

Data processing and analysis reduced raw quantitative data into manageable proportions, summarizing the data into recurring patterns and using the data to highlight points of possible intervention during the design phase of the Activity. The qualitative analyst supported the analysis of qualitative data and the principal investigator led the triangulation of these data with primary and secondary quantitative data sources.

Quantitative. Taking into consideration the VCA objectives, as outlined in the introduction of this document, the VCA team used household survey data to estimate descriptive statistics that summarize bivariate relationships between demographic characteristics and VC specific outcomes of interest and identify recurrent patterns and trends for each of the selected VC in the quantitative data. Our analyses make extensive use of continuous variables such as profits and expenditures. To address concerns regarding outliers in such data, we report median values as opposed to means and dropped observations after the 99th percentile for all continuous variables related to finances andmoney (profit, revenue, expenditures, prices), as well as volume of harvest and number of livestock sold. These steps ensure that our data are robust to extreme outliers.

We divided our analyses in two parts. Part 1 used the household survey data to rank the most profitable VCs across various profitability measures: annual median profits, median profits per acre of land used, and return on investment. These metrics were then disaggregated to consider the primary participant's age and host or refugee community status. These findings were presented to consortium members on 4 June 2021. A second discussion occurred on 11 June 2021 and focused on important criteria gathered through existing qualitative data and secondary data sources for each potential value chain. These criteria included PSE opportunities, land size required, maturation time, food security, nutritional value, cultural attachment, opportunities, and challenges. Contextual information gathered during the desk review mentioned above was featured during this second discussion. The teams then triangulated this quantitative and qualitative information to develop a

decision matrix (see Annex V), which allowed AVSI to select six main value chains for assessment and promotion: potatoes, cassava, groundnuts, goats, pigs, and chickens.[14]

Part 2 focuses on more detailed assessments of the six selected VCs and presents VC maps and other relevant information. Metrics include the types of VCs the households are currently involved in, the selling challenges faced in each VC, patterns of harvest, sales, and purchases.

We collected survey data using tablets with Open Data Kit (ODK) software. We used the household surveys to capture detailed information on households' income sources, particularly as they relate to harvest uses and revenues for individual crops, as well as livestock purchase and resale prices. The team further stratified these descriptive statistics to reveal subgroup differences and explored these variations while accounting for other demographics, such as age group, head of household's gender, refugee status, and treatment arm. The analysis in this report is primarily descriptive but was inspired by the International Food Policy Research Institute's (IFPRI) 5Capital tool VCA development methodology.

Qualitative. The qualitative analysis elaborates on the survey results and explores the nuances behind them. For example, qualitative data provide a greater awareness of how, at a broad level, the various dimensions of each value chain, from input dealers to endline buyers, may affect crop and livestock farmers or how household interactions with private sector actors may improve their livelihood outcomes.

To conduct this qualitative data analysis, the assessment team identified recurrent patterns and trends in the qualitative data to address the research questions. First, we developed a preliminary coding structure to apply to notes and transcripts, which we then revised based on initial data. We then used a matrix analysis to categorize, triangulate, synthesize, and summarize the raw data. After reviewing all transcripts from FGDs, we stripped these notes of personally identifiable information and uploaded them to Excel for analysis. In doing so, we identified common themes using the constant comparative method to draw out areas of overlap and divergence to understand the VCs of interest, identify areas to support producers of the VCs, and analyze the effectiveness of livelihood interventions to date to inform future activities for cohort two.

2.8 Limitations

Coaches as data collectors. There were clear benefits to having the coaches conduct survey data collection – for instance, coaches know where participants live, and participants are more likely to agree to a long survey because of their familiarity with the coach. Still, the existing relationship between coach and participant may bias the respondent's answer in some way, such as the respondent providing a more socially desirable answer to please their coach, or the coach assisting the participant in recalling past information. However, even taking these factors of potential bias into consideration, the assessment team concluded that the benefits of working with Activity staff as enumerators far outweighed the disadvantages, and mitigated these concerns through 1) training enumerators on survey data collection (having them explain to respondents, in detail, that the information collected as part of the survey will be used to improve the Activity design to benefit cohort two participants and has no benefits/consequences for them based on responses they provide); 2) triangulating responses through qualitative data collection gathered by POs; and 3)

[14] Three additional value chains were identified for promotion only through the private sector: maize, matooke, and passionfruit. Annex V provides more details on their selection.

recognizing that the coach–participant relationship was near the end, which might reduce the likelihood of respondents prioritizing pleasing the coaches with their responses over being candid, as data collection took place during the closeout period of cohort one implementation.

Lack of comparability with cohort one VCA. Although the Activity conducted a VCA before the start of the first cohort, that baseline assessment of value chains was aimed primarily to inform cohort one project design for promoting on maize, beans, and groundnuts. In contrast, the purpose of our current assessment is to study participants' engagement with the Activity and identify new value chains to promote for cohort two programming. We also collect new data on an array of outcomes directly linked to the Activity, such as earnings, profits, detailed information on crops and input utilization, time use, and the like that were not collected at baseline.

Length and complexity of the survey questionnaire. Building upon lessons learned from the first refinement period, the assessment team developed a comprehensive assessment framework to integrate the five individual assessments, including Value Chain, Labor Market, Gender, Nutrition and WASH KAP, and Youth Assessments, to ensure that key research and learning questions are answered and the Activity implementers have meaningful, timely information to make decisions regarding the design of cohort two. By creating a comprehensive assessment framework, the assessment team was able to streamline data collection, minimize data analysis, and mitigate survey fatigue among participants and staff. However, the length and complexity of the survey required exceptional skills from the field staff. On average, completing the survey took approximately 6 hours per household in the refugee community and approximately 5 hours in the host community. Because of the length and complexity of the survey, field staff conducted the household survey in two visits per household. reducing the amount of time respondents spent answering questions per visit to 3 hours in the refugee community and 2.5 hours in the host community.

Causal interpretation of results. Our study is primarily a descriptive, mixed methods study, and our conclusions should not be interpreted as causal. As such, any measures of impact are based on perceived impact as reported by participants or based on qualitative insights. A separate, more detailed impact evaluation (conducted by Innovations for Poverty Action) will study causal effects in more depth.

Cancellation of Data Collection. At the end of June 2021, the consortium agreed to do a major assessment of each of the cassava, potato, and goat value chains, as well as a minor assessment of each of the groundnut, pig, and chicken value chains. As delays to fieldwork progressed and forced the assessment team to abandon another round of data collection specific to these value chains, the consortium decided to only perform abbreviated assessments of each of the six value chains. These abbreviated assessments made use of the prior household assessment data collected, but do not capture additional value chain-specific data that might have provided a more robust understanding of linkages between value chain actors.

3. FINDINGS

The findings are organized around the two stages of the VCA. Part 1 details profitability information of the chosen six VCs while Part 2 shares validated VC maps and additional findings, across both quantitative and qualitative data, for the six selected VCs.

PART 1: Profitability of Value Chains

Below we summarize our profitability results for the top six VC selections. We conducted the analyses for overall samples across all value chains[15] and across various demographic groups: host and refugee communities and youth and adult populations. Land related constraints are also factored into our analyses. All results are estimates of household profitability as reported by the primary participants of the Activity.[16] We only report profitability numbers for the chosen six VCs but share their overall ranks with respect to the other VCs analyzed to provide additional context.

Overall

Exhibits 9, 10, 11, and 12 show median-based rankings for the overall samples (across all age and demographic categories) using self-reported values of overall net profitability, expenses, and land use in the past 12 months. Exhibit 13 shows median net profits in the last 12 months by refugee versus host status while Exhibit 14 shows this information comparing youth and adult participants. The rankings in each of these exhibits are out of the 20 original VCs offered as discrete selection options to household survey respondents. While other VCs may have been ranked higher than the six VCs chosen for this metric, the six value chains showed the strongest potential based on their index score across metrics. The methodology section (2.7) provides more information on the selection process, and Annex V includes the decision matrix used to select the VCs.

Findings in Exhibit 9 show that our chosen top six VCs are ranked amongst the highest, with pigs, potatoes and goats ranked top 10.

Exhibit 9. Rankings for our Chosen VCs Based on Annual Median Profits (UGX)

Overall Ranking	Value Chains	Median Annual Profits	N
3	Pigs	210,500	336
5	Potatoes	200,000	143
7	Goats	190,000	287
11	Chickens	66,000	463
12	Groundnuts	58,000	136
14	Cassava	45,000	102

[15] The 20 value chain options in the household survey were: maize, rice, onion, beans, cassava, groundnuts, ginger, matooke, passion fruits, Irish potatoes, eggplant, millet, cattle, goats, sheep, pigs, fish, ducks, chickens, and turkeys. Each of these was given due consideration for selection for promotion in cohort two.

However, analysis of total profits does not consider the absolute levels of costs, expenditures, and investment. Using household data on total expenditures[17] for each VC in last 12 months, we calculated estimates for the Return on Investment (ROI) for each VC and display these results in Exhibit 10.[18] A value greater than one would suggest greater net profits than the amount invested and would indicate a worthy investment. The higher the rate of return, the more lucrative the VC. Based on ROI, we find that all six VCs have an ROI greater than one, suggesting a household's ability to earn more than is invested. When considering ROI (Exhibit 10), cassava and goats have the highest ROI, whereas pigs, chicken and groundnuts have the same ROI of 2.33. All the chosen VCs feature among top 10 in terms of ROI rankings. The difference in ranking likely reflects those differences in levels of investments and expenditures. If farmers have liquidity constraints, then absolute profits may not be as meaningful without considering the levels of investments required. For example, the ROI on cassava is higher than potatoes despite higher overall profits from potatoes, as our data suggests that cassava requires a much smaller investment than potatoes. (Exhibit 9).

Exhibit 10. Ranking of Value Chains Based on Median Return on Investments in the Last Year

Overall Ranking	Value Chains	ROI	N
2	Cassava	3.25	42
5	Goats	2.57	257
6	Pigs	2.33	307
6	Chickens	2.33	322
6	Groundnuts	2.33	80
8	Potatoes	2.20	110

One concern that is validated by initial qualitative interviews from the LMA report is that land is scarce in this context and productivity varies by land size.[19] Furthermore, some landowning farmers may not have accounted for opportunity costs of lost rents on land or may have had difficulty estimating how these costs vary by VC, so there may be differences in rankings based on ROI versus profits per acre of land used.

Exhibit 11 ranks VCs by profit per acre. We find that, once land constraints are taken into consideration, the relative rankings of most of our chosen six VCs improve relative to Exhibit 9. Five out of the six chosen VCs are among top 10 profitable VCs purely based on median profits per acre.

[17] For our current analysis, we do not differentiate between direct and indirect costs for estimation but focus on self-reported overall expenditures. To the extent that respondents are not including the value of their time (opportunity costs) in such estimates, the estimates of expenditures are underestimates of total expenditures. However, if indirect costs are highly correlated with direct costs and vary systematically with direct costs or if they are broadly similar across different VCs or if people include them in their estimates, then indirect costs are unlikely to affect our rankings of VCs in a significant manner.

[18] ROI: Net Profits per VC divided by Total Expenses per VC in the last 12 months.

[19] Foster, Andrew D., and Mark R. Rosenzweig. *Are there too many farms in the world? Labor-market transaction costs, machine capacities and optimal farm size*. No. w23909. National Bureau of Economic Research, 2017 (Revised March 2021).

Exhibit 11. Ranking of Value Chains Based on Median Profits (UGX) Per Acre in the Last Year

Overall Ranking	Value Chains	Median Profits Per Acre	N
2	Pigs	553,500	134
3	Potatoes	456,000	139
7	Goats	180,000	227
8	Chickens	160,000	165
10	Groundnuts	137,500	134
16	Cassava	60,000	99

Exhibit 12 shows ROI and profit per acre sorted by acres of land used per VC. This method allows us to make land size specific recommendations for profitability and productivity of alternate VCs. For **farmers of very small plots** (those who can allocate 0.25 acres of land to any given VC), groundnuts and pigs are the most preferred option. For **farmers of small plots,** who can cultivate 0.5 acres of land per VC, we find that cassava, chickens, and potatoes are the most lucrative. For **farmers of medium sized plots** who can cultivate 1 acre of land per VC, goats are most profitable.

Exhibit 12. ROI and Median Profits Per Acre, by Acres of Land Used

Value Chain	Acres	ROI	Median Profits Per Acre
Groundnuts	0.25	2.33	137,500
Pigs	0.25	2.33	553,500
Cassava	0.5	3.25	60,000
Chickens	0.5	2.33	160,000
Potatoes	0.5	2.2	456,000
Goats	1	2.57	180,000

Exhibit 13 shows median profit-based rankings for refugee and host households using self-reports of overall net profitability. We find that the six selected VCs remain profitable for both refugee and host households with similar *relative* ranks, despite refugees generally reporting higher absolute level of profits.

Exhibit 13. Rankings of VCs by Median Net Profits in the Last 12 Months, by Nationality

Refugee Ranking	Variable Label	Refugee Profits	N	Host Ranking	Variable Label	Host Profits	N
4	Pigs	300,000	93	2	Pigs	185,000	243
7	Potatoes	250,000	47	3	Potatoes	180,000	96
6	Goats	257,500	90	5	Goats	151,000	195
9	Groundnuts	120,000	19	8	Groundnuts	56,000	117
11	Chickens	109,000	218	10	Chickens	45,000	243
13	Cassava	50,000	49	11	Cassava	40,000	53

Exhibit 14 shows median rankings for youth and adult primary participants using self-reports of overall net profitability. We find that the six VCs remain profitable for both youth and adults with similar relative ranks across the two populations. In general, adults make higher absolute profits, likely reflecting their greater experience. Cassava is an exception, where youth seem to be reporting higher absolute profits. Sample sizes for cassava are small, so these estimates should be interpreted with caution.

Exhibit 14. Rankings of VCs by Median Net Profits in the Last 12 Months, Adult versus Youth

Adult Ranking	Variable Label	Adult Profits	N	Youth Ranking	Variable Label	Youth Profits	N
4	Pigs	220,000	259	3	Pigs	200,000	77
6	Potatoes	205,000	108	5	Potatoes	200,000	35
7	Goats	190,000	228	6	Goats	178,000	57
12	Chickens	62,500	350	9	Groundnuts	100,000	24
13	Groundnuts	53,000	112	10	Chickens	75,000	111
14	Cassava	40,000	81	12	Cassava	50,000	21

Summary of Part 1: When considering total net profits, profit per acre, and ROI together, our six selected VCs all show strong potential profitability. If one considers ROI, instead of absolute profits, we find differences in relative rankings. Given that land is limited, rankings based on ROI may be less meaningful if households cannot take advantage of higher ROIs by increasing the land cultivated. In that case, estimates of profits or profits per acre may be more meaningful to rank VCs. That said, AVSI's investments in cohort two that can reduce barriers to land rental may allow farmers to engage in VCs that they are currently underinvesting in despite high ROI (e.g., cassava and goats). Part 2 discusses the VC maps, linkages, opportunities, and challenges for the six VCs.

PART 2: Value Chain Challenges and Opportunities

This section discusses in greater detail the findings on the six VCs, drawing on secondary research as well as qualitative and quantitative data collected from the Activity's cohort one participants and other local stakeholders.

Based on the feedback from the FGDs, the VC maps are divided into four overarching categories: Inputs, Farmers, Intermediaries, and Distributors/End Users. While not every VC has the same connections or relationships, each connection will have a different topic, specific to that VC. For example, researchers that provide inputs to potato farmers may include disease-resistant seed varieties. At the top of the maps are the inputs, which include land and labor for each of the six VCs. Inputs include suppliers and dealers (for example, a seed provider), the land and labor required for cultivating crops or livestock, researchers, and extension services. Inputs feed into farmers, and farmers feed into intermediaries (such as middlemen and transportation), distributors, and end users (such as community households and processors). Depending on the VC, some connections (such as middlemen) will feed back into inputs or other end users.

Potatoes

Background. According to the 2016 report from the Economic Policy Research Center on the potato value chain in western Uganda, potato is "recognized in the 2010/11- 2014/15 Development Strategy and Investment Plan (DSIP) as a strategic commodity with the potential to make a remarkable contribution both to increasing rural incomes and livelihoods and to improving food and nutrition security."[20] The report goes on to discuss how potato production is supported by numerous actors in the value chain, including, "agro-input dealers, seed multipliers, farmers/producers, marketers (agents and traders), and processors." Qualitative evidence from this study points toward low technology usage as one of the barriers to VC development for potatoes; specifically, low usage of high-quality seeds and fertilizer due to high input prices and frequent counterfeits. Other issues for the potato VC include high seasonality of production, prevalence of droughts hindering crop yields, lack of storage to manage the seasonality, and limited access to financing.

The patterns documented in western Uganda mirror patterns in the potato VC in Sub-Saharan Africa (SSA) more broadly, as identified in a 2010 FAO report.[21] Across the region, potato farmers struggle with "seed shortages, biotic stresses (e.g. late blight), abiotic stresses (climate change, especially drought), limited infrastructure, poor linkages among partners, inefficient marketing and transportation systems, limited private sector involvement, shortage of trained personnel, disorganized subsector, and unfavorable policies for tuber crops." These challenges present various factors that inhibit farmers from seeking to invest in potatoes, but they also present opportunities for the Activity to affect change.

Value Chain Map & Linkages. Exhibit 15 below shows VC maps for potatoes. VC maps were verified and adjusted by the officials in the FGDs.

- Inputs for potato farmers include extension services, as well as the land and labor required to cultivate potatoes. These inputs feed directly into farmers for their production.
- Researchers, local input dealers (such as seed multipliers), processors (including crisp producers in Kabale and Insingiro Districts), and middlemen also provide inputs to farmers.
- Processors and middlemen are also the intermediaries and purchase the farmer outputs.

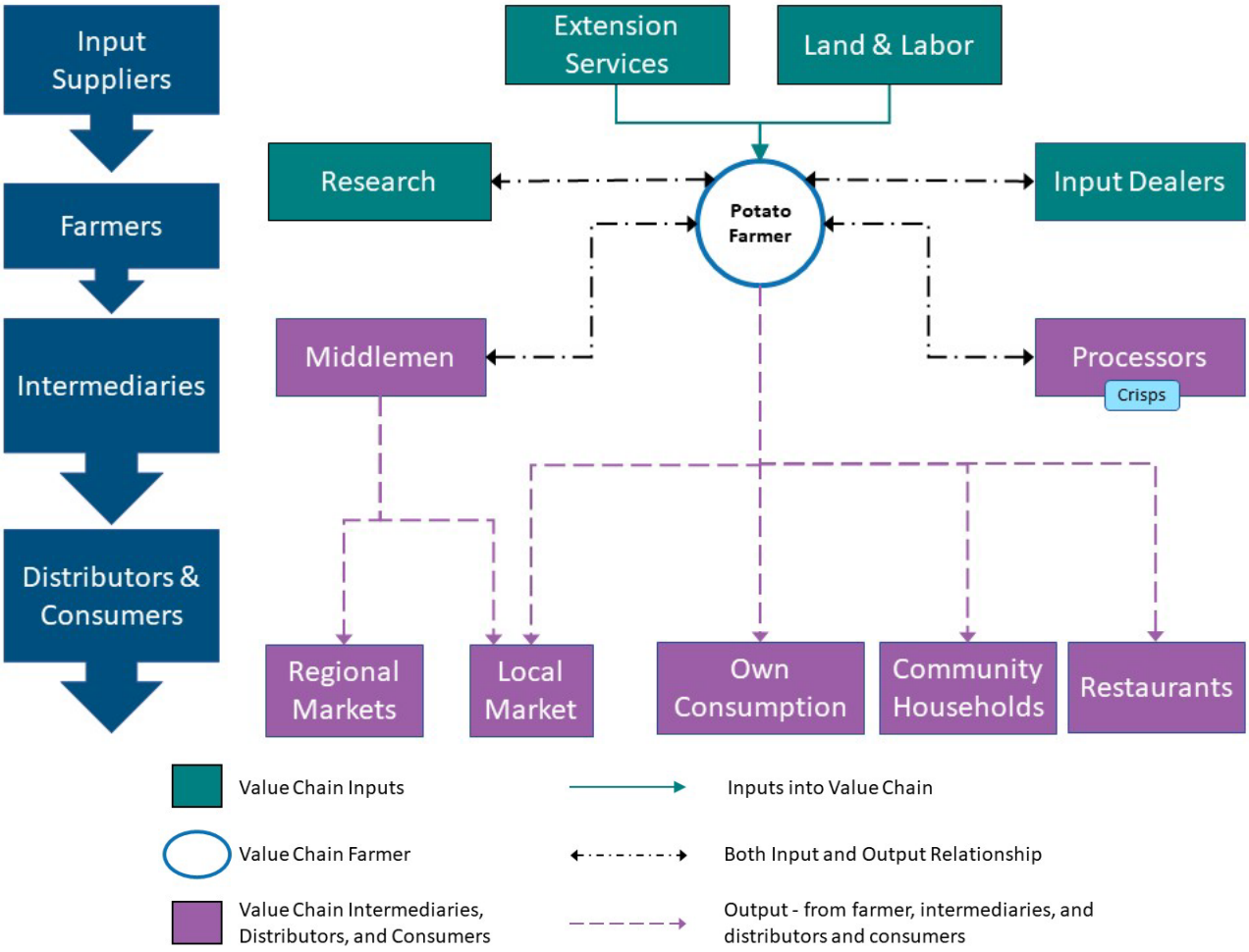
[20] Mbowa, Swaibu et al. 2017. *Investment opportunities and challenges in the potato value chain in Uganda.* https://ageconsearch.umn.edu/record/253560/files/14%20Investment%20opportunities%20and%20challenges%20in%20the%20potato%20value%20chain%20in%20Uganda.pdf

[21] Cromme, Nicolaus et al. 2010. *Strengthening Potato Value Chains: Technical and Policy Options for Developing Countries*. Food and Agriculture Organization of the United Nations. Rome. http://www.fao.org/3/i1710e/i1710e.pdf

- The end users for the potato VC encompasses the potatoes for farmers to use for their own consumption, local households and restaurants that purchase potatoes from the farmer directly, and the local markets, which then are transported to regional markets.

From the FGDs, sub-county representatives (SCRs) indicated that potato farmers, as well as pig farmers (discussed below), do not keep records, which limits the connection to outside actors. SCRs also shared that lack of, or poor-quality roads were a hindrance to potato production. Middlemen and one individual actor[22] were the only two private sector actors that were listed as working in the immediate geographic area for potatoes.

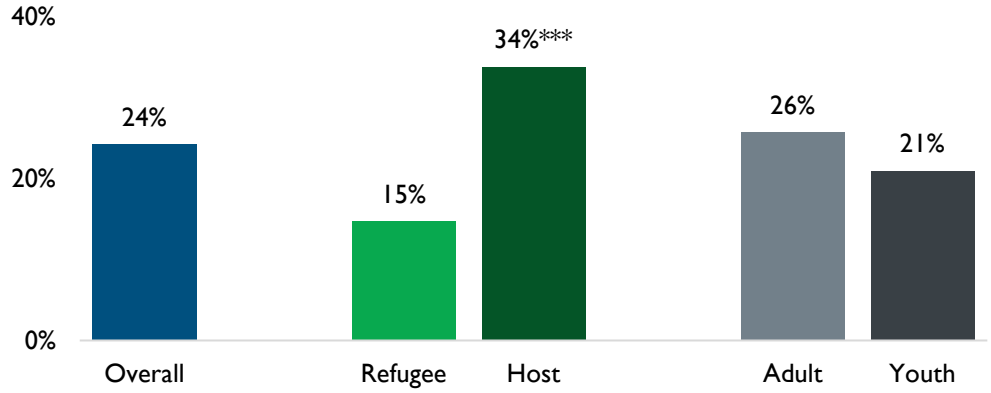
Exhibit 15. Value Chain Map for Potatoes



Cultivation Patterns. Among the participant households sampled from cohort one of the Activity, 24% overall grew potatoes, as Exhibit 16 shows. That being said, we observed a significant difference between host and refugee community households, with 34% of host households, but only 15% of refugee community households, growing potatoes (statistically significant at the 1% level). Across age, the rates of potato growers were similar (26% of adults and 21% of youth).

[22] Name was excluded from report to maintain confidentiality

Exhibit 16. Potato Growing Popularity

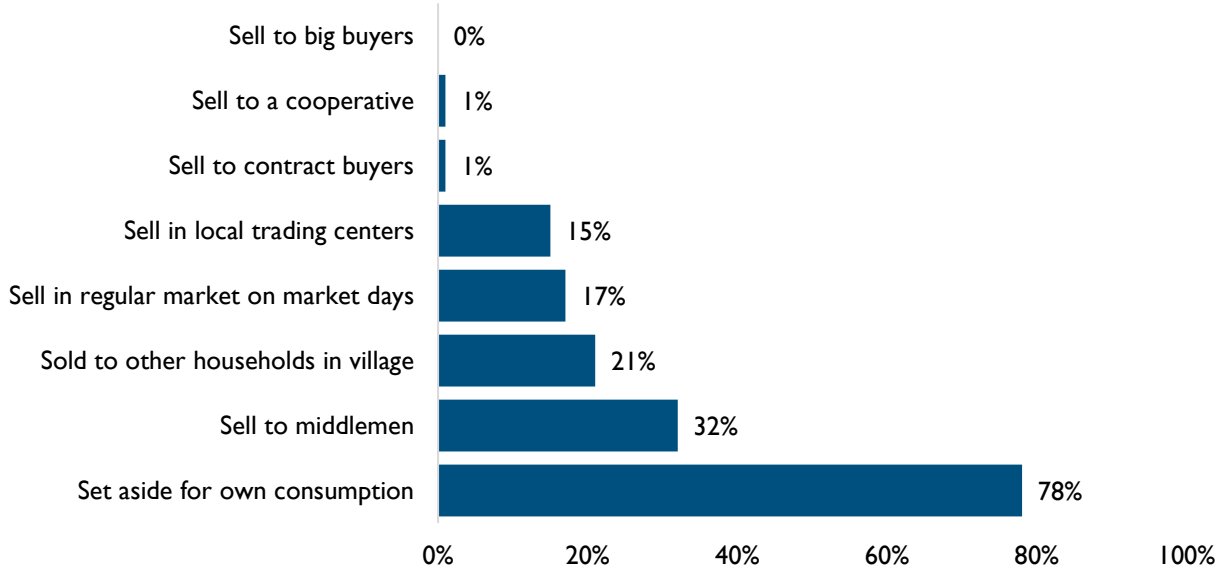


N=783 Overall; N=384 Refugee; N=392 Host; N=562 Adult; N=214 Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host, as well as adult versus youth. Significance markers are always placed on the host and youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Harvest Usage and Sales. Among the share of households that engage in potato farming, 78% of farmers set aside their harvest for personal consumption, as Exhibit 17 shows. On average, the total annual harvest[23] was 385 kg (N=137) of potatoes, with an average annual volume of 111 kg (N=110) allocated to intra-household consumption. In Exhibit 18, when we calculate the proportion set aside for personal consumption over total potato harvest at the *household level*, we find that the average volume of harvest consumed is actually 51% of total harvest. This finding means that households see potatoes as more of a food crop than a cash crop, preferring to consume it themselves over selling it at a premium and purchasing cheaper foodstuffs.

[23] Average total harvest volume was calculated by standardizing responses to kilograms. If respondents indicated that their unit of measure was "basin," then the volume was multiplied by 5 to indicate a conversion rate of 5 kilograms per basin. Other units of measure like "bunch" or "head" were assumed to be roughly equivalent to 1 kilogram.

Exhibit 17. Potato Harvest Usage Rate



N=145; Showing household-level responses from primary participants. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

When we examine other uses of their harvest, the most popular were selling to middlemen (32%), selling to other households in the village (21%), and selling in the regular market on market days (17%). These options were not exclusive, so some respondents may have selected multiple uses for their harvest. Exhibit 18 shows the annual volume allocated to selling to these buyer types ranges from 114 kg (selling in the regular market on market days) to 205 kg (selling to middlemen). The proportion of their harvest allocated to each of these uses varies, with about 50% of the total harvest allocated to selling to other households or selling in the regular market on market days, as compared to about two-thirds of the harvest being allocated to selling to local trading centers or middlemen. This finding suggests that there are two main types of potato farming households: a household that chooses to sell most of their harvest to either middlemen or at local trading centers and a household that divides the proportion they sell more evenly between selling to other local households or in the regular market and setting the other half aside for their own consumption.

Exhibit 18. Potato Usage Volumes and Percent of Harvest Allocated

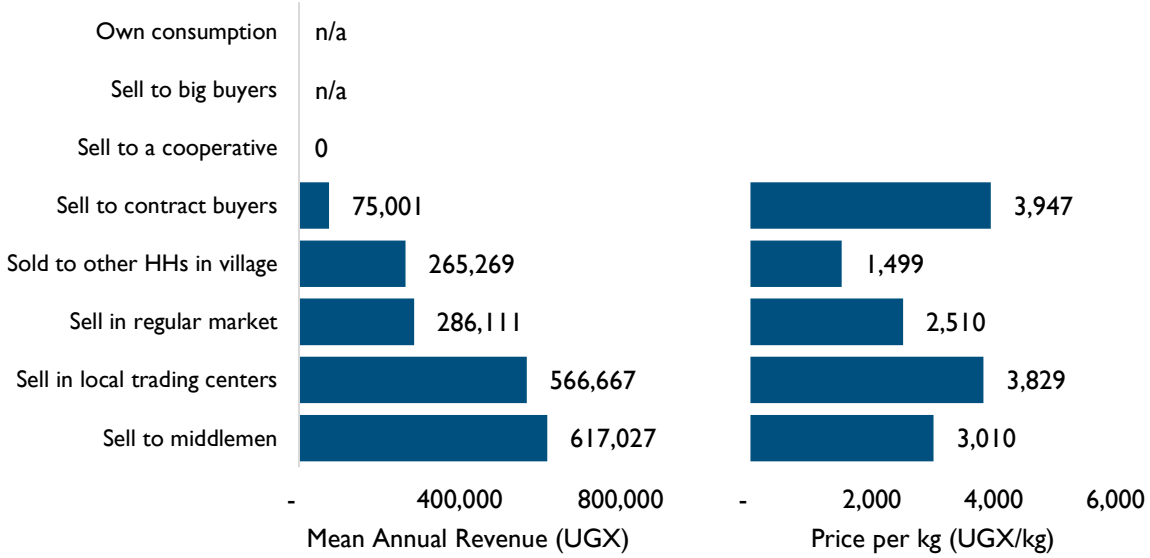
Potato usage	Mean Annual volume (kg)	Mean percent of harvest allocated to this purpose[1]
Set aside for own consumption	111 kg (110)	51% (101)
Sell to middlemen	205 kg (37)	66% (37)
Sold to other households in village	177 kg (27)	50% (21)
Sell in regular market on market days	114 kg (18)	53% (18)
Sell in local trading centers	148 kg (15)	69% (15)
Sell to contract buyers	19 kg (2)	60% (2)
Sell to a cooperative	0 kg (1)	0% (1)
Sell to big buyers	n/a	n/a

Sorted by usage rate. N size shown in parentheses. Showing household-level responses from primary participants. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

[1]This metric was calculated by dividing the volume of crop allocated to each usage type by the total harvest, at the household level. Then, an average was calculated among those household-level percentages for each usage type.

Exhibit 19 shows that the average annual revenue reported from selling to each of the buyer types varies from about 286,000 UGX per year (selling to other households in the village) to about 617,000 UGX (selling to middlemen). Interestingly, those who sold to middlemen allocated about twice the volume to this usage on average as compared to those who sold in the regular market. When examining prices by buyer type, local trading centers offered the best price per kilogram of potatoes (next to contract buyers, but the sample size for that data point is very small).

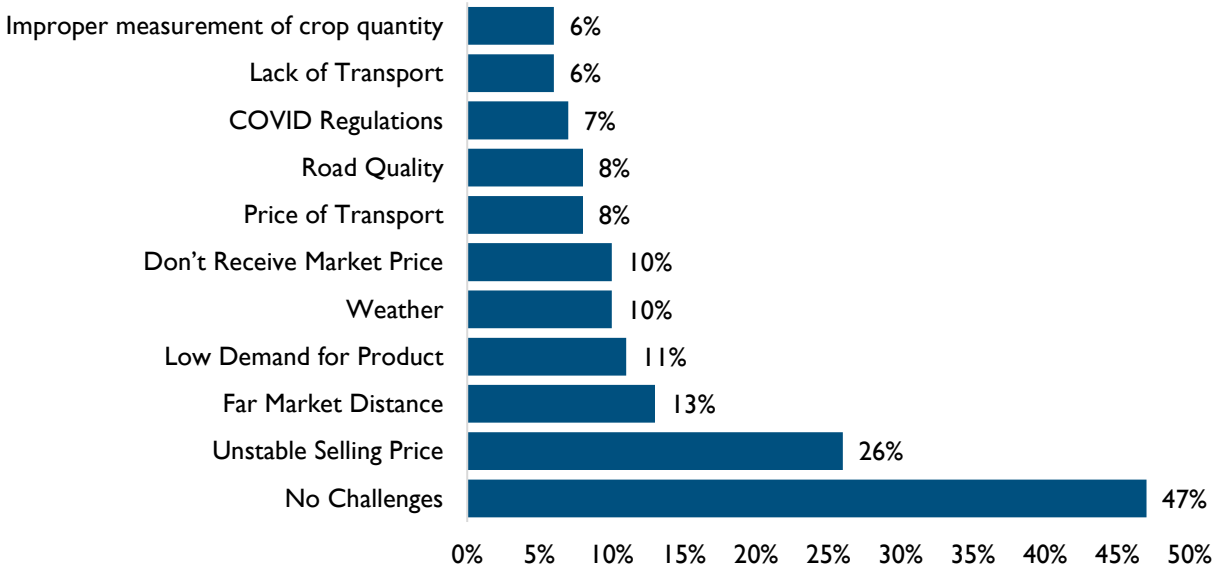
Exhibit 19. Potato Usage Average Revenue and Price per kg in the Last 12 Months, by Buyer Type



N size varies from 1 to 37, based on usage rate. Showing household-level responses from primary participants. Price per kg is calculated by dividing average sale volume by average sale revenue by buyer type. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

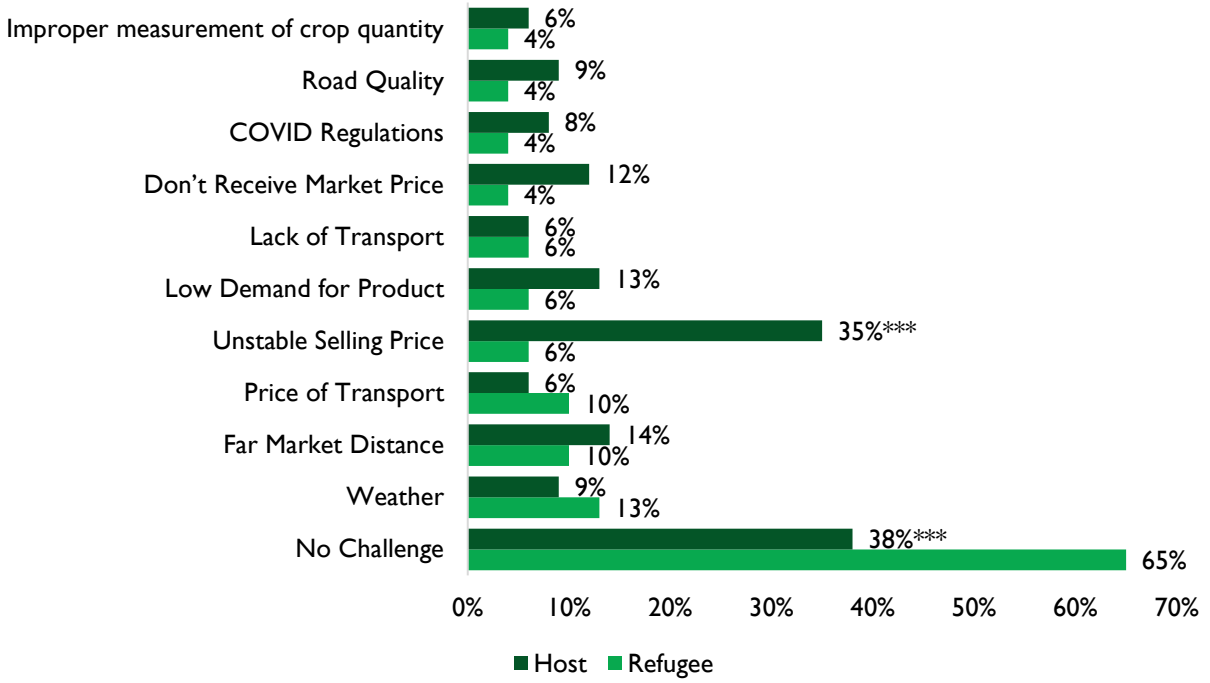
Challenges. Exhibit 20 shows challenges that farmers faced in selling potatoes. Overall, a little less than half of all farmers (47%) reported no challenges, with majority of refugee households (65%) facing no challenges, but only 38% of host households reporting no challenges. The biggest challenge overall was unstable selling prices (26%), followed by distance to markets (13%). Improper measurement of potatoes by buyers and lack of transport were the least common challenges (6%). There are interesting differences between host and refugee households: unstable selling prices were the biggest challenge for 35% of host community households but were only a relevant issue for 6% of refugee households. In contrast, weather, usually drought, was the biggest issue faced by refugee households (13%) but was a challenge for only 9% of host community households. Distance to market was the second biggest challenge for both host and refugee households. Interestingly, COVID-19 regulations were reported as challenges by only 8% of host community respondents and 4% of refugee community respondents. When we examine the challenges by age group, there are few differences. While more youth report "no challenges" than adults, the difference is not statistically significant. However, significantly more adults reported weather as a challenge than youth (13% versus 3%, respectively).

Exhibit 20. Potato Selling Challenges



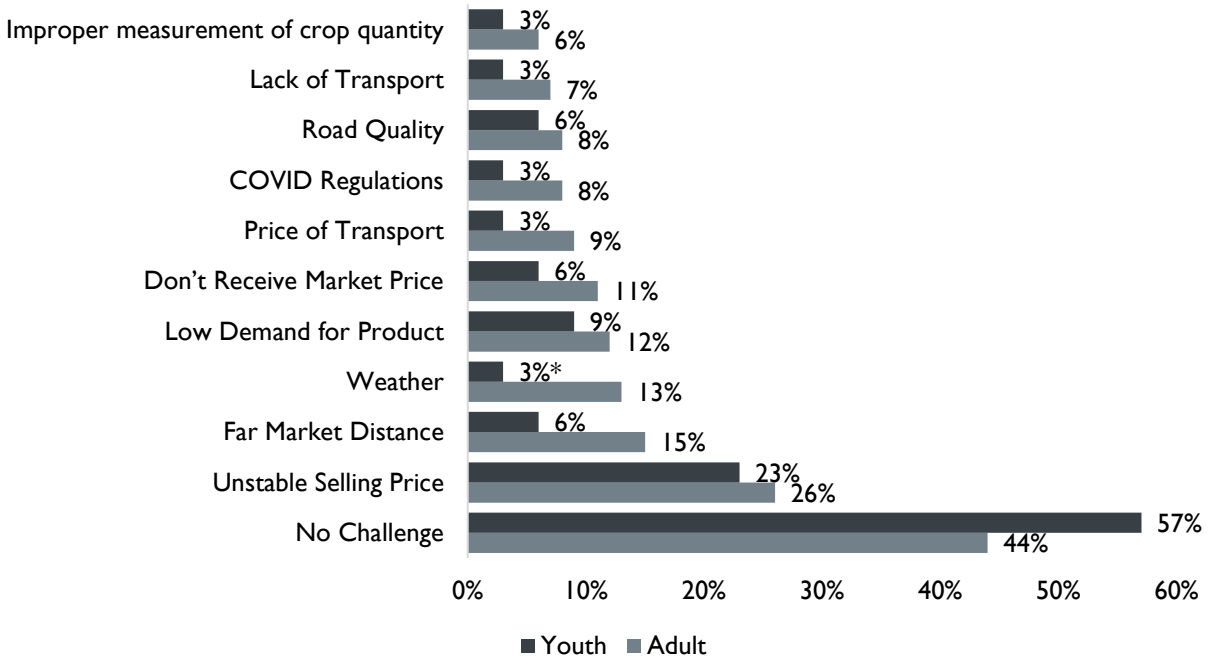
N=145; Showing household-level responses from primary participants.

Exhibit 21. Potato Selling Challenges by Nationality



N=48 for Refugees; N=97 for Hosts; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host. Significance markers are always placed on the host values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit 22. Potato Selling Challenges, Adult versus Youth



N=110 for Adult; N=35 for Youth; Showing household-level responses from primary participants. Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between adult versus youth. Significance markers are always placed on the youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Diseases were a commonly shared challenge that SCRs and DLOs discussed in the FGDs for potatoes. On the input side, SCRS listed as challenges lack of seed and/or seed multipliers, small land plots, and poor-quality soil. On the output side, DLOs indicated that poor postharvest handling was a challenge in growing potatoes as the shelf life is reduced.

Benefits & Opportunities. The first FGDs showed that potatoes are consumed in these communities, indicating an established market for potatoes and making them an ideal crop to improve food security. The VC FGDs also revealed three benefits from cultivating potatoes: For the farmer, there are multiple potato varieties to choose from. Potatoes also mature quickly – making them market-ready locally and regionally – and are easy to cook, benefitting both the farmer and buyer.

> **In the potato value chain, we have restaurants, and they buy potatoes for different purposes such as chips. The potatoes for chips are specific and if a farmer has the right type, they get good prices.**
>
> **FGD with DLOs**

Cassava

Background. Given the high nutrient value in its leaves and year-round availability, cassava represents an important food and income source for Ugandans.[24] It has even been identified in the Kamwenge Five-Year

[24] Waigumba, Simon Peter et al. August 2016. *Technical report: Market Opportunities and Value Chain Analysis of Fresh Cassava Roots in Uganda*. CGIAR Research Program on Roots, Tubers and Bananas. http://www.rtb.cgiar.org/wp-content/uploads/2015/06/Technical-report_Market-Opportunities-and-Value-Chain-Analysis-of-Fresh-Cassava-Roots-in-Uganda.pdf.

Development Plan for its ability to provide food security.[25] According to the Development Plan, the crop is versatile with its ability to grow both in lowlands and on slopes, as well as in the Rift Valley. It is described as "an essential part of the diet" that "provides a livelihood for millions of farmers and thousands of processors and traders." Fresh cassava is a staple of both urban and rural diets, serving as either a snack or the primary ingredient in a main meal. The Development Plan goes on to say that "demand for fresh cassava in Uganda is increasing with urbanization," but "cassava is very susceptible to postharvest physiological deterioration (PPD) and begins to deteriorate within 48 hours," causing losses during postharvest handling, processing, and transportation to consumers. These losses are estimated at "more than 30 million USD," with retailers, often women, bearing the majority of these postharvest damages. Thankfully, preferences are increasing for less perishable cassava products like fried chips, boiled cassava, or steamed cassava. However, given its perishability, "traders often purchase cassava in small quantities."

A 2012 study[26] analyzed the commercialization of higher-value cassava products among smallholder farmers and found that high-quality cassava flour (HQCF) was the main commodity traded. However, the supply of quality cassava was insufficient to meet demand for fresh roots. The report mentions that, in terms of opportunity, the use of HQCF in biscuit production, animal feeds, and beer brewing has increased. An assessment of the marketing of cassava products noted that the root has "important industrial applications for plywood, textile, bakery, pharmaceutical, paper, alcohol, and food industries" so it is growing in popularity as a commercial commodity for export, though is still largely produced and consumed domestically within Uganda.[27]

Value Chain Map & Linkages. Exhibit 23 below shows VC maps for cassava.

- Like potatoes, cassava inputs include extension services, land and labor, input dealers, researchers (including both public and private research on value addition equipment costs), and suppliers (specifically, cassava cuttings suppliers).
- Community households purchase cuttings and raw cassava, dried and raw cassava are sent to local (and regional) markets, and flour and chip processors receive cassava from middlemen. Community households and regional markets then produce local brew. Livestock feed producers, restaurants, and the government of Uganda purchase cassava from farmers directly.

As mentioned in the potato value chain, FGDs revealed that cassava farmers are also impacted by a poor road network; either there are no roads or the quality is too poor to utilize, which ultimately increases the cost of production. SCRs also highlighted a challenge accessing value addition information for cassava and groundnuts.

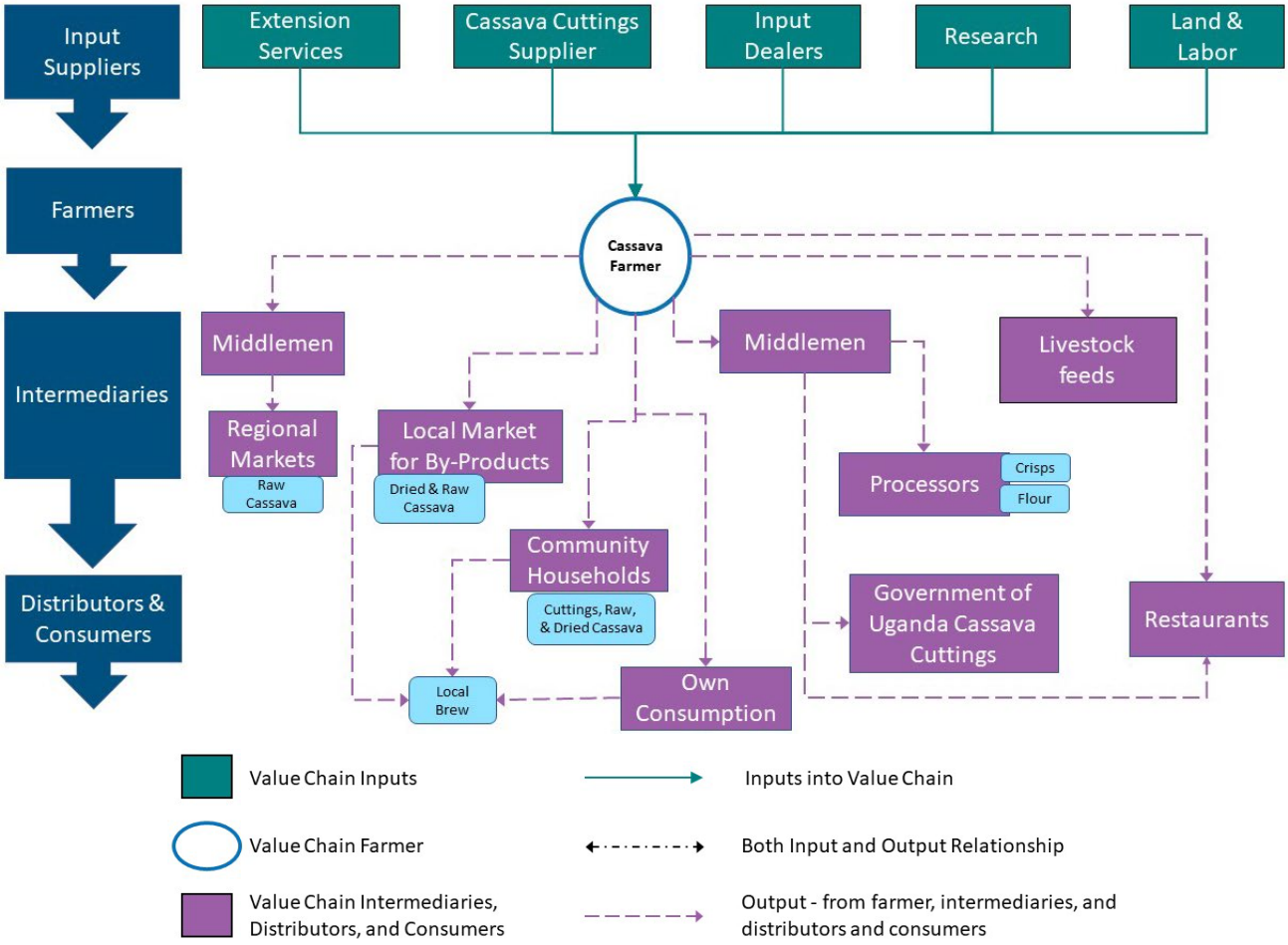
---

[25] Kamwenge District Council. Revised 2016 Edition. *KAMWENGE DISTRICT LOCAL GOVERNMENT: FIVE-YEAR DEVELOPMENT PLAN: 2015/2016 – 2019/2020.* http://npa.go.ug/wp-content/uploads/2017/05/KAMWENGE-DDP-2015-2020-FINAL.pdf

[26] Kleih, Ulrich et al. *Cassava Market and Value Chain Analysis: Uganda Case Study*. July 2012. https://cava.nri.org/images/documents/publications/UgandaCassavaMarketStudy-FinalJuly2012_anonymised-version2.pdf

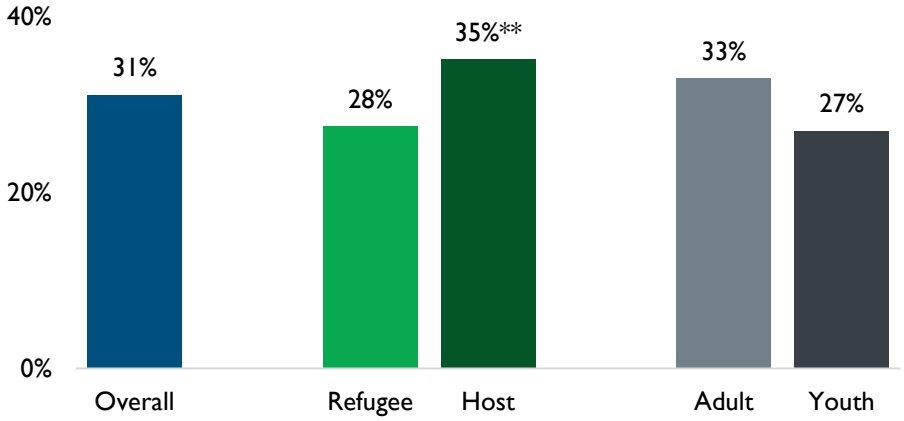
[27] Etany, S., Odongo, Walter. 2018. *Value chains and marketing margins of Cassava: An assessment of cassava marketing in Northern Uganda*. African Journal of Food, Agriculture, Nutrition, and Development. https://www.researchgate.net/profile/Walter-Odongo/publication/324586293_Value_chains_and_marketing_margins_of_Cassava_An_assessment_of_cassava_marketing_in_Northern_Uganda/links/5ad6ef530f7e9b285938e62f/Value-chains-and-marketing-margins-of-Cassava-An-assessment-of-cassava-marketing-in-Northern-Uganda.pdf

Exhibit 23. Value Chain Map for Cassava



Cultivation Patterns. Among participant households from cohort one, endline survey data shows that 31% of households grew cassava, with some variability across age (33% adults and 27% youth) and significantly more host households (35%) than refugee households (28%), as Exhibit 24 shows.

Exhibit 24. Cassava Growing Popularity

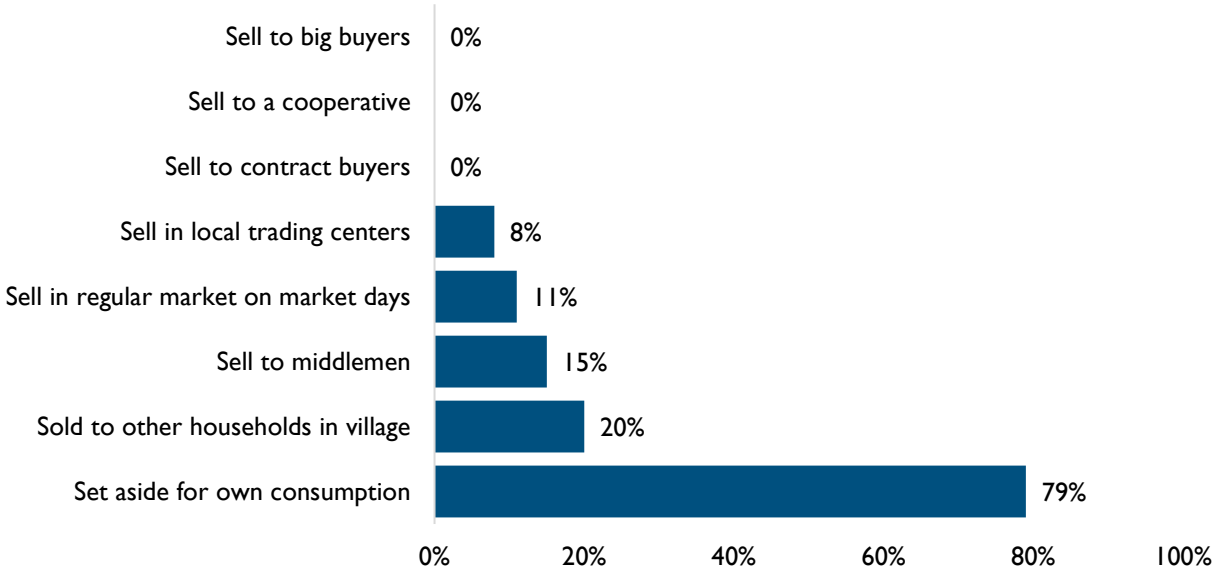


N=783 Overall; N=384 Refugee; N=392 Host; N=562 Adult; N=214 Youth Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host, as well as adult versus youth. Significance markers are always placed on the host and youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Harvest Usage and Sales. Among households that engage in cassava farming, the most widespread use of their harvest was setting it aside for their own consumption (79%), as Exhibit 25 shows. The mean total harvest[28] was 184 kg (N=103) of cassava, with an average annual volume of 91 kg (N=80) being set aside for their own consumption. In Exhibit 26, when we calculate the proportion set aside for personal consumption over total cassava harvest at the *household level*, we find that the average percent allocated is 68% of total harvest. This finding means that households see cassava as more of a food crop than a cash crop, preferring to consume it themselves over selling it at a premium and purchasing cheaper foodstuffs.

[28] Average total harvest volume was calculated by standardizing responses to kilograms. If respondents indicated that their unit of measure was "basin," then the volume was multiplied by 5 to indicate a conversion rate of 5 kilograms per basin. Other units of measure like "bunch" or "head" were assumed to be roughly equivalent to 1 kilogram.

Exhibit 25. Cassava Harvest Usage Rate



N=107; Showing household-level responses from primary participants. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

Looking at other uses of the harvest, the most popular were selling to other households in the village (20%), selling to middlemen (15%), and selling in the regular market on market days (11%). These options were not exclusive, so some respondents may have selected multiple uses for their harvest. Exhibit 26 shows that the annual volume allocated to selling to these buyer types ranges from 112 kg (selling to middlemen) to 153 kg (selling to other households in the village). Households that sold to each of these buyer types allocated between two-thirds to just over three-quarters of their total harvest to each usage, suggesting that an individual household tends to select one primary buyer for most of their harvest. Exhibit 27 shows that the average annual revenue reported from selling to each of the buyer types was relatively consistent for cassava at about UGX 150,000 per year. While it was technically possible for cassava farming households to identify multiple buyers, the usage rates and average percent of harvest allocated to each usage suggest that households were more likely to identify a single usage and commit to it heavily, rather than diversifying buyers. Prices on average for each buyer type were similar, suggesting no dominant preferred buyer type.

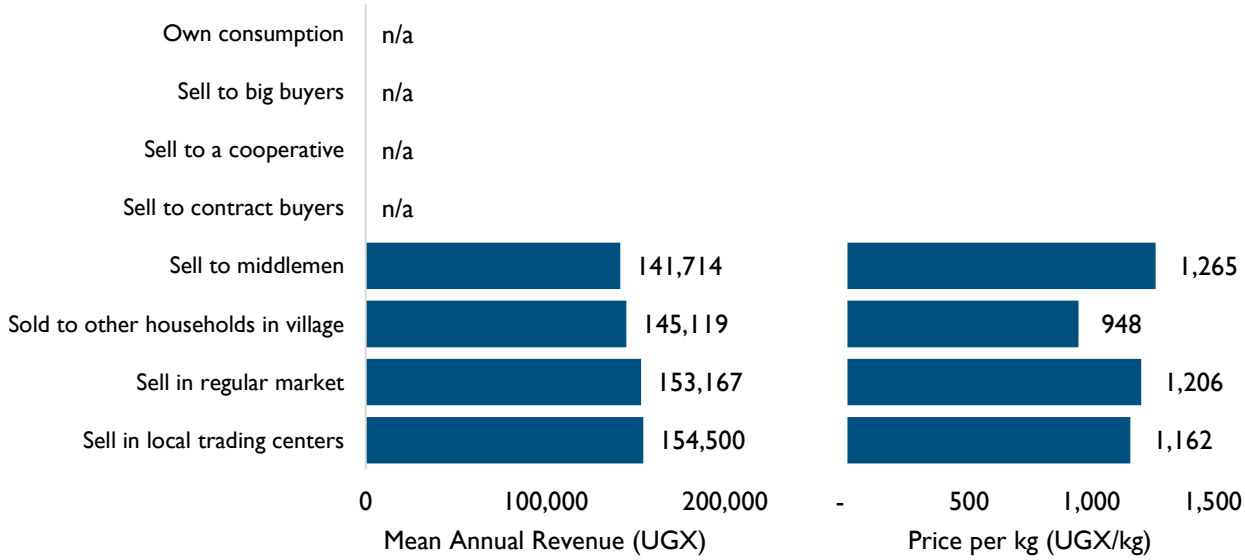
Exhibit 26. Cassava Usage Volumes and Percent of Harvest Allocated

Cassava usage	Mean Annual volume (kg)	Mean percent of harvest allocated to this purpose[1]
Set aside for own consumption	91 kg (83)	68% (80)
Sold to other households in village	153 kg (21)	71% (21)
Sell to middlemen	112 kg (14)	79% (14)
Sell in regular market on market days	127 kg (12)	76% (12)
Sell in local trading centers	133 kg (8)	68% (8)
Sell to contract buyers	n/a	n/a
Sell to a cooperative	n/a	n/a
Sell to big buyers	n/a	n/a

Sorted by usage rate. Showing household-level responses from primary participants. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

[1]This metric was calculated by dividing the volume of crop allocated to each usage type by the total harvest, at the household level. Then, an average was calculated among those household-level percentages for each usage type.

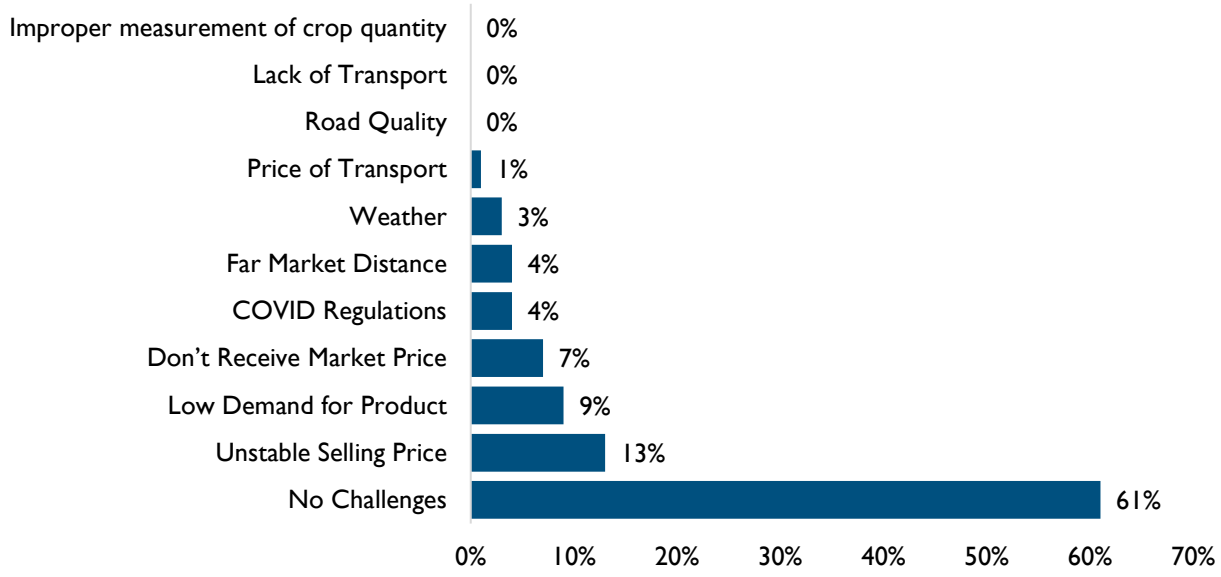
Exhibit 27. Cassava Usage Average Revenue and Price per kg in the Last 12 Months, by Buyer Type



N size varies from 8 to 21, based on usage rate; Showing household-level responses from primary participants. Price per kg is calculated by dividing average sale volume by average sale revenue by buyer type. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

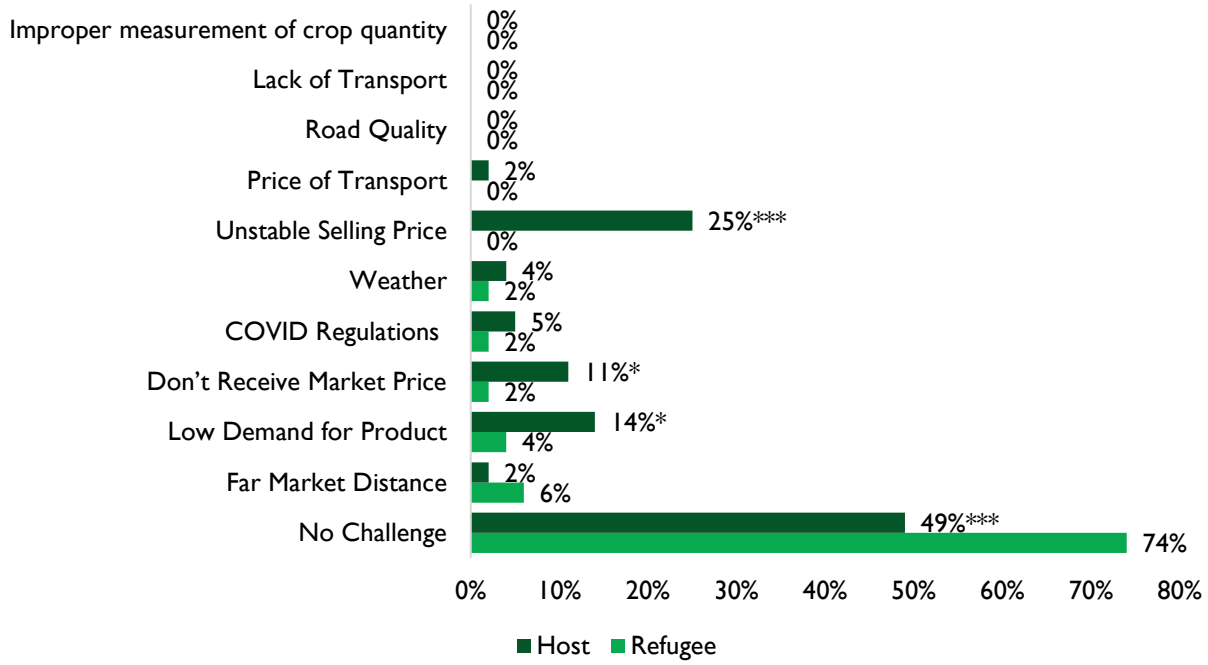
Challenges. Exhibit 28 shows challenges that farmers faced in selling cassava. The overall majority of farmers (61%) reported no challenges, with more refugees (74%) reporting no challenges than hosts (49%). Overall, the biggest challenge is unstable selling prices (13%), followed by low demand for the product (9%). Improper measurement of cassava by buyers and lack of transport were the least common challenges (less than1%). There are interesting differences between hosts and refugees: whereas unstable market prices were the biggest challenge for 25% of host households, they were not a relevant issue for refugee households (less than 1%). In contrast, market distance was the biggest issue faced by refugee households (6%), which was a challenge for only 2% of host households. Low demand for product was the second biggest challenge for both host and refugee households. Interestingly, COVID-19 regulations are reported as challenges by only 5% of host and 2% of refugee households. There were few differences between the challenges reported by age group. More youth than adults reported facing "no challenges," but this difference is not statistically significant. However, significantly more youth reported the price of transportation as a challenge than adults (5% versus 0%, respectively).

Exhibit 28. Cassava Selling Challenges



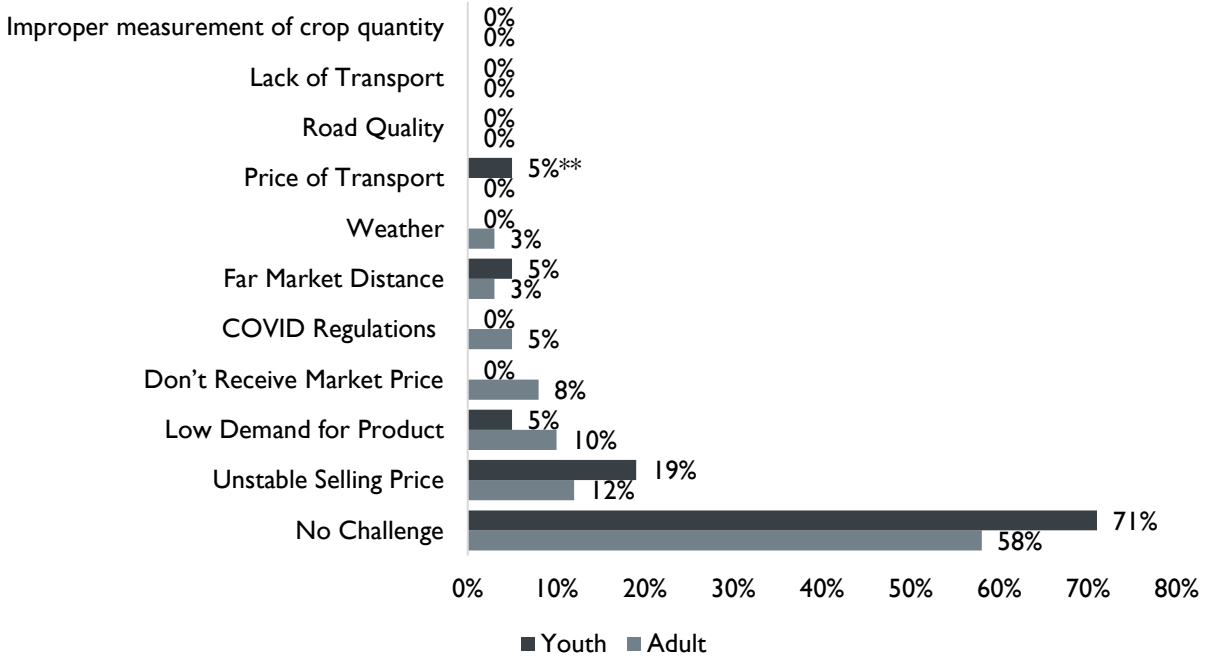
N=107; Showing household-level responses from primary participants.

Exhibit 29. Cassava Selling Challenges, by Nationality



N=50 for Refugees; N=57 for Hosts Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host. Significance markers are always placed on the host values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit 30. Cassava Selling Challenges, Adult versus Youth



N=86 for Adult; N=21 for Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between adult versus youth. Significance markers are always placed on the youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

> **When growing cassava, it is difficult to grow another crop as it takes a long time occupying the field. In addition, it needs special attention.**
>
> **FGD with SCRs**

SCRs shared these cassava growth challenges in the FGDs: poor-quality soil and cuttings, price fluctuations, land shortages and small land plots. SCRs also commented that cassava requires additional care and time to grow, reducing farmers' ability to cultivate other crop varieties. DLOs listed high disease incidence as the only challenge; however, they also pointed out that a disease-resistant cassava variety was released by NARO researchers.

Benefits & Opportunities. SCRs positively noted that cassava is drought-resistant and easy to cook, whereas DLOs highlighted the current establishment of community seed multipliers as a result of local interventions. FGD participants commented on the multiple drought-resistant varieties, cassava's ability to be dried for food security, farmers' ability to sell crisp varieties locally and to private sector actors, and an established market for cassava due to it being culturally consumed.

Specific opportunities to improve production for the next cohort of farmers included providing farmers with fertilizers and quality planting material, such as disease-resistant seed varieties. Relatedly, SCRs noted that the planting material should come from a reliable source, a common theme throughout the FGDs.

Groundnuts

Background. Compared to other crops, groundnuts account for a small share of the harvested area in Kamwenge (2.4 percent).[29] Though its popularity and production volumes are smaller than other crops, groundnuts still remain an important legume for many Ugandans.[30] A 2015 value chain study on maize, groundnuts, and soybeans revealed that most farmers produce groundnuts for home consumption and sell the surplus on the local market (though a smaller portion of shelled groundnuts are sold internationally to neighboring countries, such as Kenya).[31] Another report measured that, in 2010, the daily per capita consumption of groundnuts among women and children was 65 and 37 grams, respectively.[32] Most groundnut production occurs not in the western region but in the northern, eastern, and southern parts of the country, with the bulk coming from eastern Uganda.[33]

Value Chain Map & Linkages. Exhibit 31 below shows VC maps for groundnuts. The groundnuts map contains more inputs than the other VCs and includes NGOs, UNHCR, the Ugandan government, other farmers, input shops, loans from VSLA or microfinance programs, and the farmer's own home saved seeds. Of the six VCs, groundnuts have one of the most interconnected relationships.

- The purple arrows indicate that farmers and producers have a circular relationship, in which farmers provide producers with groundnuts, and the producers provide farmers inputs. This

[29] Data Africa. https://dataafrica.io/profile/kamwenge-uga#agriculture, accessed December 2018.

[30] Mugisha J, Lwasa S, Mausch K. 2014. *Value chain analysis and mapping for groundnuts in Uganda*. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Socioeconomics Discussion Paper Series.

[31] Randall D, Stepanovic, S. 2015. *Strengthening Market Linkages for Smallholder Rural Farmers in Uganda: A Landscape Analysis of Maize, Groundnut and Soybean Value Chains across 21 Districts*. USAID/Uganda Production for Improved Nutrition Project.

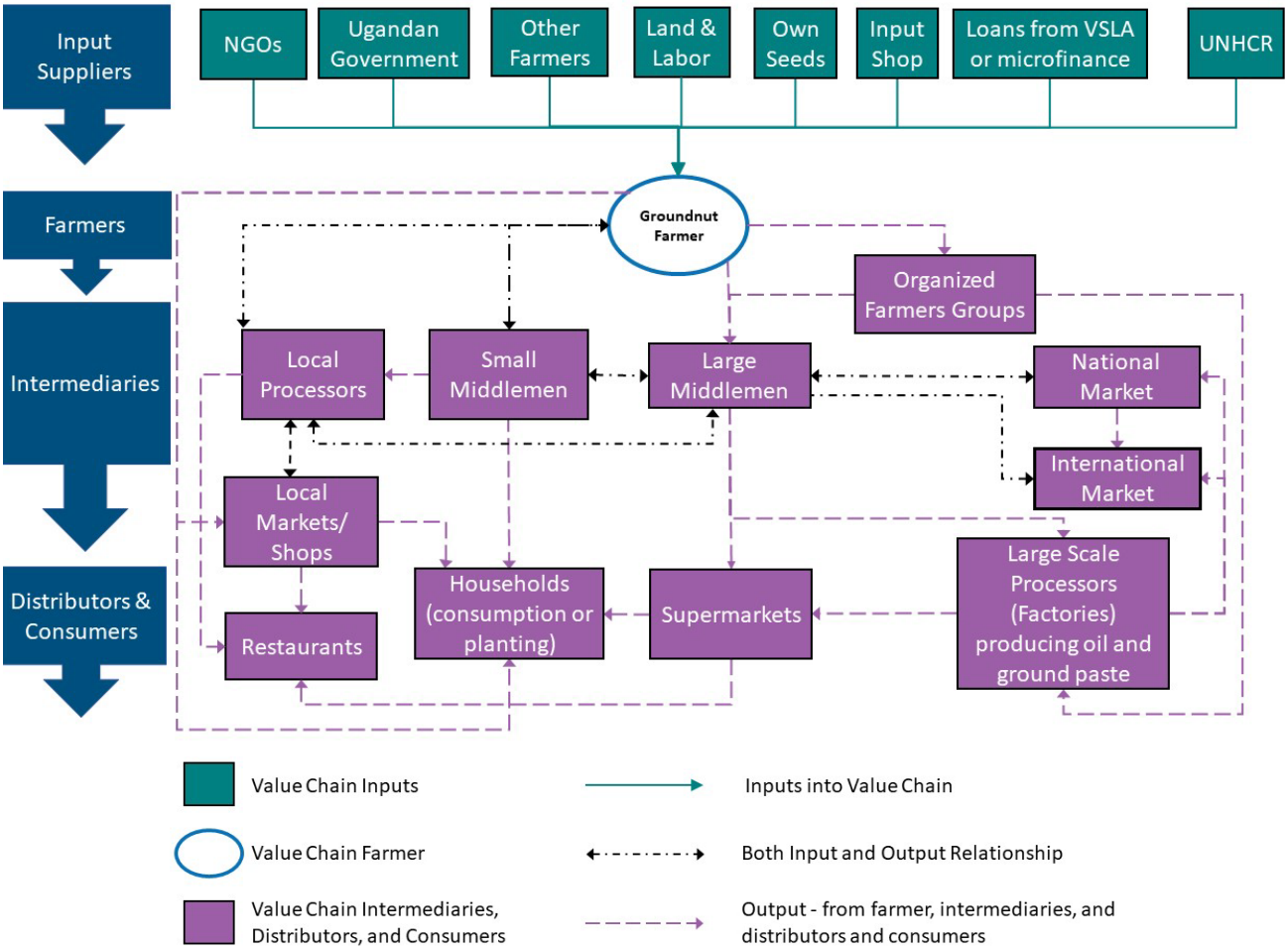
[32] Mugisha, J, Lwasa, S, Mausch, K. 2014. *Value chain analysis and mapping for groundnuts in Uganda*. International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) Socioeconomics Discussion Paper Series.

[33] Ibid.

relationship is seen between farmers, small middlemen, local processors, and large middlemen, as well as between large middlemen and the national and international markets.

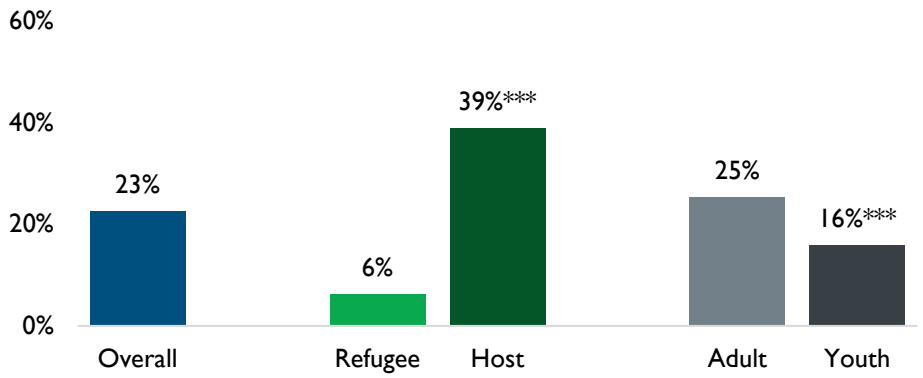
- Most of the value chains serve as intermediaries with multiple connections to other value chains.
- In general, the chain ends at either restaurants or households.
- Middlemen were the only identified private sector actors working in the geographic area during the FGDs.

Exhibit 31. Value Chain Map for Groundnuts



Cultivation Patterns. Among households surveyed at the end of cohort one, 22.6% of participants grew groundnuts, with significantly more adults (25%) than youth (15.9%) growing them, as Exhibit 32 shows. Among participant households at the endline, 39% of host community households and 6% of refugee households engaged in growing groundnuts. Cohort one programming promoted groundnuts, but a majority of farmers do not grow groundnuts. Low uptake of the programming among refugee households could be driven by low land availability for them, preventing investment in unfamiliar crops, or dietary attachments to particular crops.

Exhibit 32. Groundnut Growing Popularity

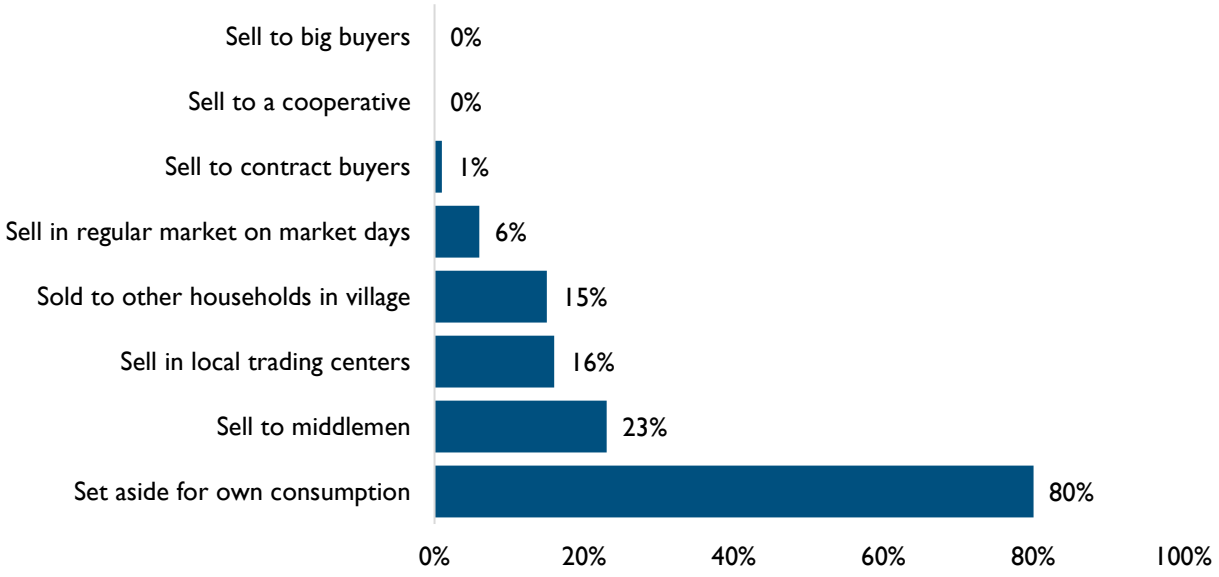


N=783 Overall; N=384 Refugee; N=392 Host; N=562 Adult; N=214 Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host, as well as adult versus youth. Significance markers are always placed on the host and youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Harvest Usage and Sales. The most widespread use of the groundnut harvest among households that engage in groundnut farming is setting it aside for their own consumption (80%), as Exhibit 33 shows. On average, the total harvest[34] was 61 kg (N=137) of groundnuts, with an average annual volume of 27 kg (N=109) allotted for their own consumption. Though it would appear that households set aside about half their harvest to consume, when we calculate the proportion set aside for consumption over total groundnut harvest at the *household level*, we find that the average percent allocated is 64% of total harvest. In other words, among the 80% of groundnut farming households that set aside some of their harvest to eat, they typically allocate about two-thirds of their harvest toward personal consumption. Households therefore see groundnuts as more of a food crop than a cash crop, preferring to consume it themselves over selling it at a premium and purchasing cheaper foodstuffs.

[34] Average total harvest volume was calculated by standardizing responses to kilograms. If respondents indicated that their unit of measure was "basin," then the volume was multiplied by 5 to indicate a conversion rate of 5 kilograms per basin. Other units of measure like "bunch" or "head" were assumed to be roughly equivalent to one kilogram.

Exhibit 33. Groundnut Harvest Usage Rate



N=145 Showing household-level responses from primary participants. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

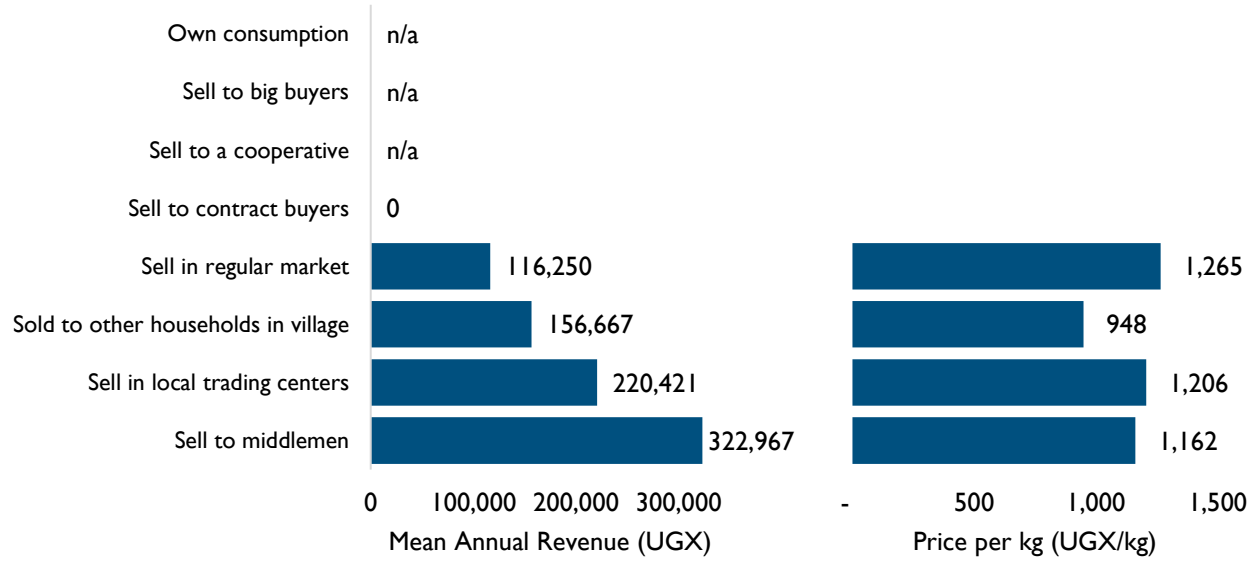
When we examine other uses of their harvest, the most popular were selling to middlemen (23%), selling to local trading centers (16%), and selling to other households in the village (15%). These options were not exclusive, so some respondents may have selected multiple uses for their harvest. Exhibit 34 shows that the annual volume allocated to selling to these buyer types ranges from 38 kg (selling to other households in the village) to 77 kg (selling in local trading centers). The proportion of their harvest allocated to each of these uses had some variation as well, with about 53% of the harvest allocated toward selling to other households, compared to about two-thirds of the harvest being allocated toward selling to local trading centers, middlemen, or at the regular market on market days. This finding suggests that an individual household tends to select one primary buyer for most of their harvest. However, the relatively low proportion of harvest being allocated to selling to other households (53%) suggests that this particular option may have been frequently paired with another (e.g., selling half of their harvest to other households while keeping the remaining proportion for their own consumption). Exhibit 35 shows that the average annual revenue reported from selling to each of the buyer types is somewhat varied, from about UGX 116,000 per year (selling in the regular market on market days) to about UGX 322,000 (selling to middlemen), both with similar average volume sold. The price per kg of groundnuts was highest when selling to the regular market, though only by a small margin. However, small sample sizes on these metrics prevent definitive conclusions from the quantitative data about one type of buyer giving preferential treatment to groundnut farmers.

Exhibit 34. Groundnut Usage Volumes and Percent of Harvest Allocated

Groundnut usage	Mean Annual volume (kg)	Mean percent of harvest allocated to this purpose[1]
Set aside for own consumption	27 kg (109)	64% (104)
Sell to middlemen	60 kg (30)	66% (29)
Sell in local trading centers	77 kg (19)	68% (19)
Sold to other households in village	38 kg (21)	53% (20)
Sell in regular market on market days	58 kg (8)	69% (7)
Sell to contract buyers	0 kg (1)	0% (1)
Sell to a cooperative	n/a	n/a
Sell to big buyers	n/a	n/a

Sorted by usage rate. Showing household-level responses from primary participants. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.
[1]This metric was calculated by dividing the volume of crop allocated to each usage type by the total harvest, at the household level. Then, an average was calculated among those household-level percentages for each usage type.

Exhibit 35. Groundnut Usage Average Revenue and Price per kg in the Last 12 Months, by Buyer Type

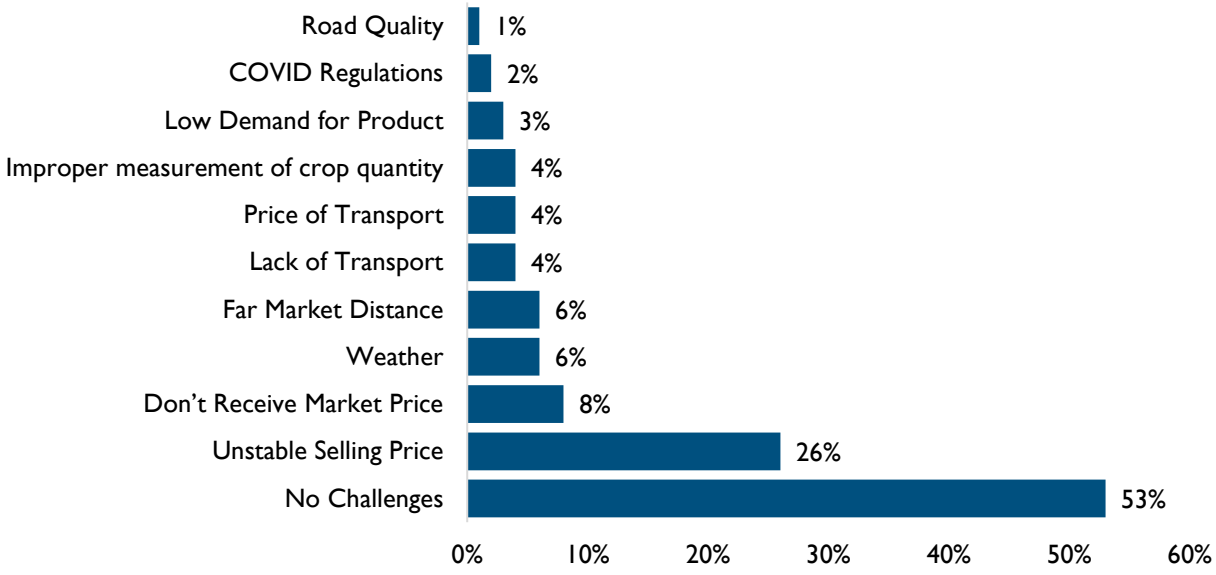


N size varies from 1 to 30, based on usage rate. Showing household-level responses from primary participants. Price per kg is calculated by dividing average sale volume by average sale revenue by buyer type. 'Sell to big buyers' includes Kakinga Millers, Kad Africa, or Kamwenge Community Development.

Challenges. Exhibit 36 shows challenges that farmers faced in selling groundnuts. Overall, the majority of all farmers (53%) reported no challenges, with more refugee households (68%) than host

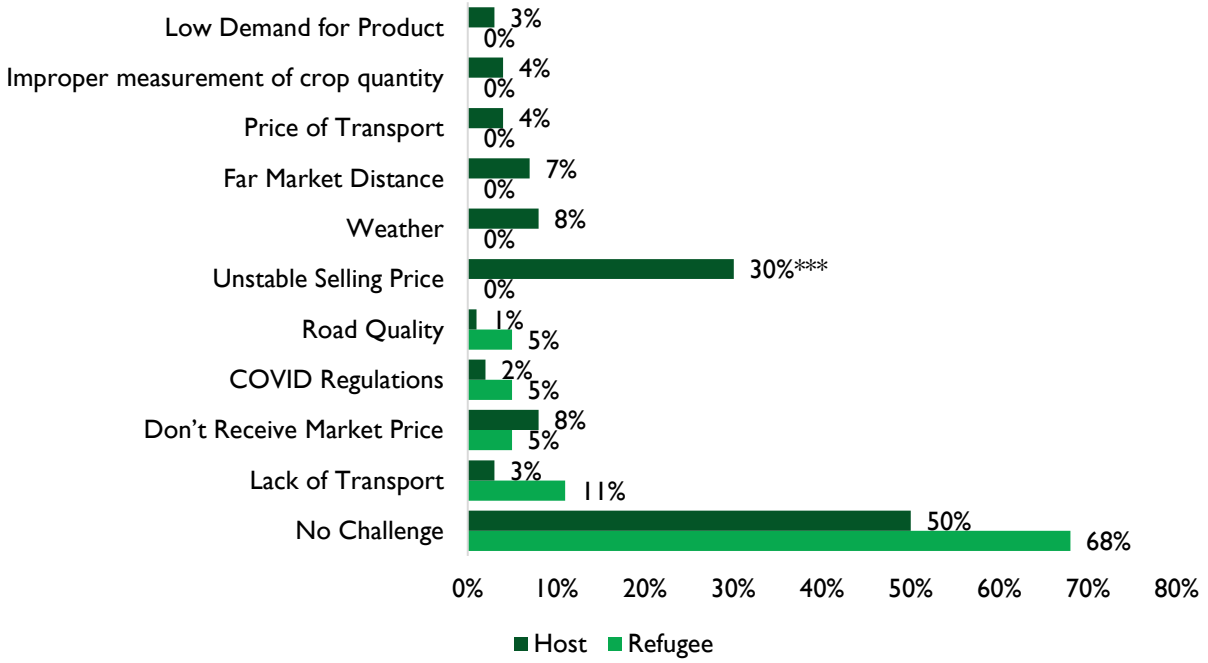
households (50%) reporting no challenges. The biggest challenge was unstable selling prices (26%), followed by not receiving market price (8%). Road quality was the least common challenge (1%). There were interesting differences between host and refugee households: whereas unstable selling price was the biggest challenge for 30% of hosts, it was not a relevant issue for refugees (less than 1). In contrast, lack of transport was the biggest issue faced by refugee households (11%) which was a challenge for only 3% of host households. Not receiving market price for product was the second biggest challenge for both hosts and refugees. Interestingly, COVID-19 regulations were reported as challenges by only 2% of host and 5% of refugee households. Sample sizes for refugee households are rather small (19), so those numbers should be interpreted with caution. There were no significant differences when challenges are examined by age group. A greater share of youth than adults reported "no challenges," but this difference is not statistically significant.

Exhibit 36. Groundnut Selling Challenges



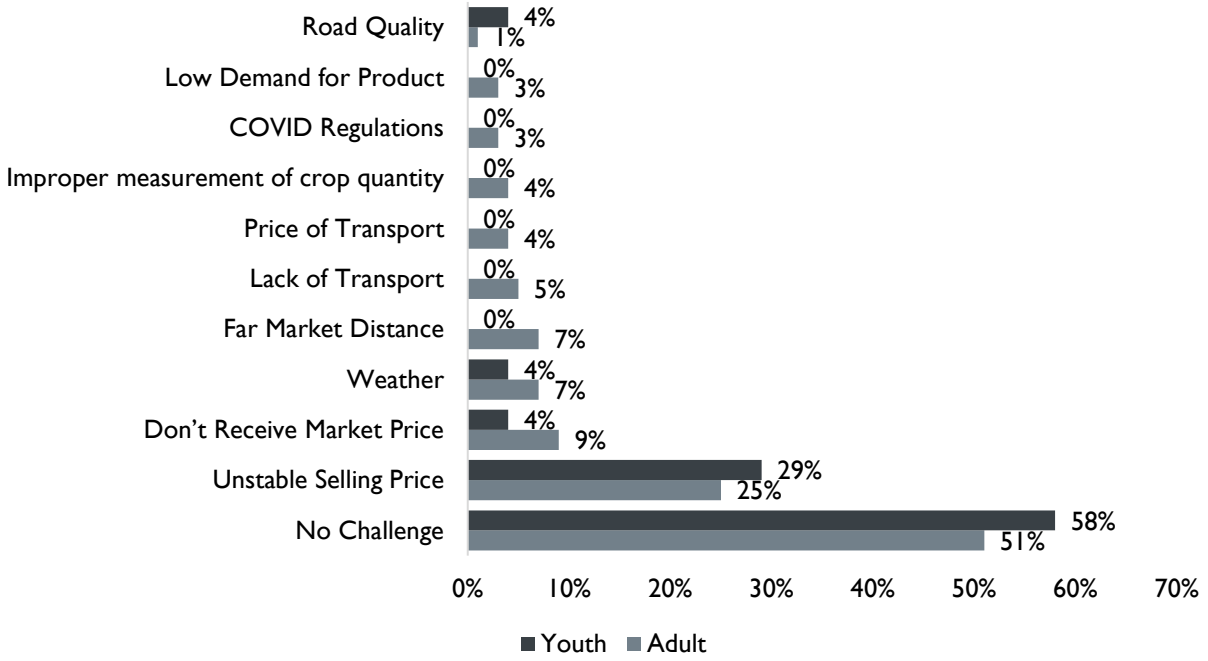
N=139 Showing household-level responses from primary participants.

Exhibit 37. Groundnut Selling Challenges, by Nationality



N=19 for Refugees; N=120 for Hosts; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host. Significance markers are always placed on the host values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit 38. Groundnut Selling Challenges, Adult versus Youth



N=115 for Adult; N=24 for Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between adult versus youth. Significance markers are always placed on the youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

> **There is a shortage of certified seed and some of the farmers end up using their home saved seed, yet it has low levels of productivity.**
>
> **FGD with DLOs**

As discussed for the other two crop VCs, FGDs suggested that groundnut farmers are also faced with the challenge of small plot size, poor soil quality, and lack of access to value addition information. DLOs, however, listed seeds as the sole challenge. Specifically, farmers tend to rely on home saved seeds, which do not produce a bountiful harvest, and access to quality seeds is limited. Further, some groundnut seed varieties are not suitable for the regions in which they are available.

> **Electricity would help running small machines in groundnut grinding (machines for making groundnut paste).**
>
> **FGD with SCRs**

Benefits & Opportunities. DLOs noted the importance of more engagement with actors at varying levels of the value chain, especially input suppliers, as groundnuts have had many challenges in the district. Further, private sector actors struggle to maintain seed quality, and therefore, any actors that are engaged need to be trustworthy and reliable. Lastly, officials shared that electricity would be helpful in processing groundnuts to make paste, as limited access to electricity is a major constraint to agro-processing.

Chickens

Background. Chickens represent the most commonly reared livestock among Ugandan smallholder farmers, with 60% of the households in the cohort one sample engaging in raising chickens. An assessment of livestock value chains in East Africa states that, "in Uganda, the poultry population is estimated at 38 million, supporting over 3.2 million (65.9%) households."[35] This popularity is supported by environmental inputs that enable chicken-rearing, namely feed resources like plants and insects that can be freely scavenged by chickens.[36] That being said, this popularity does not necessarily translate to a strong revenue source for smallholder farmers.

A 2018 report on the chicken value chain in Uganda notes that, "Processors obtained the highest gross margin compared to the rest of the value chain actors, whereas farmers got the lowest gross margin."[37] The report also notes that gender equity in the chicken value chain is varied, with women's and men's activities following traditional gender roles. Men were noted as typically more responsible for technical and marketing roles, while women were reported as responsible for cleaning, feeding, and cooking. Most concerning is that few women felt they had control over how the income from chicken production was utilized. The report concludes that youth engagement in the chicken value chain and adult literacy programs could help to increase participation among marginalized groups. Specifically, literacy and greater confidence in business matters would reduce cultural barriers to engagement in the financial aspects of chicken-rearing. This issue presents an opportunity for the Activity to address longstanding gender equity issues in Ugandan communities by engaging with

[35] Guthiga, Paul et al. *CTA Discussion Paper: Mapping Livestock Value Chains in the IGAD Region*. 2017. The International Livestock Research Institute (ILRI). https://cgspace.cgiar.org/rest/rest/bitstreams/f7c6179b-7a79-4516-b8bb-e3248dfd0189/retrieve

[36] Charles Lubandi, Stephen Lwasa, Donald Kugonza, Babigumira M Brian, Gideon Nadiope, Marion Wilfred Okot. 2019. *Analysis of Indigenous Chicken Value Chain in Uganda*. African Journal of Rural Development.

[37] I. Akite, I. P. Aryemo, E. K. Kule, B. Mugonola, D. R. Kugonza & M. W. Okot. 2018. *Gender dimensions in the local chicken value chain in northern Uganda*. African Journal of Science, Technology, Innovation and Development. 10:3, 367-380. https://doi.org/10.1080/20421338.2018.1469214

women and youth to promote chicken-rearing and broadening their skillsets to include the business-related aspects of the livelihood.

Value Chain Map & Linkages. Exhibit 39 below shows VC maps for chickens.

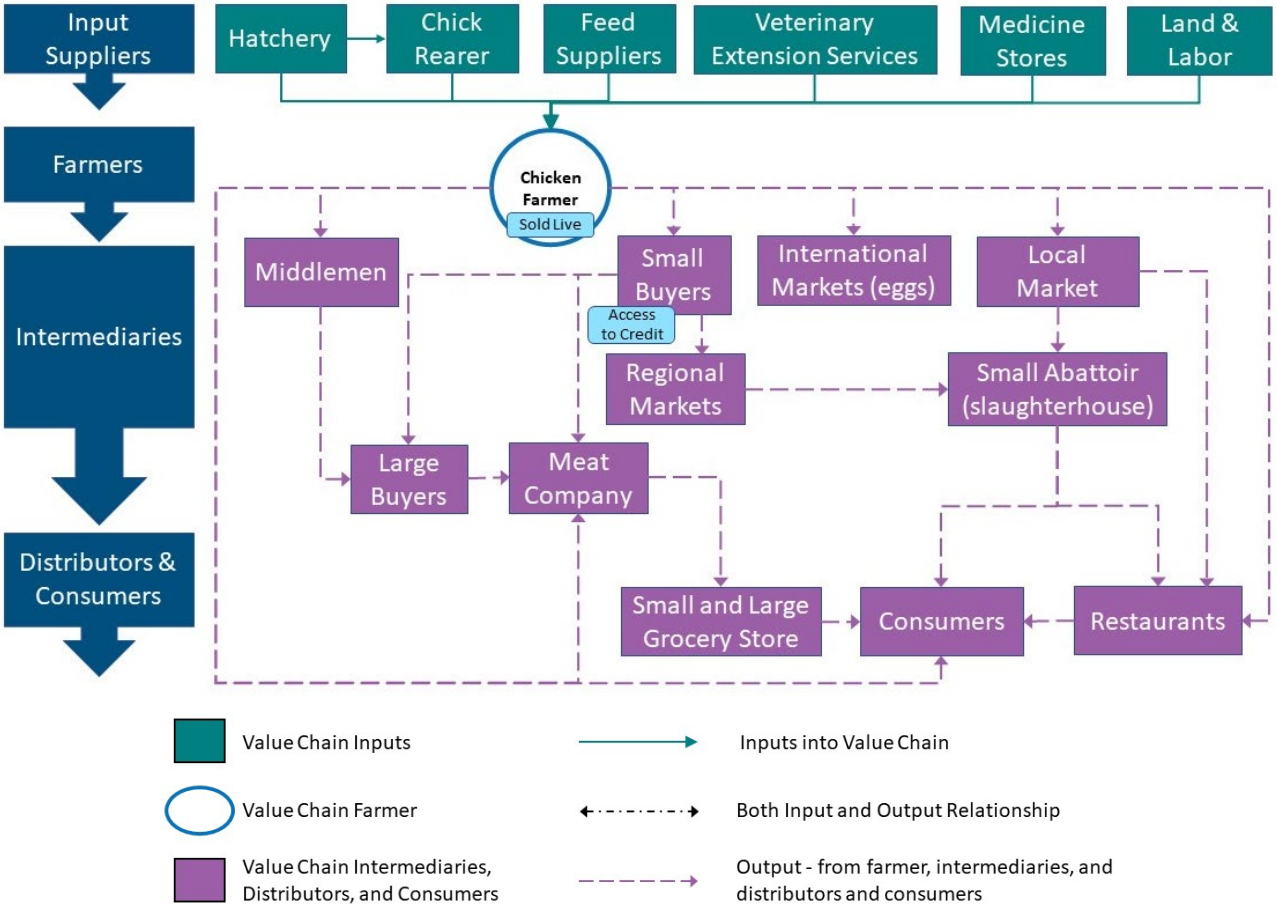
- Veterinary services, feed, chicks, and the regional food market make up the inputs of chicken farmers.
- While the inputs for the chicken VC is more distinct, there is more interconnectedness when it comes to intermediaries and outputs.
- Farmers sell directly to small buyers, the local food market, international markets (eggs), restaurants, consumers, and middlemen.
- The process for local and regional food markets varies slightly; local food markets receive chickens directly from the farmer and then sell to a small slaughterhouse, whereas regional food markets do not purchase directly from the farmer and instead purchase chickens from middlemen or small buyers, and either sell to a larger meat company or back to the farmer.

FGD comments revealed that improving the relationship between chicken farmers and private sector meat packers would increase market potential and production.

- The meat company can receive its supply in a couple of ways. They can receive chickens directly from the farmers, from large buyers (which transfers from middlemen), or the regional food market (which transfers from small buyers). Likewise, consumers can access chickens or chicken meat in three different ways; they can purchase chickens directly from the farmer or purchase the meat from restaurants or small and large grocery stores.
- Restaurants tend to purchase live chickens from the farmer directly or meat from the small slaughterhouse.

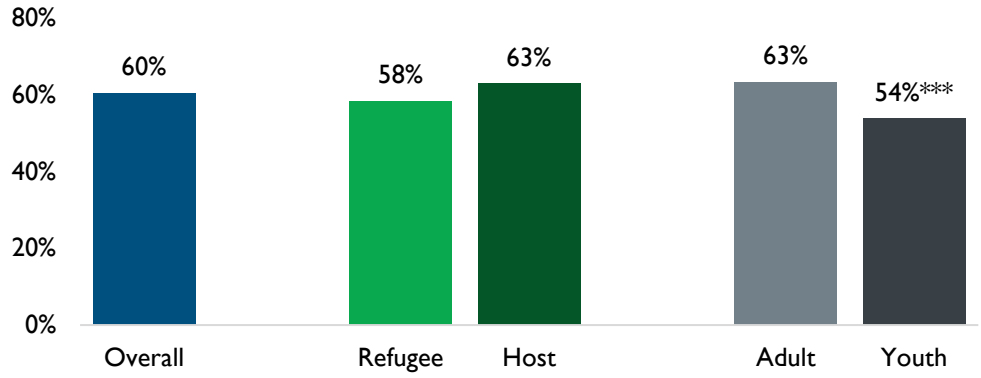
When asked how relationships between actors can be improved, SCRs suggested connecting farmers to private sector processors.

Exhibit 39. Value Chain Map for Chickens



Rearing Patterns. Among participant households surveyed from cohort one, the majority of households (60%) reared chickens, with significantly more adult participants (63%) than youth (54%), but similar participation for hosts (63%) and refugees (58%), as Exhibit 40 shows.

Exhibit 40. Chicken-Rearing Popularity

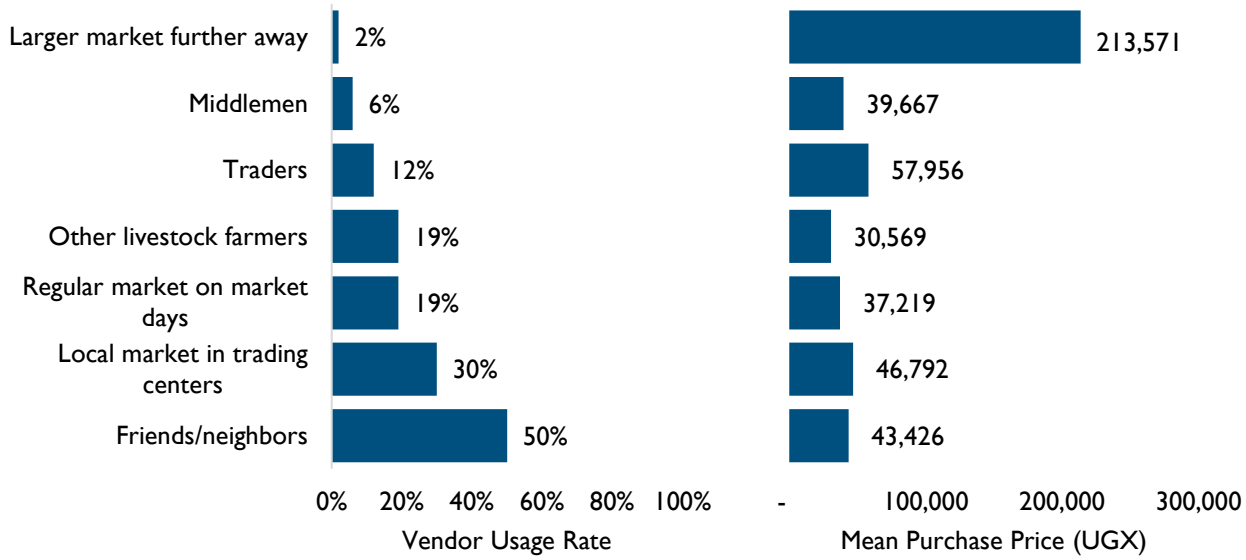


N=783 Overall; N=384 Refugee; N=392 Host; N=562 Adult; N=214 Youth Showing household-level responses from primary participants.

Chicken Sales. Among the 472 cohort one households sampled who engaged in chicken-rearing, most bought their chickens from friends or neighbors (50%), local markets in trading centers (30%),

the regular market on market days (19%), or other livestock farmers (19%), as Exhibit 41 shows. Overall, the average purchase price was 46,325 UGX per chicken (N=358). This purchase price varied somewhat by vendor, with other livestock farmers offering the lowest price at about 30,000 UGX per chicken, while the most popular option of buying from friends was associated with a price of about 43,000 UGX per chicken. Average purchase price might be an indicator of quality or trust between the households and the vendor, with farmers perhaps being willing to pay more to vendors whose reputation they trust.

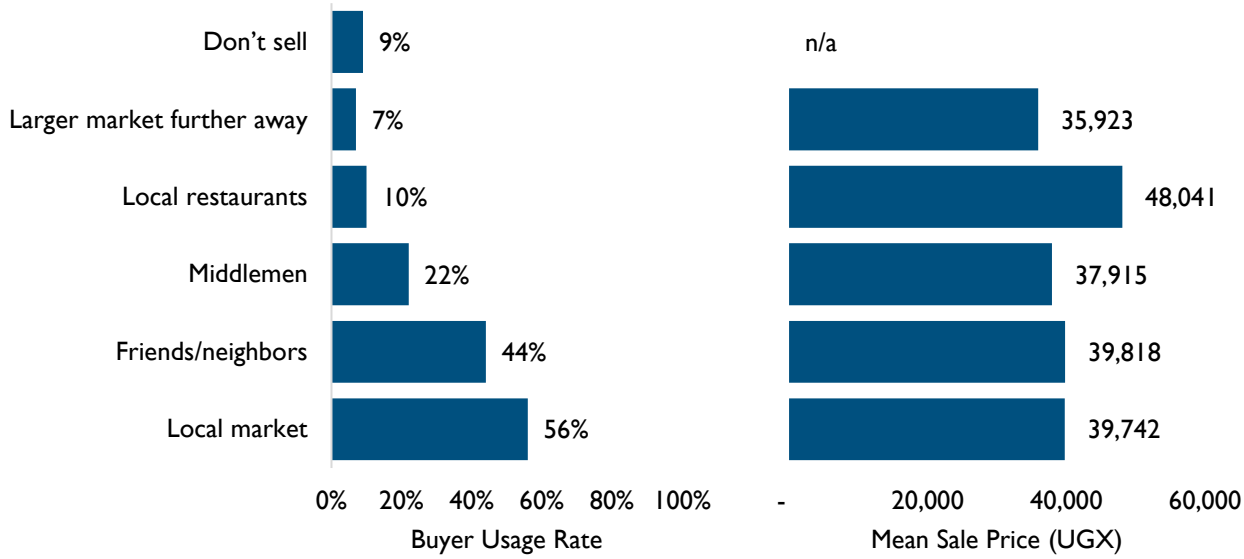
Exhibit 41. Usage Rates of Vendor Types to Purchase Chicken & Mean Purchase Price per Chicken, by Vendor Type



N=472 for usage rates; Showing household-level responses from primary participants.
N size varies from 7 to 175 for mean purchase price, based on usage rate of each vendor type; Showing household-level responses from primary participants.

In terms of selling chickens, the most popular buyers to sell to among our sample of households was the local market (56%), then friends or neighbors (44%), then middlemen (22%), as Exhibit 42 shows. The overall average selling price was 37,000 UGX (N=467), which was consistent with the price offered to the local market, friends or neighbors, and middlemen. Interestingly, only 10% of chicken-rearing households sold directly to local restaurants, but the average price associated with selling to this buyer was 10,000 UGX higher than the three more popular buyers. Relatively few households that rear chickens did not sell at all (9%), presumably rearing them for their own consumption.

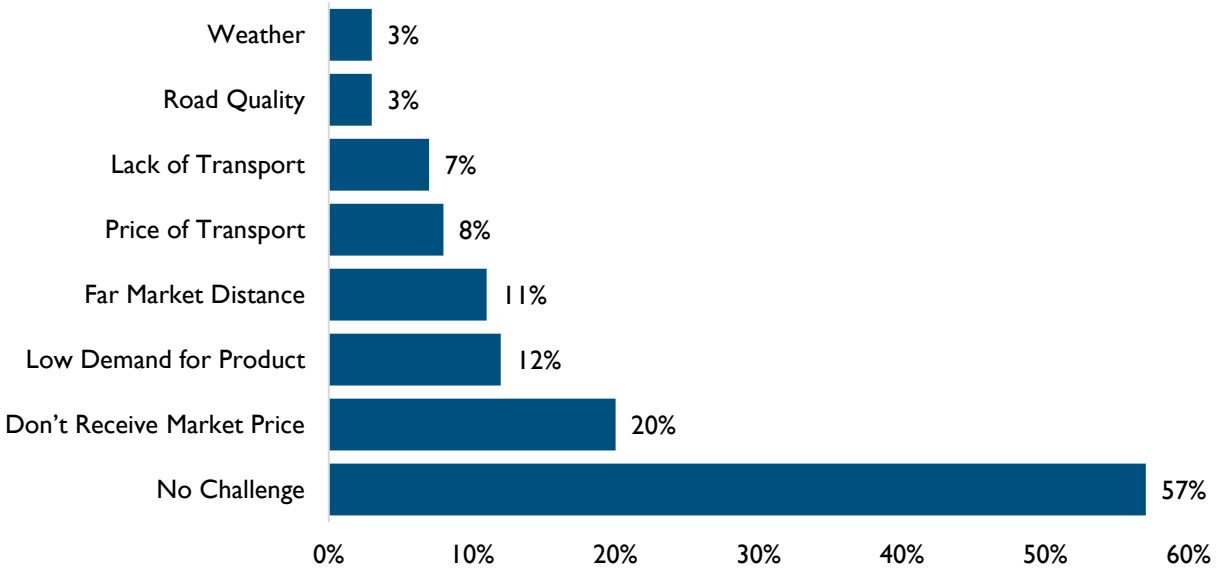
Exhibit 42. Usage Rates of Buyer Types to Sell Chicken & Mean Sale Price per Chicken by Buyer Types



N=472 for usage rates; Showing household-level responses from primary participants.
N size varies from 32 to 265 for mean sale price per animal, based on usage rate of each vendor type, showing household--level responses from primary participants.

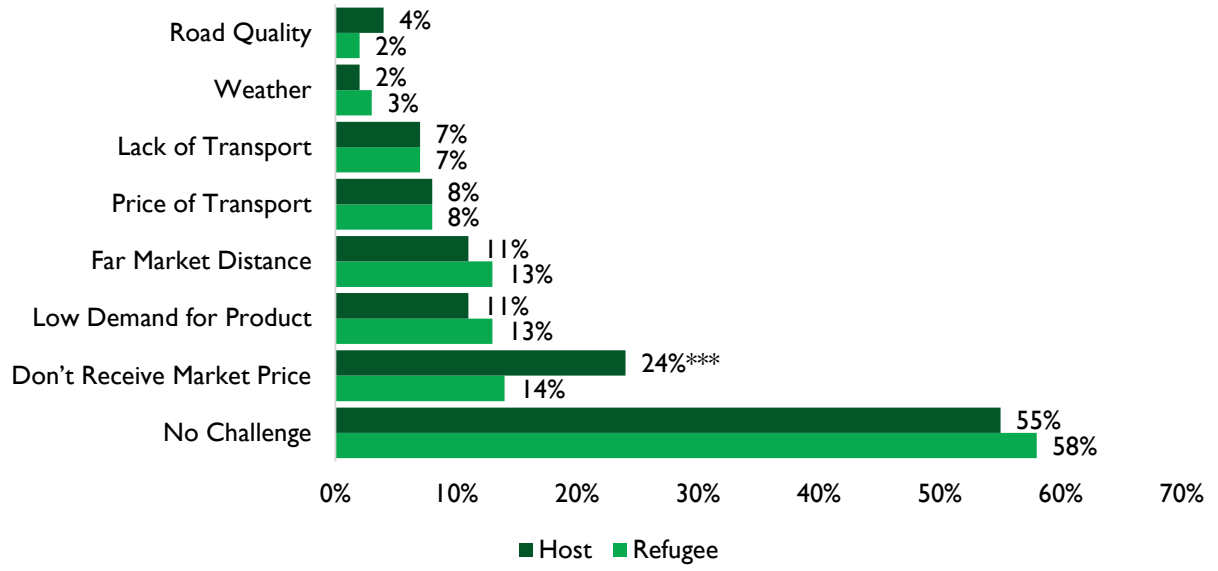
Challenges. Exhibit 43 shows challenges that farmers faced in selling chickens. Overall, the majority of all farmers (57%) reported no challenges, with similar percentages of refugee households (58%) reporting no challenges compared to host households (55%). Overall, the biggest challenge was not receiving market price (20%), followed by low demand for product (12%). Road quality and weather were the least common challenges (3%). There are interesting differences between host and refugee households: not receiving market price was the biggest challenge for both refugee and host households, though more host (24%) than refugee households (14%) report this challenge. Low demand for product was the second biggest challenge for both host (11%) and refugee households (13%). When examining the challenges reported by age group in Exhibit 45, we see that significantly more youth (67%) reported no challenges than adults (53%). Considerably more adults reported facing challenges with a far distance to the market and the price of transportation.

Exhibit 43. Chicken Selling Challenges



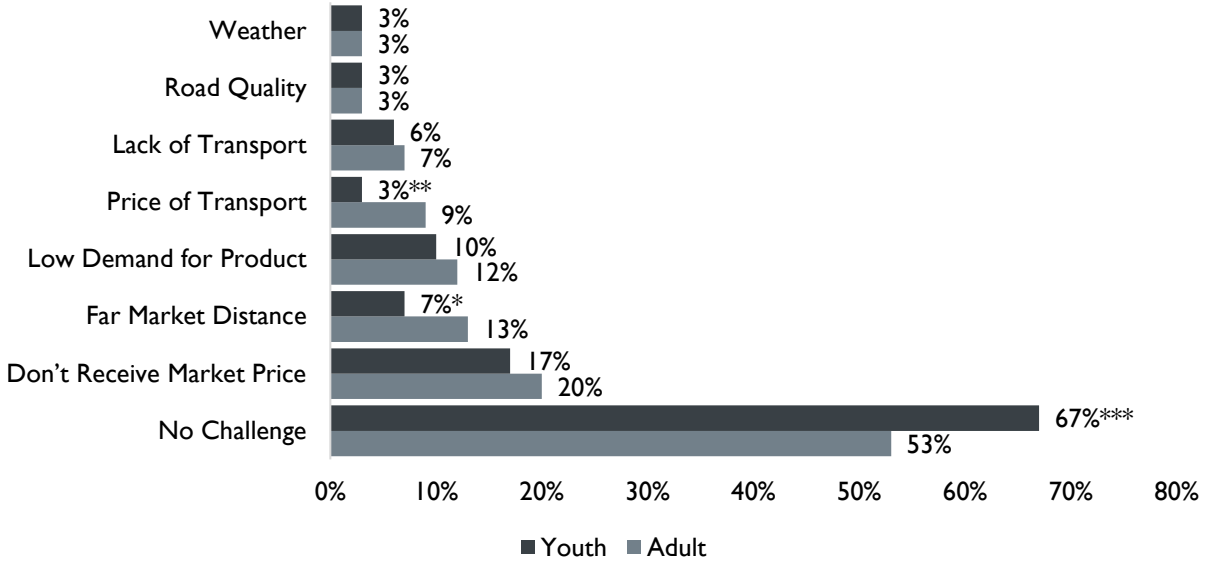
N=471 Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host, as well as adult versus youth. Significance markers are always placed on the host and youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit 44. Chicken Selling Challenges, by Nationality



N=223 for Refugee; N=246 for Host; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host. Significance markers are always placed on the host values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit 45. Chicken Selling Challenges, Adult versus Youth



N=354 for Adult; N=115 for Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between adult versus youth. Significance markers are always placed on the youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

From the FGDs, two themes were identified in chicken-rearing: chicken health challenges and connecting farmers to private sector processors. In relation to health challenges, SCRs listed diseases such as gumboro, coccidiosis, and salmonella as the main challenge in rearing chickens. The DLOs aligned with this theme and identified high mortality rates, particularly among exotic breed varieties, as the primary constraint.

Benefits & Opportunities. The two benefits of rearing chickens, noted in the FGDs, included a small land requirement and an already established market.

> **Invite private sector players…meat packers for chicken, goats etc. to increase market potential and production of meat products.**
>
> **FGD with SCRs**

Goats

Background. Goats represent an important livestock alternative to cattle for smallholder farmers in Uganda, particularly in pastoral areas that face drought. A 2015 assessment of livestock value chains in East Africa states that, compared to cattle, goats can be preferred because of their "resilience to droughts, faster reproduction rates and easier sales for loss mitigation during severe droughts."[38,39] This resilience offers greater food security given uncertain weather conditions and seasonal income.

A 2020 report on the impact of refugees on Ugandan markets analyzed the specific impacts of these newcomers to the goat value chain. It states that, as of 2017, over 95% of the domestic goat

[38] The International Livestock Research Institute (ILRI). 2017. *CTA Discussion Paper: Mapping Livestock Value Chains in the IGAD Region*. https://cgspace.cgiar.org/rest/rest/bitstreams/f7c6179b-7a79-4516-b8bb-e3248dfd0189/retrieve
[39] Lebbie, S.H.B. 2004. *Goats under household conditions.* Small Ruminant Research 51(2): 131–136.

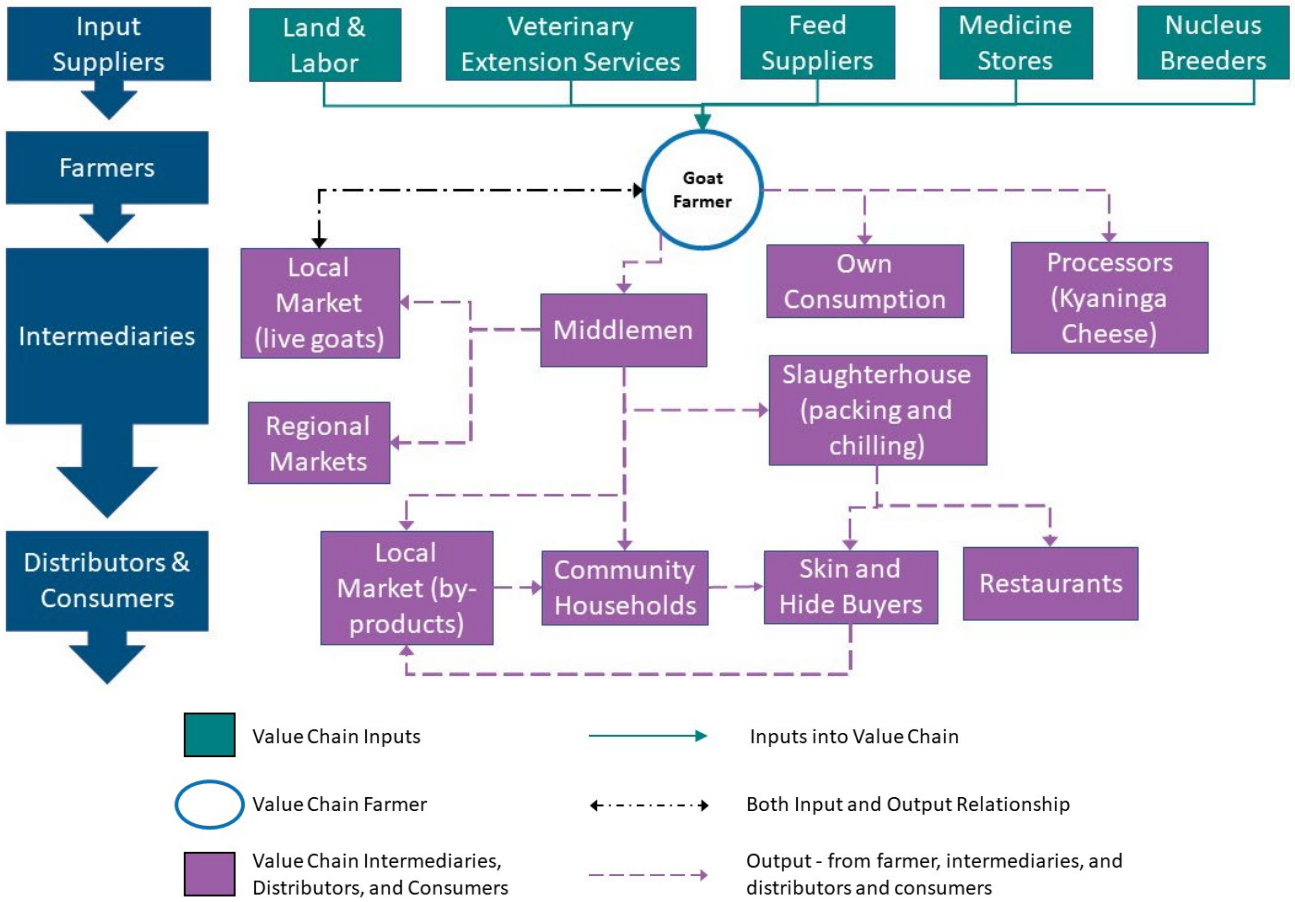
population was comprised of indigenous breeds.[40] The report notes: "These breeds are tolerant to pests and diseases, heat, water scarcity and can survive on poor quality and/or inadequate feed," which affirms the durability of these goats and explains why farmers might prefer them to cattle. The report goes on to describe how meat is the primary product sold, along with hides and skins. Milk is a rare product due to local consumer preferences and cultural taboos over drinking goat milk. While the indigenous goat breed (Boer) is generally understood to have low meat yields compared to high-productive breed or crossbreed alternatives, these alternatives are more susceptible to disease and parasites. Improved infrastructure for preventative veterinary care and better pasture quality could mitigate this issue. Availability of crossbreeds is presented as less of an issue than upfront costs of buying a stud and low understanding of the potential value of crossbreed goats.

Value Chain Map & Linkages. Exhibit 46 below shows VC maps for goats. Goat farmers receive veterinary services, feed, and goats (from breeders and the local market).

- Land and labor are also an input for goat farmers.
- In the goat VC map, the local goat market is the only connection serving as an intermediary; the local market receives goats from middlemen, and the farmer receives goats from the local market.
- Cheese processors receive goats directly from the farmer.
- All other connections go through middlemen. Regional and local markets, community households, and slaughterhouses (where the meat is packed and chilled) receive goats from middlemen. Slaughterhouses then sell the goat meat to restaurants as well as skin and hide to buyers. The FGDs described middlemen as the only private sector actor listed working in the geographic area of goats.

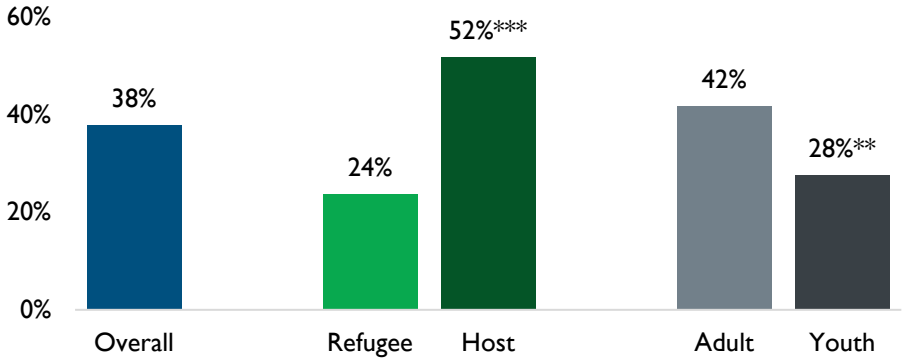
[40] World Bank Group. 2020. *Value Chain Assessment Report: Adjumani: Development Response to Displacement Impacts Project*. https://data2.unhcr.org/en/documents/download/82478

Exhibit 46. Value Chain Map for Goats



Rearing Patterns. Among the households surveyed at endline from cohort one of the Activity, 38% engaged in rearing goats, as Exhibit 47 shows. This livelihood was significantly more common among adult primary participants than youth primary participants, with 42% of adult households and 28% of youth households stating they currently own goats (statistically significant at the 1% level). Community type also plays a role in goat ownership, with 24% of refugee households and 52% of host community households reporting that they own goats (statistically significant at the 1% level).

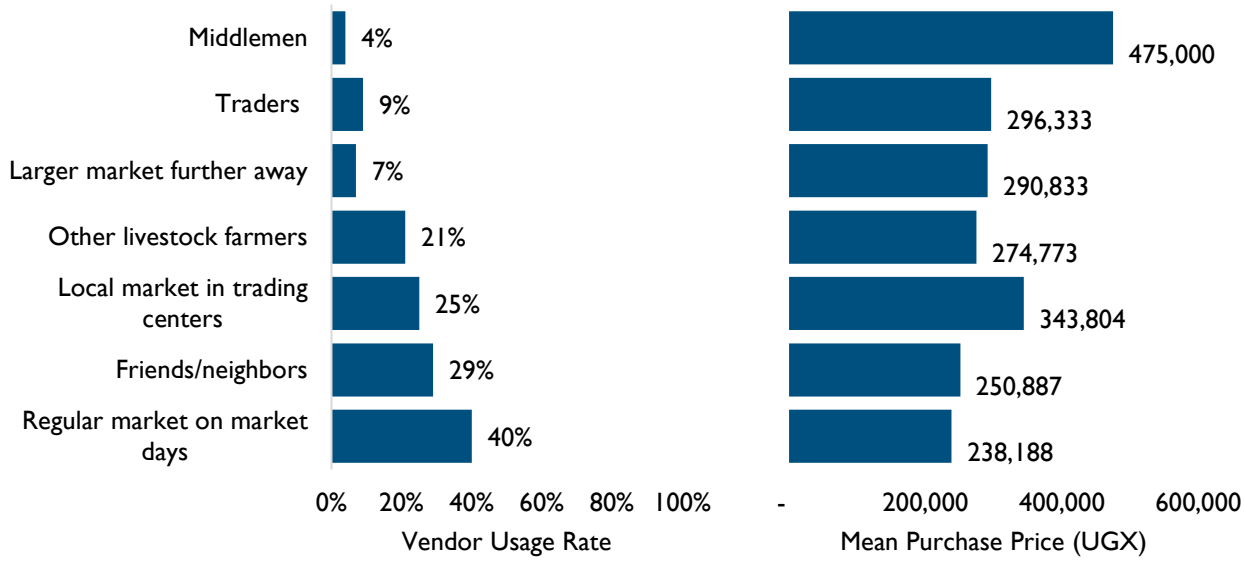
Exhibit 47. Goat-Rearing Popularity



N=783 Overall; N=384 Refugee; N=392 Host; N=562 Adult; N=214 Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host, as well as adult versus youth. Significance markers are always placed on the host and youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Goat Sales. Among the 296 cohort one households sampled that engaged in goat-rearing, most bought their goats from the regular market on market days (40%), friends or neighbors (29%), local markets in trading centers (25%), or other livestock farmers (21%), as Exhibit 48 shows. Overall, the average purchase price was UGX 262,024 per goat (N=205). This purchase price varied by vendor, with the regular market offering the lowest price at about UGX 238,000 per goat, which also happens to be the most popular vendor option. The price offered by friends or neighbors was only slightly higher, at about UGX 250,000, while the least popular option of middlemen (7%) sold to farmers at the highest average price of about UGX 475,000.

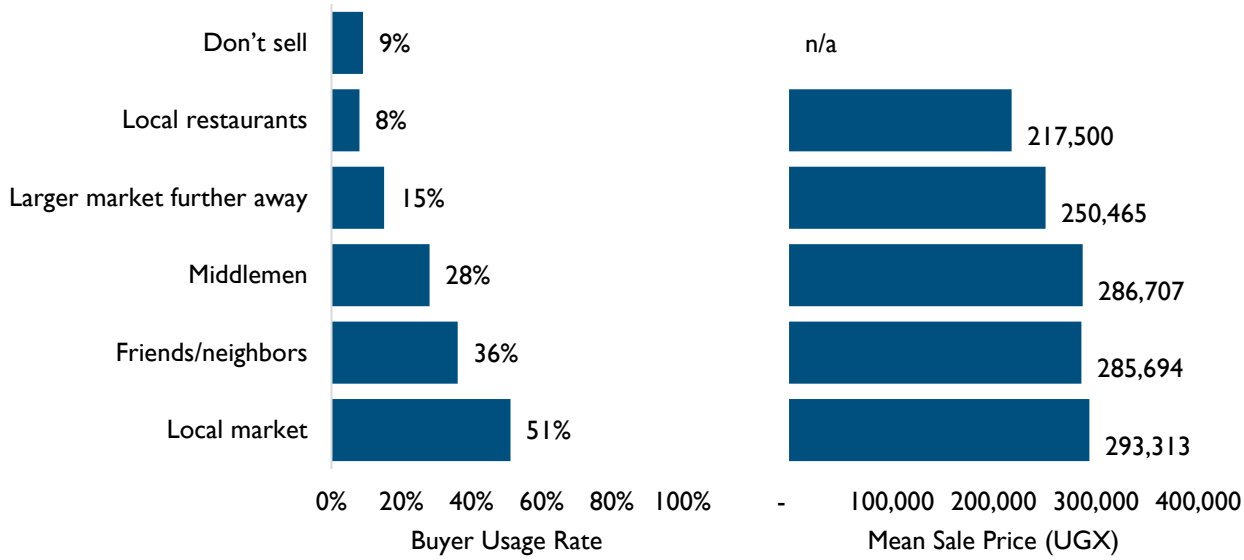
Exhibit 48. Usage Rates of Vendor Types to Purchase Goats & Mean Purchase Price of Goats, by Vendor Type



N=296 for usage rates; Showing household-level responses from primary participants.
N size varies from 7 to 80 for mean purchase price, based on usage rate of each vendor type; Showing household-level responses from primary participants.

In terms of selling goats, the most popular buyers to sell to among our sample of households was the local market (51%), then friends or neighbors (36%), then middlemen (28%), as Exhibit 49 shows. The overall average selling price was UGX 270,000 (N=290), which is somewhat lower than the price offered to the local market, friends or neighbors, and middlemen. The overall average price seemed to be skewed downward by the sale prices for larger markets further away (UGX 250,000) and local restaurants (UGX 217,000), though these are the two least popular buyer types. Perhaps the low sale price is driving farmers away from selling to these buyers. Relatively few households that rear goats did not sell at all (9%), presumably rearing them for their own consumption.

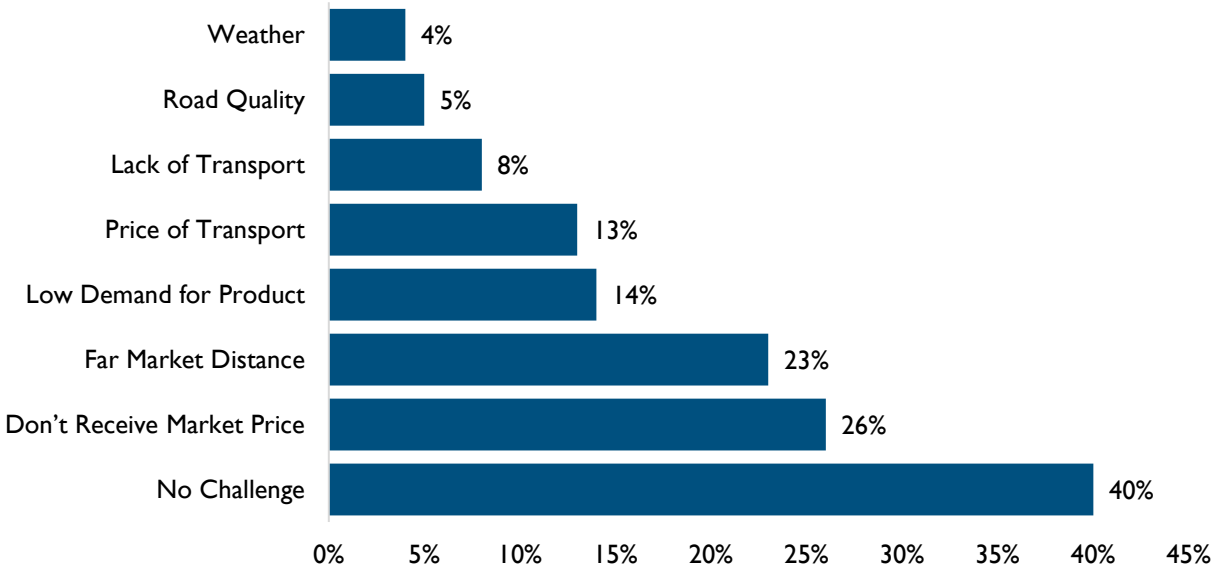
Exhibit 49. Usage Rates of Buyer Types to Sell Goats & Median Sale Price per Goat, by Buyer Types



N=296 Showing household-level responses from primary participants.
N size varies from 24 to 150 for mean sale price per animal, based on usage rate of each vendor type; Showing household-level responses from primary participants.

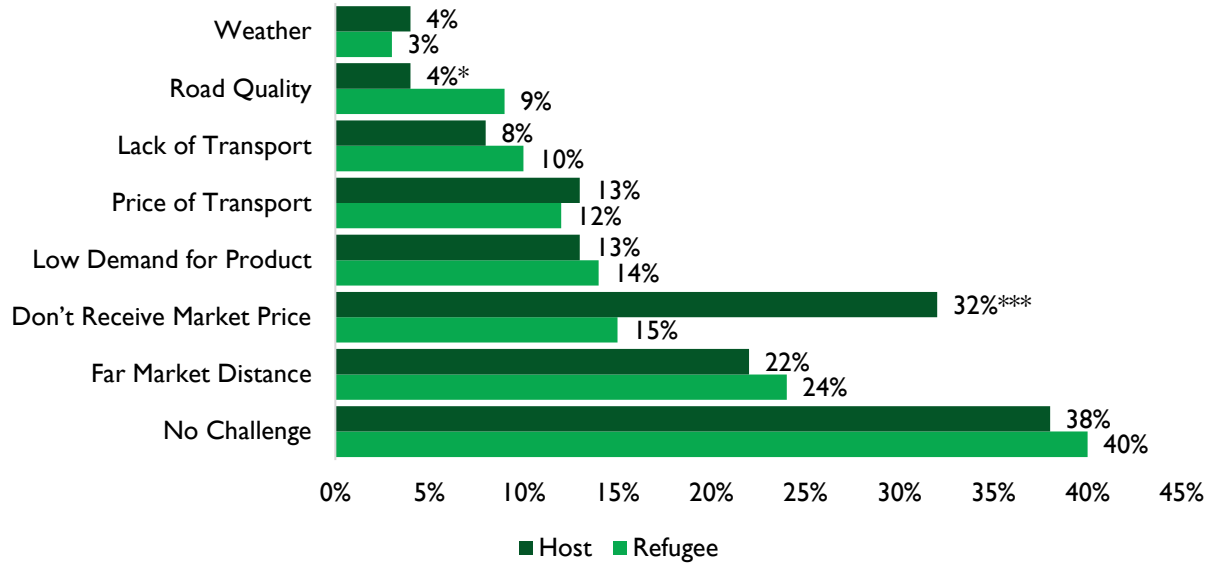
Challenges. Exhibit 50 shows challenges that farmers faced in selling goats. Overall, 40% of all farmers reported no challenges, with a broadly similar percentage of refugee households (40%) reporting no challenges compared to host households (38%). The biggest challenge was not receiving market price (26%), followed by distance to the market (23%). Road quality (5%) and weather (4%) were the least common challenges. There were interesting differences between host households and refugee households: not receiving market price was the biggest challenge for host households (32%) and the second biggest challenge for refugee households (15%). Weather was the least common challenge among refugee households (3%) and host households (4%). When examining the challenges reported by age group, we find that adults are significantly more likely than youths to report difficulties related to a far distance to the market and the price of transportation. Youth (10%) were significantly more likely than adults (4%) to report the road quality as a barrier to selling goats. While more youth than adults reported facing no challenges, the difference between them is not statistically significant for this metric.

Exhibit 50. Goat Selling Challenges



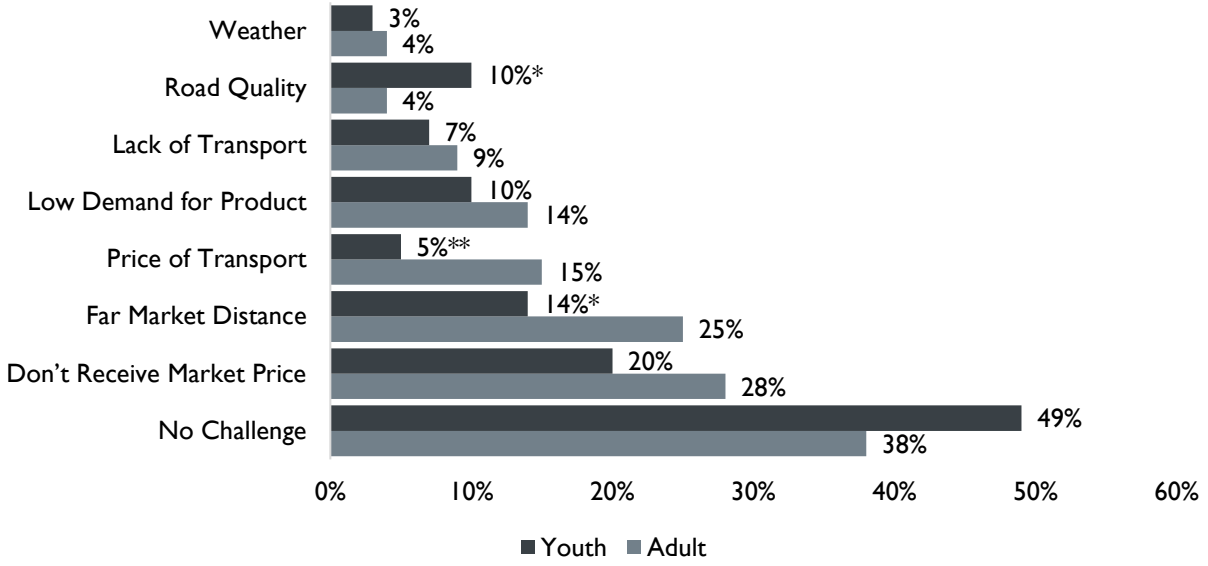
N=296; Showing household-level responses from primary participants.

Exhibit 51. Goat Selling Challenges, by Nationality



N=91 for Refugee; N=203 for Host Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host. Significance markers are always placed on the host values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit 52. Goat Selling Challenges, Adult versus Youth



N=235 for Adult; N=59 for Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between adult versus youth. Significance markers are always placed on the youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

SCRs reported that the challenges faced by goat farmers include diseases, the large amount of land required, poor-quality breeds, and unavailability of quality breed providers. Interestingly, while SCRs expressed goats' susceptibility to diseases and worms, they also commented that goats are disease-resistant. DLOs noted that goats can meet nutritional needs through grass and legumes.

Benefits & Opportunities. Opportunities to improve the next cohort of farmers centered around inputs. SCRs suggested connecting farmers with a reliable source to obtain quality goat breeds and trainings to gain the skills needed to improve production. As previously mentioned in the chicken VC, SCRs also recommended connecting farmers with private sector processors to increase market production.

> **Reliable sources of inputs… good goats and reliable trainings for farmers and everyday supervisors. If they get the skills and they get good breeds, it will improve their production capacity.**
>
> **FGD with SCRs**

Pigs

Background. Consumption of pork in Uganda is increasing, according to a 2015 report from the International Livestock Research Institute (ILRI).[41] As of reporting, pork ranked fourth among meats in terms of per-capita consumption, and consumption of pork is especially high in urban areas. Indeed, 44% of households surveyed from cohort one of the Activity participated in rearing pigs.

That being said, the ILRI report notes that pork is not a major or priority enterprise for strategic investment and promotion in the country by the Ugandan government. International trade of pigs is

[41] Tatwangire, Alex. 2014. Uganda smallholder pigs value chain development: Situation analysis and trends. International Livestock Research Institute (ILRI).
https://cgspace.cgiar.org/bitstream/handle/10568/34090/PR_UgandaSituationAnalysis.pdf

almost non-existent, and frequent African Swine Fever outbreaks, as experienced in the area of operation in 2020, represent a health constraint with no vaccine available at present. Nevertheless, "private veterinary providers, drug shops, and community-based animal health service providers supplement the work of government veterinary officers in reaching out to pig and other livestock farmers."[42] The report identifies some barriers to the industry, including limited breeding stock (resulting in a high level of inbreeding and lower meat yields) and poor-quality feed supplies. Additional research on the value chain notes that the value chain is long, with multiple intermediaries between the production and end-consumers.[43] Given these limitations, the Activity may have opportunities to intervene in connecting producers directly with distributors or providing linkages to better preventative care and input dealers.

Value Chain Maps & Linkages. Exhibit 53 below shows VC maps for pigs.

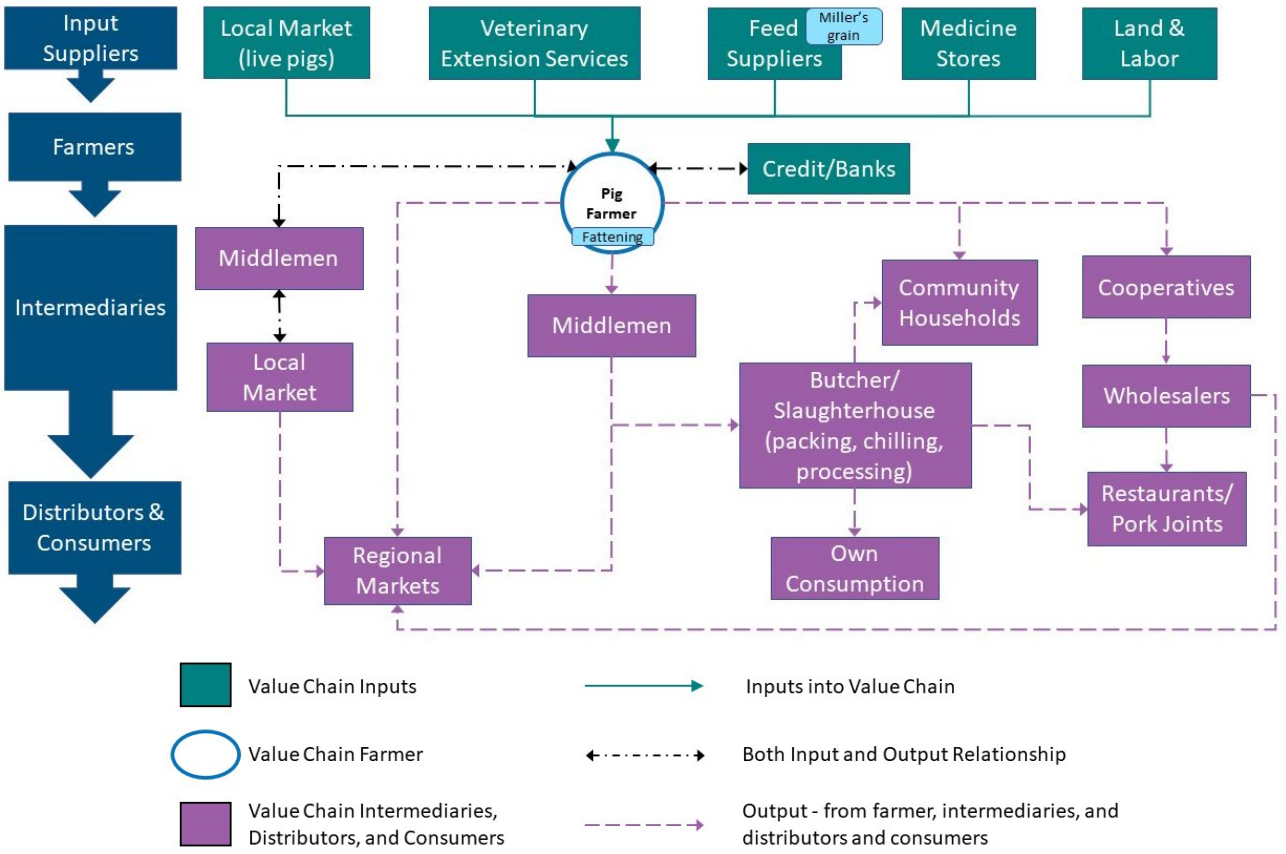
- Farmers receive pigs from the local market, veterinary services and medicine from stores. They purchase grain through a feed supplier, and credit from banks. Like goats, the local market provides pigs to farmers and receives pigs from farmers.
- Cooperatives and households purchase pigs directly from the farmer.
- Regional markets also receive pigs directly from farmers, in addition to middlemen, and sells pigs to wholesalers.
- Wholesalers purchase pigs from cooperatives and regional markets before selling to restaurants. Butchers and slaughterhouses receive pigs through middlemen before selling to households and restaurants.
- "Amos Millers," private buyers and pig traders from Kasese were listed by FGD participants as the actors in the geographical region. Officials pointed out that the traders tend to buy various types of livestock in bulk and transport the livestock back to Kasese.

Officials also noted the linkage barriers between farmers and medicine stores, specifying that medicine stores often provide fake and counterfeit products. The relationship between farmers and suppliers is also weak, due to a higher interest rate on pigs. Officials also described little to no record-keeping among farmers.

[42] Ibid.

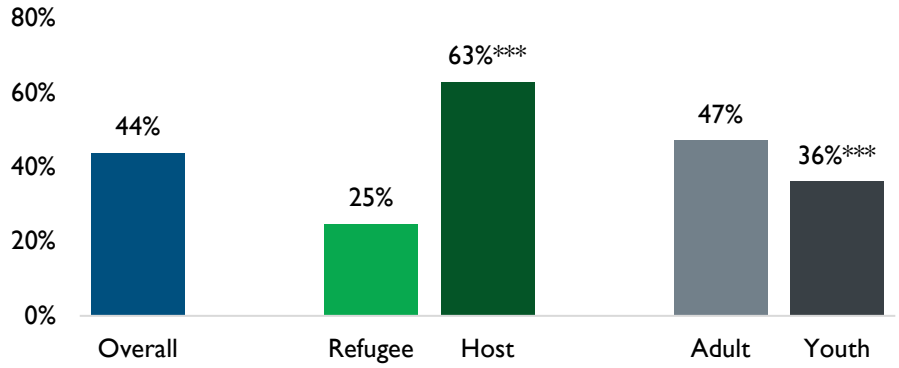
[43] Ouma et al. 2014. *Governance structures in smallholder pig value chains in Uganda: constraints and opportunities for upgrading.* International Food and Agribusiness Management Review.

Exhibit 53. Value Chain Map for Pigs



Rearing Patterns. Exhibit 54 shows that 44% of participants in cohort one reared pigs, with significantly more adult participants (47%) than youth (36%). Rates of engagement with this value chain varied by community, with 63% of host community households but only 25% of refugee community households engaging in pork productions (statistically significant at the 1% level).

Exhibit 54. Pig-Rearing Popularity

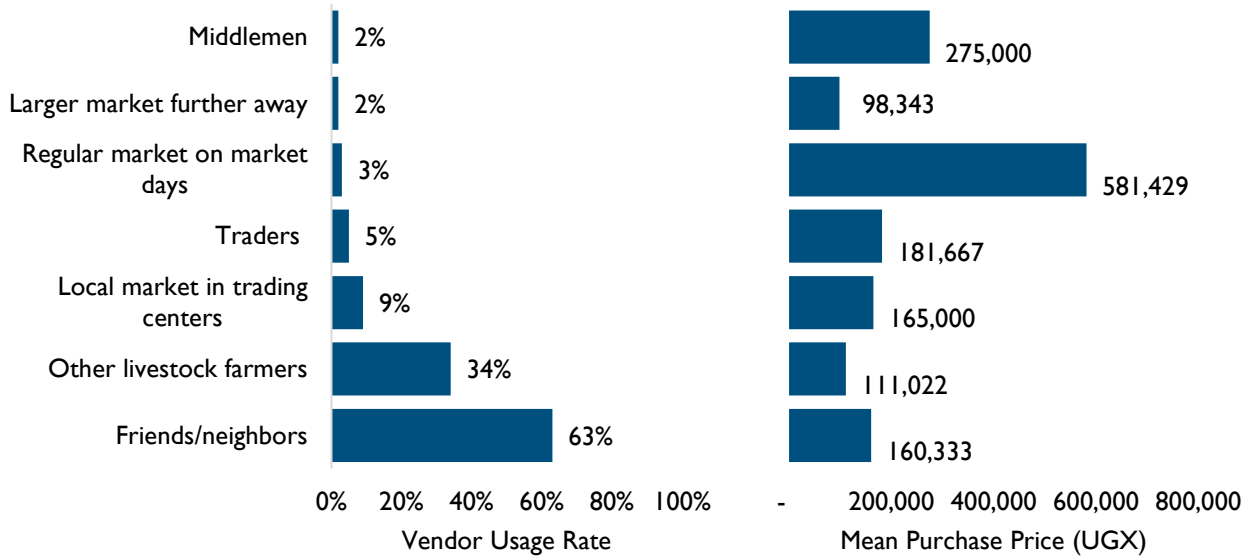


N=783 Overall; N=384 Refugee; N=392 Host; N=562 Adult; N=214 Youth; Showing household-level responses from primary participants.
*Note: Statistical significance is shown for t-test differences between refugee versus host, as well as adult versus youth. Significance markers are always placed on the host and youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Pig Sales. Among the 341 cohort one households sampled that engaged in pig-rearing, most bought their pigs from friends or neighbors (63%), other livestock farmers (34%) or the local market in

trading centers (9%), as Exhibit 55 shows. Overall, the average purchase price was UGX 153,259 per pig (N=271). This purchase price varied by vendor, with the larger markets and other livestock farmers offering the lowest prices of about UGX 98,000 and UGX 111,000 per goat, respectively. The price offered by friends or neighbors was much higher, at about UGX 160,000, despite its popularity as a vendor type.

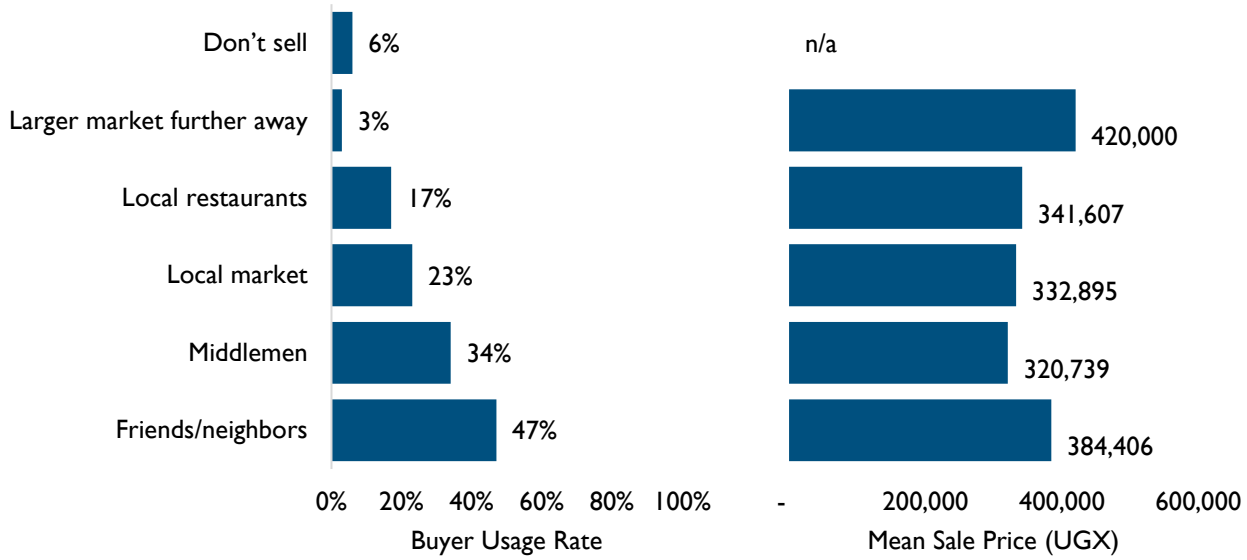
Exhibit 55. Usage Rates of Vendor Types to Purchase Pigs & Mean Purchase Price per Pig, by Vendor Type



N=341 for usage rates; Showing household-level responses from primary participants.
N size varies from 4 to 174 for mean sale price per animal, based on usage rate of each vendor type. Showing household-level responses from primary participants.

In terms of selling pigs, the most popular buyers to sell to among our sample of households was friends or neighbors (47%), then middlemen (34%), then the local market (23%), as Exhibit 56 shows. The overall average selling price was about UGX 317,000 (N=337), which is somewhat lower than the price from friends or neighbors. Notably, sale prices are about double the purchase prices, suggesting strong returns on investment in rearing pigs. Relatively few households that rear pigs do not sell at all (6%), presumably rearing them for their own consumption.

Exhibit 56. Usage Rates of Buyer Types to Sell Pigs & Mean Sale Price per Pig, by Buyer Types

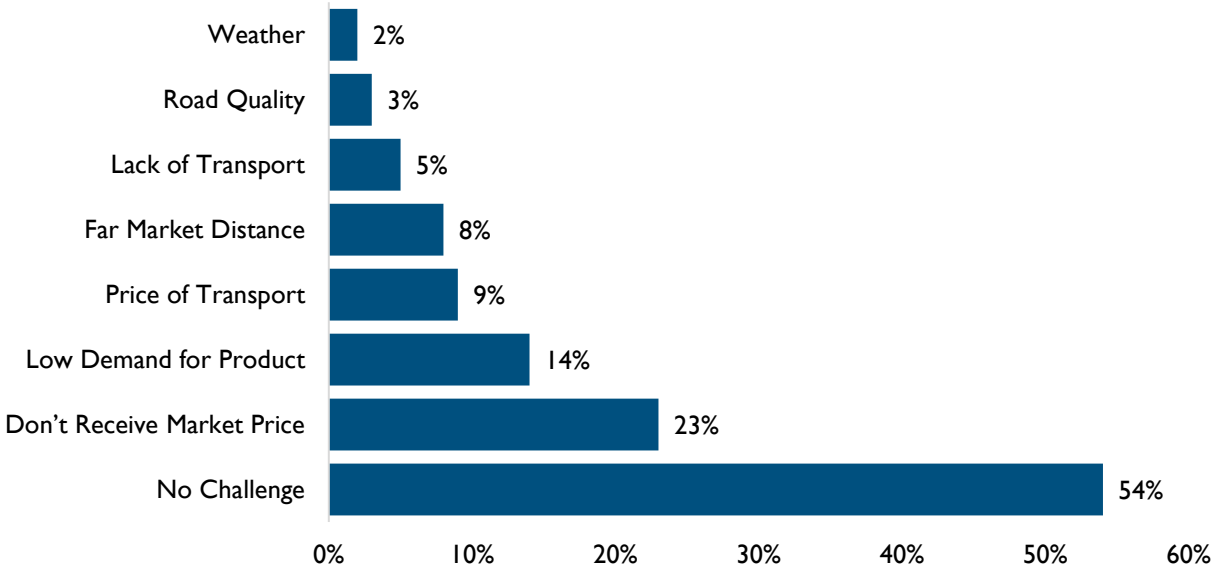


N=341 for usage rates; Showing household-level responses from primary participants.
N size varies from 10 to 160 for mean sale price per animal, based on usage rate of each vendor type. Showing household-level responses from primary participants.

Challenges. Exhibit 57 shows challenges that farmers faced in selling pigs. Overall, 54% of all farmers reported no challenges, with more refugee households (64%) reporting no challenges compared to host households (50%). The biggest challenge was not receiving market price (23%), followed by low demand for product (14%). Road quality (3%) and weather (2%) were the least common challenges. There are interesting differences between host households and refugee households: not receiving market price was the biggest challenge for host households (27%) and the second biggest challenge for refugee households (15%). Price of transport was the biggest challenge for refugee households (16%). Weather was the least common challenge among refugee households (3%) and host households (2%). When examining the challenges reported by age group, we find few differences between adults and youth. The only significant difference of note was that youth (10%) are significantly more likely than adults (4%) to cite lack of transport as an issue with selling pigs.

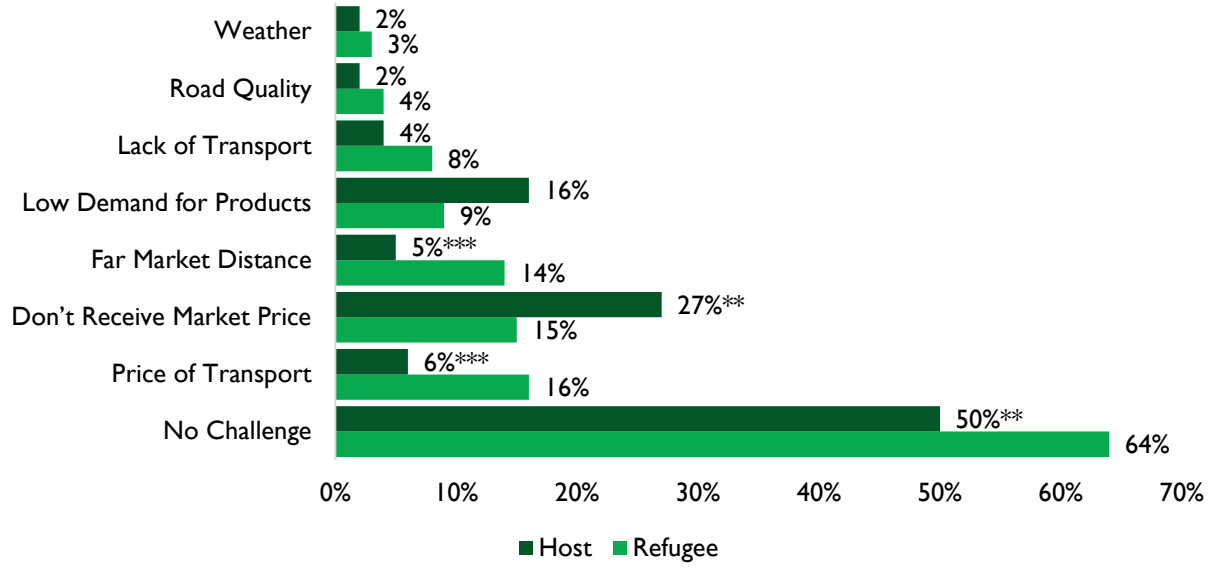
> **Most don't know that pigs can be injected hence they do not bother seeking for veterinary services. They also have the perception that pigs eat too much and hence over feed them even when it is not necessary.**
>
> **FGD with SCRs**

Exhibit 57. Pig Selling Challenges



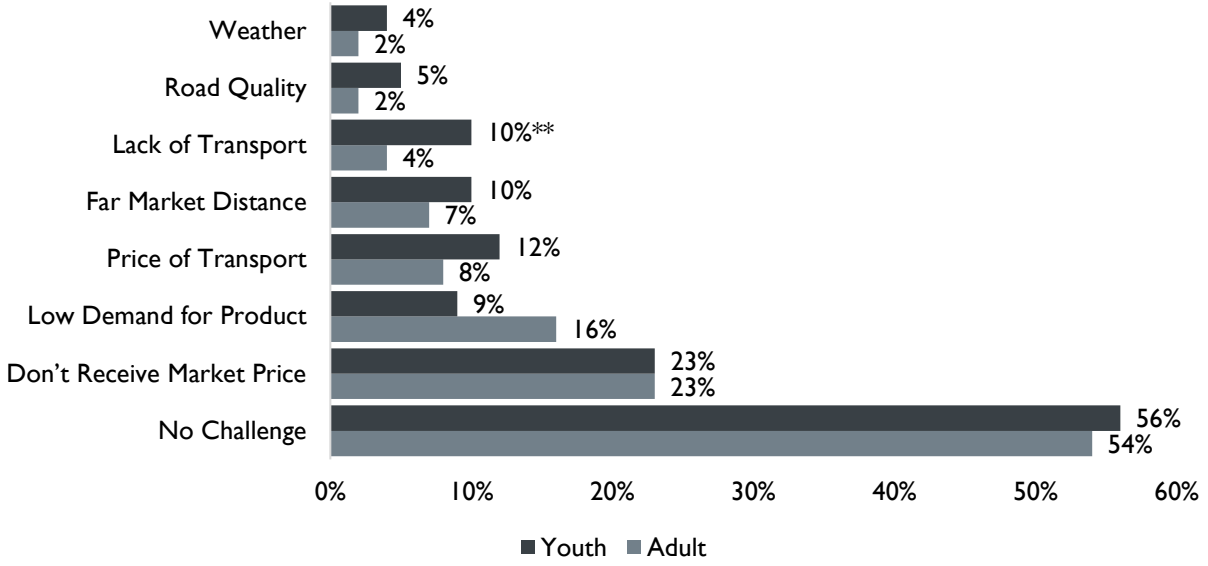
N=341; Showing household-level responses from primary participants.

Exhibit 58. Pig Selling Challenges, by Nationality



N=95 for Refugee; N=246 for Host; Showing household-level responses from primary participants.

Exhibit 59. Pig Selling Challenges, Adult versus Youth



N=264 for Adult; N=77 for Youth; Showing household-level responses from primary participants.

In the FGDs, as with other livestock, diseases and worms were listed as common challenges among pigs, with swine flu specifically causing a lot of loss. Troubling barriers included the farmers' relationship with external actors (detailed below under Linkages) and knowledge deficiencies, such as not seeking out veterinary services due to lack of information on vaccinations. Additionally, conflicting viewpoints in feeding practices arose; SCRs noted that overfeeding is a common practice among pig farmers, while DLOs commented that a good feeding practice is required to maximize profits.

Benefits & Opportunities. Multiple benefits of pig-rearing were discussed in the FGDs. On the input side, pig feed is easily accessible and available, and pigs can eat various foods. Further, it was noted that NARO researchers have developed more beneficial breeds. For the farmer, pigs require small land plots, grow quickly, and are prolific. On the output side, there is an abundant market for pigs.

SCRs recommended that pig farmers improve their record-keeping practices and be taught to calculate how much their pigs consumed from purchase to selling to understand their overall profit. Additionally, representatives would like to see farmers or external organizations mobilize and lobby for veterinarians to reach farmers to prevent livestock deaths.

> **The medicine stores and pig farmers have a weak relationship in terms of prices and quality of medicine; they bring fake medicines/counterfeit products.**
>
> **FGD with SCRs**

Cross-Cutting Issues

Market Information & Access. Inability to access outside markets was discussed in both FGDs. While a poor road network was specifically mentioned for certain VCs, it is a cross-cutting issue impacting all VCs. Without reliable access to roads, high-quality roads specifically, farmers are unable to access larger markets. Further, farmers are more likely to be cheated by buyers in cases where roads are impassable because it reduces their bargaining power. While most participants noted either a lack of roads or poor road quality negatively impacting farmers, SCRs also noted that, even when high-quality roads exist, they are not utilized for transporting produce. No further explanations were offered on why the high-quality roads were not utilized.

> **When roads are impassable, the buyers end up cheating the farmers.**
>
> **FGD with SCRs**

On multiple occasions, officials commented on a lack of market information. Broadly, both FGDs shared a need for participants and AVSI to understand the market and prices of specific value chains. DLOs pointed out that there is an information gap on value chain developments, such as seed sources. Similarly, SCRs commented that farmers are unaware of where to sell their produce and suggested using radio to increase awareness and connect farmers to potential private sector buyers. When asked about the technical knowledge needed for households to expand their business and earnings, SCRs suggested providing information on specific markets and market prices to all stakeholders: farmers, agricultural officers, commercial officers, and the District Community Development Officer. DLOs recommended that AVSI consider using a farmer market school approach (promoted by ADRA), which provides market information and gives farmers an opportunity to share their solutions to market challenges.

> **Most local input dealers are not registered, and it becomes hard to have a relationship with them.**
>
> **FGD with DLOs**

Linkages & Private Sector Engagement. On the input side, it was frequently brought up that farmers have little connection to reliable sources that provide high-quality inputs, such as seed varieties and disease-resistant breeds. Further, developing formal relationships with input dealers is difficult, as most are not registered. The connection between veterinary service providers and farmers could also be better facilitated, as the relationship is currently weak. The relationship between farmers and middlemen is also strained. There is a clear lack of trust, and middlemen are cited as taking advantage of farmers, though price information from the household survey shows that middlemen offered among the top three prices per kilogram to farmers for potatoes, cassava, and groundnuts. As mentioned in the market access section above, the linkage between farmers and larger markets also needs to be improved.

Opportunities to improve linkages include strengthening the connection between farmer-to-input suppliers, farmer-to-farmer, farmer-to-private sector, and farmer-to-market connections. SCRs suggested that trade shows would give farmers the opportunity to showcase their products, while also serving as a source of information to other farmers on best practices. On the processors side, AVSI can connect farmers to larger private sector players, such as meat packers, hotels, and those doing value-addition, such as producing crisps. This relationship-building would increase market potential and allow for direct transactions, reducing the middlemen's opportunity to cheat farmers. Of course, farmer to private actor linkages depend on the farmers' ability to access them through roads, as discussed above.

Farmer Groups. A common theme that arose from the FGDs included the formation of farmer groups. Both SCRs and DLOs recommended that farmers organize into small groups to improve their negotiating power and ensure better prices. Specifically, officials often commented that group formation would allow the farmers to sell their products in bulk, which would secure higher prices and regular buyers, and attract large private buyers. Certain government policies and regulations, however, limit the formation of farmer groups. To register as a group, there is a minimum requirement of 15 members. This forces some groups to adopt farmers that may not have the same objectives to meet the minimum number requirement. The high cost of registration is an additional deterrent to farmers forming groups.

> **Operating in groups, that encourages bulking. When farmers come together in cooperatives, they have a strong voice, and they can bargain for better prices.**
>
> **FGD with District-Level Officials**

> **Discourage farmers from taking out loans; most farmers take multiple loans with high interest rates and they end up toiling for nothing.**
>
> **FGD with SCRs**

> **Limited access to finances… this is a push factor for the farmer to sell their products at farm gates, which fetches them low prices.**
>
> **FGD with DLOs**

Farm Finance. Access to finance was another theme that was frequently cited during the FGDs. For farmers to be involved in agricultural production, they need finance. Unfortunately, limited access to finance is hindering farmers' ability to invest in agriculture. Lack of funding also forces some to sell their products at their farm, rather than going to a local market, causing them to receive lower prices. Unsurprisingly, farmers are reportedly taking out multiple loans with high interest rates. The lack of record-keeping among farmers also impacts their ability to accurately calculate their profit.

To address some of the barriers, officials suggested increasing access to finance by encouraging VSLA participation so farmers can receive loans with low interest rates. Beyond having the finances to start cultivating crops or rearing livestock, access to finances is also needed at each stage of the value chain because there are costs associated with different actors. For livestock farmers, SCRs mentioned the need for subsidized medications, in the form of soft loans, to increase farmers' ability to access drugs easily. They also commented that farmers often treat animals themselves, perhaps due to high prices.

Crop Diversity, Quality, & Protection. Improving crop diversity and quality was a common theme brought up for all crop VCs. SCRs recommended providing farmers with fertilizers for each of the crop VCs to improve production and teaching farmers to grow a variety of crops - particularly those that have a short growth and maturation period. DLOs shared that farmers should cultivate crop varieties with a specific market in mind (for example, cultivating potato varieties commonly used to make chips that can be sold to restaurants). SCRs also relayed that crops can be destroyed by harsh weather, such as hailstorms, strong wind, and droughts, which can cause food insecurity. When asked what resources would help mitigate adverse weather impacts, they said wind breaks, such as trees, and irrigation equipment.

Gender. SCRs identified the barriers felt by women as: a lack of capital to invest in agriculture, lack of decision-making power, and lack of ownership of outputs even though they tend to put in more work cultivating or rearing. It was noted that there is a community misperception that AVSI is specifically targeted toward women.

When asked how to improve opportunities for women, SCRs suggested encouraging gender mainstreaming by inviting a female representative to meetings and engaging both men and women to participate in trainings (to mollify male resentment at female-targeted programming), as well as asking women what challenges they face, specifically regarding gender, so that solutions can be tailored to their responses.

4. CONCLUSIONS

This assessment employed a mixed-methods approach to evaluate six value chains of interest – potatoes, cassava, groundnuts, chickens, goats, and pigs – to assess the experiences of Activity participants involved in those VCs and refine intervention implementation for cohort two. We provide lessons learned and offer recommendations for modifications in cohort two. This section provides a summary of key insights,[44] which we elaborated on in Section 3.

Profitability Analysis

- Across all ages and demographics, pigs ranked first among the chosen VCs (ranked third overall), generating UGX 210,500 of median annual profits. Cassava ranked last among the chosen VCs (14th overall) with the lowest median annual profits of UGX 45,000.
- When taking into consideration ROI estimates, cassava ranked first among the six VCs (second overall) for median ROI in the last 12 months, while potatoes ranked last for the selected VCs and eighth overall.
- When analyzing median profits by acre in the last 12 months, pigs ranked 2nd overall with UGX 553,500, and cassava ranked 16th at UGX 60,000.
- Breaking down ROI and median profits by acres of land used, we found that groundnuts and pigs were the most profitable for very small farmers (0.25 acres); cassava, chickens, and potatoes were most profitable for small farmers (0.50 acres); and goats were the most profitable for medium sized farmers (1 acre).
- The six VCs were profitable when disaggregated by refugee or host status. We find that they had similar relative profitability rankings.
- The six VCs were reported as profitable when disaggregated by age. Adults in general had higher absolute profits, except for cassava, for which youth report earning a higher profit.

Value Chains of Interest

- ***Potatoes***
  - Overall, 24% of households cultivated potatoes. There was a significant difference ($p < 0.01$) in the number of households engaged in potato cultivation when disaggregated by host versus refugee community status (34% and 15%, respectively). There was no significant difference by age group.
  - The majority of potatoes were set aside for the farmer's own consumption (78%). Selling to middlemen was the second largest use reported (32%). There were two categories of a potato farming households: households that sold primarily to middlemen or at local trading centers, and households that equally split the proportion they sold between other local households or in the regular market and used the other half for their own consumption.
  - When disaggregated by buyer type, local trading centers tended to offer the best price/kilogram of potatoes.
  - Overall, just under half of farmers reported no challenges when selling potatoes. The second most reported challenge is unstable selling price at 26%. Lack of transport and improper measurement of crop quantity were the lowest reported challenges at 6%.

[44] Statistical significance is stated as the following: a statistical significance level of 10% is indicated as $p < 0.10$; a statistical significance level of 5% is indicated as $p < 0.05$; and a statistical significance level of 1% is indicated as $p < 0.01$.

- When disaggregating by host or refugee status, most host households (65%) reported no challenges, whereas 38% ($p < 0.01$) of refugee households reported no challenges. Interestingly, 35% ($p < 0.01$) of host households reported unstable selling prices as a challenge, compared to only 6% of refugee households.
- When disaggregating by youth, more than half of youth reported no challenges (57%) and less than half of adults (44%) reported no challenges.
- The challenges impacting potatoes described by FGDs included diseases, lack of seed and/or seed multipliers, small land plots, poor quality soil, and poor postharvest handling. Benefits described in the FGDs included multiple potato varieties, short maturation period, and ease of cooking. A key opportunity for improving the potato VC includes cultivating varieties with a specific market in mind, such as chip varieties for restaurants.

- ***Cassava***
  - Overall, 31% of households cultivated cassava. There was a significant difference in cassava cultivation when disaggregated by host versus refugee communities (35% [$p < 0.01$] and 28%, respectively). There was no significant difference by age group.
  - Of the cassava cultivating households, 79% set it aside for their own consumption, 20% sold to other households and 15% sold to middlemen. No cassava farmers (0%) reported selling to big buyers, cooperatives, or contract buyers. There was little difference between prices for each buyer type.
  - The majority of households (61%) reported no challenges selling cassava. The top two challenges reported were unstable selling price (13%) and low demand for product (9%). When broken down by host/refugee status, there was a significant difference between those reporting no challenge (49% for host [$p < 0.01$] versus 74% for refugee households), unstable selling price (25% [$p < 0.01$] versus 0%), low demand for product (14% [$p < 0.10$] versus 4%), and not receiving market price (11% [$p < 0.10$] versus 2%). Reporting price of transport as a barrier varied greatly between youth (5%, $p < 0.05$) and adults (0%).
  - Key challenges for cultivating cassava expressed during the FGDs were the additional care and longer maturation periods, which impacts farmers' ability to allocate land toward other crops. Other challenges included poor-quality soil and cuttings, price fluctuations, land shortages, small land plots, and high disease incidence. FGD participants stated that cassava is drought-resistant and easy to cook, and that new developments of disease-resistant cassava varieties is a key opportunity to improve production.
- ***Groundnuts***
  - Overall, 23% of households grew groundnuts. Like the other crops, there was a significant difference in cultivation between refugee and host households (6% and 39% [$p < 0.01$], respectively), as well as adults versus youth (25% and 16% [$p < 0.01$], respectively).
  - The majority (80%) of groundnut farmers are allocating groundnuts for their own consumption, about 64% of their total harvest, on average. Of groundnut farmers, 23% sold to middlemen, 16% sold in local trading centers,15% sold to other households, 6% sold in regular market, and only 1% sold to contract buyers.
  - Overall, a little over half of farmers reported no challenges when selling groundnuts, followed by 26% reporting unstable selling price. 8% or less was reported for all other challenges. Disaggregating by host/refugee status, 30% ($p < 0.01$) of host households and 0% of refugee households reported unstable selling price as a challenge. There were no significant differences between youth and adult farmers.

- In addition to small plot size and poor-quality soil challenges, FGDs noted that groundnut farmers have limited access to quality seeds, and some seed varieties are ill-suited for certain regions, such as the Serenut variety in the Kamwenge district. Engagements with actors should be made at each level of the VC, sources of seeds need to be trustworthy to ensure good seed quality, and electricity infrastructure is particularly important for groundnut paste production.

- ***Chickens***
  - Overall, 60% of households reared chickens. While there was no significant difference between the rates of host and refugee households rearing chickens, adults were significantly more likely than youth to engage in chicken-rearing (63% versus 54% [$p < 0.01$], respectively).
  - Half of chicken farmers reported receiving chickens from friends or neighbors, followed by local markets in trading centers (30%), and from the regular market on market days or other livestock farmers (19%). The majority of farmers purchased chickens from friends or neighbors, and the average price is about UGX 43,000 /chicken, but livestock farmers offered the lowest price for chickens (about UGX 30,000).
  - Among the challenges faced when selling chickens across all demographics, more than half of farmers reported no challenge, followed by 20% reporting not receiving market price. Reports of this challenge were statistically different among hosts and refugee households, with 24% ($p < 0.01$) of host households and 14% of refugee households reporting not receiving market price as a selling challenge. Youth and adults are also statistically different, with 67% ($p < 0.01$) of youth and 53% of adults reporting no challenge selling chickens.
  - The challenges identified by FGDs for rearing chickens included diseases impacting chicken health and high mortality rates among exotic breeds. The benefits included small land requirements and an already established market.

- ***Goats***
  - Overall, 38% of households reared goats. Goat-rearing was more popular among host households than refugee host holds (52% [$p < 0.01$] versus 24%, respectively), and less popular among youth compared to adults (28% [$p < 0.05$] versus 42%, respectively).
  - Goat farmers most commonly reported purchasing goats from the regular market on market days (40%) at an average price of about UGX 238,000 (the cheapest reported price from vendors), and only 4% purchase from middlemen at the highest average price (about UGX 475,000). The three most popular vendors to sell goats to were the local market (51%), friends or neighbors (36%), and middlemen (28%).
  - Of the selling challenges reported, 40% of goat farmers reported no challenge, 26% reported not receiving market price, and 23% reported far market distance. Compared to 15% of refugee households, 32% ($p < 0.01$) of host households reported not receiving market price.
  - A key challenge shared during the FGDs was accessing good quality breeds and good quality breed suppliers, along with diseases and large land requirements.

- ***Pigs***
  - Overall, 44% of farmers reported rearing pigs. Pig-rearing was more popular among host households than refugee households (63% [$p < 0.01$] versus 25%, respectively) and more popular among adults than youth (47% versus 36% [$p < 0.01$], respectively).

- Most pig farmers reported buying pigs from friends or neighbors, with the least amount purchasing pigs from local market in trading centers (9%). There were strong returns on investment in pig-rearing, as sale prices were roughly double the purchase prices.
- Of pig farmers, 54% reported no challenges selling pigs, followed by 23% reporting not receiving market price, and 14% reporting a low demand for product. There was a statistical difference between host and refugee households; 50% ($p < 0.05$) of host households reported no challenge, compared to 64% of refugee households; 27% ($p < 0.05$) of host households reported not receiving market price as a challenge compared to 15% of refugee households; only 6% ($p < 0.01$) of hosts reported price of transport as a selling challenge, compared to 16% of refugees; and only 5% ($p < 0.01$) of hosts, compared to 14% to refugee households, reported far market distance as a challenge. When disaggregated by age, 10% ($p < 0.05$) youth reported lack of transport as a selling challenge, compared to only 4% of adults.
- Key challenges for rearing pigs included linkages to medical stores and veterinary services, along with diseases and feeding practices. Benefits to pig-rearing included accessibility, numerous feed varieties, small land requirement, short growth period and abundance. FGD participants suggested improving linkages between farmers and veterinary staff/medical stores.

Cross-cutting issues

- ***Market Information & Access***
  - Poor road networks impact all value chains. Farmers that that do not have access to roads or are unable to travel due to poor road quality cannot access markets outside of their communities. This lack of access reduces farmers' bargaining power and increases the likelihood of being cheated by buyers.
  - Lack of market information was a common theme among FGD participants. Overall, AVSI staff and farmers need to have an understanding of VC markets, such as market prices and knowledge of best practices. There is also an information gap regarding VC developments, such as seed sources and markets in the area. Participants recommended a farmer-to-farmer approach, such as the farmer market school approach, to equip farmers with market information and solutions to common challenges.
- ***Linkages & Private Sector Engagement***
  - Linkages to middlemen are strained and they are often cited as taking advantage of farmers.
  - Improving linkages between farmers and larger markets and private sector actors, such as meat packers and hotels, would not only increase market potential, but by connecting farmers directly with private actors, would also reduce the incidence of middlemen cheating farmers by connecting farmers with private actors directly.
  - Connecting farmers with other farmers (through trade shows, for example) would allow them to showcase their products and learn about best practices from other farmers.
  - Forming formal relationships with input dealers is difficult as the majority are not registered. Connecting farmers to reliable input dealers would provide access to high-quality products and services, such as disease-resistant breeds and seed varieties as well as veterinary care.

- ***Farmer Groups***
  - Forming groups to sell in bulk would fetch higher prices, attract regular buyers, and attract large private buyers.
  - Government regulations hinder group formation due to the high cost of registration and the 15-member minimum regulation requirement, which forces some farmers to join with members who do not share their objectives.
- ***Farm Finance***
  - There is a lack of record-keeping practices among farmers, hindering their ability to correctly calculate their profit.
  - Farmers are taking out multiple loans with high interest rates. FGD participants recommended encouraging VSLA participation to get loans with lower interest rates.
  - There is a need for cheaper livestock medication. Farmers are treating animals themselves (though they would have preferred professional veterinary care), suggesting that the high price of medication and/or veterinary services is a barrier to proper treatment.[45] FGD participants recommended subsidizing medications in the form of soft loans, to help farmers access livestock drugs and medical care more easily.
- ***Crop Diversity & Quality***
  - Providing farmers with fertilizer and teaching them to diversify their crops (especially if they are currently growing crops that have a short maturation period) would be beneficial. Crop diversification is associated with more resilient earnings, as weather, disease, and pest issues are unlikely to affect all crop types equally.
  - Another recommendation is to encourage crop cultivation toward a specific market, such as cultivating potato varieties that are used to make chips to sell to restaurants.
- ***Gender***
  - FGD participants described the challenges that women experienced as lacking capital, household decision-making power, and ownership over harvest or livestock. FGD participants also revealed that there is a community misperception that AVSI is targeted at women.
  - Opportunities to improve gender equity included improving gender mainstreaming by having a female representative at meetings and involving men and women in program trainings. They also suggested asking women directly about their challenges and their opinions on how to best address them.

[45] More broadly, it is well known that professionally trained health workers and vets are vital to not only good animal health but human health as well and it may be beyond the skills of ordinary farmers to detect and treat zoonotic diseases. The Ministry of Health in Uganda has made it a strategic priority to invest in animal care services/vets/ "one health" systems to prevent and treat zoonotic diseases for better animal and human health in Uganda: https://www.health.go.ug/cause/uganda-one-health-strategic-plan-2018-2022/. Furthermore, one of the lessons from controlling Ebola in Uganda has been the need to provide trained health professionals to facilitate early detection for prevention of Ebola that ordinary farmers and community members simply cannot do: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4209631/.

5. RECOMMENDATIONS

This section presents recommendations based on key Activity outcomes, limitations, and lessons learned from the assessment. These recommendations do not address all challenges and opportunities from the assessment. Rather, they focus on recommended changes for the success of cohort two programming. The recommendations are grouped by category.

Cross-Cutting Recommendations:

1. Engage private sector actors early and regularly. In line with USAID's PSE Strategy[46] Principle 1, we encourage early and regular interaction and face time between local private sector actors and cohort two participants, which should facilitate not only timely linkages but also increased trust through consistent engagement. Our research shows that there are opportunities to connect participants to crisp manufactures for potatoes, cassava cutting suppliers for cassava producers, and restaurants and cheese manufacturers for goats and other value chains (VC-specific recommendations below). Some possible ways to bolster these relationships include:

- Work with agents or local dealers for each VC to set up regular meetings between them and participant households. These interactions could also occur at VSLA gatherings.
- The Labor Market Assessment provides more details on private sector engagement recommendations across VCs.
    - AVSI can strengthen its relationship with private sector actors and motivate them to work more frequently with participants. AVSI could offer incentives to the private sector, such as guaranteeing that participants will buy products from one service provider in exchange for private sector actors reaching out more to the participants. Households might be more trusting of private sectors that have been "vetted" by the Activity.
    - AVSI should engage private sector enterprises early to promote value chains and connect participants directly with input suppliers and product buyers. Specific actors vary by value chain.
        - Private sector enterprises can set up demonstration sites within the community to improve farmers' learning and boost further interaction. Private sector actors could also support public gatherings, such as "plant health rallies," where plant experts can share with community members the challenges that affect agricultural production and ways to address planting issues. FFBS training sessions can be used to promote private sector events and activities of interest.

2. Promote youth engagement and adult literacy for women to help them engage with the business side of the crop and livestock value chains.

- Youth are significantly less likely than adults to rear livestock, and secondary research suggests that women are frequently excluded from the financial aspects of marketing their crop or

[46] USAID. 2018. *Private Sector Engagement Policy*. https://www.usaid.gov/sites/default/files/documents/1865/usaid_psepolicy_final.pdf

livestock production.[47] Additional efforts to increase literacy through adult learning programs and enable marginalized groups to engage with the financial aspects of selling goods could promote equity in the community.

3. Assist in bookkeeping for farmers on profitability.

- Better bookkeeping of inputs, expenditures, and revenues could assist with farmer understanding of earnings. As illustrated in the qualitative findings, pig farmers, for example, have trouble keeping track of how much they are feeding pigs, hindering the calculation of costs.

4. Reduce barriers to land rental by providing information on rental costs.

- VCs like cassava and goats require more acreage to unlock greater profits. If AVSI can assist households by providing information on rental costs, participants could improve their negotiating power and be less likely to take an unfair deal. The confidence to rent additional land may result in farmers investing in these high-profit VCs that require greater land access.

5. Promote group selling or cooperatives for improved bargaining power.

- Current practices do not yield the potential earnings that farmers could achieve through collective bargaining, which would allow them to demand better prices and help to stabilize revenue.
- In the household survey, cohort one households expressed low interest in information on selling in groups, so promoting the benefits of this practice and changing existing selling behaviors may require additional effort. One stakeholder noted that there is a minimum requirement of 15 individuals to legally form a cooperative. AVSI could facilitate the formation and sustainability of farmer groups to help overcome the bureaucratic hurdles of government registration and organization difficulties.

Crop Value Chains:

Potatoes

1. Provide linkages to local trading centers.

- Unstable selling prices was a common challenge cited among cohort one households engaging in potato farming. Local trading centers represent opportunities to provide farmers with reliable buyers for their harvest, particularly when selling in bulk.
- Farmers also cited distance to markets as a barrier to selling their potatoes, and trusted buyers might be willing to pick up closer to their farms if there were an established relationship.

2. Promote specific seed varieties of potatoes to cater to restaurant demand.

- DLOs stated that restaurants buy specific varieties of potatoes for chips, so promoting that variety presents an opportunity for farmers to sell directly to a processor or distributor and earn a better price per potato.

[47] I. Akite, I. P. Aryemo, E. K. Kule, B. Mugonola, D. R. Kugonza & M. W. Okot. 2018. *Gender dimensions in the local chicken value chain in northern Uganda*. African Journal of Science, Technology, Innovation and Development. 10:3, 367-380. https://doi.org/10.1080/20421338.2018.1469214

- AVSI may need to follow up with DLOs or local restaurants to determine the specific potato variety demanded.

3. Promote improved postharvest handling practices.

- Poor postharvest handling can hurt potato shelf life, hindering farmers' ability to time their sale to maximize revenue. Better education on postharvest handling and storage practices could increase revenue, as well as food security.

Cassava

1. Provide linkages to livestock feed suppliers to purchase cassava.

- Livestock feed suppliers sometimes purchase cassava to bolster the nutritional value of livestock feed. Linkages with these suppliers could present a reliable buyer for cassava farmers. Other buyers do not offer very different prices from one another, so the most impactful way to improve farmers' livelihoods from cassava growing would be to have a reliable buyer who will accept a consistent, good price.

2. Promote specific, better-performing seed varieties of cassava.

- The National Agricultural Research Organization (NARO) introduced new disease-resistant cassava varieties: NAROCass 1 and NAROCass 2. Using disease-resistant varieties could mitigate crop loss, which is especially important given the additional amount of time and care needed to grow cassava.

3. Explore and carefully encourage the use of cassava leaves for its nutritional value.

- A review of existing research[48,49] suggests that the way cassava leaves are processed plays a critical role in its overall nutritional value. Cassava leaves are an excellent source of protein and micronutrients, while the root has high caloric value. Raw cassava also has antinutrients that could cause disease, so the careful detoxification and processing of cassava leaves is needed before its consumption.[50] We recommend that AVSI consult a nutritionist or health professional with knowledge about cassava and local processing methods as they engage in activities, such as cooking demonstrations that teach recipes incorporating safely prepared cassava leaves.

4. Promote improved postharvest handling practices.

- Commonly, poor postharvest handling results in lost goods for cassava, given their rapid deterioration once harvested. Improved storage or handling practices could reduce these losses.
    - An example of an improved handling practice would be not pulling the cassava root from the ground until the farmer is ready to sell.
    - Sometimes farmers pull the cassava from the ground early because they have immediate financing needs. Improved access to credit will hopefully address those

[48] Latif, S., & Müller, J. 2015. *Potential of cassava leaves in human nutrition: a review*. Trends in Food Science & Technology, 44(2), 147-158.
[49] Waigumba, Simon Peter et al. August 2016. *Technical report: Market Opportunities and Value Chain Analysis of Fresh Cassava Roots in Uganda*. CGIAR Research Program on Roots, Tubers and Bananas. http://www.rtb.cgiar.org/wp-content/uploads/2015/06/Technical-report_Market-Opportunities-and-Value-Chain-Analysis-of-Fresh-Cassava-Roots-in-Uganda.pdf.
[50] Ibid.

immediate needs and allow cassava farmers to maximize their income by optimizing the timing of their cassava sales.

- Cooking cassava by drying, frying, or boiling it can also serve to extend its shelf life.

Groundnuts

1. Promote groundnuts in refugee communities. Understand why the cohort one programming was not effective in the refugee communities.

- Fewer refugee households than host households farmed groundnuts at the end of cohort one. Additional understanding of the refugee households could be helpful in explaining why they were less enthusiastic about this value chain. One reason that groundnuts may be less popular is because they are not viewed as a cash crop and are allocated primarily for personal consumption.

2. Provide linkages to local trading centers.

- Unstable selling prices was a common challenge cited among cohort one households engaging in groundnut farming. Local trading centers represent opportunities to provide farmers with reliable buyers for their harvest.

3. Make sure seeds varieties are high-quality and tailored to the region.

- Limited access to high-quality seeds, along with other quality planting materials, was listed as a challenge impacting the groundnut VC. In addition, some seed varieties were described as not suitable for certain regions. For example, the groundnut variety Serenuts were listed as ill-suited for the Kamwenge district.

Livestock Value Chains

Chickens

1. Provide linkages to local restaurants for selling chicken.

- Local restaurants are willing to pay more on average per chicken than other buyers, though relatively few farmers sell to them. Providing linkages to enable this trade could increase farmer earnings by cutting out middlemen.

2. Provide linkages to veterinary services.

- Chickens were described as affected by diseases with exotic varieties experiencing a high mortality rate. To reduce disease infection and mortality, AVSI should promote preventative care and provide farmers with reliable veterinary service connections.

Goats

1. Promote crossbreed goats and provide linkages to veterinary services.

- Crossbreed goats reportedly produce higher meat yields but are more susceptible to diseases and parasites. To prevent these downsides, it is important to pair promotion of crossbreed goat varieties with linkages to veterinary service providers. Otherwise, the sick crossbreed goats could be a liability rather than an asset.

2. Provide linkages to purchase goats from the regular market on market days, where the average buying price is cheapest.

- Purchasing goats at lower prices will improve profit margins on rearing goats, and regular markets on market days offer the lowest purchase price on average, according to cohort one households. Regular markets are also the most common purchase source at present.

3. Provide linkages to selling goats at local markets, where the average selling price is highest.

- The majority of goat-rearing households from cohort one already sells their goats at the local market (51%). The local market is where they receive the highest sale price for their goats. Promotion of buyers who will guarantee good prices would address farmers' concerns that they are not receiving market price for their livestock.

Pigs

1. Provide linkages to veterinary care providers and medicinal drug sellers.

- African Swine Fever and other diseases present a persistent hurdle for those rearing pigs. Additional training to identify symptoms of common diseases, and linkages to veterinary care providers could help to protect pig farmers' livestock investments.
- Improve linkages between pig farmers and veterinary drug suppliers. There are valid fears of counterfeits, as some medicine stores provide faulty products, so ensuring the quality of these suppliers is critical.

2. Provide linkages to local restaurants or promote selling to friends or neighbors.

- The average sale price to local restaurants is higher than that of the more common choices of middlemen or the local market and could represent an untapped opportunity for higher earnings for pig-rearing households.
- Friends and neighbors offer an even higher average price than local restaurants, so promotion of intra-community selling could also improve earnings.
- Pig farmers more commonly sell to middlemen, but they offer the lowest price.

3. Selling to larger markets in Kasese for bulk selling pigs.

- Qualitative information suggests that there are better selling prices for bulk selling pigs to middlemen coming from Kasese.

4. Promote best practices on the proper feeding amount for pigs.

- There is poor understanding of the proper feeding amount for pigs. Education on best practices for feeding amounts could prevent overfeeding and cut costs, while maximizing meat production yields.

ANNEXES

Annex I. Household Survey Sampling Frame

Quantitative Sampling Frame[51]

Sub county	Number of Households				TOTAL (%)
	Youth Primary (Host)	Adult Primary (Host)	Youth Primary (Refugee)	Adult Primary (Refugee)	
Biguli	25	97	0	0	**14%**
Bihanga	13	52	0	0	**7%**
Bwizi	27	91	0	0	**13%**
Nkoma	22	71	0	0	**11%**
Nkoma-Katalyeba TC	9	33	0	0	**5%**
Rwamwanja	0	0	165	275	**50%**
TOTAL (%)	**11%**	**39%**	**19%**	**31%**	**100%**

[51] All refugee households are located in Rwamwanja settlement within Nkoma subcounty. Host communities are in Biguli, Bihanga, Bwizi, and Nkoma subcounties and Nkoma-Katalyeba Town Council. Distribution of households across subcounties, youth/adult primary participants, and host/refugee status selected for the sample of 880 respondents are representative of the distribution of households in the entire Activity population.

Annex II. Additional Exhibits

Exhibit A1. Overall popularity of VC

(In the last 12 months, did you cultivate [crop]? / Do you own any [livestock]?)

VC	% who grow or rear
Chickens	60.3%
Pigs	43.6%
Goats	37.8%
Cassava	31.2%
Potatoes	24.3%
Groundnuts	22.6%
N	783

Showing percent of full sample of households (regardless of livelihood activities)

Exhibit A2. Overall popularity of VC by Age

(In the last 12 months, did you cultivate [crop]? / Do you own any [livestock]?)

	N	Youth	N		
Food Crop Overall	89.7%	562	84.6%**	214
Cassava	33.1%	562	27.1%	214
Potatoes	25.8%	562	21.0%	214
Groundnuts	25.4%	562	15.9%***	214
Livestock Rearing Overall	86.5%	562	84.6%	214
Chickens	63.2%	562	53.7%**	214
Pigs	47.0%	562	36.0%***	214
Goats	41.8%	562	27.6%***	214

*Note: Statistical significance is shown for t-test differences between adult and youth. Significance markers are always placed on the youth values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit A3. Overall popularity of VC by Host

(In the last 12 months, did you cultivate [crop]? / Do you own any [livestock]?)

	N	Host	N		
Food Crop Overall	83.6%	384	92.9%***	392
Cassava	27.6%	384	35.2%**	392

Potatoes	14.8%	384	33.9%***	392
Groundnuts	6.3%	384	39.0%***	392
Livestock Rearing Overall	81.3%	384	90.6%***	392
Chickens	58.3%	384	62.8%	392
Pigs	24.7%	384	62.8%***	392
Goats	23.7%	384	51.8%***	392

*Note: Statistical significance is shown for t-test differences between refugee and host. Significance markers are always placed on the host values (*p < 0.10; **p < 0.05; ***p < 0.01).*

Exhibit A4. Graduating to Resilience Treatment Arms

PROGRAM COMPONENT	ARM 1 STANDARD GRADUATION	ARM 2 GROUP COACHING	ARM 3 EMPOWERMENT MODEL
Consumption Support	●	●	●
Livelihood Skills Training and Support	●	●	●
Savings and Financial Inclusion	●	●	●
Asset Transfer	●	●	—
Coaching	INDIVIDUAL	GROUP	INDIVIDUAL
Linkage and Referrals	●	●	●

Annex III. Evaluation Matrix

Value Chain Assessment Methodology			
Objectives	**Illustrative Research Questions**	**Data Source**	**Learning Questions**
VCA 1: Identify potential agricultural/livestock rearing value chains in Kamwenge in which the majority of extremely poor Ugandan and refugee households could participate and value chains with potential for raising the incomes of this group.	▪ What opportunities exist for private sector engagement in each value chain? ▪ How profitable is each value chain? ▪ What is the potential for each value chain to ensure food security for the household?	▪ **Quantitative:** *Household Surveys* to examine the value chain specific patterns and differences in livelihoods among women and men, and among poor refugee and Ugandan households. *Data on RCT* to identify treatment and control villages. ▪ **Qualitative:** FGDs, Qualitative Case Studies, and Standing Committee Summary Notes	▪ What do households consider as critical aspects to consider when deciding which value chain to invest their resources (time and money)?
VCA 2: Map the key actors, activities, processes, and information flows in the value chain, particularly the role and participation of extremely poor Ugandan households and refugees, and women in the value chain.	▪ What are the core processes of the value chain? What are key opportunities? ▪ What relationships do households have with different key actors in the value chain? ▪ How does information flow in this value chain? ▪ How are prices set in this value chain?	▪ **Quantitative:** *Household Surveys* to examine the value chain specific patterns and differences in livelihoods among women and men, and among poor refugee and Ugandan households. *Data on RCT* to identify treatment and control villages. ▪ **Qualitative:** FGDs, Qualitative Case Studies, and Standing Committee Summary Notes reports, post-distribution monitoring data and reports.	▪ What kinds of inputs are required for households to be successful? ▪ What are the opportunities for low cost options to add value and increase potential profitability?

Value Chain Assessment Methodology			
Objectives	**Illustrative Research Questions**	**Data Source**	**Learning Questions**
VCA 3: Characterize the linkages, such as strength and direction, among the value chain actors, including the institutional and governance structures, linking the extremely poor populations in the Activity area.	▪ Classify the linkage between actors as weak, two-way (and fair), and one way (moderate to weak). ▪ Look into the differences between poor Ugandan and refugee households and between women and men	▪ **Quantitative:** *Household Surveys* to examine the value chain specific patterns and differences in livelihoods among women and men, and among poor refugee and Ugandan households. *Data on RCT* to identify treatment and control villages. ▪ **Qualitative:** FGDs, Qualitative Case Studies, and Standing Committee Summary Notes reports, post-distribution monitoring data and reports.	▪ How do women feel regarding their participation in the value chain? How have women been involved? How has this changed as a result of the Activity? ▪ How have households established linkages to participate in these value chains and where do they require further support?
VCA 4: Understand the key market opportunities and constraints for improving the participation and welfare of the extremely poor households in the value chain.	▪ What prevents households from accessing high value and staple value chain opportunities? ▪ What are the key barriers to marketing in this value chain? ▪ What opportunities exist to work with the private sector in this value chain?	▪ **Quantitative:** *Household Surveys* to examine the value chain specific patterns and differences in livelihoods among women and men, and among poor refugee and Ugandan households. *Data on RCT* to identify treatment and control villages. ▪ **Qualitative:** FGDs, Qualitative Case Studies, and Standing Committee Summary Notes reports, post-distribution monitoring data and reports.	▪ What resources/assistance would be helpful to access more profitable value chains? ▪ For women, what do you need to feel equipped to take advantage of the opportunities in this value chain?

Annex IV. Focus Group Discussion Interview Guide

Graduating to Resilience Activity
Value Chain Assessment Focus Group Discussion Guide
ZARDI, District Officials, UNHCR
Sub-County Representatives

1.	**Date (DD/MM/YY):**	
2.	**Location:**	
3.	**Start Time:**	
4.	**Interviewer/Facilitator Name:**	
5.	**Note Taker(s) Name(s):**	
6.	**Number of Participants:**	
7.	**Finish Time:**	

Introduction and consent

Introduce yourself and the study: Our names are _____ (Facilitator and Note Taker). We work for _____. Graduating to Resilience is implemented by a consortium led by AVSI Foundation (AVSI), in partnership with IMPAQ International and Trickle Up. The goal of Graduating to Resilience (the Activity) is "To graduate extremely poor refugee and Ugandan households in Kamwenge from conditions of food insecurity and fragile livelihoods to self-reliance and resilience". Over the next two and a half years, the AVSI Consortium will work with the 2nd cohort of the Activity. Half of the households will be from Uganda and the other half will be from the refugee community living in Rwamwanja settlement. As part of the project, ASVI is conducting an assessment of groundnuts, cassava, potatoes, goats, pigs and chickens to understand how it could support and engage producers working in these value chains to increase productivity and profitability.

I would like to remind everyone that you only have to share what you feel comfortable sharing and all the information shared here is confidential and will only be used to improve the design of the Graduating to Resilience Activity. We ask that you allow every person to talk and not to interrupt one another.

Obtained written informed consent [Read Consent Form]

1. Did you ask if the participants had any questions? □ Yes □No
2. Did all participants agree to participate? □ Yes □No ☐STOP

1. Validate the Value chain

   a. Validate that all actors in each value chain are identified and if any actors need changed or added.

b. Valid ate connection (in both directions) are correct.

2. Tell us about the connections between the actors.
   a. Where are these particularly strong, trustworthy relationships? And why?
   b. Where can relationships be improved? And why?
3. From your perspectives, what did AVSI do well in working with farmers to prepare them for successful livelihoods in maize, beans, and groundnuts?
   a. *Hint: Can ask in general, no need to ask for specific value chains.*
4. What can AVSI do better with the second group of farmers who will be working with groundnuts, cassava, potatoes, pigs, chickens, and goats?
   a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*
5. How can AVSI work with existing agricultural services (government and private sector) to deliver assistance to farmers related to groundnuts, cassava, potatoes, pigs, chickens, and goats?
   a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*
6. What can be done to ensure better prices for farmers?
7. What can be done to improve negotiating power for farmers?
8. What can be done to ensure regular and improved buyers for farmers?
9. Please describe how **women** have engaged in the value chains (groundnuts, cassava, potatoes, pigs, chickens, and goats).
   a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*
   b. What are the key areas of opportunities for them?
   c. What are the constraints specific to women?
   d. How does this vary from men?
10. Please describe how **youth** have engaged in the value chains (groundnuts, cassava, potatoes, pigs, chickens, and goats).
    a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*
    b. What are the key areas of opportunities for them?
    c. What are the constraints specific to youth?
11. Please describe how the host community engages with each value chain (groundnuts, cassava, potatoes, pigs, chickens, and goats) compared to refugees?
    a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain.*
    b. What are the key areas of opportunities for refugees?

c. What are the constraints specific to refugees?

12. Overall, what are some of the unique challenges and opportunities in each of these value chains (groundnuts, cassava, potatoes, pigs, chickens, and goats)?

    a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*

Knowledge and Skills

13. How can AVSI improve households' access to information on market conditions and prices?

14. What do you consider the most useful technical knowledge and skills for households to expand their success and earnings in these value chains (groundnuts, cassava, potatoes, pigs, chickens, and goats)?

    a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*

15. What steps have been taken by the GOU and other actors to ensure households in your community are included in these value chains (groundnuts, cassava, potatoes, pigs, chickens, and goats) and to equip them with the skills and knowledge for successful livelihoods?

    a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*

Actors in the Value Chain

16. What private sector actors are working in this geographic area in each of these value chains?

    a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain by asking, "is there anything different or addition about____ value chain"?*

17. What knowledge, skills, and abilities do you see in your communities that are unrealized?

18. How can these gaps be filled by private sector partners?

19. What are some ways to improve household linkages to private sector services? What are the barriers in developing that connection?

    a. *Hint: Private sector services may include, but are not limited to, marketing, skill building, access to inputs, etc.*

20. We are currently using a digital platform where value chain actors can interact providing links and contacts between buyers and sellers. Additionally, farmers can access market and weather information and financial services. How can we strengthen or foster our participants' use of the digital platform that is already in place?

21. How have adverse weather events (e.g., droughts or floods) affected household livelihoods in these value chains?

    a. What kinds of resources would be helpful to households to ensure they can safeguard their businesses against future adverse weather?

22. What government policies and/or regulations **help** or **hinder** actors in this value chain, particularly small-holder farmers?
23. What other external factors **help** or **hinder** actors in this value chain, particularly small-holder farmers?
    a. *Probe: transportation, infrastructure (roads, electricity, etc.)*

Wrap-Up

24. What are the most important things to know regarding the value chain before engaging with participants?
    a. *Hint: Ask question in general and see what response is. Follow up for specifics on each value chain.*
25. Is there anything you would like to add?

Thank the participants for their time.

Annex V. Value Chain Selection Summary

The selection of the value chains took place over two discussions in June 2021. The first discussion occurred on 4th June 2021 and focused on profitability and return on investment data from the Labor Market Assessment (LMA) household survey (see corresponding PowerPoint presentation), while the second discussion took place on 11th June 2021 and focused on important criteria gathered through qualitative data collection and secondary data sources.

Using data from the LMA Assessment on profitability and return on investment (ROI) as well as FGDs with AVSI personnel on 18th February 2021 and stakeholders on 3rd March 2021, the following value chains were selected for further analysis.

Crops: Rice, Maize, Potatoes, Beans, Matooke, Groundnuts, Onion, Cassava, Millet, Eggplant, and Passion Fruit

Animal: Cattle, Goat, Pigs, Chickens, Ducks and Sheep

The additional analysis included profitability and ROI as well as the following criteria:

- PSE opportunities
- Land size
- Maturation time
- Food security
- Nutrition
- Cultural attachment
- Opportunities
- Challenges

Each of these criteria were given a rating scale as detailed in Exhibit 1.

Exhibit 1: Value Chain Rating Scale

Criterion	*Rating Scale*	
Profitability	>300,000	3
	>200,000-300,000	2
	100,000 – 200,000	1
	<100,000	0
Return on Investment	High	3
	Medium	2
	Low	1
	Too Low	0
Private Sector Engagement	Existing positive relationship	3
	Aware of private sector and have yet to contact	2
	Unknown	1

Criterion	Rating Scale	
	Contacted: services and products were not relevant	0
	Contacted: Private sector actor (PSA) is not interested in partnering	0
	There are no PSA in this value chain	0
Land Size	0 - .5 acres	3
	>.5 acres – 1 acre	2
	>1 acre – 2 acres	1
	>2 acres	0
Maturation Time	0 – 6 months	3
	> 6 – 9 months	2
	>9 months – 1 year	1
	>1 year	0
Food Security	High	3
	Medium	2
	Low	1
Nutrition	High	3
	Medium	2
	Low	1
Cultural Attachment	High	3
	Medium	2
	Low	1
Opportunities	High	3
	Medium	2
	Low	1
Challenges	High	3
	Medium	2
	Low	1

Using information from secondary data sources like the Ministry of Agriculture, Animal Industry, and Fisheries Profitability of Agricultural Enterprises; the LMA Household Survey; the Graduating to Resilience Staff FGD; and the external stakeholder FGD, scores were assigned to each value chain for criteria detail in in Exhibit 1 (see supplemental Excel spreadsheet for more information).

Once scores were included, we tallied up the results and considered the value chains looking at their total scores, as well as scores weighting profitability. Two rows were added to include an 80% weight and another, factoring in a 50% weight to profitability. The score where profitability was weighted by 50% was focused on during the discussion.

Taking all these factors into consideration the final value chains were selected. We placed value chains into four categories: those we would focus on for the Value Chain Assessment (VCA); those we would promote as an activity but will conduct a full VCA; those that we would promote through PSE; and those that would not be supported by Graduating to Resilience in cohort two.

Through the discussion it was decided that the activity would conduct a VCA on potatoes, cassava, groundnuts, goats, pigs, and chickens and promote them through the farmer field business school (FFBS) selection process. The decision to provide more options stemmed from the FFBS learning session that occurred on 22nd August 2019 and participant feedback stating they would have preferred more options during the selection process of the FFBS. Additionally, it was considered in this discussion to conduct skill building for an animal and a crop value chain during FFBS during cohort two.

Exhibit 2: Value Chain Decisions

Value Chain	*Will conduct a Value Chain Assessment and Promote as FFBS option*	*Will Promote Through the Private Sector*	*Will Not Promote in Graduating to Resilience*
Rice			X
Maize		X	
Potatoes	X		
Beans			X
Matooke		X	
Groundnuts	X		
Onions			X
Cassava	X		
Millet			X
Eggplant			X
Passion Fruit		X	
Cattle			X
Pigs	X		
Goats	X		
Sheep			X
Chickens	X		
Ducks			X

The following section summarizes why the TSC made the decisions detailed in Exhibit 2 beginning with those value chains the Graduating to Resilience Activity will not promote.

1) ***Rice*** was removed from consideration for several factors, most concerning is the low profitability and the large amount of land required to earn a profit as a rice producer (>1 – 1.5 acres). These factors, when combined with the low nutritional value and few opportunities in the value chain for processing, resulted in a weighted score (using the 50% weight to profitability) of 9.5 which was among the lowest scores of the value chains.

2) ***Beans*** were also removed because of the low profitability, but also the limited PSE opportunities available in the area and the few opportunities for business along the value chain. There was much debate about keeping beans because of the food security, nutrition, and cultural attachment, but the TSC decided, based on their experience in cohort one, to focus on a crop that required more skill building to reap a plentiful harvest.

3) ***Matooke*** was removed because of the length of time it takes to grow matooke (>9 months – one year). We also factored in the low food security options with matooke and the few opportunities along the value chain. It is recommended that private sector linkages be made because of the abundance of this crop, yet the low profitability reported in the LMA.

4) ***Onions*** and ***Eggplant*** were removed because of their low profitability, low food security, and high challenges. On the 50% weighted scale, onions scored the lowest score (8) of all value chains. However, it was discussed that eggplant should be considered as a crop for kitchen gardens because of the nutritional value they provide.

5) ***Millet*** was ruled out because of the low profitability, the low cultural attachment in this region, and the preference for other crops based on the scores by the TSC.

6) ***Cattle*** was removed for consideration because the challenges are just to great for our programming including the length of time to earn a profit (greater than one year) and the amount of land required to do so (2 acres).

7) ***Sheep*** were removed despite the high score because when choosing between goats and sheep, there is greater cultural attachment for rearing goats.

8) ***Ducks*** were also removed, because of their low profitability, lack of PSE opportunities, and few opportunities in the value chain. On the 50% weighted scale, ducks scored the second lowest score (8.5) of all value chains.

Continuing to describe the decisions made in Exhibit 2, in this section we describe why particular crops were selected for private sector promotion and not direct promotion by the activity. These crops were placed in this category to continue building on existing relationship thus, expanding the opportunities to participants in the activity through PSE.

1) ***Passion Fruit*** was placed into this category because of the existing and positive relationship with Kad Africa, who is based in Fort Portal. While both staff and external stakeholders believed passion fruit is a very profitable crop, the high number of challenges to start-up passion fruit production, along with concerns over food security, resulted in this crop not being selected for direct promotion in FFBS. Instead, Graduating to Resilience staff can use private sector linkages for those farmers who want to engage in passion fruit production and Kad Africa or other PSA can provide the necessary skills training and information. It should be noted, that there was a gap in information on this fruit, as only two respondents in the LMA were growing passion fruit and there is limited secondary data.

2) ***Maize*** was selected to be promoted through PSE to build off the relationships and skills training provided by Kakinga Millers and Kamwenge Community Development Center. In this way, the activity can promote other crops of interest that may bring in more profit, while participants can still benefit from the skill building provided by these entities.

Finally, we describe the reasons for selecting the six value chains for the VCA.

1) ***Groundnuts*** was selected because of the potential profitability. According to the M&E data collected in April 2021, only 2% of host community and 1.3% of refugee participants were linked to output buyers and yet 26.0% of host community and 44.2% of refugee participants who grew groundnuts sold their crop at a price that is equal to or above the local market price. It was determined that, because of this information, combined with the food security and nutritional value of groundnuts this crop would be included as an option for FFBS groups. The PSE Technical Advisor (TA) will focus on private sector linkages to ensure increased success for groundnut farmers.

2) ***Pigs*** were selected as a value chain to be promoted. Limited resources and complications with COVID-19 restrict the expansion of value chains for the VCA from three value chains, as planned, to four. However, the overall score for pigs, 12.5, as well as the popularity of pigs after the asset transfer was distributed, were factors for selecting this animal value chain for the FFBS. The PSE TA will focus on private sector linkages to ensure inputs, output buyers, and market information for those who decide to start a piggery.

3) ***Chickens*** were considered because of their high overall score of 11.5. Due to the popularity of this animal as a means of savings, economic activity, food security and nutrition for either egg production or poultry, the TSC believed it should be included as an FFBS option so participants can raise their chickens to the maximum potential.

4) ***Cassava*** was among our highest scoring crop value chains, 12. While profitability is low at this time, both the staff FGD and the external FGD believe this crop can be very profitable when grown properly and connected to the right PSA. Additionally, there are many possibilities for processing, such as cassava flour, crisps, and selling cuttings, which increases the number of private and government sectors who may work with the participants as well as opportunities for the participants themselves. Additionally, cassava scores very high for food security, nutrition (cassava leaves), cultural attachment, and the challenges to grow cassava are low as it is drought resistant, for example.

5) ***Potatoes*** were selected for many reasons including the small land size to grow, the fast maturation time, potential profitability, and high cultural attachment. Additionally, there are known PSAs for processing potatoes into crisps, which the PSE TA will work to develop a partnership.

6) ***Goats*** were selected for their overall high score of 12. The number of households who decided to rear goats upon receiving the asset transfer was a main factor in this decision. While profitability is currently low, goats have potential profitability with their fast maturation time and cultural attachment.

Value Chain Selection Matrix

Criteria	Crops																					
	Rice		Maize		Potatoes		Beans		Matooke		Groundnut		Onion		Cassava		Millet		Eggplant		Passion Fruit	
Profitability	Low	1	Medium	2	High	3	Low	1	Low	1	Low	1	Low	0	Low	0	Low	0	Low	0		
ROI	>1.5 - 2	2	>1.5 - 2	2	>2 - 2.5	3	>1.5 - 2	2	>2.5 - 3	3	>2 - 2.5	3	>1.5 - 2	2	>2.5 - 3	3	>1.5 - 2	2	>2.5 - 3	3		3
PSE Opportunities	Aware of private sector and have yet to contact	2	Existing positive partnership	3	Aware of private sector and have yet to contact	2	None	0	Unknown		None	0	None	0	Aware of private sector and have yet to contact	2	Aware of private sector and have yet to contact	2	None	0	Existing positive partnership	3
Landsize	>1 -1.5 acres	1	>1 -1.5 acres	1	>.25 - .5 acres	3	>.75 - 1 acre	2	>.25 - .5 acres	3	0-.25 acres	3	0-.25 acres	3	>.25 - .5 acres	3	>.25 - .5 acres	3	0-.25 acres	3		
Maturation Time	3 months - 6 months	3	3 months - 6 months	3	3 months - 6 months		3 months - 6 months	3	> 9 - 12 months	2	3 months - 6 months	3	3 months - 6 months	3	> 9 - 12 months	2	3 months - 6 months	3	3 months - 6 months	3	> 6 - 9 months	2
Food Security	High	3	High	3	Medium	2	High	3	Low	1	High	3	Low	0	High	3	High	3	Low	0	Low	0
Nutrition	Low	1	Low	1	Low	1	High	3	Medium	2	High	3	Low	1	Low	2	Medium	2	High	3	Medium	2
Cultural Attachment	High	3	High	3	High	3	High	3	High	3	High	3	High	3	High	3	High	3	High	3	High	3
Opportunities	Low	1	Medium	2	Medium	2	Low	1	Low	1	Medium	2	Low	1	High	3	Medium	2	Low	1	High	3
Challenges	Medium	2	Medium	2	Low	3	Low	3	Low	3	Medium	2	Low	3	Low	3	Medium	2	Low	3	High	1
Raw Total		**19**		**22**		**22**		**21**		**19**		**23**		**16**		**24**		**22**		**19**		**17**
80% Weighted Total		**5.6**		**6.8**		**8**		**6**		**6.2**		**7**		**4.4**		**6.6**		**5.6**		**5.6**		**5.2**
50% weight		**9.5**		**11**		**11**		**10.5**		**9.5**		**11.5**		**8**		**12**		**11**		**9.5**		**8.5**
Top 3 Rank Based on Weighted total																						

Value Chain Selection Matrix												
Criteria	**Animals**											
	Cattle		Pigs		Goats		Sheep		Chickens		Ducks	
Profitability	High	3	High	3	Low	1	Low	1	Low	1	Low	1
ROI	>2 - 2.5	3	>2 - 2.5	3	>2.5 - 3	3	>2.5 - 3	3	>2.5 - 3	3	> 0 - .5	1
PSE Opportunities	Aware of private sector and have yet to contact	2	Aware of private sector and have yet to contact	2	Aware of private sector and have yet to contact	2	Aware of private sector and have yet to contact	2	Aware of private sector and have yet to contact	2	None	0
Landsize	> 2 acres	0	0-.25 acres	3	>1 -1.5 acres	1	>1 -1.5 acres	1	>.5 - .75 acres	2	>.5 - .75 acres	2
Maturation Time	>1 year	1	3 months - 6 months	3	3 months - 6 months	3	3 months - 6 months	3	> 6 - 9 months	2	3 months - 6 months	3
Food Security	High	3	Medium	2	High	3	High	3	High	3	Medium	2
Nutrition	High	3	High	3	High	3	High	3	High	3	High	3
Cultural Attachment	High	3	Medium	2	High	3	Medium	2	High	3	Medium	2
Opportunities	High	3	Medium	2	High	3	Medium	2	High	3	Low	1
Challenges	High	1	Medium	2	Medium	2	Medium	2	Medium	2	Medium	2
Raw Total		**22**		**25**		**24**		**22**		**24**		**17**
80% Weighted Total		**8**		**8.6**		**7.2**		**6.8**		**7.2**		**4.6**
50% weight		**11**		**12.5**		**12**		**11**		**12**		**8.5**