



FEED THE FUTURE

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



FEED THE FUTURE RWANDA ORORA WIHAZE ACTIVITY

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MIDLINE REPORT



USAID
FROM THE AMERICAN PEOPLE

Prepared for the United States Agency for International Development (USAID) by:
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Acronyms

BDS	Business Development Services
BII	Business Innovation Index
CRS	Catholic Relief Services
CFSVA	Comprehensive Food Security and Vulnerability Analysis
FTF	USAID Feed the Future
FTFMS	Feed the Future Monitoring System
GFSS	Global Food Security Strategy
I/NGO	International / Non-Governmental Organization
MSA	MarketShare Associates
MSD	Market System Development
NISR	National Institute of Statistics of Rwanda
PSDAG	Private Sector Driven Agriculture (USAID Rwanda)
PIRS	Performance Indicator Reference Sheets
PWD	People with Disabilities
RAB	Rwanda Agriculture and Animal Resources Development Board
RSB	Rwandan Standards Board
SACCO	Savings and Credit Cooperatives
TMG	The Manoff Group
USAID	United States Agency for International Development
Venture37	Land O'Lakes Venture37
ZOI	Zone of Influence

Executive Summary

Assessment Background

The Feed the Future Rwanda Orora Wihaze Activity (Orora Wihaze), funded by the United States Agency for International Development (USAID), aims to sustainably increase the availability of, access to, and consumption of animal sourced foods (ASF) in eight districts across Rwanda. The Activity, implemented by Land O'Lakes Venture37 (Venture37) in partnership with Catholic Relief Services (CRS), MarketShare Associates (MSA), The Manoff Group (IMG) and Urunana Development Communications (UDC), works to strengthen goat and sheep, poultry, swine and fish value chains while increasing consumption of ASF, especially by women and children. Orora Wihaze follows a market systems development approach, where interventions work through existing market actors to change how they interact with customers and suppliers to meet the Activity goals.

The purpose of this midline assessment is to update Orora Wihaze's understanding of the current market system dynamics and how they have changed since the baseline, conducted in 2020. The midline assessment answers five evaluation questions which assess different aspects of the market system: cooperation and trust, business innovation, inclusive value creation, ecological factors affecting ASF consumption, and market linkages.

The midline employed qualitative design to answer the evaluation questions. The evaluation team interviewed 335 ASF market system actors in Rwanda between April and May 2022. The respondents included actors involved with Orora Wihaze's programming, and others who weren't, ultimately providing a view of the entire market system and its dynamics. Interviews were coded and analyzed to identify themes and findings for each evaluation question, using the NVIVO software. Findings of the Midline were compared to those at Baseline to comment on the shifts in market system dynamics since the beginning of the Orora Wihaze project.

Findings

Cooperation and Trust Index: This index is used to measure market actors' expectation of cooperation and trust in their business transactions and interactions with each other. Both norms are measured on an indexed scale from 0 (low) to 3 (high) considering perceived expectations of providers and consumers. Very similar to what was found in the baseline, the ASF market system showed in this midline assessment a medium degree of cooperation (1.25 at baseline and 1.08 at midline) and trust (1.32 at baseline and 1.55 at midline). Actors value some degree of cooperation, but despite this, many transactions are based on the spot market. As found in the baseline, there is no evidence that the different ASF market functions are customer oriented and record keeping is limited. However, consumers seem to feel that providers make efforts with products, services, prices, credit and terms to find "win win" relationships or "mutual understanding". In terms of trust, actors expect negotiations to take place fairly, but they are resigned to the fact that some are likely to take advantage of others - an expectation found in the baseline and maintained in the midline findings. Unlike the baseline, the actors expect that a certain level of quality standards will be met, even if this is very difficult, as in the case of animal feed. While many actors are producing good quality feed, the regulatory standards are incredibly high to meet. Adding on to that, distributing the high-quality feed into remote and rural areas, makes the process of maintaining feed quality even more difficult.

Business Innovation Index: The Business Innovation Index (BII) measures the level of innovation in a market system. Innovations do not need to be novel to the market system, only to the business of organization adopting them. In total, 15 types of innovations are counted in the BII, including two which are for producers only. The index is on a scale of 0 (low) to 1 (high). If a respondent has more than five innovations, their score is 1. This index received a score of 0.372, higher than that found at baseline (0.250). Innovation is highest in

the input market function at 0.524 and lowest in the enabling environment at 0.286. In the case of the baseline, the input market function was also the highest (0.347), but the lowest was the supply function (0.182). As in the baseline, innovation scores are lower for women market actors (0.335 at midline and 0.202 at baseline) compared to scores for men (0.388 at midline and 0.265 at baseline). In addition, youth are more innovative (0.462 at midline and 0.317 at baseline) than those aged 30 and over (0.355 at midline and 0.203 at baseline). Ultimately, there has been increasing innovations across the different market systems functions, demographics, and innovation categories. As expected, direct partners of Orora Wihaze scored was significantly higher (0.511) than the overall score found (0.372).

Youth, women and PWD in ASF Market Systems: These groups all face lack of capital for entrepreneurship as their greatest challenge, which is in line with the findings in the baseline. Women are the most involved in small animal production, especially backyard production, and are especially trusted for their reliability, hygiene, and care for animal husbandry. Female producers are now frequent customers in the input market - a new and different finding from the baseline. Youth continue to be seen as potential employees due to their physical strength, motivation, availability and low salary requirement, as noted in the baseline. PWDs are the group that faces the most challenges, as this market often presents additional constraints for PWDs to perform activities and has not quite adapted to the needs of PWDs. However, no intentional, inclusive strategies to employ, incentivize, accommodate, or serve any of these groups were cited by any actor.

Ecological Factors Index affecting ASF Consumption: Ecological factors measure the contextual aspects of the market system, in the home and community, that may influence the choices that people make, specifically about consuming ASF. Fourteen ecological factors were identified at baseline, categorized as Institutional, Interpersonal and Individual Factors¹. The strength of influence of each factor supporting the consumption of ASF are scored on an indexed scale from 0 (low) to 3 (high) using thematic analysis based on responses from consumers. The average score of Ecological factors supporting ASF consumption is 1.79 at midline, compared to 1.21 at baseline. Relatively high cost puts regular consumption of many ASF products outside of many households' reach. However, unlike the baseline, a significant portion of the respondents mentioned that even the poorest people can consume ASF like eggs and dry fish. There is also an increased recognition that children and women, especially those who are pregnant or breastfeeding, should consume ASF. Similar to what was found at baseline, there is relatively high confidence in the safety of ASF due in large part to vet inspections of animals before slaughter. Nevertheless, even considering this vet inspections, there is less confidence in slaughterhouse hygienic safety. I.e., the respondents know about the vet inspections and, in general, they consider ASF consumption safe, but, at the same time, they believe the slaughterhouses are not hygienic enough. Ultimately, the ecological factors affecting ASF consumption are becoming stronger in a positive direction, but there are less shifts in institutional factors, which stand to have the greatest impact.

Market Linkages: The midline assessment largely validated findings from the baseline. Unsurprisingly, limited mobility and other demand and supply side shocks caused by the COVID-19 pandemic and subsequent food, fuel, and price shocks have limited the ability of market actors to establish linkages. The use of formal contracts remains uncommon, especially for linking producers to markets. Short term value chain credit is common between customers and suppliers through buy now-pay-later arrangements that involve some risk for the lender but are still deemed important for attracting and keeping customers. Finance through banks is not popular in the ASF market system while savings and credit organizations are more common, but have modest loan sizes,

¹ Three categories of Ecological Factors explained: **Institutional** level of factors address the prevalence of informal and formal rules that may influence collective dietary behaviors such as community expectations and governmental practices and regulations. It also includes market related factors. The **interpersonal** level considers the expectations of the household that may influence dietary behaviors. The **individual** level considers individual beliefs, knowledge and tastes that may influence dietary behaviors.

resulting in a “missing middle”. Prices appear to be predominantly driven by sellers and their cost of production which makes the ASF market system extremely sensitive to the cost of feed, which is currently at an all-time high.

Conclusions

Overall, the findings of the assessment indicate that:

- **Cooperation and Trust:** Respondents, especially smallholder livestock producers, appreciate and expect increased flows of information and credit that can enable more productivity from their ASF business.
- **Business Innovation:** Input suppliers and some ASF supply chain actors (but not many producers) are adopting more new business practices, especially in ASF process innovations.
- **Inclusive Value Creation:** Respondents could not articulate a value proposition for designing inclusive practices, technologies, or ASF products specifically to meet the needs of women, youth, or PWD, which accounts in part for why few examples were found.
- **Ecological Factors affecting ASF consumption:** Respondents expect, more so than baseline, that ASF will be served and should be consumed, especially by women and children, in the household and socially beyond the household.
- **Market Linkages:** Most market linkages have short durations formed for the purpose of extending short term credit or finance, which is not substantial enough for smallholders and other actors to upgrade production quality or efficiency in doing business in pigs, goats, sheep, fish, or chicken value chains.

Next Steps

Findings from this midline will be used for a number of purposes:

1. **Setting Market System Level Midline values:** The project will use the scores and findings in cooperation and trust, business innovations and ecological factors for consumption in the target market systems to evaluate shifts and potential contribution of the Orora Wihaze interventions to influence future programming.
2. **Provide context to issues in the target markets systems:** This midline provides context about how the goat, sheep, fish, pig, and chicken value chains currently work in Rwanda and identifies some changes for further exploration.
3. **Inform the Orora Wihaze Strategy:** Findings have already informed the Orora Wihaze year 4 workplan that highlights and recommends which constraints in the market system need to be addressed to reach the Activity goals and objectives. The findings will continue to inform ongoing learning and adaptation of programming.
4. **Conduct follow up deductive analyses:** Having observed shifts in the market system, a potential next step in Y4 of the program will be to conduct deductive analysis to make sense of the changes occurring and their link, if any, to agent level behavior supported by the Activity.

This midline does not provide broad recommendations, because that is the purpose of the Orora Wihaze workplan. During the development of the workplan, the team used information from this study that looks at different aspects of the market system along with the data collected as part of annual performance monitoring.

I. Introduction

I.1. Project background

Context

Food security in Rwanda has not kept pace with the country's impressive per capita income growth. The share of the population in Rwanda whose food intake is insufficient to meet dietary energy requirements (undernourishment) increased from 32.5 percent in 2012 to 36.8 percent for 2017. By comparison, the regional prevalence of undernourishment in 2017 was 22.8 percent. Nearly 38 percent of children under 5 years old in Rwanda suffer from stunting, which is evidence of chronic malnutrition.²

Low food security is driven in part by low consumption of animal sourced foods. The 2018 Comprehensive Food Security and Vulnerability Analysis (CFSVA) in Rwanda, led by the World Food Programme with partners including the Government of Rwanda, the United States Agency for International Development (USAID), the European Union, and the United Nations Children's Fund, found that the share of the population with acceptable Food Consumption Scores declined from 79 percent in 2010 to 76 percent in 2018. Those households with Poor or Borderline scores (24 percent of the population) were found to consume no animal sourced foods. Furthermore, the CFSVA found a positive relationship between livestock ownership and food security.³

Project Design

Against this backdrop, the Feed the Future Rwanda Orora Wihaze Activity was conceived by USAID with the goal to sustainably increase the availability of, access to, and consumption of ASF. Orora Wihaze (which means raising livestock for self-sufficiency), is implemented by Venture37 along with partners including Catholic Relief Services (CRS), Market Share Associates (MSA), The Manoff Group (TMG), and local partner Urunana Development Communications. Orora Wihaze has two objectives: 1) Strengthen inclusive private sector led ASF value chains, specifically goats and sheep (shoats), fish, pigs and chicken, and 2) Increase the demand for ASF consumption by women and children. Orora Wihaze targets ASF producer and consumer households in Burera, Gakenke, Nyamagabe, Nyamasheke, Rutsiro, Ngororero, Kayonza and Ngoma districts.

Orora Wihaze takes a market system development (MSD) approach to achieving its two objectives and goal. The MSD approach aims to enable micro, small and medium enterprises and other organizations in the market system to strengthen ASF value chains. It relies on evidence-based social and behavior change (SBC), both to achieve this objective and to increase demand for ASF by women and children. Activities will be designed under six broad intervention areas: production, product markets, end market access, financial services, nutrition extension, and women's empowerment. The MSD implementation model for activity design and implementation involves learning, then generating, testing and scaling ideas, all in collaboration with market system actors.

For the purposes of this study, Orora Wihaze divided the market system into four categories of core functions, typical of market systems programs. The Input Distribution function (hereafter referred to as Inputs) and Supply Chain (hereafter, Supply) are at the center and include the market actors who handle the product from end to end, including farmers, herders, extension services, animal health services, aggregators, processors, wholesalers, retailers, input manufacturers, as well as the end consumers. The Supporting Services (hereafter,

² USAID IDEA. [Rwanda: Hunger and Food Security](#), accessed April 2020.

³ World Food Programme (2018). Rwanda: [Comprehensive Food Security and Vulnerability Analysis](#), December 2018.

Support) function may include agricultural and business service providers (i.e., veterinary services skills and training providers, financial services, marketing firms, etc.). The Enabling Environment function (hereafter, Enabling) actors play a role in shaping rules (both formal and informal) that affect the core value chain. This function may include those with the power to shape formal rules can be the national or local government, researchers, media, universities, among others.

I.2. Evaluation Purpose and Questions

The purpose of the market systems midline assessment is to assess the current state of the small livestock market system and how it has changed compared to baseline by answering the five evaluation questions below. Three of these evaluation questions – 1, 2 and 4 – are the basis for calculating the custom market systems indicators (refer to section 3.2). Market system indicators quantitatively measure changes in system dynamics, norms and behaviors. The other two evaluation questions – 3 and 5 – aim to generate responses that produce knowledge about the ASF market system that is valuable to Orora Wihaze in understanding the market system and assessing changes over time. The evaluation questions, shown below, are each answered in their own subsections in section 3.

- **Evaluation Question 1 – Cooperation and Trust (indicator).** What formal and informal rules and expectations between ASF producers and other market actors affect the flow of information, financing, and commercial exchange of goods and services?
- **Evaluation Question 2 – Business Innovation (indicator):** What kinds of changes—organizational, marketing, process, or product innovations—are ASF market actors making to their business models, if any? What is the pace at which changes are being made?
- **Evaluation Question 3 – Inclusive Value Creation:** To what extent are ASF market actors designing improved technologies, or implementing production and management practices to be inclusive of women, youth, and PWD?
- **Evaluation Question 4 – Ecological factors affecting ASF consumption (indicator):** What aspects of the family or home environment related to ASF food intake (e.g., home availability or accessibility of certain foods) are linked with dietary behavior?
- **Evaluation Question 5 – Market linkages:** What types of market linkages and supply-chain coordination and development models for animal sourced foods across the implementation districts are most effective in linking farmers to profitable markets and improving quality and efficiency in the market?

In addition to answering these five evaluation questions, this midline assessment also provides an update on the context from a review of secondary data, as detailed in section 3.1.

2. Methodology

This section details the methodological approaches used to answer each question; tools, targeting, and implementation of data collection; and coding and analysis of data. Annex II outlines the Scope of Work.

2.1. Evaluation matrix

Table 1 shows the evaluation matrix with summaries of the analytical approaches used to answer each evaluation question. Note that in addition to directly providing indicator midline values for the market systems indices, responses for evaluation questions 1, 2 and 4 also include further descriptive analysis of findings based on the qualitative data. For more details on the development of these indices, refer to data analysis section (2.3).

Table 1: Evaluation matrix

Evaluation question	Analytical approaches: Indices and Tools
Evaluation Question 1 Cooperation and Trust	Scale index value from 0 to 3 based on analysis of qualitative data.
Evaluation Question 2 Business Innovation Index	Scored from 0 to 1 based on the number of innovations reported by respondents through qualitative data collection.
Evaluation Question 3 Inclusive value creation	Descriptive findings-based analysis of qualitative data.
Evaluation Question 4 Ecological factors affecting ASF consumption	Scale index value from 0 to 3 based on analysis of qualitative data.
Evaluation Question 5 Market linkages	Descriptive findings based on analysis of qualitative data.

2.2. Qualitative data collection

This midline assessment utilizes qualitative data to answer the five evaluation questions. Qualitative data were collected through interviews in Rwanda between April and May of 2022, following approval from the Rwanda National Ethics Committee (RNEC). Exactly 335 interviews were conducted using 14 question guides and were subsequently coded and analyzed to answer the evaluation questions.

Tools

For the baseline assessment in 2020, MSA developed interview protocols and semi-structured guides for each type of actor. For the midline study, MSA reviewed and adjusted these tools according to the objectives, especially considering the implementation status of the interventions. Additionally, two new questions were added to the questionnaires to better understand changes that may have happened since the start of project implementation.

Keeping the same procedure adopted in the baseline, in total, 14 different question guides were used to conduct interviews with 36 different respondent types. The relatively limited number of different question guides compared to respondent types reduced the learning curve for interviewers. Interview guides were translated into Kinyarwanda. Table 2 on the next page shows the questionnaires, respondent types and total number of interviews conducted for this evaluation. It also shows how actor types (respondents) are categorized by the different market system functions category. See Annex 1, Summary of Interviews, for more details about the market actors surveyed, including the geographic locations by districts.

Table 2: Questionnaires, respondents and number of interviews

Market system function	Questionnaire	Respondent type	# of interviews
Supply	Producers	Backyard producers	21
		Small semi-commercial producers	9
		Medium to large commercial producers	21
	Producer groups and coops	Producer groups and cooperatives	25
	Output traders and processors	Collectors/aggregators	10
		Output wholesalers	3
		Exporters	2
		Slaughterhouse/abattoirs, butchers, processors	18
	Output retailers	Small retail store	17
		Stall at market	10
		Supermarket	7
		Restaurants/hotels	15
	Consumers	Consumers (individuals)	44
Inputs	Input Retailers & Wholesalers	Agrodealers/input suppliers	18
		Vet pharmacies	7
		Input wholesaler	5
	Input manufactures	Hatcheries/multiplication center	8
		Breeder	1
		Feed manufacturer	3
	Vets	Private vets	26
Support	Transport	Transporter	5
	BDS	BDS	6
	Finance	Banks	4
		Microfinance	5
		Mobile finance	3
		Government finance	2
Enabling	Policy and implementers	National government	3
		Public Vet	10
		Local government	6
		I/NGOs	6
		Youth, women or PWD organization/platform	4
		Business association	1
	Research	Government researcher	3
		University researcher	1
		Private sector researcher	3
	Media	Newspaper, TV and radio	3
		Total	335

Respondent targeting

In the baseline, the team identified respondent types and number of each to interview based on secondary research that identified the key actors involved in the functioning of the market system and their relative prevalence. Non-probability quota sampling was used to include a distribution of actors by type, location and value chain. Actor types and quotas for number of interviews were refined in consultation with the Orora Wihaze team. There was agreement at midline on increasing the sample to account for partners and non-partners of Orora Wihaze as well as new actors identified since implementation began. We were able to achieve an 8.8% increase (308 interviewees at baseline and 335 at midline). In addition, we have included a new respondent type linked to the enabling market system function: public vets (using the "policy and implementers" questionnaire). Interviews were targeted for all four project regions (two districts per region) as well as Kigali, for all four value chains, and for all 36 actor types. A total of 64 actors were interviewed in the North, 69 in the East, 82 in the West, 30 in the South and 90 actors in Kigali - reaching a total of 335 interviews. Interviewers were also instructed to carry out interviews in different parts of each targeted district, to ensure that we had a mix of respondents from both more urban and more rural areas in the districts. . If some respondents could not be reached during fieldwork, they were replaced with other actors on the list or referrals from other actors. Throughout the fieldwork and data collection, some respondents were replaced, through referrals from the team, when they could not be reached.

Repeating an approach used in the baseline, 4 value chain referral case studies were carried out to provide a snapshot of the relations between actors in a value chain. One referral case study was carried out for each targeted value chain. The case study started with a producer, who worked with an Orora Wihaze partner and was already targeted for interviews. Interviewers identified some other connected businesses by asking for referrals to businesses with whom the producer did business with, and followed that chain of referrals. These four single-page 'market linkages snapshots' are presented throughout the Findings Section. The snapshot found here may raise some aspects to consider regarding subtle changes in the value chain if we compare it with what we found in the baseline - some comments on this can be found in the corresponding section.

Figure 1: Female Fish Producer from Nyamasheke



Fieldwork implementation

Interviews were conducted by 20 enumerators hired by Orora Wihaze in all eight project districts and in Kigali. The enumerators teams were divided into two per district, and the teams were managed by one person from the Kigali office.

MSA conducted a three-day in-person training for the enumerator team the week of April 1st, 2022. The training covered the purpose of the midline, the logistics of the fieldwork, the content of the question guides and the system for uploading notes and keeping track of progress. Each interviewer conducted 2 pilot interviews that were checked by the lead researcher, who sent feedback on the interview notes to each enumerator.

The interviews were conducted during the months of April and May. Each interview was conducted by a single interviewer in Kinyarwanda using the 14 question guides and a notepad and pen. Later, interviewers typed up their notes in English and uploaded them to an online team shared drive. This system allowed data collection teams to track their progress against targets and for management to monitor progress and quality. A total of 335 interviews were completed (with 30 percent female respondents and 16 percent under 30) and notes uploaded as shown in Table 2 above. A more detailed breakdown of interviews by region is found in Annex 1.

2.3. Data analysis

Coding

Following the same analysis pattern developed in the baseline, the Midline team coded all interviews using the computer-assisted qualitative data analysis software program, NVivo. Codebooks were created with nodes for each evaluation question and sub-nodes for each evaluation question area. Through NVivo, researchers can access all the text across all the interviews categorized by node and sub-node and disaggregate by location, actor type, value chain, sex, age, and other relevant demographic characteristics. The evaluation research team who carried out the coding worked with the interviewers to clarify their notes where needed.

Analysis

The midline team analyzed the results by reading through the coded parts of interviews and identifying themes and findings that were responsive to each evaluation question. These themes and findings were supported using the excerpts from the interviews from which they were identified. The research team shared their analysis internally with two main objectives: (1) to identify any possible bias of the researchers involved in the coding and, at the same time, (2) to verify whether findings and themes were supported by the data and responsive to the evaluation questions. During this process, the results found were compared with those found at baseline. The results of this vetted analysis and comparison are the basis for the findings in the next section where all five evaluation questions and findings are presented.

In the same way as was done in the baseline assessment, the evaluation team also used the analyzed data from the five evaluation questions for three market systems indicators that will be used to measure progress in changing the market systems in Rwanda: Business Innovation Index, Cooperation and Trust Index, and Ecological Factors Index. Questions on inclusive value creation and market linkages help Orora Wihaze understand the nature of the dynamics and relationships in the market system, but do not result in an indexed benchmark, while the other three that follow do.

Business Innovation Index

The Business Innovation Index (BII) measures the level of innovation in a market system. The BII was developed under the USAID/Leveraging Economic Opportunities (LEO) Activity⁴ and has been used in market systems assessments on various other projects, including USAID Feed the Future (FTF) Activities. The index comprises responses to yes/no questions on 13 innovation types in a six-month retrospective time frame. The index is on a scale of 0 to 1 and is constructed by multiplying the number of innovations reported by a respondent by 0.2. If a respondent has more than five innovations, their score is 1.

During the baseline assessment, the team discovered that many of the 13 innovation questions were not relevant for producers. Furthermore, some innovations, like the use of a new feed type, were not captured by the index. Therefore, the BII was modified and simplified for producers, producer groups and cooperatives. Only three questions on innovations were used for the producer respondent types, while the other respondent types were asked the full set of 13 innovation questions. To normalize the BII scoring index calculation, BII calculation for producer respondent types was adjusted as follows: 1 innovation is scored as 0.2, 2 innovations are scored as 0.5, and 3 innovations are given a score of 1. In the midline assessment this procedure was maintained, and the same set of questions were used for the same types of actors, as performed at baseline - this allowed the comparison between the indices found at baseline and midline.

Cooperation and Trust

The Cooperation and Trust Index measures market actors' expectation of cooperation and trust in their business transactions and interactions with each other. Both norms are measured on an indexed scale from 0 (low) to 3 (high) considering perceived expectations of providers and consumers. This index was first constructed and applied on the Mozambique FTF Inova program in 2018. The index values are constructed by analyzing the dimensions of trust (integrity, competence, and reliability), and the dimensions of cooperation (belief in the importance of ongoing relationships, and belief in mutually beneficial purpose) according to the assessment criteria, using thematic analysis. The index was used in the baseline and the repetition of its application in the midline allowed us to make a comparison of the results, as detailed later in the findings section, for each dimension.

Ecological factors

Ecological factors gauge the contextual aspects of the market system, in the home and community, that may influence dietary behaviors. The index was developed at baseline, whereby fourteen ecological factors were identified using an inductive approach by conducting a series of interviews about expectations of what may influence whether ASF is consumed or expected to be consumed, and by whom. Analysis of these interviews was complimented by observations at restaurants, retail markets, and other venues, as well as by secondary sources like newspaper articles and research studies. Once the factors were identified, using this inductive approach, they are measured on an indexed scale from 0 (low) to 3 (high) according to the strength of influence it has on the decision to consume ASF, as expressed by the respondents and coded using thematic analysis. Each factor was then ranked as low, medium, or high, by the research team panel in a data interpretation workshop. Each rating was assigned a value 0.5, 1.5, or 2.5 and then averaged for the total value. The range for the final scoring is Low (0.00-0.99), Medium (1.00-1.99) and High (2.00-3.00). The index considers three levels of the market system—the individual (agent-level), the interpersonal (networks), and the institutional (norms). As already mentioned with regard to the other indexes, the results found in the midline on ecological factors were compared with the results of the baseline, as detailed in the Findings section.

⁴ Sparkman, Tim (MarketShare Associates), Mike Field, and Eric Derks. *Practical Tools for Measuring System Health*. Washington: USAID Leveraging Economic Opportunities (LEO), 2016. <https://marketshareassociates.com/testing-tools-for-assessing-systemic-change>.

2.4. Secondary data

Secondary research during the assessment was conducted to provide additional context for Orora Wihaze indicator values and findings. Secondary data sources include USAID, the Government of Rwanda, the International Food Policy Research Institute (IFPRI) and other sources. The findings from this analysis can be found throughout the report complementing the primary analysis, as well as in the Market Systems Context in section 3.1 below.

3. Findings

3.1. Market system Context

The global and Rwandan context has changed considerably since the Orora Wihaze Activity was first conceptualized, and even since the beginning of project start-up in October 2019. First and foremost, the COVID-19 pandemic led to limited movement and interaction as a result of government-imposed lockdowns as a measure to protect public health. The first of several lockdowns was implemented in March 2020 in Rwanda. These lockdowns lasted through 2020 and 2021, with varying levels of restrictions including but not limited to restricting movement outside the home except for essential activities (i.e., health care, grocery shopping, etc.) and only essential businesses were allowed to operate with capacity restrictions and curfews in place.⁵ The lockdowns changed the way the world moved, worked, and interacted, and Rwanda was not an exception. The many adverse economic effects, discussed below, were accompanied by changes in how markets operated, businesses interacted with one another, and significant fluctuations in supply and demand.

Alongside the limited movement and interaction are ongoing fuel, food, and fertilizer crises that were set off by a chain of global health and geo-political events; including but not limited to the COVID-19 pandemic and the Russian invasion of Ukraine. In summary, the global price of food, fuel and fertilizer has been rising, and continued to rise especially throughout 2022. Between July 2021 and April 2022, natural gas prices have risen by 88%, fertilizer by 101%, and food varies between commodities but ranges from 11% for maize and 100% for wheat. The International Food Policy Research Institute (IFPRI), among many other research institutes, studied the impacts of the Ukraine and global crises on poverty and food security in Rwanda. The world price shocks have had significant influences on the price of food, fuel and fertilizer in Rwanda, but has also disrupted supply chains, influenced the affordability and accessibility of healthy diets, and the productivity of rural farmers.⁶ The most relevant changes, as studied by IFPRI are summarized below:

- **The rising prices in oil and crops like maize disrupt supply chains because Rwanda mainly uses them as key materials in input use (86% of oil demand, and 65% of maize).** Most petroleum products, for example, are used by the transport sector, the cost of which affects the price of all marketed goods and services in the economy. Maize for example is a key ingredient in livestock feed.
- **The net effect on rural farmers' welfare is negative,** as a result of higher fertilizer and fuel prices, reduced fertilizer use, and lower agricultural productivity.

⁵ Citing TBD: [Cooperative Resilience: A comparative case study of two business models in crisis \(sharepoint.com\)](#)

⁶ Diao, Xinshen; Dorosh, Paul A.; Thurlow, James; Spielman, David J.; Smart, Jenny; Benimana, Gilberthe; Mugabo, Serge; and Rosenbach, Gracie. 2022. Rwanda: Impacts of the Ukraine and global crises on poverty and food security. Global Crisis Country Brief5. Washington, DC: International Food Policy Research Institute (IFPRI). <https://doi.org/10.2499/p15738coll2.135963>

- **Employment has declined 3.1% economy-wide**, and more specifically by 4.5% in the agri-food system, 4.3% in agriculture, and 7.7% in off-farm employment. 85% of the decline in total employment comes from on-farm activities
- **The cost of a healthy diet has increased, and diet quality has decreased for many.** Declining incomes and rising food prices make it more difficult to access and/or afford food. IFPRI expects that 1 million people will be deprived in at least one more food group.
- **There has been a substantial increase in the poverty headcount rates** as a result of food, fuel and fertilizer price shocks, by 3.8% nationally, 2.6% among urban populations, and 4.1% among rural.

Ultimately, these effects influence the behaviors and incentives of individual market actors or agents, the networks in which all actors operate within to share information and buy and sell products and services, and ultimately, the norms that were previously held and in the process of changing. While Orora Wihaze acknowledges that systems have always been dynamic and complex, the recent crises have had serious implications on the ASF market system; some of which has yet to be observed or documented. This context is important as it may provide some reason as to why the Midline assessment observed certain changes in comparison with the baseline that was conducted in 2020.

3.2. Market system Indicators

Market System indicators are a set of custom indicators that have been selected to gauge prioritized slow moving variables within the dynamics of the market system. The three market system level indicators are listed below. Performance Indicator Reference Sheets (PIRS) for these indicators can be found in Annex 3:

- #5 Observed shifts in Cooperation and Trust between smallholder producers and other market actors
- #12 Average business model innovation score
- #16 Observed shift in ecological factors related to food intake

Table 3: Market system indicators, baseline and midline values

#	Indicator	Baseline Value	Midline Value
1	Observed shifts in Cooperation and Trust between smallholder producers and other market actors (Market System Indicator)	Cooperation=1.25 Trust=1.32	Cooperation=1.08 Trust=1.55
2	Average business model innovation score (Market system indicator)	0.25	0.37
3	Observed shift in ecological factors related to food intake (Market system indicator)	Overall mean=1.21 Individual=1.08 Interpersonal=1.11 Institutional=1.31	Overall mean=1.79 Individual=1.63 Interpersonal=2.09 Institutional=1.68

These market indicators are discussed further in this report that follows.

3.3. Cooperation and Trust

Expectations between producers and other market actors about how to exchange information, financing, goods, and services affect market system dynamics and relationships. Orora Wihaze intends to promote change by working with several types of interconnected actors in the agricultural market system.

This section specifically addresses how and when actors expect to cooperate and trust one another in the ASF market system. For the flows of information, finance, and commercial exchanges to facilitate the optimization of both inclusive productivity and consumption of ASF, actors need to be considered in relation to one another. For every dyadic relationship, there is a provider and a consumer, whether their role be in the provision or consumption of a good, service, or information. In a market system, an actor should not only be a provider or only be a consumer. A consumer could be a woman who purchases fish to eat, or a customer of medicine for broiler poultry, or a farmer member of a cooperative, who receives member services. A provider could be a private veterinarian vaccinating goats, a restaurant selling fish, a mobile money facilitating digital payments for an agrodealer, a truck driver delivering feed, a community health worker explaining the benefits of dietary practices, a health inspector checking the safety of a slaughterhouse and so forth. For the purposes of this study, the dimensions of cooperation and trust from the provider and consumer perspectives are the primary units of analysis.

The evaluation team used thematic framework analysis and coded qualitative data according to the established index dimensions for both cooperation and trust. Evaluators interpreted the coded summaries by the established assessment criteria for each dimension and ranked responses using the scale (Figure 2) below. In the following subsections, we present the mean scores for cooperation and trust as well as associated descriptive findings. This approach is the same as that adopted in the baseline, which allows us to highlight some comparisons between the data found in 2020 and the data found recently – in the midline assessment.

Figure 2: Evaluation 0 – 3 Coding Scale

0	1	2	3
Reference group does not expect this to be true	It would not be entirely unexpected if this were true	It is most appropriate if this is true	This is fully expected, and there are major consequences for market actors who defy expectations

Cooperation

The degree of cooperation in a market system indicates the willingness of actors (individuals and groups) to invest their time in working with others for mutual benefit. This midline assessment considers two specific dimensions of cooperation – belief in the importance of ongoing relationships and belief in mutually beneficial purpose. Cooperation is scored according to expectations by providers and consumers, rather than on the act of cooperating itself.

Belief in the importance of relationships was scored a 1.17 on a scale of 0 to 3, which was lower than the 1.25 found in the baseline. Belief in importance of relationships manifests itself in two ways – long-term customer orientation from the supplier’s end and brand loyalty from the customer’s end.

The belief in the importance of relationships is moderately low in both the input distribution market function and the supply chain management functions of the market system. In 2020, in the baseline assessment, no strong evidence of customer orientation was found, i.e., we did not find a significant change in the system in this regard when we compare baseline and midline assessments.

There are, in fact, some providers that track their customers and expect them to be "loyal", although recognizing that there are some exceptions. An agrodealer who sells veterinary drugs and supplements for animals and crops in Nyamasheke explained that: *"sometimes we receive credits from our suppliers too because we are loyal to them and recorded on the list of their potential customers. [...] There is no contract applicable because as the main customers we are loyal to the suppliers, and the way of delivering products to us mostly on credits is based on trust. Thus, they respect us, and we respect them back that we don't have such intention of deceiving them."*

However, it does not seem that the practice of tracking customers or obtaining feedback is common among providers, even though some understand that strengthening customer relationships can improve the orientation of the business to customer needs. Regarding this, a chicken male farmer from Kayonza explained his commercial relationship based on cooperation with Tubura⁷: *"To get chicks we negotiate with Tubura, they give us chicks and supply food and cut off the price during selling because they come back to buy them."* The evidence of not tracking clients appears to have been stronger at midline assessment than at baseline.

Key aspects of importance of relationships dimension:

- Agricultural input suppliers are still not tracking customers' needs, feedback, and purchases. (Even wholesalers are not making efforts to find out agrodealer needs; agrodealers are not tracking their farmer customers)
- Output buyers (like traders, processors and retailers) are giving more information on their expectations for some livestock size, weight, and health, but not as an intentional or systematic way to improve their supplier loyalty or their productivity.
- Credit is given using a buyer check off system on a short-term basis with very little stake put into the customer or supplier over time.
- Finance, transporters, and other service providers did not emphasize the importance of the ASF market actors or efforts made to make or keep them as customers.

Although the different type of functions in the market system do not seem to be customer-oriented, evidence was found that most consumers (those who buy inputs) are satisfied with their relationships with providers, especially with regard to granting credit and the type of business relationship that develops between them (whether or not using contracts). This relationship includes the exchange of information - which was mentioned in a few cases in the supply chain functions. A young male from Nyamasheke who works as collector and aggregator in the goat/sheep value chain (Supply Chain Management function in the market system) mentioned that he provides the customer with information and terms that he believes will in some way benefit the consumer and that this makes both of them satisfied with the commercial agreement made between them: *"When we establish such an agreement, I am always satisfied because he/she tells me her/his suggestions and I tell her/him mines then we make an agreement. It is all about the type of goat, the suggested date of payment, the signature of both of us.... I feel satisfied because I have contributed in setting the rules and regulations of the agreement. But when I am familiar with the supplier, we only trust each other and never use papers."*

⁷ Orora Wihaze partnered with Afrisol, and Tubura (One Acre Fund) was a downstream partner at the time of the Midline data collection. Tubura is the name that One Acre Fund operates under in Rwanda. They manage the network of producers, provide extension services as part of the contract/outgrower model Afrisol piloted.

Figure 3: Male Agrodealer from Kayonza



Across all value chains, but especially with pigs, chickens and goats, commercial transactions are a one-time exchange of goods in a spot market. These transactions typically lack formal contracts and, typically, no effort is made to establish an ongoing commercial relationship between buyer and seller. This result is quite similar to the baseline evaluation findings and therefore seems to be a practice that is perpetuated in this type of commercial relationship.

A male farmer from Ngorero that raises pigs explained how this relationship works: *"I bring my pigs to market clients pay me cash no credit yet no contracts even because I don't know clients who buy my products, we meet there at market, I sell, they buy, then I return home."*

A female producer from Nyamasheke that raises goats, in turn, explained that this type of commercial relationship is adopted because she is still a backyard producer: *"When I have a customer, we discuss the price by estimation according to some criteria. Then he/she pays cash. I find that this is the best way of selling as I am still a backyard which haven't many goats."*

Belief in mutually beneficial gains—when consumers and providers expect their interests are aligned—had an average score of 1. Mutually beneficial gains manifests in many ways. For example, this can be seen in the willingness of a repeat consumer to pay a premium to a provider for a quality product or service that improves their productivity (like their yield). The provider expects that consumers will continue to purchase the quality product or service from them if the provider invests in giving the consumer better information about the product or service, better terms of pay or credit, or even as seen frequently by providing discounts (a few input suppliers mentioned offering discounts). Conversely, the consumer expects the provider will take measures to ensure the consumer has all the necessary arrangements to acquire and utilize the product or service effectively. Some of the specific examples mentioned by respondents include examples of calling veterinarians and expecting them to provide advice and guidance. Some vets also find mutual benefit in traveling to visit smallholders to show them how to care for their animals, like in breeding and medicine, since many are illiterate. This was specifically mentioned for pigs and chickens.

No strong evidence was found of belief in mutually beneficial gains from taking the risk of a partnership. As found in the baseline assessment, the midline results point to the fact that the idea of mutually beneficial gains focuses on the expectation that there will be a mutual benefit between parties. One common example is in granting credit, as this adult male agrodealer from Nyamasheke explains: *"we give credits to our*

Figure 4: A Vet Pharmacy in Ngoma



customers when they don't have enough money, it is primordial for a customer it shows him that you contribute to his/her progress. Other way, he/she may go to buy somewhere else and you can lose clients as the times goes by."

Although the expectations for mutually beneficial gains do not seem to be very high or something prevalent in the commercial relationships that are established in this market system, evidence was found that there is an effort on the part of the actors to practice a "mutual understanding". Most of the interviewees highlighted the importance of mutual understanding in commercial relationships, especially those where credit is granted. In other words, respondents emphasized the importance of aligning interests before granting credit and formalizing a commercial relationship – which also includes fixing prices for products. In fact, there is an expectation that longer-term business relationships and/or those that establish credit will have a mutual understanding or mutual agreement that respects both sides of the relationship. A male adult who owns a vet pharmacy in Ngoma described aspects of their mutual understanding relationship with both their providers and their customers: *"Yes, in both sides, on our side we record loans on book which contains loanee address, period for loan and repayment installment which discussed before he or she buy a product. On other side on where we buy product from the loan, it based on trust, time collaborations and sometimes we use bounced cheque as signs of commitment to repay on time. [...] Yes [I'm satisfied], because there is an agreement between two sides and the contract considers the benefit of each other"*.

Key aspects of mutually beneficial dimension:

- Smallholder farmers and other market actors, like vets, think that other actors do want to find the right transactional price, loan or credit to make a deal.
- There is little to no mention of business relationships that will be a "win-win," wherein a market actor states that promoting the productivity gains of their customers means potentially more sales for both actors.
- There does not seem to be claims of intentional predatory relationships to take advantage of other market actors, but there are few to no examples of investments made to promote both providers and consumers benefitting.

This mutual understanding, however, does not mean that there is a high and consistent influence of consumer interests in commercial relationships. As pointed out in more detail in the Trust section, most consumers mentioned that the providers decide the final price adopted in commercial exchanges and, in most cases, the expectation is that the provider decides the main clauses in relation to the granting of credit - even if there is an attempt at a mutual understanding.

In terms of expectations related to support services and the mutual gains involved in this type of relationship, the actors interviewed maintain the same pattern that was found in the baseline, that is, there are no expectations that the services of transporters, banks, or other business providers adapt their offerings to the agricultural sector. Furthermore, actors do not have expectations that especially the banking sector related to loans will be

reasonable on each actor's terms or consider the particular challenges faced for example by small rural producers – which inhibits many actors from trying to apply for loans, as can be seen in more detail in the Finance sub-section in the market linkages section. A male adult agrodealer from Nyamagabe explained a difficulty faced with regard to the planting season: *"I don't like it. [...] I am not also satisfied with the terms. For example, you can ask for agriculture credit in September, then Bank manager accepts in November. What can you do with it since planting period is already finished? For those who receive loans from Banks, they should submit the collaterals and their projects"*.

Cooperation is scored overall, with an average score of 1.08 out of 3, a score slightly lower than what was found at baseline, 1.25. There were no significant changes in cooperation in this market system. Informal short-term credit is still frequently used by actors occupying different roles in the market and builds a potential basis for cooperation - centered on an idea of mutual understanding.

However, many transactions still take place through spot markets and there are no expectations of major consequences for not cooperating. In fact, the pandemic context was mentioned in some cases as one of the justifications for the lack of cooperation, since it demanded from the actors a rearrangement in the way they developed their commercial relations and physically separated the actors from each other, due to contamination prevention measures - such as lockdown.

Figure 5: Cooperation scores comparing baseline and midline assessments

Dimension of Cooperation	Score in Baseline (2020)	Score in Midline (2022)	Difference (Midline – Baseline)
Belief in the importance of relationships	1.5	1.17	-0.33
Belief in mutually beneficial gains	1	1	0.00
Overall score	1.25	1.08	-0.17

Trust

The degree of trust in a market system is important because it signifies a willingness to take on risk and be confident that any short-term inequities encountered with a business partner can be resolved. To aid our understanding of trust, we explore three specific dimensions of trust – integrity, competence, and reliability – assessing levels of expectation of trust from 0 to 3 (low to high). Trust is scored according to expectations of consumers (like buyers or target audiences) and providers (sellers, media, government, etc.), rather than the act of trusting itself.

Integrity—the expectation that a provider or consumer will be fair or just in dealings— had an average score of 1.58, slightly lower than the baseline (1.67).

Key aspects of Integrity dimension:

- Market actors, like smallholders of livestock, expect that the rules and norms by which the animal sourced food markets work are known and generally agreed upon by parties (even when the norms vary).
- Exceptions to the rules are also expected to be made based on purchasing power, i.e., lowering prices or extending timeframes for payment for poorer consumers.
- Rules are not “set” in stone or down on paper, like in contracts. There are exceptions to this, but given illiteracy this seems to be considered “just”, (i.e., a live animal purchased should be “healthy”)
- There is also an expectation to share market information with your peers. Shared information seems to be considered “fair,” regardless of source.

As seen in the baseline, a fair transaction is understood in different ways by the actors. Some respondents mentioned that benchmarks of a fair price are set (a) by the government or by specific institutions such as associations, others said that the market price is set by (b) large supplier companies or specific marketplaces and according to most of the interviewees, a fair price should be based on (c) the general expenses that market actors have (price of inputs, packaging, house rent, transport, medicine or animal feed, taxes, employees, etc.), based on (d) prices offered by competitors and (e) on purchasing power of customers, i.e., on each buyer's ability to pay. All these aspects were mentioned in the baseline as well, which means that the fair transaction idea remains quite similar to what was found in 2020. However, in the midline, some interviewees also mentioned other aspects that characterize the expectation of a fair price, such as the exchange of market information with peers and the natural market movements in terms of supply and demand. The cooperatives mentioned that the fair price is defined by a group of people or by a specific committee that assumes this role. An adult male private breeder from Burera

explained that he considers his customer's purchasing power to fairly determine the price of his products: “It depends on availability of clients and by considering the affordable price for them to avoid conflicts or delaying payment”.

There seems to be an expectation that prices set by providers are “market value” and that market value is “fair”. So, actors expect fair treatment in negotiations, but at the same time they are resigned to the fact that some are likely to take advantage of others and that the price paid for inputs will usually be ultimately set by suppliers. In general terms, most of the actors interviewed (considering the different functions of the market) do not believe that contracts between buyers and sellers are necessary for the other actor to comply with fair terms. It

was also mentioned that customers do not feel comfortable when they are asked to sign a contract, which becomes even more complex in the case of customers with lower literacy. These results follow the same degree of trust found in the baseline.

Figure 6: Chicken Farmer from Kayonza



Some interviewees have the expectation that contracts help to build a more stable commercial relationship and strengthen cooperation and trust between actors. About this, an adult male who owns a vet pharmacy said: *"Yes, we are using a contract in order to make a trust that our products will have clients in short term, facilitate the management of cash flow and to allow us to be competitive at the market level [...] it helps us in planning to the client's needs, trust between us and making stability in our business"*.

Unlike the baseline findings, there is very little to no mention of being "cheated," like on the content of feed,⁸ or always needing to negotiate. The idea of predatory prices for certain types of inputs, mainly animal feed, persists from the baseline. In addition, there is an expectation that live animal purchases, such as chickens and fish, will be healthy. A young male who works at a stall at market in Gakenke said that *"the supplier should have healthy products (healthy animals). I am able to know if the poultry is sick or not. So, I can't buy a sick poultry"*.

Competence –the expectation that a provider or consumer can do what they say–had an average score of 1.25, which is higher than the score found in baseline (0.83).

There are competency standards that can be and are expected to be met, even when considering prices that consumers can afford. The exception occurs in the case of feed, as there is a high standard, but it is difficult to meet and deliver reliably in rural areas. This does not mean that feed providers deliver low quality feed. Rather, it means that the quality standards for this type of product are very high and difficult to meet, and it is especially difficult to meet when

distributing far distances to rural or remote areas. As this adult female who works as a private veterinarian in the Ngororero region explained: *"It is difficult to get certified/ industrial based manufactured animal feeds in rural area"*.

⁸ At baseline, different types of testimonials were found that highlighted a concern that feed quality expectations cannot be ensured everywhere. Some actors interviewed, during the baseline, even claimed that the feed vendors were actually milling residues from milled grains like maize, sorghum and cassava. In midline assessments, there were no concerns about the quality of the content of feed raised.

Quite differently from what was found in the baseline, consumers believe and expect that certain standards can be met. In this regard, the product quality is one of the main aspects that lead consumers to choose their suppliers. This aspect can be seen in what this adult male who works as a collector/aggregator in the Rutsiro region said: *"the main criteria to decide who can supply us those chickens is he must be known, by government with documents, to have low price and good products"*.

In the midline, a lot of evidence was found that the price of feed is quite high in all the surveyed districts. Many respondents across the different value chains mentioned that it is very difficult to buy feed, especially quality feed, because the prices are very expensive, and this has gotten even worse in recent months. So, it is inferred that the concerns about quality of feed are due in part by the inability to "pay" or "afford" the quality feed, not that there are not any competent providers. Here's what an adult female who works as a secretary at a cooperative in Nyamagabe said: *"People are able to grow poultry, but they need support of poultry and or poultry feeds. It is the same for us because it will reduce expenses of feeds due to the fact that poultry waste that fall in ponds will be used as feeds for fish. [...] We are extending our fishponds: we need support of feeds since they are very expensive compared to the price of fish."*

Some documents reviewed in the analysis of secondary data confirm this finding regarding the increase in prices of certain products (retail food prices) at the country level due to the war in Ukraine - these increases may be reflected in the price of animal feed.⁹

Evidence was found that there are quality standards in terms of medicines and that these can be met by suppliers, despite high drug prices. In addition, veterinary service providers, who are qualified and charge a price that a small farmer can afford, are scarce. Both these findings are very similar to what was found in the baseline. Regarding this, an adult male who works as a livestock specialist at an INGO in Kigali said that *"small farmers should be supported by providing small animals and doing husbandry follow up if not these animals will disappear due to lack of feeds and drugs"*.

Reliability –the expectation that a provider or consumer will do what they say– had an average score of 1.83, which is a higher score than what we found at baseline (1.46).

Very similar to what was found in the baseline, the actors interviewed in the midline assessment explained that most dealings are based on the extension of informal credit with the expectation that not all borrowers will follow through reliably on delivery of goods or payment. An adult male agro-dealer mentioned something regarding this: *"Yes, I do provide products to my client on credit and my suppliers also do it for me. I do not have special terms with them, what I do is just to write in book, client name, address, debt and products for reminding me in case he/she delays payment. For suppliers I do use their bank account or momo pay after receiving my products."*

Key aspects of Competence dimension:

- Market actors are expected to be able to meet the standards where possible, with the exception of quality feed that faces delivery challenges in remote areas.
- Most remote smallholders simply cannot afford the quality inputs needed to raise livestock productively and at high quality
- There continues to be an expectation that INGOs will need to provide inputs and training on husbandry and other practices.

Key aspects of Reliability dimension:

- Providers of inputs and services will extend informal credit to smallholders of livestock and output buyers will extend informal credit to cooperatives
- Informal credit should not always expect to be re-paid in full or on time.
- There was no mention of side-selling (taking credit in cash or in-kind from one actor and selling to a different output buyer).

⁹ <https://ebrary.ifpri.org/digital/collection/p15738coll2/id/135073> and <https://www.ifpri.org/event/rising-global-commodity-prices-and-import-dependence-impacts-retail-food-prices-and-food>

As a new result found exclusively in the midline, there is a set of customers (buyers) who offer credit to suppliers, especially to guarantee that they will receive production. This is particularly so in the case of cooperatives that act as suppliers. In other words, some buyers pay in advance their providers to guarantee the purchase delivery.

A very significant part of the actors interviewed, representatives of both the input and the supply market functions, recognize the importance of offering (informal) credit to their customers in building a relationship of cooperation and trust – they understand that they play a role in the market. There is an expectation regarding these providers helping that actor who cannot afford to pay for the product at the time of purchase.

This aspect was also found in the 2020 baseline, however, in the midline assessment the evidence related to this seemed more significant – several actors mentioned something related to this. The category of private veterinarians stands out in this regard.

The expectation that some providers will not be paid or will be paid without respect for deadlines was also found both in the baseline and in the midline assessment, however this aspect appeared more significantly in terms of evidence at the baseline. In fact, in the midline assessment most respondents, despite recognizing that some customers may not pay the credit granted, have the expectation that informal credit agreements work and, in general, are satisfied with the way in which these relationships are established. An adult male that is a feed manufacturer owner, from Nyamagabe, provided us some details about this relationship: *“Yes. We provide the credit according to the honesty of the customers, simply it is a trust. [...] Yes, I’m satisfied, most of my customers are honest. I give them the products on credit, and they pay on convened time”*. An adult male that works as a manager in a restaurant in Ngororero also mentioned something regarding this type of commercial relationship: *“Yes, my suppliers are my best clients and best friends too, if they come in my restaurant, I give them credits: they can take roast meat, chickens and whatever they want. [...] Yes, I’m satisfied with the term because we have an agreement to avoid betrayal.”*

As in the baseline, it was found in the midline assessment that the only consequence for a delinquent recipient of informal credit is that they cannot continue to do business with the business they owe money to. However, the evidence related to this in the midline is not very significant, only a few interviewees mentioned this point related to granting credit. One of the respondents that mentioned this was an adult male that works as an agro-dealer in Nyamasheke: *“According to the contract when we give credits to our customers, it is not applicable as they are also to us. Indeed, when some customers show a behavior of delaying in payment, we stop the procedure of credits then we ask him to always pay cash”*

In the baseline, an aspect directly related to gender was found, the expectation that the level of Cooperation and Trust is higher among women. In the case of the midline assessment, this result is maintained, with the addition of evidence that even some men emphasize having greater trust in women - especially with regard to the commitment to correctly repay the granted credit. More details on this finding are presented in the Inclusive Value Creation section.

Overall trust was given an average score of 1.55 of 3, which reflects a medium degree of expectation that market system actors will be willing to take a risk and confidently rely on partnerships. As in the baseline, in general terms, the relationships were not considered on the whole to be predatory. Partnerships appeared a little more stable in the midline findings. As well as other factors already mentioned, such as expectations regarding mutual understandings in business relationships and expectations that certain quality standards can be met.

Figure 7: Trust scores comparing baseline and midline assessments

Dimension of Trust	Score in Baseline (2020)	Score in Midline (2022)	Difference (Midline – Baseline)
Integrity	1.67	1.58	-0.09
Competence	0.83	1.25	+0.42
Reliability	1.46	1.83	+0.37
Overall score	1.32	1.55	+0.23

Conclusion

In comparing the baseline from 2020 with the midline in 2022, overall, the trust index scores increase and there is a decrease in the cooperation index. However, these index changes were quite subtle and do not represent a significant shift in the market system dynamics. Nevertheless, even in the face of the stress of COVID-19 restrictions on movements and the price shocks related to the Russian-Ukraine conflict, market actors found ways to continue to make commercial transactions and, in some cases, continue forming short-term commercial relationships, wherein informal credit is offered and monitored.

Commercial relationships, which refer to interactions that involve the exchange of goods or services, in more developed and healthy market systems are characterized by longer-term and less opportunistic interactions between market actors and smallholder farmers. Note that even though the smallholders do not feel taken advantage of in Rwanda, there is little reports of investment made in gaining their trust and facilitating cooperation.

Most smallholder respondents expected some efforts to be made to get them inputs and services that met a quality standard, like extending them credit or providing them information via an agrodealer, vet pharmacy, or output buyer, or an INGO granting them animals or teaching them husbandry. However, the expectations are very short term, one-off spot transactions that are expected. Most smallholders did not mention concerted efforts or expectations of efforts from market actors to invest in long-term commercial relationships with them. For example, few suppliers or buyers are tracking smallholder customers and suppliers or encouraging other actors in the value chains to focus on monitoring feedback and purchases with them. Orora Wihaze interventions involve intentionally facilitating some of this customer centricity with partners and there is some traction with certain first movers, like Ox¹⁰, but on the whole the market system shows only slight shifts in the development of such longer-term commercial relationships, with transactions repeated intentionally over time, with reciprocal trust and mutual beneficial gains.

3.4. Business Innovation Index

This subsection responds to evaluation question 2, which focuses on: what kinds of changes—organizational, marketing, process, or product innovations—are ASF market actors making to their business models, if any; what is the pace at which changes are being made; and how do the BII scores compare with those in the baseline assessment. Innovations are defined as self-reported improvements made by a business in the market system in the six months prior to the interviews. Innovations do not need to be novel to the market system, only to the business or organization adopting them. In total, 15 types of innovations are counted in the BII, including two which are for producers only. These innovation types are listed in table 6 below.

¹⁰ Ox delivers is a transportation and distribution service provider, providing logistics for avocados, coffee, and other commodities. Orora Wihaze partnered with Ox and entered the animal feed market, to provide a last mile commercial animal feed distribution service to increase the affordability and accessibility of commercial animal feed among rural and remote small livestock producers.

Overall, the mean BII score across all respondents increased from baseline to midline. The results are shown in table 4 below. The mean BII score across all respondent types was 0.37 at midline, compared to 0.25 at baseline. However, the median scores are the same at 0.2, suggesting that the increase in BII is driven by those that were already innovative at baseline becoming more innovative, rather than those who were not innovating at baseline becoming more innovative.

Disaggregation by market function shows increases in BII scores across all functions, with the largest increases for non-producer supply function actors, input actors and support services actors. Only very small increases in BII scores were found for enabling environment actors, and producers, who already had the lowest BII at baseline. Overall, input actors continue to be more innovative than others, but in terms of the pace of innovation, supply chain actors who are non-producers have increased their business model changes more dramatically.

Table 4: Mean actor BII scores by market function (BII score from 0 to 1)

	Mean BII score (median) Baseline	Mean BII score (median) Midline	Difference (mid/base)	Pace (mid/base)
All (midline n = 288)	.250 (.2)	.372 (.2)	.122	1.49
<i>Market function</i>				
Supply (n = 158)	.182 (.2)	.312 (.2)	.130	1.71
-Producers (n = 76) ¹¹	.138 (.1)	.141 (0)	.003	1.02
-Non-producers (n=82)	.217 (.2)	.471 (.4)	.254	2.17
Input (n = 68)	.347 (.3)	.524 (.6)	.177	1.51
Support (n = 25)	.323 (.4)	.464 (.4)	.141	1.44
Enabling (n = 37)	.277 (.2)	.286 (.2)	.009	1.03

Business model innovations in and of themselves signify those businesses are making changes to be competitive in the market. Not all business model changes will be “successful”. The more changes observed in the market the more adaptive businesses have to be in order to compete. The more competitive a market the more producers and consumers have power to influence the market.

Table 5 shows further disaggregation of BII scores by demographics and value chain. In all cases, BII scores increased by at least 0.1. Women’s BII scores increased more than men’s, though there is still a gap in BII scores between them. Likewise, both youth and those 30 and older saw similar increases in BII scores, with those under 30 still significantly more innovative than those 30 and older. BII scores increased for all four value chains, with fish continuing to be the least innovative value chain and poultry the most. However, the pace of innovation (measured by dividing the midline by the baseline value) indicates that innovations in fish are increasing at a faster rate than the other value chains (1.51) followed by shoats (1.49). Furthermore, all 9 of the project partners included in the BII had scores well above average at 0.51.

¹¹ Producers were only asked about three possible innovation types.

Table 5: Mean BII scores by demographics and value chain (BII score from 0 to 1)				
	BII score (median) Baseline	BII score (median) Midline	Difference (mid/base)	Pace (mid/base)
All (midline n = 288)	.250 (.2)	.372 (.2)	.122	1.49
Demographics				
Women (n = 86)	.202 (.2)	.335 (.2)	.133	1.66
Men (n = 202)	.265 (.2)	.388 (.2)	.123	1.46
<=30 years old (n = 45)	.317 (.4)	.462 (.4)	.145	1.46
>30 years old (n =243)	.203 (.2)	.355 (.2)	.152	1.75
Value chains				
Poultry (n = 174)	.308 (.2)	.417 (.4)	.109	1.35
Swine (n = 148)	.292 (.2)	.393 (.2)	.101	1.35
Shoats (n = 122)	.283 (.2)	.422 (.4)	.139	1.49
Fish (n = 91)	.233 (.2)	.352 (.2)	.119	1.51
Project partners (n = 9)	NA	.511 (.6)	NA	NA

Key aspects of BII dimensions:

- **Products:** There are less reports of new products and services being developed or offered than baseline (pace of change is 0.62).
- **Processes:** The most modifications or new innovations in this dimension were in payments—now more digital, and in information access (pace of change is 1.97).
- **Marketing:** This dimension only features advertising, and compared to the other dimensions, we observe a higher increase than Product and Organizational innovations, and very close to Process (pace of change is 1.73).
- **Organizational:** Most changes were in how smallholders conduct business, but more so in their management practices, as new production and technology practices actually decreased its prevalence in the market system (pace of change is 1.47).

A trend in broad categories of innovations appears to be that those in the digital space (payments, information) accelerated at the fastest pace, as seen in Table 6 below. This trend is consistent with COVID-19 government restrictions on movement and physical gathering which have accelerated a preexisting trend towards online digital business. Payments showed substantial increase in innovation, driven largely by market system actors' adoption of Mobile Money Rwanda ('Momo pay'), a digital payment platform introduced in September of 2021.¹² Indeed, nearly three-quarters of respondents that reported having made payment innovations mentioned Momo payment by name. Many of these respondents mentioned COVID-19 and avoiding the risk of close human contact as a reason they made a transition to digital payments.

¹² <https://www.newtimes.co.rw/news/mtn-introduce-charge-momo-pay-merchants>

Information access innovations also increased substantially, with many respondents reporting having used WhatsApp and other online groups to share market information. On the other hand, the development of new products and services declined significantly from baseline, with less than a quarter of respondents reporting having developed a new product or service in the past half year compared to nearly 39 percent at baseline.

Table 6 below shows the innovations that constitute the BII scores. The results in the table are the mean or average number of innovations of each type per respondent, at baseline and midline. The results show that actors developed fewer new products and services compared to baseline, as well as fewer new production practices and technologies for producers compared to baseline. All other innovations showed improvements.

Table 6: Mean BII scores by type of innovation (BII score from 0 to 1)

Dimension	Innovation type	# of innovations Baseline	# of innovations Midline	Difference (mid- base)	Pace (mid/ base)
Product	New product/service ¹³ (midline n = 288)	.39	.24	-.15	0.62
Process	Storage (n = 212)	.13	.11	-.02	0.85
Process	Transport (n = 212)	.11	.16	.06	1.45
Process	Packaging (n = 212)	.05	.11	.06	2.20
Process	Grades and Product Standards (n = 212)	.07	.16	.09	2.29
Process	Information (n = 212)	.15	.31	.16	2.07
Process	Payments (n = 212)	.14	.50	.36	3.57
Process	Finances and inventory (n = 212)	.11	.15	.04	1.36
Marketing	Advertising (n = 212)	.15	.26	.11	1.73
Organizational	Value Chain functions ¹⁴ (n = 212)	.09	.17	.08	1.89
Organizational	Hiring strategy (n = 212)	.03	.07	.04	2.33
Organizational	Staff capacity (n = 212)	.05	.14	.09	2.80
Organizational	Supplier or customer capacity (n = 212)	.07	.15	.08	2.14
Organizational	Production practices and technology ¹⁵ (n = 76)	.28	.18	-.10	0.64
Organizational	Business processes ¹⁶ (n = 76)	.14	.26	.12	1.86

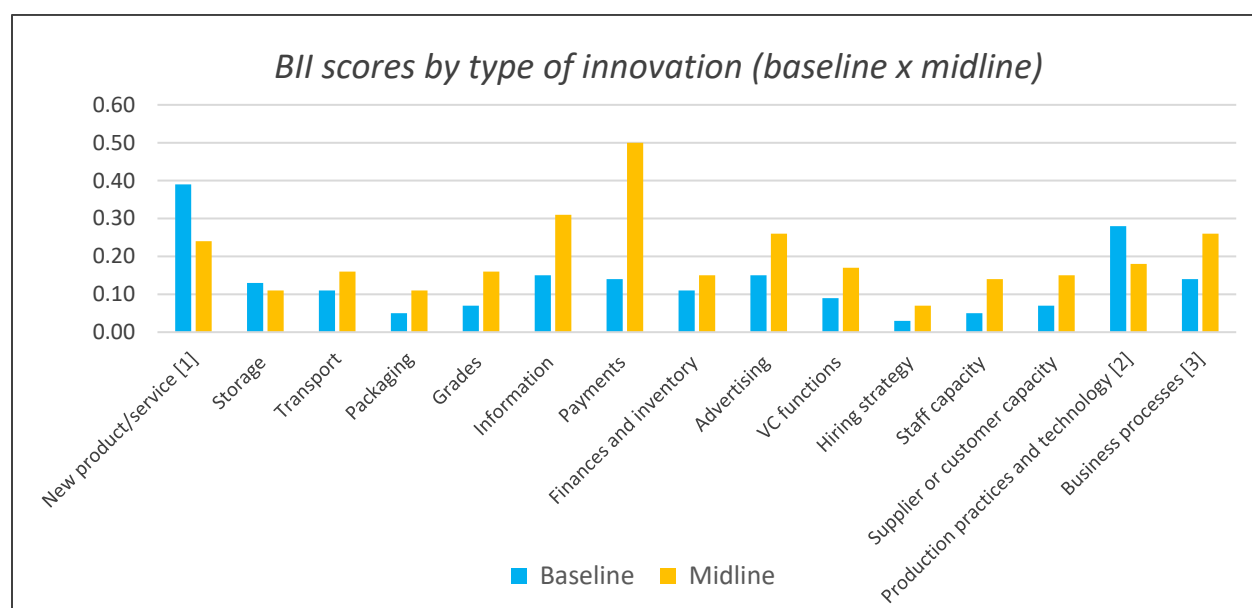
¹³ Includes producers and non-producers.

¹⁴ Functions performed by the market actor in any given value chain

¹⁵ Producers only.

¹⁶ Ibid.

Figure 9: BII scores by type of innovation



[1] Includes producers and non-producers; [2] and [3] Producers only.

Most of the innovations mentioned by the interviewees refer to process innovations, which includes aspects such as payments, market information, storage, transport, etc. Examples of innovations of this type carried out in the last 6 months include:

- A male private vet from Burera who bought a stall for medicines' disposition.
- A male input manufacturer from Kigali that started using drones in delivering swine semen to different districts.
- A female input retailer and wholesaler from Nyamasheke that due to the RCVD (Rwanda Council of Veterinary Doctors) inspections to veterinary pharmacies realized that it is better to classify the products especially to remove those already expired from her pharmacy and to dispose of them according to the regulations.
- A female output trader and processor from Nyamagabe who responded that she recently went on to record each business transaction in the related book.
- A male output trader and processor from Gakenke mentioned that they no longer use basins, they pack eggs in trays and then sell.

Respondents also mentioned changes related to offering new products or new services, some of these mentioned changes were:

- A female researcher from Kigali mentioned that with support of MINAGRI, they are doing research on a new, better variety of swine.
- A male input retailer and wholesaler from Gakenke said he included small fish in his products and started to work with Huye feeds. If a customer comes with his / her formula, I can help him / her mix animal feeds as an after-sale service.
- A female output trader and processor from Kigali mentioned that she bought a machine then processed sausages. She also tried to make breads of different forms and shapes mixed with eggs.
- A female output retailer from Ngororero said she started offering new products such as cheese.

Orora Wihaze's partners presented a higher innovation index than non-partners, as seen in Table 5. Innovations mentioned by partners include:

- The female managing director of a hatcheries and multiplication center from Ngoma replied that they recently train their staff and train their clients providing them technical assistance.
- A male producer who is a member of a cooperative in Ngoma mentioned that the cooperative changed its farming model, in March 2022, and started to conduct modern fish farming.
- A male collector and aggregator from Rutsiro mentioned several innovations made in the last 6 months, including (1) started to advertise his business by making pancarte (signboards), and mobilizing farmers in village on livestock management and consumption, (2) created a WhatsApp group for all breeders and slaughterhouses in order to share market information and news, (3) diversified their business functions, having started with egg collection and now they started to buy baby chicks for raising.
- A female Chief Executive Officer in a microfinance institution from Kigali also mentioned different types of innovation, including (1) during field tours, they facilitate their clients to pay loans/credit once they have money in any other banks doing money transfer, (2) they tried to facilitate farmers on deadline payment and requirements of getting loans and (3) they provide loans without any interest for some special cases and groups.
- A male Chairperson in a youth, women or PWDs organization from Kigali said that in the last six months different innovations were introduced, among them (1) they encouraged women, Youth and PWD to join other agriculture groups so that they can help each other instead of working alone, (2) they started to do marketing online and (3) they encouraged women, youth and PWD to think a lot on transportation of products from Agriculture sector and, in addition, they mentioned that (4) Most of farmers started to use MOMO and Airtel Money.

Conclusion

Ultimately, innovation across the market system, among different market actors, and within different categories saw broad increases from baseline (BII of 0.25) to midline (BII of 0.372). However, the scale and pace of changes in that time differs across different criteria. The high pace of innovations in payments was a bit of an expected anomaly (pace of 3.57), but most other categories of innovations also saw an increase in the midline (except new product/service, storage, and production practices/technology) and most increased at a pace above 1.50. Orora Wihaze's partners scored a higher-than-average BII (0.511) as was expected since Orora Wihaze is working with these partners primarily to spur market innovations.

Several innovations mentioned by non-partners bare resemblance to, or are related to, recent or upcoming innovations and models facilitated by Orora Wihaze through partners. For example, some micro input retailers talk about their new relationships with feed manufacturers and providing feed mixing as an after-sale service to producers. Given these observations that seem to be linked with innovations that Orora Wihaze has facilitated, it will be important to monitor Orora Wihaze's partnerships to assess the impact of related changes. In the case of this example, monitoring Orora Wihaze's partnerships in input distribution around and including Ox's work on last mile small stock animal feed distribution is an important focus; this model stimulates uptake of innovation across the system from feed manufacturers to distributors, to agrodealers, and producers. The wide-ranging impact of this business model, and the potential scaling pathways, all present opportunities for innovation adoption from several market actors and so should be monitored.

However, the low and decreasing levels of innovation among producers in general, and particularly does stand out. Going forward, it will be important to monitor the recovery of innovation within the system, especially among producers and in other areas where innovation decline or slowed down during the COVID-19 pandemic. While Orora Wihaze is promoting and facilitating a range of innovations intended to be both

inclusive, and targeted at various system constraints, access to credit is a key market constraint to the innovations by producers explored in the BII assessment. As a result, Orora Wihaze's work through Intervention Area 3 (Access to Finance), which is underway with existing and potential partnerships with the Bank of Kigali, Vision Fund Rwanda, the Association of Microfinance Institutions in Rwanda (AMIR) and SACCOs, will be important to monitor to understand how these innovations stimulate the development of and access to innovative financial products, especially for producers; including key leading indicators that will inform Orora Wihaze's adaptive management decisions, and measures of commercial success and customer satisfaction.

3.5. Inclusive value creation

Inclusion is a core tenet of the Market Systems Development approach, and similarly, of Orora Wihaze's objectives. Economic growth in its traditional form often does not benefit vulnerable populations, nor do existing systems listen to and care about their needs. The systemic approach aims to facilitate economic growth that benefits vulnerable populations by facilitating systems that listen to and care about their needs, ensure their participation, and ultimately evolve to include these groups more meaningfully. While this targets rural and remote smallholder producers primarily, there is a specific focus on the inclusion of the most vulnerable, which includes women, youth and PWDs. As per the USAID/Rwanda Country Development Cooperation Strategy, women and youth constitute over half of the population.¹⁷ In 2019, 71% of employed women work in agricultural sectors, including small livestock (International Labor Organization, 2021).¹⁸ Given the importance of including women, youth and PWD, this subsection specifically responds to evaluation question 3; assessing to what extent ASF market actors are designing improved technologies, or implementing production and management practices to be inclusive of women, youth, and PWD. This subsection, however, does not report on an indicator. Instead, it identifies general market system findings related to expectations of inclusiveness for women, youth and PWDs.

Women

As also seen in the baseline assessment, women are the primary individuals involved in backyard production of smaller livestock such as chickens, goats and even pigs. The assessment asked market actors how, if at all, they engaged with women and their experiences thus far. The market actors interviewed, from different market functions, generally pointed out that women are favorable to work with primarily because they are more hygienic than men in the production process and pay more attention to the health of animals. Women also play an important role in cooperatives, especially cooperatives working in the fish and chicken value chains. In the case of fish cooperatives, the drying process of the fish is mainly performed by women and, in some cases, by people with disabilities - see more details about this in the PWD section.

Employment: Specific to employment, a significant part of the sample of businesses also mentioned employing women and being very satisfied with the work performed by them. Nevertheless, there were no specific talent strategies to recruit and/or hire or incentivize women to continue to work cited by any of the market actors. Some quotes from respondents can be found below:

“We employ all categories and 90% of the employees are youth and women. We also have 3 people with disabilities. Men are not trustworthy when it comes to giving care, especially feeding the fish, women are very caring in nature, so we trust

¹⁷ The USAID Country Development Cooperation Strategy lays out the vision for cooperation between USAID and Government of Rwanda from 2020-2025. Refer to the website here for more information: [Country Development Cooperation Strategy | Rwanda | U.S. Agency for International Development \(usaid.gov\)](#)

¹⁸ For more information on relevant agriculture sector statistics in Rwanda, refer to the World Bank dataset online: [Employment in agriculture, male \(% of male employment\) \(modeled ILO estimate\) - Rwanda | Data \(worldbank.org\)](#)

them when given a task of feeding and cleaning, we know that the fish are taken care of when we task women to feed and take of them especially fingerlings.” (Adult female, Input market, Kayonza)

“We employ all categories and 90% of the employees are youth and women. Women are generally careful when they are feeding the pigs and are very good in cleaning the pens of the pigs.” (Adult male, Input market, Kigali)

Some actors spontaneously demonstrated throughout the interviews that they understand the importance of parity in the hiring of men and women. This was especially true in larger companies that have the capacity to hire more workers. An adult male who works as a financial service provider in Kigali highlighted his support for gender balance in the workplace: *“We do employ them especially women and about youth it depends of course if you finished to study and capable to work [...] opportunities with working with them is that we get to support gender balance in our country and they work attentive”.*

Respondents indicated that women are also better than men in selling products and services, and specifically in how they forge relationships with customers. Women are also seen as more reliable and more careful with production, which relates back to their higher levels of hygiene and care shown in animal husbandry. Below is what a few supply chain management function actors stated:

“Yes, most of sellers like 80% are women and youth. Working with these segments is good because most of the time women and youth are motivated in business and they do well. The challenges are about the time, as women must go back home earlier, but it cannot possibly cause clients of fish mostly come evening and it takes time for travel to home this can cause conflicts into family. So, the only way of addressing the issue is quit the job.” (Adult male, Supply market, Burera)

“Most of my employees are youth who help in lifting trays of eggs and women who sort the eggs. The opportunity of working with women they handle eggs with care. Eggs doesn’t get broken.” (Adult male, Supply market, Kayonza)

“There are many opportunities to work with them. I believe women are honest in tax collection because it is very difficult for them to steal money from tax collection and finally women are good in cleanliness more than men.” (Adult female, Supply market, Nyamagabe)

Customers and Suppliers: About the provision of services, input market actors mentioned that most of their clients are youth and women. They also mentioned that they work with cooperatives whose majority of members are formed by these categories. At baseline, it was noted that these actors had no particular strategies in place to target women more proactively as customers, even though they flagged issues with their lack of capital and ability to pay at times. Still, at midline, no specific solutions, like payment plans, were mentioned by actors as specifically being marketed or offered for women. Supply market respondents mentioned that their female and young customers typically consume products such as eggs and chicken, which are the two most affordable types of ASF. Supply market respondents mentioned that their female and young customers typically consume products such as eggs and chicken, which are the two most affordable types of ASF.

A significant part of the input market respondents mentioned that it is mainly women who are most involved in farming and, besides that, most of the customers are women, *“because women are the one to do most of the shopping for households”*, said a young male, sales manager from a small retail store in Kigali.

Figure 11: Female Swine Producer from Nyamasheke



Despite this, we found no evidence that the agribusiness and input providers interviewed develop specific strategies to target women more proactively as clients, but they are generally satisfied with their interactions with them. This satisfaction is mainly because women are trustworthy. Several interviewees mentioned that they trust women and that they have good experiences selling products on credit to them. About this, a male agrodealer from Gakenke said that *“usually women are very trustworthy there is no woman I have given goods on credit and has not paid back whereas many men have.”* It is important to note that these findings maintain a pattern that we had already found in the baseline as well.

In Nyamasheke, an interesting case of mutual help between women was found. An adult female who owns a vet pharmacy highlighted the desire to cooperate with other women by helping them to become empowered as veterinarians.

“Among our customers we have many categories of persons. I am planning to help young female veterinarians to create their own business because we really need many veterinarians. I will try to facilitate them to work by giving them products on credits.” (Adult female, Input market, Vet pharmacy, Nyamasheke)

Youth

Employment: Regarding employing any of the categories of people mentioned here (women, youth and PWD), most respondents mentioned employing young men, in different value chains and in different market functions.

Keeping with the same pattern found in the baseline, young men are the most employed category because they are considered to be energetic, dynamic, have the strength to complete tasks, complete tasks quickly, are flexible, learn easily and accept lower wages or are more compatible with what the market actors can offer. This observation was identified among the different market functions, including actors that perform support functions. However, they weren't without challenges. The main difficulties were around youth being unpredictable, changing locations frequently, are unstable, and in some case, dishonest. Relevant quotes from respondents are found below:

“I employed youth because the youth people are ready to accept the low salary however the youth are not stable in the employment.” (Adult male, Supply market, Nyamagabe,)

“We employ youth, I work with 3 youth [...] Youth are very powerful, and they can complete the work very fast.” (Adult male, Transport service provider, Kayonza)

“I do [employ youth] because those young people work very hard compared to middle aged people [...] the challenge of working with them is that they are clever enough to steal from you and other faults and the opportunity is that they are quick learners” (Adult male, Supply market, Kigali)

“I employed 6 people all are youth, 5 among them are male while 1 is female veterinarian [...] the youth are very quick in terms of delivering services than adults people and they operate wholeheartedly.” (Adult male, Supply market, Ngoma)

Customers and Suppliers: As already mentioned in the *Women* section, a large part of the interviewees mentioned that their clients are mainly youth and women. The veterinarians we interviewed, for example, mentioned that youth and women are the main types of customers they have, and mostly buy deworming drugs and vitamins. The biggest challenge encountered is that most of these youth and women are backyard producers and, therefore, sometimes they have difficulty making payments. For example, some vets have said that vet materials and instruments are expensive and there is nothing they can do other than offer a few days of credit payment. Since similar concerns with ability to pay were flagged during the baseline, it seems little intentional efforts have been made to address the challenges faced by youth in the sector by the public or private sector actors.

In the baseline assessment, we found results referring to youth having ambition to develop as entrepreneurs in this market, however, the biggest challenge was the initial capital and land ownership, despite the existence of government incentives. This continues to be a challenge faced by the category. About this, a Public Vet (District Veterinarian) from Ngoma said: *"The opportunities are to help them for startup their business because many of them don't have financial capacity for start. The challenge we meet is their cooperative management mostly in the cash management often it delays them in development."*

People with disabilities

Employment: Very similar to what was found in the baseline assessment, most respondents answered that they do not employ PWD mainly because the type of work requires certain skills that most PWD do not have due to their physical or mental limitations - such as transporting heavy goods, taking care of animals, driving fishing boats, transporting, and trading eggs without breaking them, etc. However, several respondents mentioned that if PWDs have the capacity to do the work that needs to be done, there is no impediment to hiring them. Again, despite hopes to nudge the system to be more inclusive, little to no intentional efforts on the part of the public or private sector to hire or serve PWDs was cited. That being said, those who responded that they employ PWDs, all mentioned that they are reliable and strive to do the job as best they can.

"Yes. My shop operator is a female youth with an eye disability. [...] Most times people think PWD are not able to work, but my dear I assure you that my shop operator is a very good employee. Working with youth also leads to completion of work in a short period of time." (Young female, Input market, Gakenke).

"Of course we do [employ PWD]. Because even if they lack some parts of the body, they have conscience like others and they have proven to me that they can because I have been working with them many times." As advantages: when you want to work with women and youth, you can find them easily and they don't require too much money for payment. For the case of PWD, they are trustful when they know the duties assigned to them and they want to show perfection mostly. But there may be some limits when working with the youth: they have big pressure when they need money, it is not easy to handle them or to make them understand some issues especially when they were mistaken. In addition, they want to much freedom even beyond the limits. As challenges with working with the PWD, when you give them a credit, sometimes they are late to pay and sometimes didn't arrive at work at the right time." (Adult male, Supply Market, Nyamasheke)

Further, two different cooperatives in the Rutsiro district that work with the fish value chain employ PWD for the fish drying process. And they seem to be satisfied with the work performed by this category of actors.

Figure 12: Young Male Private Vet from Nyamagabe



“Of course we did, youth are in charge of conducting ships and both women and PWD are in charge of making fishes dry at sunshine. [...] Actually, there is no challenge because all of them are committed” (Adult female, Supply market, Rutsiro)

“Yeah, we did, youth drive ships and one ship should have 10 persons while we have 10 groups, exactly you understand that we employ more than 90 youths. Women and PWD usually during drying fish they get great tasks.” (Adult male, Supply chain, Rutsiro)

Customers and Suppliers: It is not just in terms of employment that the PWD category finds more challenges than youth and women, as they also face more challenges as customers. Both supply and input market actors mentioned that they do not have many PWD customers. Those who mentioned having customers that are PWDs said that they are involved in cooperatives and that they are very reliable, but they often have difficulty making payments because they do not have much capital.

Other Findings

- Most private veterinarians mentioned that they work alone and those who responded that they have some type of employee usually employ young men who have knowledge in the area or who are studying to be veterinarians (interns).
- Most producers work alone and do not employ any category of actors, some male producers pointed out that their wives and/or young children are usually involved in some stage of creation – such as feeding the animals. Medium and large producers were those who said they employ people and said that most of the employees are young men.
- Some actors responded that they are unable to employ because they are still trying to recover the losses, they had due to the COVID-19 pandemic, similar to what this young Private Vet from Nyamagabe said: *“We don’t employ any, because we are still struggling with COVID-19 challenges. We don’t have enough investment for our business to engage youth, women and PWD.”*
- Support services, in particular BDS (Business Development Services), mentioned that in some cases these categories of actors (women, youth and PWD) are the target population of specific grants - especially in the case of youth and women. The policymakers interviewed also mentioned the development of projects aimed directly at this target population. A young male that works in the local government in Ngoma said: *“they are our priority, as it is, the youth and women should be supported to get animals to alleviate poverty and unemployment”*.
- Women producers and producer cooperatives interviewed made mention of participating in Community Based Savings Groups (CBSGs) and accessing credit within the group and/or through SACCOs, many citing that interest is low, application is easy, and there is support provided within the group to achieve their collective goals.

Conclusion

Overall, different market actors mentioned many reasons as to how and why they engage with women, youth, and PWD. However, there is a significant lack of a customer-orientation and models or services targeting the specific needs of women, youth and PWD. For e.g., input market actors mentioned that they do indeed sell mostly to clients that happen to be youth and women individually, and to cooperatives who are youth and/or women. However, beyond selling inputs to these customers, they have not targeted their customers' needs or pain points in any intentional or strategic way.

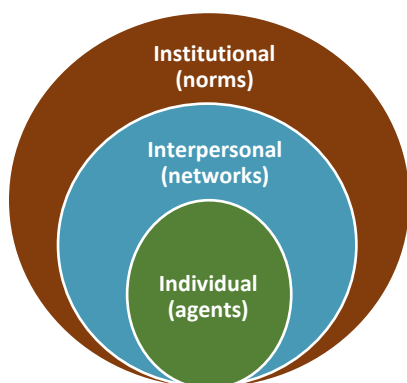
One limitation of the assessment was that interviews around inclusive value creation were focused on the market actors who are servicing these vulnerable groups, and so the analysis focused on how these market

actors include, listen to, and add value for the women, youth and PWDs in the ASF market system. That being said, some interviews with women producers and producer cooperatives indicate that CBSGs, and SACCOs are indeed providing an important service targeted to the needs of women and youth, primarily. Additionally, the External Midterm Evaluation conducted by ME&A under the USAID/Rwanda Collaborating, Learning, and Adaptation Activity (CLAA) discovered that CBSGs and Cooperatives supported by Orora Wihaze, had majority women participants and leaders, included significant youth participation, and in specific scenarios focused on PWDs (i.e., COTUMATU in Nyamagabe).

While the CBSGs, Cooperatives, and SACCOs demonstrate some platforms that do cater to the needs of these groups, other market actors are not targeting these groups. There remain many opportunities for actors and the system writ large to be more conscious of the needs of women, youth, and PWD producers, customers, and employees. Women were said to be heavily involved and trusted in the production process (animal health, more hygienic), buying/selling, and in repaying credit. Meanwhile, there is a perception that youth have high entrepreneurial skills and limited capital, presents an opportunity for Orora Wihaze to facilitate adoption of youth inclusive or financing business models.

3.6. Ecological Factors affecting ASF Consumption

Figure 14: Three levels of ecological factors affecting ASF consumption



Orora Wihaze aims to promote changes that will affect collective dietary behaviors in Rwanda, especially for the benefit of rural women and children. As a result, the purpose of examining the ecological factors affecting ASF consumption with Orora Wihaze clients is to determine the level of influence various market actors and project actions have on impacting collective patterns of food intake behaviors.

As illustrated in Figure 14, researchers used an ecological framework¹⁹ to best consider the modifiable dietary behavioral factors at the individual level, interpersonal level, and the institutional level. Each of these levels also corresponds with the Disrupting Systems Dynamics (DSD) analysis of systems change (agents/market actors, networks, and norms, respectively).²⁰

Following the same procedure implemented in the baseline, we analyzed 14 ecological factors – listed in tables 7, 8 and 9 below, and compared the index score between baseline and midline. To determine the index score, the research team considered the frequency and relative importance of a factor given by respondents as reflective of its current influence on consumption. The strength of the factors that cause some aspect of diet or activity is indicated with the index score. The percent change in the index score category levels also helps pinpoint how much modifications in the environment are happening institutionally, interpersonally or individually.

In the next subsections, we present the index scores for each ecological factor (from 0 to 3) in addition to a qualitative assessment about how these factors are influencing dietary behaviors, and how that has changed compared to baseline. The analysis was pulled from all interviews, regardless of stakeholder type, geography,

¹⁹ For more information on Social Ecology, start with the Wendel et al. (2015). [Ecological Approaches](#). Oxford Bibliographies, accessed August 2022.

²⁰ MarketShare Associates. [Disrupting System Dynamics: A Framework for Understanding Systemic Changes](#). Washington: USAID Leveraging Economic Opportunities (LEO), 2016.

and gender. The index was constructed to identify and assess factors that have the most impact on behaviors that lead to ASF consumption when modified. The hypothesis of the ecological framework is that factors in the outer ring—the institutional factors which are related to norms—will have the most impact if modified. Change in norms is often a slow moving effort, which is also reflected in the findings here.

Institutional

The institutional level addresses the prevalence of informal and formal rules that may influence collective dietary behaviors such as community expectations and governmental practices and regulations. It also includes market related factors. The seven factors classified under institutional are present in Table 7, along with their scores on a scale of 0 to 3.

Table 7: Institutional factors

Institutional Factor	Baseline 2020		Midline 2022	
	Rating	Value	Rating	Value
Expected availability of ASF in local restaurants/hotels	High	2.20	Medium	1.66
Expected availability of ASF in local retail (local markets, supermarkets, vendors)	Medium	1.50	High	2.00
Expected that dining beyond the household should include ASF	Medium	1.50	Medium	1.74
Expected that ASF is safe to consume	Medium	1.50	Medium	1.75
Presence of marketing/messaging about value of ASF	Medium	1.00	High	2.06
Expected to consume a portion of home produced ASF	Medium	1.00	Medium	1.50
Expected accessibility to ASF irrespective of socio-economic status	Low	0.50	Medium	1.04
Average Value	Medium	1.30	Medium	1.68

Most respondents reported that ASF is available for purchase in local retail (i.e., local markets, supermarkets, vendors) and restaurants but noted that it is expensive for most families, and especially so for those that are poor. Relatedly, several respondents noted that the amount and kind of ASF consumed is certainly affected by socio-economic status. However, certain ASF like eggs and dried fish are relatively affordable and so accessible irrespective of socio-economic status. This was a noticeable difference from the baseline, increasing the score from medium to high. While respondents are noting an increased availability of ASF in local retail outlets compared to baseline, affordability remains a barrier. Of the respondents in the midline who reported that there has been no change or a decrease in consumption, most quoted the increased costs of ASF and the impact of COVID-19 reducing incomes and access to markets.

Most respondents know what constitutes or assures safety and expect that they can find out if products are safe, but much of the barriers around meat inspections, hygienic practices, and old storage remain from the baseline. Several doubt the safety of the ASF supply which is creating some mistrust. Most expect that if butchers and vendors are inspected by veterinarians or other governments officials, then it could be considered safe and hygienic. Those who mentioned it was unsafe, felt that the butchers and others do not follow proper procedures and noted that refrigeration and cold storage were issues of potential contamination.

The certification of standards provided by the Government of Rwanda was one point of influence around trusting and expecting the safety of ASF; similar to baseline. However, some respondents worried that while the regulations are strong, adoption by sellers is difficult due to high cost of equipment (i.e., cold storage). While there were mixed levels of reported trust in veterinary inspections, many did mention meat inspections by vets to be an important driver to expecting safe ASF. Dining in restaurants was less specifically reported on, with many respondents noting that they do not eat at restaurants, especially as there were COVID-19 restrictions, but if they do, they will consume ASF.

Compared to the baseline, there was a noticeable increase in respondents reporting an improved presence of marketing and messaging on ASF.

Messaging was largely disseminated through direct messaging from Community Health Workers, health centers, and forms of media like radio and TV. Consumers recognized that improved messaging and availability has influenced the expectations on consumption of ASF within their household. A noticeable difference was that marketing and advertising was reportedly low in prevalence, compared with messaging coming from the aforementioned public channels. Even so, many respondents are expecting to see higher presence of marketing and advertising of ASF, beyond the increasing presence of public messaging. With this however, there was debate on its effectiveness and reach. There was some mention of Orora Wihaze, and local partner Urunana, when speaking about Village Nutrition Schools and messaging coming from the latter. At baseline, there was a commonly expressed opinion that ASF marketing is not necessary, however at midline some respondents reported that there was none or insufficient marketing on the topic to improve ASF consumption, and encouraged the need for it.

Overall, most reported that persons should consume the ASF that is produced at home, but the reasons for it were diverse. Respondents thought that the availability of animals in the household, prevalence of hunger, having insight from veterinarians on animal health and the reproduction of current animals, were all different reasons that influenced whether or not they thought they should consume that ASF produced at home. Producers rely on veterinarians, who may advise them that their sick animal will not recover and should instead be slaughtered, and if it is still safe to eat, it should be consumed. Some producers felt that the size of the animal influences this choice, as it is a more profitable choice to sell the larger animals rather than consume at home because it would be too large for the family to consume; poultry, egg, fish and rabbit were quoted as the smaller ASF produced at home suitable for consumption. Some mentioned that if market prices for home grown ASF is too low, it might incentivize their decision to consume at home.

Figure 15: An Adult male providing slaughterhouse services in Ngoma



Key aspects of Institutional dimension:

- The influence of the government, like public messaging and regulations, is recognized. Although there is some concern that public investment is insufficient to influence private market actors behaviors—like compliance or facilitating affordable access to ASF.
- The influence of community market access to ASF reinforced the finding that supply available is still priced too high for most to eat in the household (their own production) or beyond the household (buying for home preparation or at a restaurant).
- Marketing, by the private sector, to all socio-economic groups is still limited.

Lastly, the majority of respondents indicated consumption of ASF was referred for the wealthy, but not as strongly at baseline” Respondent indicated that there were some ASF, such as eggs and dried fish, that could be consumed by those with less resources. The accessibility of higher priced ASF however, such as chicken, cows, goats, or pigs, were certainly still tied to socio-economic status.

Interpersonal

The interpersonal level considers the expectations of the household that may influence dietary behaviors. The four interpersonal factors along with their scores are presented in Table 8.

Table 8: Interpersonal factors

Interpersonal Factor	Baseline 2020		Midline 2022	
	Rating	Value	Rating	Value
Frequency of ASF meals eaten together with household	Medium	1.40	High	2.10
Frequency of ASF at social gatherings	Medium	1.30	High	2.00
Presence of household expectations for children to consume ASF	Medium	1.00	High	2.29
Presence of household expectations for women to consume ASF	Low	0.80	Medium	1.97
Average Value	Medium	1.10	High	2.09

The expectation to eat ASF meals together with the entire household has increased significantly from the baseline. Most respondents reported eating ASF with their families, ranging from small ruminants and eggs to a more diverse diet with fish and poultry, and with some cultural and religious segments foregoing pork and sheep specifically. There was only one respondent who reported adhering to a vegetarian lifestyle. This is a change from baseline wherein ASF meat was considered a treat.

While most respondents reported that meat should ideally be available at social gatherings, they were

Key aspects of Interpersonal dimension: ▪ The household expectations to eat ASF together and for women and children to consume ASF have increased from baseline. ▪ In terms of social and ceremonial expectations of ASF, there are also higher expectations for gatherings with friends, families, and church and school community members, to offer ASF.	also conscious about the varying ability of hosts to afford ASF. The expectation has increased compared to baseline, as many respondents mention that offering ASF at social gatherings is culturally expected, and is a sign of respect for the guests. Some respondents, however, also noted that this expectation is lowered depending on the host's economic status. Affordability was often mentioned as a barrier that limits the frequency of ASF at social gatherings. Special events include: New Years, Christmas, weddings, birthday parties, funerals and other special events/days.
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When asked about consumption of ASF by children and women, most respondents reported that there is an expectation for children and women during pregnancy and lactation to be consuming ASF to different degrees. While that was the majority, a few respondents felt that all should be eating ASF regardless of age or gender. For the most part, this represents a significant shift from baseline when the expectation for children and women to consume ASF was not that prevalent and working men were expected to eat more ASF as per their higher energy needs.

Individual

The individual level considers individual beliefs, knowledge and tastes that may influence dietary behaviors. The following three factors are included and scored in Table 9.

Table 9: Individual factors

Individual Factor	Baseline 2020		Midline 2022	
	Rating	Value	Rating	Value
Belief that certain conditions (age, sex, pregnancy) warrant consumption	Medium	1.50	High	2.40
Knowledge of ASF value for health	Medium	1.00	Medium	1.45
Taste preference for ASF	Low	0.80	Low	1.04
Average Value	Medium	1.08	Medium	1.63

There has been a significant increase in the belief that certain conditions warrant consumption of ASF;

An overwhelming majority quoted conditions such as being a pregnant woman, women in general, and children. There is an increasing belief that ASF supports a women through a healthy pregnancy and post-natal period. This was consistently reported by both men and women, and across all stakeholder types. We have seen great improvement on this factor from the baseline. However, it is important to note that this belief, for most respondents, is centered around the well-being of the child that the woman is pregnant with, more than it is about the woman's independent health. At baseline this belief existed but not nearly as commonly among respondents. Respondents during the midline also expressed a lot more detail about the mentioned belief(s), their rationale, and expectations.

Overall, the knowledge of ASF's value to health was higher at the midline. Most respondents mentioned ASF being nutritious for their health, and especially for women and children. However, they don't necessarily know the specific nutrients that make it nutritious. While most respondents know that ASF can help to have a balanced diet to fight stunting and malnutrition, they are not aware of the specific nutrients that cause this.

There was little mention of taste preference for any particular ASF. Overall, taste preference was cited less in the midline compared to baseline.

Key aspects of Individual dimension:

- The individual influences, like taste preferences, convenience, and ethnicity, did not manifest strongly. A few respondents mentioned preferring small fish and eggs, given affordability. In some cases, chicken meat was cited.
- Knowledge of ASF value as important to fight malnutrition was cited for its protein and vitamins, which is more prevalently believed to be beneficial for pregnant women and children.

Conclusion

The Midline assessment observed a positive shift in the Ecological Factors affecting ASF consumption indicator from 1.21 at baseline to 1.79 at midline. This change was driven by an increase in all three factors: Individual (51% change from baseline), Interpersonal (88%), and Institutional (28%). The major drivers of the index improvement came from changes in ecological factors at the individual and interpersonal level, whereby the midline observed changes in the environment that encourage ASF consumption, like changing household expectations as well as individual beliefs and knowledge. Community expectations, government regulations, and other informal and formal rules did not change significantly, in comparison, but still saw an increase from baseline. The positive changes at the agent (individual), network (interpersonal), and norms (institutional) levels are all encouraging, but the challenge of affordability at the institutional level remains, and seems to have been further aggravated because of COVID-19 and subsequent economic shocks.

Altogether, the preliminary system changes the midline has observed are positive in ultimately influencing the behavioral factors relating to ASF consumption. Amidst the growing global and localized food crisis, however, Orora Wihaze will need to consider how and which institutional factors can be influenced throughout the remaining life of project while continuing to monitor the changes and the extent to which they will sustain. Otherwise, the risk is that individuals will know and appreciate the value of ASF, expect it within their household and social activities, but not have the market system that facilitates access and availability for them to improve their diets.

3.7. Market Linkages Snapshots

To trace relationships, a set of case studies was carried out in this assessment. Producers from each value chain were selected. Based on the interviews with them, it was possible to map the connections between different types of actors in the market for buying and selling products for each value chain. It is not expected, however, that producers are representative of each value chain, but that they can be a reference for the types of relationship dynamics in the system.

At baseline, this same type of study was performed considering other actors for each case. The repetition of the study in the midline, selecting different actors, allowed us to observe if there is a pattern in the dynamics of relationships in each value chain and, then, to be able to identify changes in the established linkages - not only between the supply and input market functions but also considering enabling functions.

Poultry market linkages snapshot – Eastern Province

Medium-to-large producers: The starting point of this linkage map are two medium-to-large producers who raise chicken, one adult female producer and one adult?? male producer. The male producer started raising chickens in 2020 and the female producer started in 2021. Both received day old chicks and poultry feed from AfriSol²¹, who then buys back the adult broiler chicken from these same producers. These producers are also given extension services by Tubura²², and sometimes assisted by other types of inputs coming from veterinarians and feed manufacturers.

²¹ Orora Wihaze partnered with AfriSol, and Tubura (One Acre Fund) was a downstream partner at the time of the data collection.

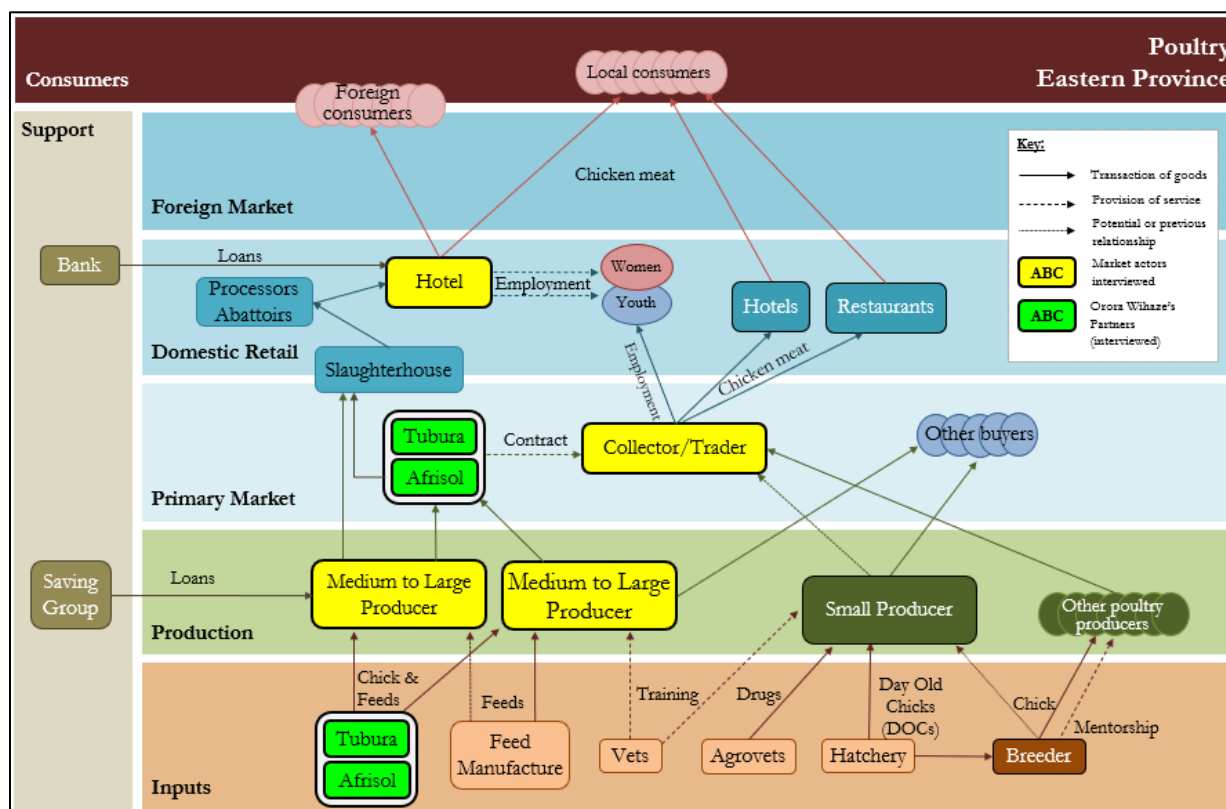
²² Tubura is the name that One Acre Fund operates under in Rwanda. They manage the network of producers, provide extension services, etc. AfriSol is the input provider and runs this outgrower model. They provide the day-old chicks, and other inputs to the producer and, later, they buy back the broiler chicken from the producer once it is raised and ready to go.

Collector/Trader: After buying the raised chickens from the producers, AfriSol sells them to the local trader. A collector/trader who buys from AfriSol through a contract was interviewed, an adult male who sells chicken meat to hotels and restaurants in different parts of the country.

Hotel: The male producer mentioned that he also sometimes sells to a certain slaughterhouse and explained that this slaughterhouse sells the meat to abattoirs who then sell it to hotels. A hotel that buys chicken from an abattoir was interviewed. The owner of the hotel is an adult woman who explained that this place has been operating as a hotel for 6 years and that they serve starch, vegetables and ASF (especially beef, chicken and fish). In addition, for breakfast, they offer eggs and milk as ASF to local and foreign consumers.

Observations against Baseline: The most significant change at the time of data collection, was the presence of a new broiler outgrower model that Orora Wihaze facilitated through partner AfriSol, and downstream partner Tubura. Compared to the baseline, this model established new relationships between input, production, and output markets. The relationships increased the flow of resources to and from one another, as producers were able to access inputs, credit, day old chicks, and an end market through AfriSol and extension services through Tubura. While this was true at the time of data collection, AfriSol has since adapted and downscaled the model after 3 phases, while Tubura continued to provide this service to a larger and more consolidated company in Bugesera.²³ Orora Wihaze is currently using the learnings from facilitating 3 phases of the broiler outgrower model, to facilitate a comprehensive outgrower pullet model with another partner named ABUSOL.

Figure 16: Poultry market linkages snapshot



²³ [Embracing Change to Facilitate Inclusive Market Systems \(msdhub.org\)](https://msdhub.org/)

Goat market linkages snapshot – Western Province

Goat producer: the adult female producer is the starting point of this market linkages map. She has been raising goats for 5 years. Usually, she raises 5 to 8 goats which is what helps her to meet the needs of her family. In addition, she uses goat manure to fertilize her land. She buys medicine (i.e., antiparasitic drugs, vitamins) and veterinary services, and feed from a veterinarian who, sometimes, when necessary, gives her the products on credit. Her decision on who to buy from is determined by which vet/pharmacy is closest to her, and the availability and price of the inputs. The price of the inputs is determined by the vet, who she trusts. In terms of selling her goats, the price is negotiated with the buyer depending on criteria like sex, size, and age. Formal contracts are not used, and the producer suggests that negotiating at the point of sale and paying by cash is most ideal for her as a backyard producer with limited goats. An interesting point is that while she has not taken any loans and prefers to rely on her own income, she is considering a loan to expand her goat production. She has, however, accepted advanced payment for her goat from buyers.

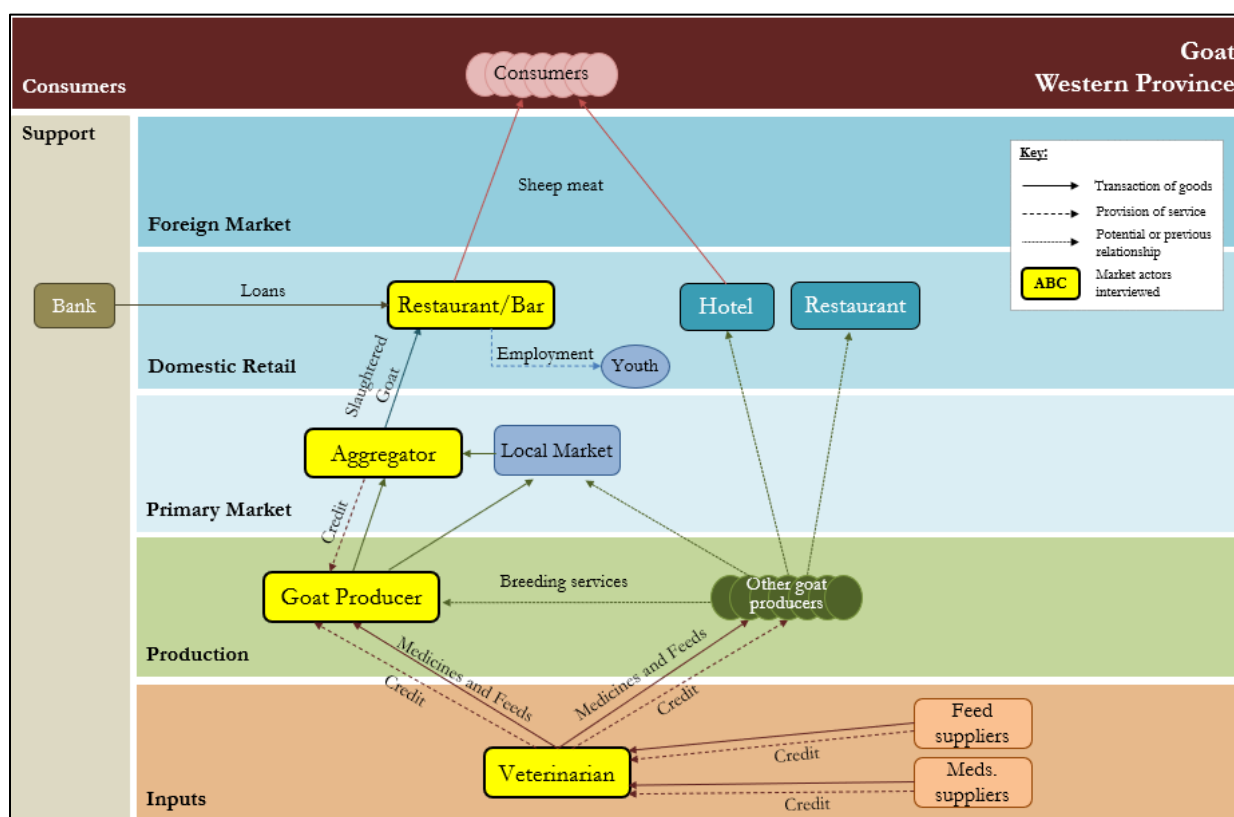
Veterinarian: this veterinarian was also interviewed, an adult male who started offering this type of veterinary drugs and related products 7 months ago. His main customers are producers in that location (sector) and some producers in neighboring sectors. The vet sources from 3 suppliers and has worked with 50 customers, in the 7 months that he has been operating. The vet chose to source drugs and inputs from nearby Kamembe instead of from Agrotech in Kigali, given the high cost of transportation, and has been quite satisfied with the service. The vet noted that the price of drugs tends to be fixed, aside from transport costs, but the price of feed fluctuates. He trusts his customers and cares about mutually beneficial gains in both their businesses, and so offers inputs on credit when needed. While formal contracts aren't used, he sometimes writes up a paper with purchase details in agreement with his buyers.

Aggregator: The female goat producer sells her goats to a young male aggregator who has been buying goats from different producers for 4 years, either in the markets or in households. In the past year he has bought goats from approximately 24 producers. His buying is mostly determined by price and quality of the goat, as he looks for goats that are old and fat enough. He negotiates a price with the producers and prefers those who sell at home as they tend to have higher quality than those at markets, and allows him time to inspect the quality of the goat. Producers sometimes contact him when they have goats for sale. He slaughters the goats and sells them to restaurants, namely 2 specific buyers. The price he sells to his buyers at is determined by the cost he bought the goat at, cold storage, transport cost, and a markup. He uses a similar paper agreement/informal contract developed together with the producer; but with producers that he works with often, they don't use any agreement as they trust one another.

Restaurant: A restaurant that buys from this aggregator was also interviewed and has been operating for 8 years, is run by an adult female and serves goat brochettes to consumers. Unlike the others in this value chain, the restaurant owner has applied for and secured bank loans in the past. However, she is not particularly satisfied with the high interest rates, and feels that she has no choice or influence in how the bank operate and sets these conditions.

Observations against Baseline: A notable difference was the lack of access to credit from financial institutions across the value chain investigated at midline, where only the restaurant had been using bank loans. At baseline, the vet for example had access to credit from SACCOs. This could be related to the maturity of the businesses, since the vet at baseline had been in business since 2016 with 1,000 customers, and the one interviewed at midline had around 50 and was a lot newer. Meanwhile, the restaurant at baseline sourced goats directly from producers, whereas at midline there was an aggregator that the restaurant sourced through, presenting a key difference in the market structure. Despite these differences, the value chain was characterized by backyard producers raising and selling small numbers of goats, keeping most of the meat sold within local markets and restaurants, and a small number of veterinary drug and feed suppliers (i.e., 3).

Figure 17: Goat market linkages snapshot



Swine market linkages snapshot - Northern Province

Producer: the starting point of this linkage map is a "medium to large" adult male producer who has been raising swine for 6 years, and at the time of data collection was raising 6 pigs. This producer buys inputs from two suppliers, a veterinarian who supplies him with veterinary services and feed and a vet pharmacy who supplies him with drugs. This vet pharmacy that also works as an agrodealer was interviewed. The producer sells piglets to those who want to rear pigs, and his older grown pigs to the slaughterhouse. Usually, the buyer/slaughterhouse is the only buyer and also he dictates the selling price of the pig.

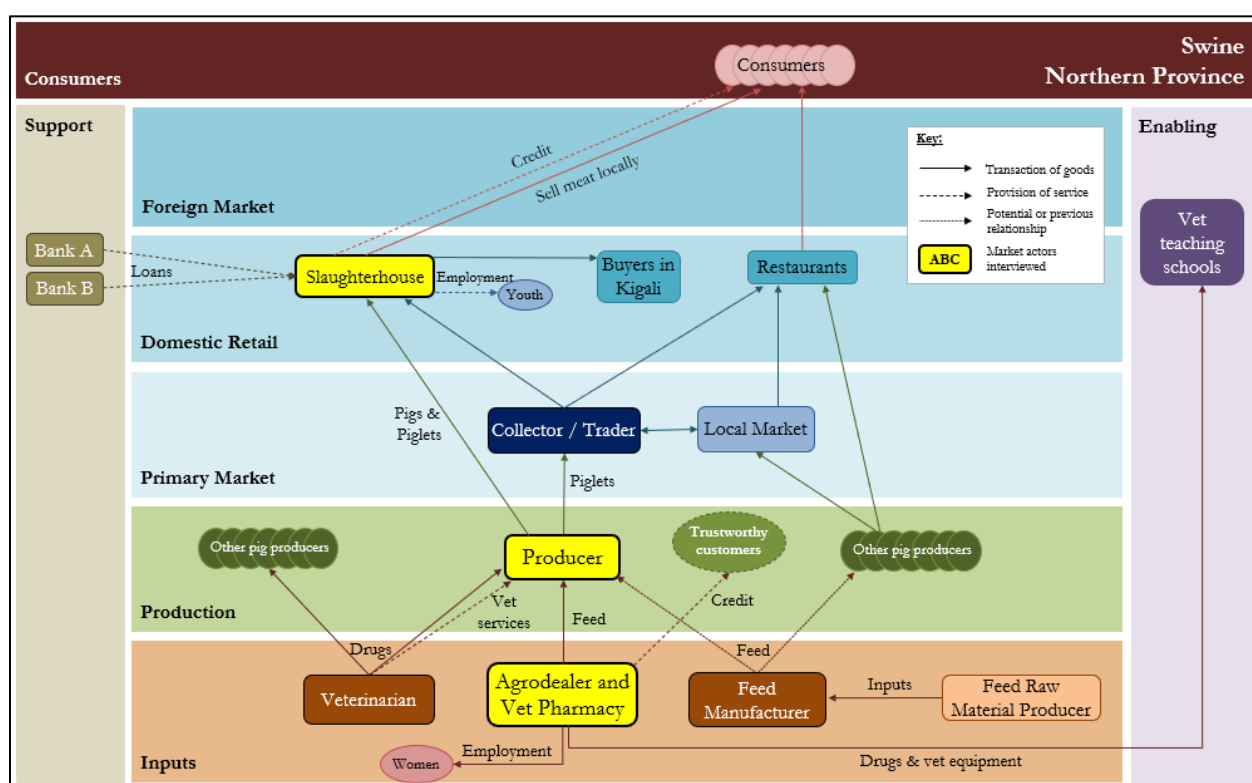
Agrodealer/Vet Pharmacy: the business is managed by the owner who is an adult male and has been operating for 9 years. He mainly sells vet drugs and vet equipment, and sometimes feed, so his customers are farmers and vet teaching schools. This vet pharmacy employs one person, and that person is a woman. In addition, they offer products on credit to the most trusted customers. He determines the selling price by looking at his acquisition costs, expenses incurred, and then adding a little margin. This pharmacy sources from 6 suppliers, while servicing approximately 10 large farmers, 2 institutions, and over 200 other customers over the past year, including the producer included in this linkage map.

Slaughterhouse: The producer who is the central actor of this map sells the pigs to a slaughterhouse, whose owner (a male adult) was interviewed. This slaughterhouse has been operating for 3 years and offers his slaughtering service to other traders, in addition to buying pigs, slaughtering them and selling the meat to local consumers in this area and mainly in Kigali. The slaughterhouse mainly sources from 6 collectors, who also have other customers; there are 3 collectors in particular that bring him most of the pigs. The owner of this slaughterhouse mentioned that he employs young people and offers service on credit and that this is a common

practice in this type of business. He said: "Yes, it is a very common practice for me and for all the people in the kind of business that I do. The terms are usually an agreed time of payment... there is nothing much all...you must have is a signed delivery note." The owner mentioned that he does not have contracts with suppliers, but does sometimes with larger buyers; both arrangements seemingly work well for him.

Observations against Baseline: There weren't any noticeable changes from baseline to midline. Some market actors that completed the chain weren't available to interview during the midline (I.e. trader) but their role in the value chain was quoted by other respondents and was similar to that in baseline. Some changes observed included the relationship between the agrodealer/vet pharmacy and Veterinary teaching schools. The Agrodealer and the slaughterhouse owners made mention of employing women and youth, respectively, which was not common at baseline.

Figure 18: Swine market linkages snapshot



Fish market linkages snapshot – Eastern Province

Cooperative: The fish value chain map starts with a fish production cooperative in Zaza Sector (labelled in the map as Cooperative A). This cooperative, whose president is an adult female, has been operating since 2011 and initially practiced traditional fish farming, but from 2020 onwards they started the practice of modern fish farming, when they started to receive support from the Rwanda Agriculture Board. This cooperative receives inputs in terms of training and technical assistance from RARICO*, another cooperative (Cooperative B) specialized in fingerlings production and technical assistance. In addition, the fish cooperative that produces fish receives inputs from a Hatchery/Multiplication center that supplies it with fingerlings.

Hatchery: The managing director of that Hatchery, also an adult female, was interviewed and mentioned that it's been operating for 6 years, supplying fingerlings and big fish from 350gm to 2kgs. It's an integrated business operating as a hatchery, fish producer and seller. They use fishponds and cages for fish production and hatching fingerlings. They have selling points in Kigali and Rwamagana for big fish, besides targeting big markets in Congo and Cyangungu, and other small farmers. The managing director also explained that they employ women, youth and PWD.

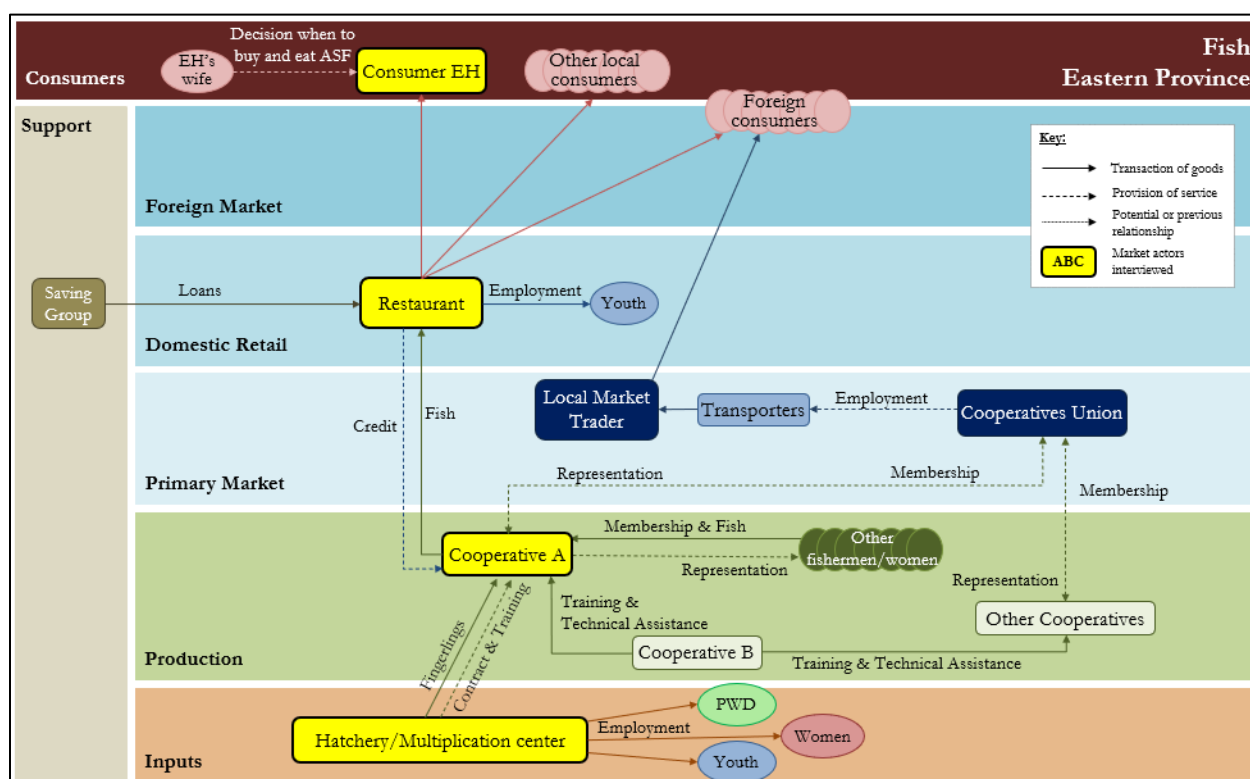
Restaurant: The fish cooperative that is served by this hatchery sells its fish to a specific restaurant which had been interviewed. This restaurant sells various types of food, such as goat, beef, chicken meats, fish, eggs, soft drinks and beers. It is a business that has been operating since 1995. The owner of the restaurant, who is a male adult, explained that he has been buying fish from the cooperative since February 2022. The owner mentioned that he offers suppliers credit, especially for the fish suppliers because fish are rare to find in market and in the area in general, and so he must work closely with fish farmers or instead, travel long distance. This restaurant has 4 employees, and they are all youth.

Consumer: To complete the map of this value chain, a consumer who frequents this restaurant was interviewed. This consumer, an adult male, mentioned that he and his family consume ASF; mainly eggs, fish, small dry fish, and goat meat. In addition, this consumer mentioned that the decision of purchasing animal source foods is often taken by his wife.

Observations against Baseline: The most notable change observed in Midline through the case studies was found in the input distribution network system, and the role played by RARICO²⁴ in providing the technical assistance for fish producing cooperatives, and fingerlings from the Hatchery. This market linkage was facilitated by an Orora Wihaze partnership and is stimulating positive change. A meaningful similarity is that in the baseline, the consumer reported that her mother makes decisions about ASF consumption at home, while at Midline the interviewed consumer spoke about his wife making that decision; in both cases, women of the household were the primary decision maker. Last but not least, a noticeable change is the mention of employing youth, women and PWD by the Hatchery, and youth working at the restaurant; something that was not mentioned at baseline.

²⁴ The Rwanda Animal Resources Improvement Cooperative (RARICO) produces and provides fingerlings and technical assistance to fish producers.

Figure 19: Fish market linkages snapshot



3.8. Market linkages

This subsection responds to evaluation question 5 (what types of market linkages and supply-chain coordination and development models for animal sourced foods across the implementation districts are most effective in linking farmers to profitable markets and improving quality and efficiency in the market?) and examines market linkages in the ASF market system, specifically addressing contracts, finance and prices. Note that this evaluation question does not produce an indicator. It is intended instead to provide a narrative that considers the status of these aspects in the midline comparing these findings with the evidence initially found in the baseline and presenting the identified changes when and if they are found.

Contracts

The baseline assessment found that the use of contracts in the ASF market system was not common, especially among smaller businesses and producers. In their place were informal trust-based relationships. Contracts were more common among larger businesses. However, market volatility and the distribution of market risk was found to pose a challenge with these contract-based market relationships.

The midline did not find evidence of significant changes in the status of contracts in the ASF system. Contracts are more likely to be found with larger businesses dealing with larger orders. For many buyers, contracts are not used because supply from any one supplier is not reliable enough to commit to. For example, one pig and goat meat seller said they could not find enough supply with any single producer to justify the commitment of a contract. That unreliability of supply is a constraint to contracts was echoed by some producers themselves.

One fishing cooperative worried that if they had a contract and the fishing season was poor, they might violate the terms of the contract.

An exception appears in the poultry value chain. Vertically integrated poultry production can be found, with producers receiving chicks and inputs to be paid returned in broilers under contract-specified conditions. The specific example producers quoted was of the innovation that Orora Wihaze facilitated through partner AfriSol and Tubura . In the time since midline data was collected, AfriSol has pivoted elsewhere after 3 phases of gradually increasing investment in the model. As discussed in the Poultry Market Linkages Snapshot, this initial model is being adopted by another outgrower in Bugesera. However, Orora Wihaze is also applying its learnings from the work with AfriSol, to pivot and facilitate a new pullet outgrower model with more fully developed birds with a more capitalized poultry producer (ABUSOL); so, we may see continued positive changes in contracts in the poultry value chain. Additionally, unlike other small traders in the ASF market system, some egg collectors use contracts. One egg collector reported that because eggs are so scarce, using a contract was the only way he could procure enough supply.

Finance

The baseline found that informal value chain finance was common in the ASF market system. Value chain finance is usually informal agreements between a buyer and a seller to either pay before or after delivery of a product or service. These arrangements are typically informal, and based on trust and reputation. Additionally, the baseline found that with formal finance there was a “missing middle”. Small businesses, including producers, had access to the widespread network of Savings and Credit Cooperatives (SACCOs) and large businesses had access to formal bank credit, but mid-sized businesses lacked financial options. Even so, financial products catered towards small livestock producers/business was uncommon relative to those available for other agriculture market actors.

This midline largely validated these findings from baseline. Informal value chain finance predominates and is often provided based on trust earned over the course of a business relationship. Sometimes, however, it is used as a way to win new customers, who in competitive contexts may not consider a business which does not offer them credit. This informal finance was made easier, especially during COVID-19, by the emergence of electronic payment methods (I.e., MomoPay). Electronic payments were the most significant innovation found in the BII section above and allow for buy now pay later while avoiding travel. Agents have also emerged who can help clients with payments.

Overall, the status of formal finance for ASF market system actors is similar to that of baseline, where non-SACCO formal finance unavailable or unappealing to many ASF market system actors. In fact, the challenge may even be greater. Some respondents reported that they were in a worse position to access formal finance than previously due to damage done to their business and inability to repay by COVID-19 government lockdown measures. Others, having gone through the unexpected economic shock of COVID-19, reported being more risk averse and therefore reluctant to take loans. It will be crucial to monitor the impact and changes stimulated by Orora Wihaze’s facilitation around access to finance with SACCOs, MFIs and commercial banks in the coming years.

Prices

The baseline found that ASF prices are largely determined by sellers, who set their sales prices based on their costs of production. The cost of production itself is largely determined by the cost of feed. Throughout output markets, traders would add their costs and some margin onto this purchase price.

The midline assessment largely confirmed this supply-driven price dynamic in the ASF market system, with feed prices still a major driver of costs. For example, one restaurant owner in the eastern province reported

that *“we determine selling price according to price we get products on from suppliers and the expenses we had in the business.”* As with the baseline study, one exception to the supply driven prices was found with eggs in the Northern province. These eggs are mostly exported to the Congo, and one egg collector reported that their price is set based on the price of their buyer, not suppliers.

Volatile production prices, which are largely driven by volatile feed prices are still reported. This volatility is seen by some buyers as motivation to use contracts to stabilize their business. However, since prices are largely cost of production driven, this poses a risk for producers. As a result of this risk, it is useful to consider ways to facilitate the uptake of contract-farming/outgrower models that can create a mutually beneficial win-win relationship between producers, input providers, and offtakers (I.e., previous partnership with AfriSol, and upcoming partnership with ABUSOL).

Interviews did not explicitly seek to determine the effect of COVID-19 and lockdown measures on prices. There were reports of both supply and demand reductions during the pandemic that likely influenced prices, though the net effect on livestock and ASF is unclear. Section 3.1 discusses broader economy-wide impacts, including but not limited to decreasing employment, household income, productivity, and the cost of a healthy diet. On one hand, some cash-strapped consumers were said to substitute other foods such as potatoes for meat. On the supply side, the adoption of new production technologies declined and some cooperatives and producer groups disbanded or ceased to function during the pandemic.

Conclusion

The midline assessment largely validated findings from the baseline. Unsurprisingly, limited mobility and other demand and supply side shocks caused by the COVID-19 pandemic and subsequent food, fuel, and price shocks have limited the ability of market actors to establish linkages.

Market actors in the ASF market system need to recover their capacity, confidence and bankability that were all negatively affected by COVID-19 and the subsequent food and economic crises. In addition to standard business development approaches, this step would also include methods for helping businesses weather future shocks. To help ASF members overcome the challenge of access to finance especially for mid-sized businesses, Orora Wihaze’s gradually developing work with SACCOs, MFIs, and commercial banks to develop new products tailored to the needs of small livestock producers will be crucial. Most financial institutions have a limited familiarity and appetite for risk with small livestock producing borrowers, and so the impacts of the early-stage facilitation needs to be monitored and amplified in years 4 and 5 of the project.

Findings also explored the relationship between contracts, price volatility, and improved relationships between market actors. While formal contracting arrangements were rare, there was an instance mentioned in the poultry value chain, coming through former OW partner AfriSol. While they have since downscaled this model, One Acre Fund (Tubura) continues to provide an extension services platform to promote this outgrower model/contract farming model with Poultry East Africa Limited (PEAL) in Bugesera. While this is outside of OW’s target districts, this increase in uptake by an influential offtaker is important to consider. OW is continuing to explore the potential for such a model with new partner ABUSOL, but this time with more mature pullets rather than day old chicks.

4. Overall Conclusions

This final section presents our synthesis of the findings in the previous sections, specifically in light of the five evaluation questions see Table 10 (below for ease of reference). Herein we present our interpretation of what the findings mean for the Rwandan ASF market system and what significance the findings may have to future workplanning.

Table 10: Evaluation Questions

Evaluation Area	Questions
Cooperation and Trust	What formal and informal rules and expectations between ASF producers and other market actors affect the flow of information, financing, and commercial exchange of goods and services?
Business Innovation Index	What kinds of changes—organizational, marketing, process, or product innovations—are ASF market actors making to their business models, if any? What is the pace at which changes are being made?
Inclusive value creation	To what extent are ASF market actors designing improved technologies, or implementing production and management practices to be inclusive of women, youth, and PWD?
Ecological factors affecting ASF consumption	What aspects of the family or home environment related to ASF food intake (e.g. home availability or accessibility of certain foods) are linked with dietary behavior?
Market linkages	What types of market linkages and supply-chain coordination and development models for animal sourced foods across the implementation districts are most effective in linking farmers to profitable markets and improving quality and efficiency in the market?

Respondents, especially smallholder livestock producers, appreciate and expect increased flows of information and credit that can enable more productivity from ASF business.

At the start of Orora Wihaze, ASF enterprise growth and employment faced barriers in terms of challenging regulations, lack of sufficient financing, and informal rules and norms that prevented full participation, especially of women, youth and PWD, in ASF value chains. Given the weak market linkages and low productivity of the ASF value chains, the baseline findings that highlighted lower levels of trust made sense. Still, at baseline, the formal enabling environment was found to be increasingly supportive of livestock, as evidenced by commitments from the Government of Rwanda, like in MINAGRI's Livestock Master Plan.

By this midline assessment, there are notable signs of confidence in information exchanged and received, especially by smallholders of livestock. Networks of actors involved with animal feed, pharmaceutical inputs, ASF genetics and out growers, production and publicly funded aspects of agriculture in the Rwandan ASF market system expect quality standards in ASF can be met and market prices to be fair, more than at baseline. This kind of receiving and sharing information can improve the trust and cooperation in relationships between networked actors the more reliably and regularly it flows. For example, output buyers (like traders, processors and retailers) cited giving more information on their expectations for some livestock size, weight, and health, which can help smallholders and other actors know how to upgrade productivity to meet demand.

While most of the information sharing examples cited were in one-time spot transactions, the expectation that information be shared between actors may help nudge the networks to start to cooperate more over time, more intentionally and systematically, finding ways to invest to enhance productivity. The recognition that there may be win-win commercial relationships for enhanced productivity of all actors involved in a commercial

relationship is the foundation for improved cooperation. Overall, this assessment finds respondents investing time in giving and getting information on inputs, market prices for outputs, and government regulated standards. The more consistently these exchanges occur, not out of necessity or to take advantage of short-term opportunities, but to invest in mutually beneficial, reliable commercial linkages, the more the system's development trajectory can be nudged towards strengthening inclusive private sector led animal source foods value chains.

Input suppliers and some ASF supply chain actors (but not many producers) are adopting more new business practices, especially in ASF process innovations.

When market actors have the capacity to adapt their business models to sell products and services in the face of competition, a market system becomes more competitive. When the competition that drives adaptation and innovation is in areas beyond just competition on price, like in customer service or product quality areas, there is an increased value to end consumers as well as other actors. This is one of the advantages of tracking what types of innovations are occurring and at what pace, as the types indicate where there is traction and how the market system may be evolving.

At the start of Orora Wihaze, ASF were not a standard part of Rwandan diets, in part because of the limited affordability and availability in rural areas. One of the hypotheses has been that if the production and distribution of innovative ASF could be increased, as well as improving efficiencies in the supply chain processes, then ASF could be more readily available for marketing and purchase in the rural areas, especially for target consumers.

As Orora Wihaze kicked off, investments in small stock production, particularly poultry and swine, were noticeable. However, at midline, we find that the pace of changes happening in fish and shoats is faster than the other target value chains, which indicates to us that the most sizable investments are not necessarily always gaining the most traction in the market.

The midline assessment also shows that the most dramatic changes since the baseline have been made by supply chain actors involved in market functions, other than the production of ASF. Notably, changes in processes—to improve payments, information, marketing, as well as grades and product standards (in that descending order)—are happening at the fastest categorical pace. This traction is promising, as improving the availability and affordability in rural areas through process changes in how ASF gets from producer to consumer increases the likelihood of it becoming a potential addition to the diet of target consumers. This also fits with the increased expectations of respondents at midline to be able to get ASF locally, even for poorer individuals.

Respondents could not articulate a value proposition for designing inclusive practices, technologies, or ASF products specifically to meet the needs of women, youth, or PWD, which accounts, in part, for why few examples were found.

By the midline assessment, many respondents could and did state the advantages of working with, purchasing from, or employing women (like the quality of their care for small livestock and the amount of agricultural inputs they are purchasing). Similarly, the respondents could and did state the advantages of employing youth (like their physical strength and low salary requirements). Even with the challenges that the PWD may face in performing some activities, respondents mentioned that when, for instance, they had employed PWD they were very motivated. But, even though they recognized that there is value in marketing to, purchasing from or employing these segments of the population, respondents cited few to no considerations in adapting their business practices or models to intentionally recruit or retain them as consumers, suppliers, employees or partners. The exception was in the case of Community Based Savings Groups (CBSGs) and SACCOs for which NGOs and others have encouraged the incorporation of women, for example. Without intentional, inclusive strategies to employ, incentivize, accommodate, or serve any of these groups, especially from the private sector,

the likelihood that the Rwandan system will shift to enable more women, youth and PWD as capable of sustainably accessing ASF resources and services for consumption or production is lower.

Respondents expect, more so than baseline, that ASF will be served and should be consumed, especially by women and children, in the household and socially beyond the household.

The midline assessment notes that the presence, especially of public messaging on the value that ASF has doubled its influence since baseline. This institutional factor seems to be the most influential of all of the factors cited by respondents and it is heavily influenced by the investments made by the Government of Rwanda at the national, as well as the community health worker level, to public messaging. The index also reflected that there is more expectations for ASF to be accessible, even if limited to eggs and fish for poorer individuals, and that influences respondents to consider it in their diets, along with its expected availability in retail markets. The combination of these institutional factors, especially the public messaging, likely explains much of why all of the interpersonal factors' presence increased by midline, especially the prevalence of the expectation that ASF should be eaten together with the household, with notable increases for both children and women to consume ASF.

Most ASF market linkages have short durations, formed for the purpose of extending short term credit or finance, which is not substantial enough for smallholders and other actors to upgrade production quality or efficiency in doing business in pigs, goats, sheep, fish, or chicken value chains.

Market linkages in Rwanda remain primarily informal to hedge risks that entering into contracts, extending finance, or volatile pricing present to both the suppliers and buyers, as well as supporting service providers. Until the cooperation between market actors improves substantially, with investments and commitments being made by both parties in longer term commercial relationships, significant changes in the informality of linkages are unlikely.

Annex I: Summary of Interviews

	Northern	Eastern	Western	Southern	Kigali	Total
Input						
Agro-dealers	4	3	10	1	0	18
Vet pharmacies	2	2	2	0	1	7
Private Veterinarians	5	6	8	3	4	26
Input wholesalers	2	0	0	0	3	5
Hatcheries (fish and chicken)	0	2	1	0	5	8
Breeders (goats and pigs)	1	0	0	0	0	1
Feed manufactures	2	0	0	1	0	3
Output						
Producer						
*Backyard	2	8	9	2	0	21
*Small - semi commercial	2	1	4	1	1	9
*Med-Large commercial	9	5	4	3	0	21
Producer Groups/Cooperatives	4	9	7	2	3	25
Collectors/aggregators	3	2	2	2	1	10
Output wholesalers	1	2	0	0	0	3
Exports	0	0	0	0	2	2
Slaughterhouse/abattoir, butchers and processors	3	3	5	3	4	18
Small retail stores	1	2	6	0	8	17
Stall at market	3	1	4	0	2	10
Supermarket	0	1	3	1	2	7
Restaurants/hotels	3	4	4	2	2	15
Consumers	9	10	10	4	11	44
Support						
Transporters	0	1	0	0	4	5
Banks	0	1	0	0	3	4
Microfinance	1	0	0	1	3	5
Mobile finance	0	0	0	0	3	3
Government finance	0	0	0	0	2	2
Business advisory services	3	1	0	0	2	6
Enabling						
National government	0	0	0	0	3	3
Local government	2	3	1	0	0	6
I/NGOs	0	0	0	1	5	6
Youth, women and PWD orgs	0	0	0	0	4	4
Business associations	0	0	0	0	1	1
Government research	0	0	0	0	3	3
University research	0	0	0	0	1	1
Private sector research	0	0	0	0	3	3
Newspaper, radio, TV	0	0	0	0	3	3
Public Veterinarians	2	2	2	3	1	10
Total	64	69	82	30	90	335

Annex 2: Scope of Work

Background on the Feed the Future Rwanda Orora Wihaze Activity

In October 2019, USAID/Rwanda awarded the 5-year Feed the Future (FTF) Rwanda Orora Wihaze Activity to Land O'Lakes Venture37 to *sustainably increase the availability of, access to, and consumption of animal-sourced foods (ASF) through development of a profitable market*. Venture37 and its consortium members, Catholic Relief Services (CRS), MarketShare Associates (MSA), The Manoff Group (TMG) and Urunana, will achieve this goal by strengthening inclusive private sector-led ASF value chains through facilitating chicken, swine, goat and fish productivity improvements and strengthening relationships amongst market system actors. The team will facilitate access to finance for enterprises and will utilize a grant fund to catalyze innovation and investment across the ASF sector. The Venture37 consortium will also increase demand for ASF consumption for women of reproductive age and children 6-23 months by increasing the safe consumption of ASF produced by target households, increasing the availability and accessibility of ASF for safe consumption in target districts, and fostering greater women's empowerment. Project interventions will be conducted through a market systems development (MSD) approach, under which the project will partner with market actors to carry out interventions that reach project objectives. Target districts in Rwanda include Rutsiro, Ngororero, and Nyamasheke in the West, Burera and Gakenke in the North, Nyamagabe in the South, and Kayonza and Ngoma in the East. By the end of this five-year activity, USAID will have increased the income of 125,000 households by 30%, increased farmer and firm sales by 45% and 35%, respectively, and increased prevalence of children under 2 and women of reproductive age receiving a minimum acceptable diet by 40% of baseline.

Purpose of the Midline

The MSD approach that FTF Rwanda Orora Wihaze will use is highly facilitative in nature; the objective is to encourage sustainability and replicability of partner-led changes, as well as to spark shifts in interactions amongst market actors. The success of Rwanda Orora Wihaze will be measured through two types of indicators: 1) the typical intervention-level indicators, which measure progress in achieving set nutrition and income outcomes; and 2) qualitative market system indicators, which measure changes in systems dynamics, incentives, social norms, services, and policy structures influencing producers and consumers of ASF. The purpose of the Midline is to update Orora Wihaze's understanding of existing market system dynamics and how they have changed since the baseline. Therefore, the Midline study will collect and analyze the values corresponding, specifically, to the Market Systems indicators, using the baseline as a point of comparison. The Midline study thereby provides a refreshed view of the system that will allow Orora Wihaze to continuously monitor its interventions and results against the changing dynamics of the ASF market system. Annex 1 lists the FTF indicators that Rwanda Orora Wihaze collects, analyzes, and reports, including details on the values found in the baseline study.

Key Systems Level Changes and Study Questions

FTF Rwanda Orora Wihaze posits, as depicted in its results framework (see Annex 2), that the pathways to inclusive private sector growth for ASF value chains and demand for ASF consumption for women and children are influenced by system changes. Orora Wihaze expects that the systems changes highlighted below will be key to stimulating the results and impact expected:

1. ASF market actors adopt new business practices to reach target population, ASF producers and consumers
2. Improved enabling environment for businesses in the ASF sector supported by the Government of Rwanda (GOR)

3. More women, youth, and persons with disabilities (PWD) are capable of accessing ASF resources and services;
4. Changes in informal rules around consumption in the household.

These systems level changes focus on interactions between multiple actors in the market system. In turn, the key study questions, listed in Table 1, are focused on how actors, even if they will not have any direct support from FTF Rwanda Orora Wihaze, interact with others in the system.

Table 1. Key Study Questions

Area of Study	Key Question
Cooperation and Trust	What formal and informal rules and expectations between producers and other market actors affect the flow of information, financing, and commercial exchange of goods and services?
Business model innovation	What kinds of changes—organizational, marketing, process, or product innovations—are agricultural market actors making to their business models, if any? What is the pace at which changes are being made?
Value creation	To what extent are market actors designing improved technologies, or implementing production and management practices to be inclusive of women, youth, and PWD?
Ecological factors related to food intake	What aspects of the family or home environment related to food intake (e.g. home availability or accessibility of certain foods) are linked with dietary behavior?
Market linkages	What types of market linkages and supply-chain coordination and development models for animal source foods across the implementation districts are most effective in linking farmers to profitable markets and improving quality and efficiency in the market?

Based on these key study questions, three indices will be adopted for the three indicators of market systems that will serve to measure progress in changing market systems in Rwanda: Business Innovation Index, Cooperation and Trust Index and Ecological Factors Index. These indexes were used in the baseline study and their adoption in the midline will serve as a set of data comparison tools to analyze possible changes in the market system in Rwanda.

- **Business Index Innovation:** this index was developed to measure incremental innovation in existing business models. The index is comprised of 13 aspects within four categories: product/service innovations, process innovations, marketing innovations, and organizational innovations.

-**Cooperation and Trust Index:** this index measures the informal rules and expectations in the market system that govern behavior and set expectations among and between market actors. Both norms are measured on an indexed scale from 0 (low) to 3 (high) of levels of expectations between providers and consumers.

-**Ecological Factors Index:** Ecological factors gauge the contextual aspects of the market system, in the home and community, that may influence dietary behaviors. Factors are measured on an indexed scale from 0 (low) to 3 (high) at three levels of the market system—the individual (agent-level), the interpersonal (networks), and the institutional (norms).

More information on these three indices will be explored in a document that can be found in Annex 3.

Midline Design and Methodology

This section details the research team, methods, and implementation for the Midline study.

Research Team

Consortium member, MSA, will lead the overall management and quality assurance of the midline study with support from Venture37 monitoring, evaluation and learning (MEL) staff -MSA conducted a desk review, designed the midline methodology, and will proceed to oversee the data collection, analysis and reporting. Qualitative research enumerators will be recruited to conduct the data collection. MSA experts will provide short term technical assistance in Rwanda to train the enumerators on the specific requirements and approach for this midline study, and oversee data collection. All other MSA oversight will occur remotely.

Midline Methodology

To meet the midline objective and monitor findings regarding the five key questions mentioned above, the midline will follow a methodological process very similar to that adopted in the baseline. The methodology includes a review of secondary data on political, social and economic events, and programming related to ASF that have emerged to provide context. The team will also collect primary qualitative data from key market actors to explore the behaviors and relationships of actors in the system. Primary data will be collected using two main sampling approaches: 1) Quota sampling strategy and 2) Chain referral sampling strategy. This section describes the quota sampling strategy, chain referral sampling strategy, and the secondary data review strategy.

Quota Sampling Strategy

Before implementation, Venture37 did a preliminary mapping of the actors in the ASF market system supporting the chicken, pig, goat and fish value chain. Per the BEAM exchange's guidance on market system mapping, MSA has organized the actors in the system by the function they play in the market system.²⁵

The functions of the market system are divided into four categories: the “core functions” of **Input Distribution** and **Supply Chain** and the “supporting functions” of **Supporting Services** and **Other Enabling Environment Actors**. The “core functions” focus on the actors involved in the exchanges of goods and services. Supporting Services refer to the services, resources, and infrastructure that enable the core functions of the market system. For example, what vaccine producers and vet pharmacies decide to produce or to sell may depend on electricity and transport services available in rural areas. Supporting services can include a range of functions from finance and transport to mechanization services and Information and Computer Technology (ICT) solutions. The Other Enabling Environment Actors refers to the actors that influence formal and informal rules on behavior, like important government agencies such as RAB and MINSANTE, to the community radio or local universities. This category also includes those actors that strongly influence gendered norms and perceptions of women, youth and PWD, which may include religious groups and social leaders.

Table 2, at the end of this subsection, depicts the sample of market actors that were interviewed for the baseline and who the team plans to interview in the midline study.

MSA has updated the list of market actors who will participate in the Midline study, to include the same participants from the Baseline study and to reflect those that Orora Wihaze is directly working with, reaching and impacting, and/or is considering for future partnerships, described in Table 2 below. The inclusion of new

²⁵ See: <https://beamexchange.org/guidance/analysis/mapping>

actors also took into account the adoption of a minimum number of respondents per quota (actor type) - at least three respondents for each actor type.

MSA developed interview protocols and semi-structured guides for each type of actor for the baseline and has reviewed and adjusted according to the objectives of the midline study, especially considering the implementation status of the interventions. Additionally, two new questions were added to the questionnaires, in order to better understand the context and behavior of actors with regard to ASF consumption. The guides are translated into Kinyarwanda, and translations were reviewed by a native speaker for validation. Guides ask qualitative questions to answer the five key study questions above and inform the three market systems indicators. Actors may also be asked for quantitative information to inform intervention-level indicators. The responses will benchmark how each actor operates, with whom they interact, and how their interactions affect or take into consideration consumption norms in Rwanda, if at all.

As in the baseline, the team will again use quota sampling, where a number of interviews with each type of market actor is set. The use of quotas, while not statistically representative, will ensure discussions with the key actors in the market system for the four target value chains – poultry, pig, goat and fish. Interviews will continue until the quota and/or information saturation is met. While good practice²⁶ for qualitative sampling aims for 6-12 interviews per actor type, in carrying out similar studies MSA has found saturation can be reached after interviewing 5-6 respondents for large populations and as few as 2-3 key informant interviews for smaller populations (i.e. shopkeepers, agents etc.). As such, while quotas will be set, if we find we are reaching saturation, we may prioritize more interviews with other actor types. Information saturation is determined when no new information is being gained by interviewing another actor of the same type.

The sampling approach will also ensure that FTF Rwanda Orora Wihaze has effectively contextualized the market system in each of the target districts by reviewing quotas per actor type per district. A key consideration for the sample selection will be the predominance of goats, sheep, fish and chicken by district. Swine is a nascent sector and so this will be factored into our research, acknowledging that the market system dynamics function very differently. The selection of actors for interviews across the eight target districts was informed by secondary research, project staff knowledge of the key players and geographies, and referrals by district and local actors.

Table 2. Types of Actors in the Agricultural Market System

Market system function	Questionnaire	Respondent type	# of interviews Baseline study	# of interviews Midline study (proposal)
Supply	Producers	Backyard producers	13	15
		Small semi-commercial producers	15	15
		Medium to large commercial producers	12	15
	Producer groups and coops	Producer groups and cooperatives	18	15
	Output traders and processors	Collectors/aggregators	8	10
		Output wholesalers	10	10
		Exporters	6	10
		Slaughterhouse/abattoirs, butchers, processors	16	15
	Output retailers	Small retail store	11	15
		Stall at market	5	10
		Supermarket	5	10
		Restaurants/hotels	14	15

²⁶ See: <https://researchforevidence.fhi360.org/riddle-me-this-how-many-interviews-or-focus-groups-are-enough>

Market system function	Questionnaire	Respondent type	# of interviews Baseline study	# of interviews Midline study (proposal)
	Consumers	Consumers (individuals)	43	40
Inputs	Input Retailers & Wholesalers	Agrodealers/input suppliers	17	15
		Vet pharmacies	10	10
		Input wholesaler	9	10
	Input manufactures	Hatcheries/multiplication center	5	10
		Breeder	3	5
		Feed manufacturer	10	10
	Vets	Private vets	22	20
Support	Transport	Transporter	3	5
	BDS	BDS	5	5
	Finance	Banks	5	5
		Microfinance	3	5
		Mobile finance	1	5
		Government finance	3	5
Enabling	Policy and implementers	National government	3	5
		Local government	14	15
		I/NGOs	4	5
		Youth, women or PWD organization/platform	2	5
		Business association	3	5
	Research	Government researcher	3	5
		University researcher	1	5
		Private sector researcher	2	5
	Media	Newspaper, TV and radio	4	5
		Total	308	360

Chain Referral Sampling Strategy (4 case studies)

While quota sampling is useful to get an overall snapshot of the dynamics of the various actors involved in the agricultural market system, it also illustrates the complexities of relationships within the system. To help navigate this complexity, and to not lose focus on the smallholder producer or rural consumer of ASF, MSA will include case study examples of producers or consumers in the midline using the chain referral sampling strategy²⁷, which means that we will get referrals from the actors we are interviewing to understand who we should interview next.

To conduct this case study approach, MSA, with support from the FTF Rwanda Orora Wihaze staff, will begin by selecting a single “typical” producer in each of the four-target value chains, consistent with target farmer profile for FTF Rwanda Orora Wihaze. These farmers will be selected from within the Community Based Savings Groups (CBSGs) and Cooperatives that Orora Wihaze works with, within the goat, swine, and fish value chains. Meanwhile, a poultry farmer will be selected within the network of a poultry offtaker that Orora Wihaze has supported in programming. Using a chain referral sampling strategy enables the case studies to explore direct horizontal and vertical relationships from the producer out through the market system. The relationship exploration will consist of a series of questions to determine with whom the actor does business and who and what influences those decisions. Tracing relationships vertically means moving upward through the system – from inputs suppliers, to producers, to aggregators and traders, and ultimately to product retailers – looking for how these actors do and do not interact, share information, and build relationships of trust and cooperation. Tracing relationships horizontally means investigating these dynamics by moving across actors of

²⁷ See here for more specifics. http://changingminds.org/explanations/research/sampling/snowball_sampling.htm

the same or similar types, such as producers collaborating with other producers through associations or producers organized around shared financial goals through savings groups. This case study approach will be used to map market relationships in the poultry, goat, pig and fish value chains.

While the intent is to select producers who can be references for the types and dynamics of relationships in the system, the selected producers are not meant to be representative of each value chain. Rather, the qualitative findings from each case are meant to highlight the corresponding broader findings on market system indicators from the quota sampling approach to ground how to interpret them. For example, it may happen that a smallholder producer does not know the name or contact information of who bought their chickens; they may know however that they were likely sold at the live bird market. Wherever possible, case study linkages with interviews from the quota sampling will be drawn to trace relationships.

Then, the use of this tool in midline, considering the comparison with the data found in the baseline, will allow identifying whether there has been a change in the system in terms of changes in quality and quantity of *market linkages* in relation to distribution, access, and consumption of the different value chains.

Secondary Data Strategy – Context Monitoring

To understand Orora Wihaze's operational context, MSA will review data from news and publications based on political, social and economic events that have emerged in the country in the last two years and were reported in national and/or international newspapers. This type of context monitoring will provide an understanding of wider systemic changes. Subsequently, those changes will be analyzed and their link to Orora Wihaze's intervention and influence will be deciphered.

These changes in the operational context may include government actions, implementation of public policies and/or development programs, external shocks, local or national development projects by private institutions or donors, etc.

Implementation Process

The implementation processes include data collection, management and analyses to complete the study.

Data Collection/Field Implementation Plan

The fieldwork will be conducted over the period of about 3 to 4 weeks. MSA technical staff will travel to Rwanda to train the full set of enumerators. Training will cover qualitative interviewing techniques, including probing and building rapport, evaluation ethics, data quality control and management processes. Interviews with key informants will be conducted by the enumerators, with support from MSA and V37 MEL staff, if necessary.

Semi-structured interviews will be held in a private, centrally located place, determined in conjunction with the respondent. In some instances, this may be an office space, if not, we will expect the interviewees to direct us to a location where the exchange can take place without interruption. Refreshments (water, coffee, tea, or soda) may be offered to interview participants. Prior to beginning each interview or group discussion, the data collectors will review the consent form, ensuring the respondent(s) have an opportunity to ask questions and make an informed decision about whether to participate. Interviews will be conducted in the local language or in English, whichever is preferred by the participant.

Whenever possible, data will be captured using a digital audio-recorder. If audio recording of the interview is not possible, interviewers will be instructed to record the responses on paper and then, as soon as possible, digitally transcribe and translate into English the interview notes using the word document (.docx) format.

The fieldwork will be adaptive. Regular check-ins and time to reflect on the findings will be built into the workplan to assess if saturation is being reached, and if the sampling strategy should be increased or otherwise adjusted for any of the sub-samples or a particular actor type.

Ethical Research Procedures

Collecting data ethically is something that MSA believes is very important in any type of research and this will be done in this research based on different practices:

- a) All data collectors will be trained in protecting human research subjects during the data collection training.
- b) At the start of each interview, data collectors will read a standardized informed and confidentiality statement in the local language (Annex 4) explaining consent:
 - purpose of the research
 - procedures and duration of data collection (including permission to record)
 - potential risks and benefits
 - confidentiality and their right to refuse/withdraw
 - who to contact with any questions or concerns.

Data collectors will ask respondents if they have any questions about the interventions, interview, or survey, and provide answers. Respondents will then be asked for written consent to participate and permission to audio-record the conversations. If written consent is not acceptable to the respondents, either through signature or fingerprint, verbal consent will be acceptable and documented in the audio-recording.

- c) emphasizing voluntary participation and ending any interview upon request.
- d) voiding causing physical or emotional harm to participants.
- e) ensuring interviewers remain neutral and unbiased.
- f) creating a secure data storage and sharing system, capable of protecting all Personal Identifiable Information (PII) - more details on this can be seen in the following section on "Data Management and/or Security Procedures".

Data Management and Security Procedures

As a firm that is experienced in handling sensitive data across our numerous qualitative research projects, we understand and appreciate the need for protection concerning the use, storage, and transfer of data. All data utilized, captured, or acquired for our projects are securely stored and segregated from any other company data. These procedures will include segregated project folders used only in the execution of this assignment and which will only be accessible by personnel engaged on project activities. Full data access will be limited to project management staff and higher, so as to limit those who have access to the full range of data captured and utilized throughout the execution of our contracts.

Regarding the field work and data collection, the notetakers will record field note responses and discussions by hand and then type them up at the end of the day for team daily updates. Preference will be given to verbatim responses that should be reported within quotation marks.

Upon completion of the data collection, interviewers will send all raw data to MSA for storage in a shared file and permanently remove it from their own notebooks, computers, tablets, phones, external hard drives, etc.

The shared drive will be password protected so that project file sharing is controlled by the research team, and access is only granted to those working on the research project. Raw data will be removed from the shared drive and destroyed after it is no longer necessary for it to be accessed by staff. All Personal Identifiable Information (PII) will be removed before sharing with USAID's Development Data Library and Development Experience Clearinghouse. If there is any breach in these protocols at any point, the issues will be reported to MSA along with an explanation of the cause of the breach for a determination of appropriate corrective action. Data collection will be ceased until a final determination by the MSA and Venture37 is made.

Data Analysis

Interview data will be coded using NVivo 12 Plus, a computer-based application for managing, analyzing, and presenting qualitative and mixed method research data. Only members of the research team with NVivo will have access to the coded interviews.

For each qualitative data set, the coding structure for thematic analysis will be developed collaboratively and iteratively using a combination of deductive and inductive approaches, based on the study questions. After some portion of the transcripts have been coded, the research team will meet to further refine the coding structure as needed. Any revisions to the coding scheme will be applied to the entirety of the data set. Codes will be grouped together into categories reflecting the key system changes and study questions.

An overall comparative analysis approach will be used, looking at similarities and differences by gender and age. Data will also be compared by geography and value chain.

Data Quality Assurance

MSA will incorporate a number of data quality checks in the collection and analysis of data to ensure both the quality of the data collected, but also the inferences drawn. First, MSA will instruct data collectors on proper, ethical data collection procedures and qualitative techniques. Use of recordings and transcriptions of verbatim responses will be used, when possible, to limit paraphrasing of respondent intention. During data collection, the MSA coordinators will periodically supervise interviews for quality and hold daily debriefs with each data collector.

Data collectors will also provide general updates, questions, and concerns on WhatsApp. Where the MSA coordinator discovers deviations from established protocols they will take corrective action with the data collector. Data flows will also be controlled by establishing timelines and protocols to conduct interviews, share notes with the MSA coordinator and upload to a shared file. Routine data spot checks will be conducted to ensure that data collected is valid, reliable, and free from manipulation. Once data is shared with the MSA coordinator, any and all changes to entries will be registered and tracked in the data analysis software and shared files.

MSA will also manage the quality of how the research team uses the data analysis software to draw inferences from the data. To this end, MSA will develop codebooks and thematic code summaries. MSA will employ the best practice of holding a workshop with the research team once analysis is complete to review the code summaries with the participation of at least one non-research team members to ensure the inferences drawn from the data are linked to quotes and data points from the respondents.

Timeline

TASK	Responsible	Jan 2022	Feb 2022	Mar 2022	Apr 2022	May 2022	Jun 2022	Jul 2022	Aug 2022
Design and elaboration of the Midline SOW									
Design first draft of the Midline SOW	MSA								
Set quotas by actor types and parameters for 4 case selections	MSA								
Draft interview protocols and guides by actor types	MSA								
Identify the key actors to interview within the scope of the selected case studies	MSA & V37								
Draft interview protocols and guides to use in the case studies interviews	MSA								
Review the Midline SOW with the MEL team	MSA								
Include suggestions from the MEL team in the Midline SOW	MSA & V37								
Writing the final version of the Midline SOW	MSA								
Seek and receive approval from RNEC	MSA								
Data Collection									
Train data collection team on guides and protocols	MSA								
Pilot interview guides and protocol with select actors - TBD	MSA								
Pilot interview guides and protocol with key actors (case studies)	MSA								
Refine interview guides and review protocol based on pilot	MSA								
Conduct qualitative data collection (quotas sampling + case studies)	Data Collection TBD								
Transcribe raw data in English	V37 & Translator								
Ongoing quality review of transcription	MSA								
Hold an out-brief session on data collection process and observations	MSA								
Data Analysis									
Refine existing thematic coding structure from Baseline	MSA								
Code all raw data collected in NVivo and conduct analysis	MSA								
Summarize findings by code	MSA								
Trace relationships from key actors interviews (case studies)	MSA								
Hold a code review workshop to validate research team findings and interpretation	MSA, V37 & Technical Team								
Finalize analysis	MSA								
Build sociograms from this analysis in NVivo (quota sampling)	MSA								
Build sociograms from this analysis in NVivo (relationships – case studies)	MSA								
Preparation of the Midline Report									
Review the Midline Report with the MEL team	MSA & V37								
Include suggestions from the MEL team in the Midline Report	MSA								
Writing the final version of the Midline Report	MSA								

 Is already underway.

 These dates may change according to the progress of the research.

Annex 3: Custom Performance Indicator Reference Sheets from AMELP

Performance Indicator Reference Sheet #4
Name of Indicator: Observed shifts in trust and cooperation between smallholder producers and other market actors ²⁸
Result Measured: Goal – Sustainably increase availability of, access to and consumption of animal source food through development of a profitable market
DESCRIPTION
Precise Definition(s): <i>Cooperation</i> and <i>trust</i> refer to the informal rules and expectations in the market systems that govern behavior and set expectations among and between market actors. This indicator measures the degree to which cooperation and trust are established norms within the Animal Sourced Foods (ASF) market system. Norms are defined as informal rules that govern collective behaviors and expectations of behavior. The indicator looks at two dimensions of cooperation – belief in the importance of ongoing relationships and belief in mutually beneficial purpose – assessing levels of expectation of cooperation on a scale from 0 (low) to 3 (high). The indicator further looks at three dimensions of trust – integrity, competence, and reliability²⁹ – assessing both the intentions and the abilities of market actors with a score of 0 to 3, using thematic analysis. Each of the five dimensions is assessed from the perspective of the roles of providers and consumers, resulting in 10 thematic codes applied and analyzed using NVivo and thematic analysis. For scoring, each of the 10 codes is scored according to assessment criteria of: 0=reference group does not expect this to be true 1=it would not be entirely unexpected if this were true 2=it is most appropriate if this is true 3=this is fully expected and there are major consequences for market actors who defy expectations. The scores of each of the 2 dimensions are then averaged and rounded to the closest whole number on the scale of 0-3. They are all weighted equally, if the confidence levels are high. If confidence levels are ranked medium or low, weighting is applied. Cooperation is scored according to expectations³⁰ by producers and firms rather than the act of cooperating itself. The overall scores are an average of the scores for each dimension of cooperation and trust, disaggregated by buyers and sellers. Cooperation requires trust and also reinforces it. Cooperation occurs when market actors believe that an ongoing relationship is important enough to warrant determined efforts to maintain it. It does not occur only out of necessity to avoid conflict or to take advantage of a short-term opportunity. Cooperation occurs when there is an understanding that it can lead to mutually beneficial outcomes that can exceed the outcomes that could be achieved individually. Cooperation can be

²⁸ This indicator is a custom indicator adapted from the FTF Inova Mozambique Activity.

²⁹ Paine, K.D. Guidelines for Measuring Trust in Organizations. University of Florida Institute for Public Relations Commission on Public Relations Measurement and Evaluation. January 2003.

³⁰ Norms theorists stress the importance of collective expectations about “what others do” and “what others think should be done” rather than individual perceptions. Orora Wihaze is analyzing what are the expectations of how producers should or will act and likewise consumers.

exemplified in long-term customer orientation from the supplier's end and brand loyalty from the customer's end.
Trust is an important determinant of a successful commercial relationship and can be reflected in positive expectations between market actors. While definitions vary, it is frequently defined as a willingness to take risk and a willingness to rely on an exchange partner in whom one has confidence. In other words, when actors trust each other, "they also continuously maintain positive feelings by disregarding negative attributions in the related actors in order to confirm their positive trusting attitudes." ³¹ However, trust does not occur automatically, and partners on both sides of a business relationship "must first convince themselves of the partner's ability, reliability, and their integrity." ³² When trust is established, the perception of risk in relation to opportunistic behavior is reduced, and there is an increase in confidence that short-term inequities will be resolved. Research shows that this can lead to a reduction in transaction costs. ³³
Unit of Measure: Observed shifts (qualitative); index
Data Type: Index
Disaggregated by: Market system function and value chains
PLAN FOR DATA COLLECTION
Data Source: Partner firms and other similar firms in the targeted market systems as well as other relevant reference groups who can attest to prevailing norms.
Method of Data Collection and Construction: Key Informant Interviews (KIIs)
Reporting Frequency: Baseline, Mid-term, Final
Responsible individual(s) at the Activity: Market Systems Change Advisor and MSA
BASELINE
Baseline Timeframe: By May 2020
DATA QUALITY ISSUES
Dates of Previous Data Quality Assessments and Name of Reviewer(s): N/A
Date of Future Data Quality Assessments: Internal data quality assessments will be conducted in the baseline data analysis interpretation workshop and again at midline and final assessment.
Known Data Limitations: It is difficult to get precise data on data of this nature and we will take effort to minimize selection, affect, and question bias.
THIS SHEET WAS LAST UPDATED ON: November 2019

³¹Andersson, U., Johanson, M. and L. Silver (1997). The Role of Trust, Cooperation and Commitment in Business Relationships. In Mazet, F; Salle, R; Valla, J. IMP Conference (13th): Interaction, Relationships and Networks in Business Markets; 04 Sep 1997-06 Sep 1997; Lyon, France. IMP; 1997. Available at: <https://www.escholar.manchester.ac.uk/item/?pid=uk-ac-man-scw:2n675>

³² Batt, Peter (2000). Modelling buyer-seller relationships in Southeast Asia. In Ford, D. and Naude, P. and Ritter, T. and Turnbull, P.W. and Leek, S. (ed), 16th Annual IMP Conference, 1 Sep 2000, pp. 1-28. Bath, United Kingdom: University of Bath. Available at: https://espace.curtin.edu.au/bitstream/handle/20.500.11937/8110/169648_43232_07897.pdf?sequence=2&isAllowed=y

³³ Ganeson, (1994). Determinants of Long-Term Orientation in Buyer-Seller Relationships. Available at: <https://warrington.ufl.edu/retail-center/>

Performance Indicator Reference Sheet #11
Name of Indicator: Average business model innovation score ³⁴
Result Measured: Objective 1: Inclusive private sector-led ASF value chains strengthened
DESCRIPTION
Precise Definition(s): The business model innovation scoring index was developed to measure incremental innovation in existing business models. The index is comprised of 13 questions within four categories: product/service innovations, process innovations, marketing innovations, and organizational innovations. The BII identifies purposeful innovation by firms, whether novel or through adaptation, by ranking the number of innovations on a scale of 0 (no innovation reported) to 1 (5 or more innovations reported). Each innovation question below is scored for each “yes” answer. The total “yes” answers are summed and multiplied by 20% to correspond with the index scale. The scores are then averaged for an overall score. 1. In the last 6 months, has your business begun offering a new product (or service) to customers or have you adjusted an existing product (or service)? 2. In the last 6 months, has your business changed the way it stores final products (or service)? 3. In the last 6 months, has your business changed the way it transports products (or service)? 4. In the last 6 months, has your business changed the way it packages its products? 5. In the last 6 months, has your business changed the way it grades its products? 6. In the last 6 months, has your business changed the way it accesses information about the market (any information)? 7. In the last 6 months, has your business changed the way it accepts payments for its products? What about the way it pays suppliers? 8. In the last 6 months, has your business changed the way it tracks internal finances and/or inventory? 9. In the last 6 months, has your business changed its advertising? 10. In the last 6 months, has your business changed the number of functions it performs in the value chain (increased/decreased vertical integration)? 11. In the last 6 months, has your business changed its hiring strategy? 12. In the last 6 months, has your business changed the way/amount it invests in staff capacity? 13. In the last 6 months, has your business changed the way/amount it invests in supplier and customer capacity? At baseline, the BII can be used as a diagnostic tool that can showcase the existing momentum of innovation within a company. The results from the BII at mid-term and end-line can show changes in levels of innovation over time.
Unit of Measure: Score
Data Type: Index
Disaggregated by: Market system function
PLAN FOR DATA COLLECTION
Data Source: Partner firms in the targeted market systems as well as other relevant reference groups.
Method of Data Collection and Construction: Interviews with closed questions (13) and probing on affirmative responses.
Reporting Frequency: Semi-annually
Responsible individual(s) at the Activity: Market Systems Change Advisor and MSA

³⁴ This is the sixth module used to measure the health of a market system in USAID’s LEO’s Handout on Practical Tools. https://www.agrilinks.org/sites/default/files/resource/files/HANDOUT%20-%20LEO_Brief_System_Health_Tool_FINAL.pdf

BASELINE	
Baseline Timeframe: May 2020	
DATA QUALITY ISSUES	
Dates of Previous Data Quality Assessments and Name of Reviewer(s): N/A	
Date of Future Data Quality Assessments: Internal data quality assessments on will be conducted in the baseline data analysis interpretation workshop and again at midline and final assessment, if not more frequently.	
Known Data Limitations: The closed question (Yes/No) is insufficient to capture details on the nature of the innovations pursued. In data collection we will probe for more information to accompany affirmative responses.	
THIS SHEET WAS LAST UPDATED ON: November 2019	

Performance Indicator Reference Sheet #15	
Name of Indicator:	Observed shift in ecological factors related to food intake (ASF intake ecological index)
Result Measured:	Objective 2: Demand for ASF consumption for women of reproductive age and children of 6-23 months increased
DESCRIPTION	
Precise Definition(s):	Ecological factors refer to the contextual aspects in the home or community that influence dietary behavior (for example home availability or accessibility of certain foods). These factors capture the patterns of decisions that influence diet but do not attempt to directly measure diet, which can make them easier to recall and less susceptible to various types of bias. To be effective, ecological factors need to refer to behaviors, conditions, and beliefs that can be modified and, which if modified, results in a change in diet. ³⁵
Many contextual factors affect dietary behavior. No single factor explains why we choose to eat what we do. To understand the factors that influence the complex series of decisions that lead to dietary behavior, the indicator looks at interactions among factors at three levels—the individual (agent-level), the interpersonal (networks), and the institutional (norms). At the individual level, there are many factors including, but not limited to their own attitudes, beliefs, and knowledge about ASF, convenience, costs, familiarity, voice and choice in purchase and consumption, and health status that may be considered. At an interpersonal level, factors may include, but are not limited to, the frequency of ASF being eaten at family meals, social gatherings, and at schools and churches. Factors may also include the presence of household rules about consumption of ASF by women and children as well as around what ASF produced by the household that can be consumed. At the institutional level, factors may include, but are not limited to, the influence of the community and government. For example, we may consider the availability/accessibility of ASF at local restaurants and at local retailers and markets. We may also consider the regulations and permitted accessibility to ASF in line with ASF. Finally, we may also consider the presence of marketing and messaging about value of ASF. The indicator uses an inductive approach to capture what factors are influencing dietary behavior at each of the levels. Then we use a deductive approach to assess the strength of the factors related to ASF food intake on a scale from 0 (low) to 3 (high), using thematic analysis	
Unit of Measure:	Observed shifts (qualitative)
Data Type:	Index
Disaggregated by:	Level
PLAN FOR DATA COLLECTION	
Data Source:	Relevant reference individuals or groups who are both current consumers of ASF and target consumers of ASF.
Method of Data Collection and Construction:	Key Informant Interviews with multiple purposive sample and potentially Photovoice ³⁶ , resource and time permitting.

³⁵ "7 Behavioral Indicators of Diet and Physical Activity." Institute of Medicine. 2002. *Dietary Risk Assessment in the WIC Program*. Washington, DC: The National Academies Press. doi: 10.17226/10342.

³⁶ As detailed in Perceived community environmental influences on eating behaviors: A Photovoice analysis Ana Paula Belon, Laura M. Nieuwendyk, Helen Vallianatos, and Candace I.J. Nykiforuk* University of Alberta, Canada.

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5241160/pdf/nihms6441.pdf>, we plan to consider having a small sample of individuals take pictures of meaningful environmental factors that influenced eating behaviors, especially any consumption of ASF. Then individuals are interviewed to capture why and how the photo taken influenced eating behaviors.

Reporting Frequency: Baseline, Mid-Line, Final
Responsible individual(s) at the Activity: Market Systems Change Advisor and MSA
BASELINE
Baseline Timeframe: May 2020
DATA QUALITY ISSUES
Dates of Previous Data Quality Assessments and Name of Reviewer(s): N/A
Date of Future Data Quality Assessments: Internal data quality assessments on will be conducted in the baseline data analysis interpretation workshop and again at midline and final assessment.
Known Data Limitations: It is difficult to get precise data on data of this nature and we will take effort to minimize selection, affect, and question bias.
THIS SHEET WAS LAST UPDATED ON: November 2019