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FEED THE FUTURE UGANDA MARKET SYSTEM MONITORING: FINAL REPORT

May 31, 2022

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USAID/UGANDA FEED THE FUTURE MARKET SYSTEMS MONITORING ACTIVITY

Final Report

May 31, 2022

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Table of Contents

TABLE OF CONTENTS I

ABBREVIATIONS II

1. BACKGROUND ON THE MARKET SYSTEM MONITORING ACTIVITY 1

2. PROJECT ACTIVITIES 2

2.1. Consultations with key stakeholders 3

2.2. System maps 4
2.2.1. Release Market System Maps v1.0 (Oct 2016) 4
2.2.2. Release Market System Maps v2.0 (Jul 2017) 4
2.2.3. Kumu – Uganda Agricultural Market System Maps (2019) 4
2.2.4. Kumu - Karamoja Household Resilience System Map (2020) 4
2.2.5. Kumu - Uganda Agricultural Market System Map with COVID-19 Shocks (2020) 5

2.3. Subsystem Studies 5
2.3.1. Input dealer study (2017) 5
2.3.2. Quality differentiated price study (2017) 5
2.3.3. Farmer Market Engagement Study (FMES) (2018-2019) 6
2.3.4. Ugandan Seed Sector (2018) 9
2.3.5. Health system map (2018) 10
2.3.6. CPMA data collection (2019) 10
2.3.7. System Pathways Methodology Development Studies (2018 – 2020) 10
2.3.8. Resilience Mapping of the Karamoja Cluster (2019) 13
2.3.9. COVID-19: Applying Rapid System Assessment Methodology (June - September 2019) 13

2.4. Knowledge Transfer 14
2.4.1. Market System Mapping and Measuring Workshop (May 2016) 14
2.4.2. Uganda Agricultural Market Systems Workshop (AMS) (March 2017) 14
2.4.3. Project Level M&E Statement of Work (April 2018) 15
2.4.4. Mini-Workshop: Support Institutional & Systems Strengthening Activity Planning (March 2019) 15
2.4.5. Identifying Pathways to Food Security and Inclusive Growth Workshop (June 2019) 16
2.4.6. Karamoja Market System Toolkit Workshop (December 2020) 16
2.4.7. System Pathways Toolkit (May 2022) 16

2.5. Related Activities 17
2.5.1. Production and Operations Management Society (POMS) 17
2.5.2. Institute for Operations Research and the Management Sciences (INFORMS) 17
2.5.3. Other activities 18

3. CONTACT 18

Abbreviations

AgInputs	Agricultural Inputs Activity
AMS	Uganda Agricultural Market Systems Workshop
BFS	USAID Bureau for Food Security
BHA	USAID Bureau for Humanitarian Assistance
BRC Map	Behaviors-relationships-conditions map
COVID	Coronavirus disease
CPM	Commodity Production and Marketing Activity
EEA	Enabling Environment for Agriculture Activity
FMES	Farmer Market Engagement Study
FTF	Feed the Future initiative of USAID/Uganda
FTF-VC	Feed the Future Value Chain project of USAID/Uganda
GWU	The George Washington University
HESN	Higher Education Solutions Network
IFPRI	International Food Policy Research Institute
INFORMS	Institute for Operations Research and the Management Sciences
MIT	The Massachusetts Institute of Technology
MSM	Market System Monitoring activity
PAD	USAID/Uganda Feed the Future Project Appraisal Document
PO	Producer Organization Activity
POMS	Production and Operations Management Society
RAN	Makerere Resilient Africa Network Lab
RFS	USAID Bureau for Resilience and Food Security
SCR Map	Supply chain role map
SOW	Statement of work
USAID	United States Agency for International Development
VC	Value chain
WFP	World Food Programme
YLA	Youth Leadership for Agriculture Activity

1. Background on the Market System Monitoring Activity

The Market System Monitoring (MSM) activity, based at Massachusetts Institute of Technology (MIT) and The George Washington University (GWU), aims to develop new approaches that assess the impact of market facilitation activities in the USAID/Uganda Feed the Future Value Chain (FTF-VC) project and to assess systemic change in markets in cooperation with the relevant partners. This effort complemented the monitoring and evaluation efforts of individual activities with methods to determine how the combination of activities in the project portfolio enabled systemic change in markets. The MIT-GW team brought a variety of systems engineering approaches to this problem.

To address the difficulty of monitoring outcomes for a portfolio of market facilitation activities, the team conducted analysis on two levels: the entire market system and subsets of components in the market system (subsystems). At the *market system* level, we set out to identify, understand, and analyze the relationships among the system components. Based on this understanding, we identified key parts of the system that may be measured to assess systemic changes. At the *market subsystem* level, we aimed to analyze crucial dynamics, actors, supply chains, and other interacting components to refine the indicators identified at the market system level. To do so, we developed subsystem models, using methodologies appropriate to the unique characteristics of each subsystem and aligned with the purpose of the analysis.

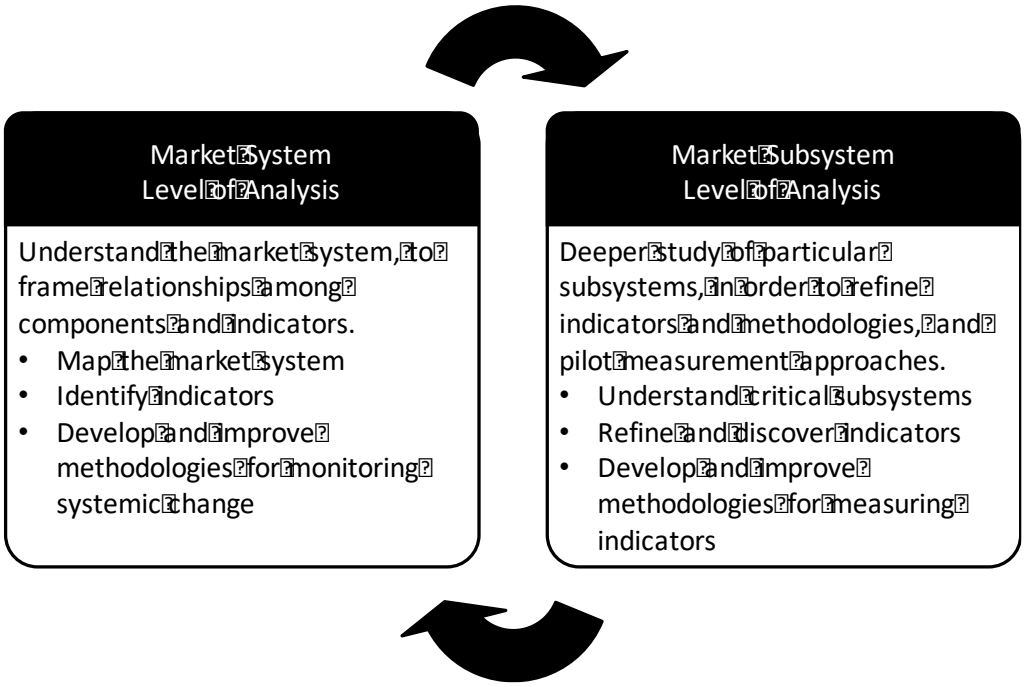

Figure 1: Approach to develop market system maps and system-level indicators

Our approach was to iterate between these two levels with methodological development, data acquisition, and analysis at each level (depicted in Figure 1). For example, we began at the market system level of analysis by developing a conceptual map of the market system and used it to identify potential systemic change indicators. Next, we selected some of these potential indicators for further study at the subsystem level of analysis. We identified a subsystem for which indicator(s) have been proposed, and studied it more deeply. To do so, we identify data

that exist or can be collected, model the subsystem, and analyze the data and models in order to formalize methodologies for measuring the change in the subsystem. In this manner, we refined the proposed indicators and develop a method for measuring them. Finally, the insights from this deeper study were captured at the market system level of analysis, by updating the market system maps and the systemic change indicators. Further analysis at the market system level would enable the identification of additional indicators and selection of additional subsystems. This iterative approach invited collaboration, learning, and adaptation across activities.

The iterative approach also informs the structure of this progress report. The report focuses on the two levels of analysis, market mapping and subsystem studies, that occurred over the course of this Activity.

2. Project activities

The MSM activity got underway with an assessment period to gain a deeper understanding of the need for and current state of systems thinking in M&E for FTF-VC market facilitation activities, learn about these activities and develop relationships with USAID and the implementing partners, and develop a better context to enable definition of the scope of the project's work. The team met with USAID to discuss project background and past M&E efforts. The team met with implementing partners to understand background and context, implementation approach, M&E approach and the structure of each activity.

After the assessment period, the MSM activity began its iterative two-level approach. MSM developed three versions of Ugandan Agricultural Market System Maps in the Fall and held workshops with stakeholders in the Spring to introduce the concept and collect feedback to improve the maps.

Subsystem studies were identified for each Summer. The MSM team conducted the following studies:

- Input Subsystem Report
- Quality-Differentiated Pricing Among Agricultural Traders in Uganda
- MSM E-verification Memo
- Seed System Studies
- Health System Mapping
- Farmer Market Engagement Study (FMES)
- System Pathways Toolkit Methodology Development

In addition to MSM's two-level approach, MSM supported additional tasks outside of the original SOW. In early 2018, USAID/Uganda approached MSM and requested support developing a statement of work for a project level M&E activity. MSM was asked to continue a CPMA data collection effort after the Activity closed-out to enable longitudinal M&E efforts. USAID/Uganda signed a new statement of work (SOW) in October 2019 that focused MSM on household resilience in Karamoja. System resilience maps were created and workshops were held for stakeholder in Karamoja. In the Spring of 2020, these plans were adjusted, in concert with USAID, to concentrate on key impacts of COVID-19 and the corresponding government response on the agriculture market system in Uganda.

Lastly, MSM finalized their System Pathways Toolkit describing their system mapping and measurement methodology developed over the course of this activity.

2.1. Consultations with key stakeholders

One of the main goals of the assessment period was to establish relationships with the key stakeholders. The team cultivated working relationships with the following key stakeholders:

- USAID FTF-VC team and other relevant USAID personnel
- Commodity Production and Marketing Activity (CPM)
- Youth Leadership for Agriculture Activity (YLA)
- Agricultural Inputs Activity (AgInputs)
- Enabling Environment for Agriculture Activity (EEA)
- Producer Organization Activity (PO)

Meetings were also held with other stakeholders who could potentially support the activity or offer alternative perspectives:

- Makerere College of Agricultural and Environmental Sciences
- Makerere Resilient Africa Network (RAN) Lab
- International Food Policy Research Institute (IFPRI)
- NU-TEC Market Development
- World Food Programme (WFP)

In each meeting, the team introduced MSM and learned about the stakeholders' activities and approach. Data from past M&E efforts were discussed. Afterword, discussions were held regarding MSM's methodological approach and feedback was sought from stakeholders.

In March 2017, USAID gathered partners and stakeholders for a three-day workshop where 168 participants and presenters explored a market systems approach, identified components within Uganda's agricultural market systems, and developed a pipeline of actionable opportunities and challenges to inform future programming. The MSM team led vendor selection and helped to design and facilitate the Uganda Agricultural Market Systems Workshop (AMS). As a result of the workshop participants successfully connected and maintained engagement, shared tacit and explicit knowledge, and developed better understandings of Uganda's agricultural market systems. The AMS workshop also enabled a co-design process to articulate a new pipeline of ideas that address bottlenecks, seize opportunities, and achieve systemic change.

Following the AMS, the MSM team worked with YLA to complete a supplementary map for human resources that identified opportunities for improvement in the agrodealer census survey and informed their activities and work plan.

After the release of the Market System Maps v2.0 in July 2017, MSM continued building on the work completed during the workshop and over the summer. The MSM team continued working relationships with our key stakeholders and added the USAID/Uganda Feed the Future Project Appraisal Document (PAD) team.

The MSM team, as part of the Indicator Study, met with EEA to co-create a detailed regulatory subsystem map used to inform a data inventory of the system maps and to identify gaps in data and resources for filling those gaps.

In addition to regular stakeholder meetings, the MSM team investigated system mapping work on systems other than agriculture. Both LINC and the QED Group, contracted to perform the USAID/Uganda Monitoring, Evaluation and Learning Program (Learning Contract), worked on health system maps in Uganda.

In 2019, the MSM held a System Pathways workshop for USAID/Uganda with implementing partners. Following that engagement, MSM worked with Power Africa to create a system map. As USAID/Uganda asked MSM to focus on Karamoja, we began working on a Karamoja Household Resilience System Map with the Karamoja Working Group composed of USAID implementing partners working in Karamoja.

2.2. System maps

We began at the market system level of analysis by developing a conceptual map of the market system and using it to identify potential systemic change indicators.

2.2.1. Release Market System Maps v1.0 (Oct 2016)

In order to depict the market system for maize, beans, and coffee in Uganda, the MSM team developed two types of maps. The first map, Supply Chain Role Map (SCR Map), captures roles in a value chain and material, financial, and service flows between actors that play these roles. The second, Behaviors-relationships-conditions Map (BRC Map), captures pathways through which the market system changes; pathways consist of conditions, relationships between actors, and behavior changes by actors. Release notes were created to describe these maps. The Market System Maps v1.0 Release Notes outlined the MSM approach and introduced version 1.0 of system maps, followed by ways in which the reader may apply these frameworks to different types of systems, gaps and limitations of these maps, and means by which the reader can contribute to their development going forward. The release notes and maps are available at here.

2.2.2. Release Market System Maps v2.0 (Jul 2017)

Before the AMS workshop, the MSM team restructured the map to better enable workshop facilitation, releasing version BRC Map v1.1. This map was used throughout the workshop. After the event, incorporating feedback from the event and consultations with key stakeholders, the MSM team revised this map with new information. The Role Map v2.0 includes updates to naming conventions and the introduction of additional service providers. In the BRC Map v2.0, each subsystem has one or more key outcomes, indicated by bold red font. These key behaviors and conditions attempt to align with the Development Objectives and results chains for FTF-VC activities. The release notes and maps are available here.

2.2.3. Kumu – Uganda Agricultural Market System Maps (2019)

After the AMS workshop, an updated map incorporating participant feedback was built using Kumu. This interactive map is available here.

2.2.4. Kumu - Karamoja Household Resilience System Map (2020)

As part of the Karamoja Resilience work two maps were created with stakeholders and updated with feedback from a December 2020 Karamoja workshop. These interactive maps are available here: Karamoja Household Resilience Map and Karamoja Market System Map.

2.2.5. Kumu - Uganda Agricultural Market System Map with COVID-19 Shocks (2020)

Following COVID-19, MSM worked to map how COVID would impact the agricultural market system in Uganda. This Kumu map incorporates data and sources into the map while highlighting COVID-19 impacts to the system. It is available here.

2.3. Subsystem Studies

2.3.1. Input dealer study (2017)

This study focused on the "inputs subsystem": the part of the value chain that enables farmers to access inputs such as fertilizer and seeds. It aimed to understand whether and to what extent expected changes were occurring in the last four years of FTF-VC work by asking "How has the inputs subsystem been changing over time?" Analysis focused on changes in essential behaviors and relationships targeted by the FTF-VC project, and how they have manifested in three types of actors: wholesalers and input dealers (or "agrodealers"), farmers, and output value chain actors (such as collectors/village agents or traders) who are involved in the inputs value chain.

This study analyzed systemic change by examining data from multiple activities. It identified several data gaps and measurement challenges that are general and likely to apply to other parts of the system:

- Longitudinal data on some key indicators was unavailable due to inconsistencies in collection over time.
- Measurements of actor success (e.g. dealer profitability, farmer yields) were limited.
- Better consistency across activities in terminology, time frame, and geographical location would enable more holistic analysis.
- Data on the reasons for change propagation or barriers to it were not available.

The study recommended the following:

- Findings should be verified by collecting similar data in the next season, particularly because several changes showed evidence of speeding up in the most recent season after several seasons of stagnation.
- The value chain impact of output actors selling inputs to farmers, a relatively new trend, should be investigated.
- Slow adoption among input wholesalers/dealers of a business mindset focusing on delivering greater value to customers should be investigated.
- Examine the delays between system changes and benefits and develop strategies to account for them in measuring systemic change.
- Develop monitoring and evaluation strategies that address both the need for longitudinal data on large, representative samples and the need for data about many different parts of the system.
- Monitoring efforts should carefully select easily collected data that collectively provide insight into systemic change.

2.3.2. Quality differentiated price study (2017)

This study was identified during the system mapping workshop in May 2016, where the attendees worked in small groups to concentrate on the various subsystems of the overall market. The output subsystem group discussed how quality differentiated prices (QDP) interact with actors in the market. In a system where downstream actors value quality and are willing to

pay more for better products, farmers have the incentive to engage in practices to improve crop quality. To achieve a market for a quality product, it is important that actors throughout the value chain offer and have access to quality-differentiated pricing. The group members discussed the "chicken or the egg" nature of this relationship where you need one to have the other.

This study took an inductive approach to generate new theory based on qualitative analysis across trader cases. The case-based, exploratory research aimed to understand the factors that enable or inhibit quality-differentiated pricing of agricultural commodities in Uganda from the trader perspective. The MSM team interviewed six traders from Uganda's western and central regions who dealt in different commodities (beans, maize, coffee, or a combination). Traders had mixed experiences providing/accessing quality-differentiated pricing.

Overall, the results indicate that quality-differentiated pricing can be propagated across the value chain through synergistic relationships. When some actors offer QDP, they create incentives for other actors to improve the quality of their goods; actors who provide high-quality goods, in turn, create an incentive for buyers to offer QDP. This reinforcing loop, in which an action produces a result that enables more of the same action, is a foundational structure within systems thinking. Additionally, findings suggest that QDP exists but is implemented informally and not yet well-established. Quality is slowly improving through efforts to disseminate knowledge about quality improvement techniques and prices are slowly rising through improving quality and better market knowledge and relationships.

The study recommended the following:

- Strengthen QDP through future interventions. QDP is implemented informally and therefore remains underdeveloped. Future interventions should aim to strengthen the reinforcing loop of actions described in the study.
- Explore QDP from the perspective of other actors: other traders (e.g. those who have not worked with USAID/Uganda FTF activities), farmers, collectors, exporters, producer organizations, exporters' business partners and other major food commodity buyers.
- Study QDP for domestic markets. Since traders primarily discussed export markets, the existence and drivers of QDP for domestic markets is unclear.
- Study correlation between knowledge of a grading system and incentive for improved quality. Evidence suggests that traders who use a formal grading system are more discerning of crop quality than those who use imprecise methods to measure and rate quality. However, this hypothesis could not be explored further with the existing interview data.

Lastly, this study was incorporated into Katherine Picchione's Master's Thesis as part of her requirements for graduation.

2.3.3. Farmer Market Engagement Study (FMES) (2018-2019)

This genesis of this study occurred during a meeting of FTF-VC activities in late fall of 2016. During that meeting, participants desired to better understand the conditions that enable farmers to participate in the market system. Effective market linkages between farmers and their immediate service providers are crucial to delivering higher income for farmers, one of USAID's major objectives. MSM was asked to further study this topic.

The MSM team identified three key knowledge gaps:

- How do individual farmers (at the village or farm level) connect to the broader market system? What are the common channels, relationships, or actors that connect farmers to the market system?
- Are there any farmers that do not engage with the market system? If so, what characteristics do the members of this group have in common?
- What are agribusinesses doing to help farmers engage in the market and to what extent are their efforts successful? What are the motives?

From the knowledge gaps listed above, four questions were articulated to focus the study:

1. What are the main channels/relationships/actors through which individual farmers purchase inputs, procure agriculture-related services, and sell their outputs? How formal or informal are they? If these relationships do not exist, why not? What are the farmers' primary sources of information about farming techniques, market prices, quality products, etc.?
2. How is the current market system failing to meet farmers' needs? Which products, services, or kinds of information are not currently available in the "last mile", and why? What would enable the market system to better reach farmers that are currently considered as vulnerable or "not market ready"?
3. If there are farm households that are not engaging with the market system, what are the main obstacles or barriers preventing them from doing so?
4. What are agribusinesses doing (individually and at scale) to engage market-ready farmers and help farmers become market-ready? Are agribusinesses' business models and business development strategies effective in helping non-market ready farmers become market-ready and engage in the market? What is the underlying causal structure of the system that enables or impedes farmer market engagement?

FMES addressed these questions through analysis of data from a diverse group of farmers and agribusinesses in five districts across Uganda. To answer the research questions, the study was scoped into two complementary parts. First, a "deep dive" study of agribusinesses was conducted in Iganga in March 2018. Second, two concurrent surveys were conducted in March and April 2018 across five districts: Gulu, Pader, Iganga, Ibanda, and Mubende. These regions were selected purposively based on their locations, crops grown, agroecology, and presence of USAID/Uganda Feed the Future activities.

The Agribusiness Deep Dive survey consisted of 40 semi-structured interviews designed to learn more about agribusiness business models and the relationships between agribusinesses and farmers. The study report was delivered in January 2018.

KEY FINDINGS

1. Small agribusinesses have adopted a spectrum of flexible business models.
2. Information is spread through relationships between market actors.
3. Most businesses rely on personal connections for credit; there is widespread distrust of formal financial institutions.

During the interviews, a spectrum of business models on the post-harvesting side of the supply chain were identified:

1. The "Agent" as an Aggregator-Processor-Trader
2. The "Agent" as a Collector or Collector-Aggregator
3. The Processor-Trader with two revenue streams
4. The Retailer
5. The Area Cooperative Enterprise (ACE)

After finishing data collection, first impressions were that to better connect farmers to the market the following areas need attention:

- There is work to be done with the "middle men".
- Need to build trust for and make financial institutions more accessible.
- Need better enforcement of crop quality standards.

In the second phase of the study, MSM conducted two related surveys in March and April 2018. Brief descriptions of the surveys follow.

Smallholder Household Survey: to determine household's level of engagement with the market system (purchasing inputs, selling produce, procuring services, etc.)

- Ask about informal/formal relationships with local market actors – input dealers, agroprocessors, traders, producer organizations, etc.
- If missing certain relationships or not engaging with the market, why? What are the primary barriers to engaging with the market?
- Which products/services does the farmer not currently have access to, and why?

Agribusiness Survey: focusing on relationships with farmers

- Basic business model
- Selling inputs to farmers
- Buying outputs from farmers
- Providing services to farmers (agricultural, extension, finance)

In April 2018, MSM provided an early overview of the FMES data that had been collect through 472 surveys in March 2018. Additional analysis continued into the summer of 2018 looking for relationships/correlations to understand what variables and combinations of variables have the biggest impact on whether farmers engage with the market. The analysis focused on the following areas:

- Overview stats
- Market access/interaction dimensions
- Vulnerability indicators
- Access to finance - both farmers and agribusinesses
- Insights from agribusiness surveys

FMES analysis was first presented in November 2018 at The Institute for Operations Research and the Management Sciences (INFORMS) annual meeting in Phoenix, AZ. Additional analysis was presented at the Production and Operations Management Society (POMS) conference in early May 2019. A FMES Final Report was delivered in July 2019. Lastly, a Master's Thesis on this topic was delivered as part of a student's graduation requirements in May 2019.

2.3.4. Ugandan Seed Sector (2018)

There is widespread agreement among farmers, agrodealers, input suppliers, donor agencies, and other stakeholders that there is a serious problem with counterfeit agricultural inputs in Uganda, although has been difficult to accurately quantify the magnitude of the problem. This research over the Summer of 2018 resulted in two related outputs describing the Seed Sector in Uganda. The first focused on KAKASA and AgVerify, while the second looked at agrodealers' perceptions of seed counterfeiting.

KAKASA: Postmortem on recent experiments with e-verification in Uganda's seed sector

This analysis is based on interviews conducted in June-July 2018 with selected seed companies, input dealers, industry representatives, USAID personnel, private sector participants, and a few additional stakeholders. These interviews shed light on the recent experience with e-Verification programs in Uganda and the challenges that these programs faced.

The research outlined the background of e-verification and narratives of how both KAKASA and AgVerify played out, based on interviews with:

- Simon Byabagambi (USAID), Robert Katende, Richard Fahey (Mpedigree)
- Grow More Seed, EA Seed, FICA/USTA, BRAC, NASECO
- Agrodealer focus groups
- TASAI Launch Event (including Emma Joynson-Hicks (AgVerify))

The following key takeaways were highlighted:

- Specific programmatic issues with KAKASA/AgVerify that should be addressed if e-verification is tried again
- KAKASA was actually largely successful, perhaps should have been considered enough progress
- AgVerify could have worked with a more limited scope, but was never going to succeed as designed given the political climate in the seed sector – effectively torpedoed by combination of industry & government stakeholders
- When promoting private sector initiatives there has to be a clear benefit for the participating companies who have to tread carefully in politically sensitive sectors and where trust in the system has failed

Analysis of How Agrodealers Perceive and Respond to Counterfeiting in the Seed Sector

This case-based exploratory research gathered information about how agrodealers navigate the uncertain input market – how they detect and react to counterfeits, decide which products to purchase, and structure relationships with their suppliers and customers. In July 2018, the MSM team completed seventeen one-on-one interviews and conducted a half-day focus group with 22 local agrodealers in Mbale. The writeup of this research occurred during the fall 2018. With this understanding of behaviors and incentives, effective market facilitation efforts can be designed that leverage agrodealers' incentives in order to promote desirable outcomes such as adoption of quality seed.

The following findings were highlighted:

- Farmers demonstrate seed brand lock-in leaving agrodealers with minimal power to influence farmer choice

- Smaller packaging is desired. The smallest pack size available is 2kg while the most demanded pack size is also 2kg. A large majority of agrodealers reported customers ask for smaller volumes
- Agrodealers reported a wide variation in methods of how to identify counterfeits.
- Verification programs had strong farmer buy-in, but a lack of differentiation between them.
- Barriers to using improved seeds included cost, awareness, and risk aversion.

Recommendations for further investigation:

- Encourage continuation of scratch label verification in some form
- Train agrodealers on agricultural practices
- Loans to increase access to improved seeds
- Strengthen extension programming
- Market research on smaller seed pack offerings
- Exploration of the factors contributing to farmers' lock-in in regard to seed brand

2.3.5. Health system map (2018)

In July 2018, MSM began restructuring existing maps created by SPACES as part of the health systems work done by the LINC activity. MSM used this existing research on Uganda's health system and applied the BRC methodology. The materials from this study can be found here.

2.3.6. CPMA data collection (2019)

At the request of USAID/Uganda, the MSM team continued CPMA's farmer survey ensuring a continuous time series of this data is available. The information was collected during the late fall of 2019. It was analyzed, indicators were reported in March 2019, and it was properly stored on CPMA's MIS server and returned to USAID.

2.3.7. System Pathways Methodology Development Studies (2018 – 2020)

Indicator study (2018)

Measuring systemic change is challenging due to system complexity and scope. The indicator study developed a measurement methodology that identifies key indicators on important "pathways to change" in a system map, supports the interpretation of results in the system context, and suggests ways to validate and update the measurement approach. The methodology cycles through the steps of defining, measuring, and validating indicators against a system map, enabling both indicators and system map to be updated as better understanding of the system emerges. MSM delivered a report with findings from data collection and analyses in January 2018. A two-page summary was delivered in March 2018.

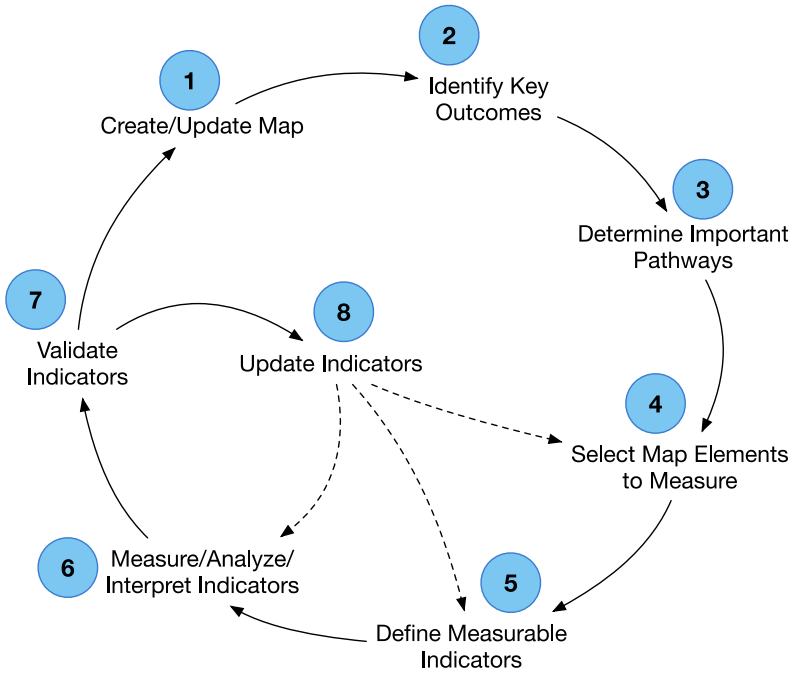

Figure 2: Measurement methodology

The methodology is summarized in Figure 2. It begins with the creation of a detailed system map, which shows how changes in behaviors, relationships, and conditions affect one another. Second, the key outcomes or desired changes are identified from the map, based on program goals, stakeholder and expert inputs, system structure, and other information. Third, important pathways to and from key outcomes and key enablers (such as interventions) are identified. Pathways are similar to results chains but may be linear, cyclical, or branching. Fourth, behaviors, relationships, and conditions are identified along key pathways to measure as indicators - "outcome indicators" measure outcomes, while "diagnostic indicators" measure intermediate steps on a pathway, to see early signs of success or barriers to change. Fifth, a quantitative measure is defined for each selected map element on a 0-1 scale, such as "percent of actors who adopted this behavior change." Sixth, the methodology suggests collecting data, computing indicator values, and comparing to expectations. This analysis should consider results on the system map: multiple indicator ratings show change along a pathway; multiple pathway ratings show change across the system. Seventh, assess both indicator validity, through "validation cards" for each measurement point, and also whether the set of indicators enables a sufficient measurement of system health, by diagnosing potential measurement problems if expectations are not met. The final step in the methodology is to adapt both the measurement approach and system map as more is learned about the system through the measurement process. The newly gathered data inform changes to the system map, and the process repeats.

The MSM team used the above methodology to develop financial access pathways. They met with EEA to create a detailed regulatory subsystem map. These maps and pathways were then used to inform a data inventory of the system maps and to identify gaps in data and resources for filling those gaps. Finally, MSM shared the results of this work with the FTF/Uganda, PAD team, USAID/Washington systems group, and BFS.

Relationship methodological development (2019)

In the spring of 2018, the MSM team, in collaboration with FTF-VC, defined a subsystem study supporting USAID/Uganda research priorities focused on the value of relationships. Sixty farmers and agribusinesses were interviewed in the Mbale district. The purpose of this research was to understand how to measure relationships, learn the (perceived) value actors gain from relationships, and identify the key dimensions of relationships that enable economic value.

Findings:

- Agribusinesses tend to value their suppliers (bulk discounts for inputs businesses, stable and good supply for outputs businesses), and competitors (product loans and information sharing for inputs businesses).
- Farmers tend to value their agents or traders (market access and finance), community (best practices and some finance), and hired labor.
- There is not much difference between urban and rural farmers, except rural farmers tend to value transport as a service with agents.
- The biggest difference in responses by farmers was between those who primarily grow maize and beans, and those who primarily grow coffee, because bulking and information sharing tended to be more important for those who grow coffee.
- Respondents did not have to be prompted for ideas about how relationships are beneficial to people. A common first answer when asked about how people would access resources without relationships was - "You can't survive."

This research was then developed into a draft methodology for measuring relationships and shared with USAID at brownbag talk hosted by the Bureau for Food Security (BFS) in April 2019. The event was well attended. The audience understood the challenges and engaged in a fruitful discussion of how best to capture detail and be holistic. This methodology was incorporated into the Systems Pathways Toolkit developed as part of the MSM knowledge transfer activities.

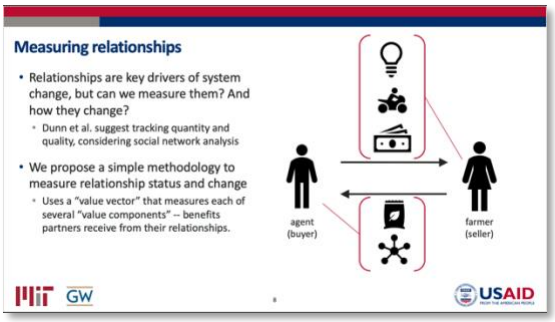

Figure 4: Measuring relationships

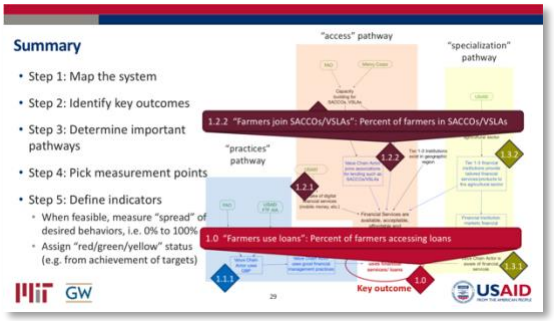

Figure 3: Relationship Measurement Summary

Ugandan Agricultural Finance Research (2020)

Building from research shared with the USAID/Uganda Mission in November 2020, MSM continued to refine the finance subsystem. MSM highlighted the following findings:

- Access to formal loans is limited but improving.
- Access to informal loans is more widely available.
- Demand for agricultural loans is low.

- Data is scarce on affordability, supply of appropriate products, and information.
- Leverage widespread informal financial networks to improve both access to and trust in formal financing.

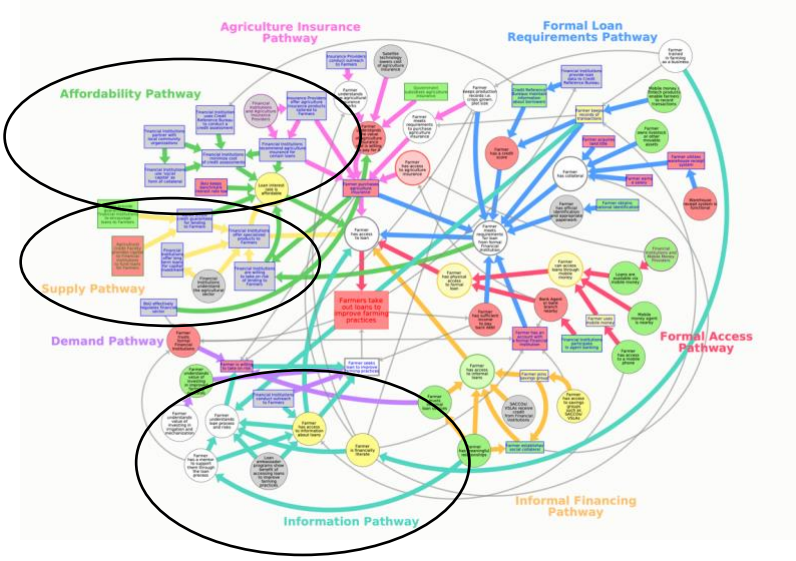

Figure 5: Ag Finance System Gaps

During this reporting period, the MSM team worked to reflect on the value of over four years of work in this area. We summarized the identified data and knowledge gaps, described the methodology, and collected all the learnings related to this subsystem into a cohesive whole. A paper was accepted for academic publication and a report was developed to share with USAID. This research was featured in the System Pathways Measurement Toolkit.

2.3.8. Resilience Mapping of the Karamoja Cluster (2019)

System maps can be an essential tool for enabling collaboration, learning, and adaptation (CLA) by USAID Activities. As part of our work supporting USAID/Uganda, the USAID/Uganda Feed the Future Market System Monitoring (MSM) Activity developed two market system maps in the Karamoja region. In December 2020 MSM shared how these maps can be used by USAID/Uganda's Karamoja Cluster to identify opportunities for collaboration and adaptation, monitor system change, and develop a learning agenda level insights that can be derived from the system maps.

2.3.9. COVID-19: Applying Rapid System Assessment Methodology (June - September 2019)

Instead of focusing on a single subsystem, this COVID-19 work included methodology development and analysis. Reports were created describing the methodology and mapping used to generate the COVID-19 updates. The updates were based on our analysis of more than 250 sources, including open-source data, articles, and reports, combined with targeted key informant interviews and insights derived from our system maps.

Our analysis focuses on a few critical subsystems, which represent the parts of the system that are most closely linked to USAID's current market system development programming. Our objective was to inform USAID's response to the situation and provide guidance on which parts of the system should be monitored in the future. The insights presented here represent our

best understanding of the system status. Portions of this analysis were incorporated into USAID/Uganda's Economic Growth Forum presentation.

The key take-a-ways are highlighted below:

- Impact in inputs sector does not seem as dire as initially expected
- Commodity distribution sector still challenged by low prices and low demand
- Smallholder farmers have suffered income losses but are resilient
- Sentinel indicators can fill knowledge gaps moving forward
- Uganda's market system has proved resilient


USAID/UGANDA FEED THE FUTURE MARKET SYSTEM MONITORING ACTIVITY

APPLYING SYSTEM MAPPING TECHNIQUES TO RESILIENCE

CONDUCTING A RAPID SYSTEM ASSESSMENT

INTRODUCTION

WHAT CAN A SYSTEM ASSESSMENT BE USED FOR?

USAID

Figure 6: Rapid System Assessment Methodology

To learn more about our methodology and read our previous reports, we encourage you to access the following resources:

- Methodology
  - Rapid System Assessment Methodology
  - Uganda Agriculture Market System Map with COVID
  - Guide to interpreting the COVID shock map
- COVID-19 Reports
  - Executive Summary
  - Update Report No 1: Representing the Shock & Initial Hypotheses
  - Update Report No 2: Deep-Dive on Agricultural Inputs
  - Update Report No 3: Deep-Dive on Commodity Distribution
  - Update Report No 4: Deep-Dive on Smallholder Farmers & Final Recommendations

2.4. Knowledge Transfer

2.4.1. Market System Mapping and Measuring Workshop (May 2016)

MSM held an all-day workshop hosted at the Learning Contract, also known as the USAID/Uganda Monitoring, Evaluation and Learning Program. The MSM team introduced the activity, team background, and mapping frameworks for two types of system maps. During most of the workshop, participants worked in small groups to revise and add to different parts of the maps. The group convened to share findings and ideas at the workshop's closing.

The group accomplished the goals set for the workshop: participants confirmed that the mapping approach was effective and began building a more systemic perspective that spans the FTF-VC activities. In the days that followed, several participants commented that the workshop gave sparked ideas about how to approach their own work and provided an important perspective about how their activity relates to the wider market system. A copy of the Market System Mapping and Measuring Workshop Report can be found at this link.

2.4.2. Uganda Agricultural Market Systems Workshop (AMS) (March 2017)

In March 2017, USAID gathered partners and stakeholders for a three-day co-creation event where 168 participants and presenters explored a market systems approach, identified

components within Uganda's agricultural market systems, and developed a pipeline of actionable opportunities and challenges to inform future programming. USAID asked the MSM team to lead vendor selection, help design and facilitate the workshop.

Day one of the workshop focused on developing better participant understanding of the connections within Uganda's agricultural market systems. Participants developed an understanding of the market systems approach through theory, role modeling, individual practice, and group refinement of current system maps. The MSM team led the introduction of the market systems approach and facilitated participants learning Uganda's agricultural market system maps and adding their work to the maps. Building on the connections developed the first day, during Workshop Day 2 participants developed a pipeline, beginning with thematic 'soft spot' areas of intervention and ending with presentations on actionable challenges and opportunities. On Workshop Day 3, after remarks from both the Government of Uganda and USAID, participants made personal commitments and categorical group recommendations to improve stakeholder work within Uganda's agricultural market systems.

A copy of the summary report can be found at this link.

In April 2017, MSM supported USAID's Brian Bingham, M&E Specialist - HESN, as he presented a peer-to-peer presentation about the AMS co-creation event at The Center for Development Innovation.

2.4.3. Project Level M&E Statement of Work (April 2018)

In early 2018, USAID/Uganda approached MSM and requested support developing a statement of work for a project level M&E activity. MSM held meetings in Washington D.C. with USAID/Uganda and BFS in Feb and April 2018 to further this goal. An outline of the statement of work was prepared based on those discussions. The high-level versions of the developed outline is below:

- Engagement with Activity-level M&E, Project stakeholders
    - M&E's relationships
    - M&E's responsibilities
- System-level Monitoring
    - Case management
    - Data aggregation/disaggregation
- System-Level Learning
    - Analysis
    - Learning
- Methodology development / evaluation
    - System indicator design
    - Adaptation/ CLA

2.4.4. Mini-Workshop: Support Institutional & Systems Strengthening Activity Planning (March 2019)

In March 2019, USAID/Uganda approached MSM to develop a half-day workshop using MSM's system mapping & measuring tools in concert with applied political economy analysis (PEA) to support the Institutional & Systems Strengthening Activity (ISSA) design team. Attendees included the ISSA design team and the broader Economic Growth Office. The workshop featured the Ugandan seed sector as an example of how the MSM Market System toolkit can be

used to represent the incentives and constraints that shape a politically complex system. The team created a basic system map for a particular sector or problem area, and used the map to identify key leverage points for change in the system as well as potential political roadblocks. The next day attendees incorporated concepts from the workshop (pathways, diagnostic indicators) into the ISSA design.

2.4.5. Identifying Pathways to Food Security and Inclusive Growth Workshop (June 2019)

On June 10th, 2019, the USAID/Uganda Mission hosted a workshop for Uganda's Global Food Security Strategy (GFSS) portfolio, bringing together USAID staff and implementing partners working on Feed the Future, Food for Peace, and resilience programming. The workshop had three main objectives: 1. Bring together the broader group of stakeholders working on the Global Food Security Strategy in order to incorporate resilience programming more formally into the systems approach. 2. Strengthen the group's collective understanding of USAID's work on agriculture and food security in Uganda, particularly the opportunities for synergy and collaboration between Feed the Future and Resilience programs. 3. Solicit input from participants on where USAID should invest next: which interventions were working well, and where there were gaps that needed to be filled. The workshop was also designed to provide an introduction to the System Pathways The MSM team organized and facilitated the workshop in consultation with the USAID/Uganda Economic Growth Unit. The Day 1 and Day2 Workshop Reports are available for download at this link.

2.4.6. Karamoja Market System Toolkit Workshop (December 2020)

The Karamoja Resilience Cluster was established by USAID to improve collaboration and coordination in the Karamoja region. In January 2020 it consisted of USAID's implementing partners working in the districts of Kaabong, Karenga, and Kotido. In January 2020, the Market System Monitoring Activity (MSM) hosted a workshop for the Karamoja Resilience Cluster, with support from the Uganda Learning Activity (ULA). The workshop was attended by representatives of all of USAID's activities in the districts, along with USAID/Uganda leadership and program staff. This workshop was the first convening of the Cluster and provided participants with an opportunity to understand each other's work and conceptualize how the Cluster will operate moving forward. MSM developed two market system maps in the Karamoja region and shared how these maps can be used by USAID/Uganda's Karamoja Cluster to identify opportunities for collaboration and adaptation, monitor system change, and develop a learning agenda level insights that can be derived from the system maps.

Outside of the work for the mission, MSM presented this work to USAID's Bureau for Humanitarian Assistance (BHA) and Bureau for Resilience and Food Security (RFS). Courtney Blair presented this work at the Market Systems Symposium and Tristan Downing incorporated it into his Master's Thesis.

2.4.7. System Pathways Toolkit (May 2022)

Throughout our activity, MSM has produced both methods and knowledge. To share the developed methods, MSM refined its methodology into a toolkit. The System Pathways Toolkit is a set of tools for mapping and measuring complex systems, such as the agricultural market system in Uganda. It consists of the System Pathways Mapping Toolkit and the System Pathways Measurement Toolkit. The toolkits are designed to be accessible. They are divided into modules with "quick" and "deep" versions of the methodology. Each module includes examples

to guide toolkit users on how to accomplish particular kinds of tasks. In addition, a System Pathways Workshop Template and a Kumu System Pathways Template Map were developed to aid practitioners.

Outside of USAID/Uganda, Erica Gralla shared the System Pathways methodology at an Engineering for Change Seminar, MSM participated in two USAID led webinars, and an academic article was published. The journal article, titled "A systems framework for international development: supporting intervention design", was published in the Production and Operations Management (POM) Journal.

2.5. Related Activities

To disseminate its work among practitioners of systems thinking, the MSM team worked to prepare academic papers and gave talks to audiences with academics and practitioners. The students and researchers of MSM disseminated their work during many events, but made a focused to attend the annual POMS and INFORMS conferences. A sample of these presentations are mentioned below.

2.5.1. Production and Operations Management Society (POMS)

MSM graduate students presented their research to date at the 28th annual conference of POMS, an international professional organization representing the interests of professionals from around the world. Madison Reinker delivered a talk called A system dynamics analysis of the adoption of improved agriculture inputs in Uganda. Her research demonstrates how a systems dynamics model can be used to show the degree of impact of levers on market outcomes. Also, Megan Peters delivered a talk called Measuring change in Ugandan agricultural markets. The talk discussed MSM's effort to develop methods that measure the changes in Ugandan agricultural markets resulting from a portfolio of market interventions. In addition, Katherine Picchione delivered a talk called Dynamics of Agribusiness Decision-Making in Uganda. The talk discussed a systems dynamics model contributing to her thesis showed that: traders use business strategies that cut across roles to improve quality, increase quantity, and get better prices; when traders fill roles in which they directly interact with farmers, their efforts to improve quantity and quality may provide long-term mutual benefits; and inputs financing and other credit policies reduce volatility in cash and supply and enable production.

For the 29th annual conference of POMS, MSM students prepared presentations of their research. Jillian Miles delivered a talk called System Dynamics Model of Interventions to Improve Financial Inclusion for Famers and Agribusinesses in Uganda. Her research demonstrated how a systems dynamics model can be used to show how: lowering interest rates helps farmers already attaining loans get better ones, but not necessarily increase total farmers overall; in order to make a substantial change, lowering interest rates has to be done in combination with trainings that make more farmers qualified; and geography remains to be one of the biggest limitations to further expansion.

The MSM team presented at the 30th annual conference of POMS. Micaela Wiseman, Megan Peters, Courtney Blair, Jarrod Goentzel, and Erica Gralla all have scheduled presentations.

2.5.2. Institute for Operations Research and the Management Sciences (INFORMS)

As part MSM efforts to disseminate its work, members of the MSM team presented their work at INFORMS Annual Meeting(s). The presentations included:

- Jillian Miles and Erica Gralla, "Using System Dynamics to Understand Financial Inclusion in Ugandan Agriculture (2018)
- Micaela Wiseman, "Farmer Engagement with Markets in Rural Uganda" (2018)
- Jarrod Goentzel, "Farmer Engagement in Agricultural Supply Chains in Uganda" (2019)
- Micaela Wiseman, Courtney Blair, and Tim Russell, "Analysis of Food Security and Market Participation for Farmer Households in Uganda," (2019)
- Courtney Blair, Finley Wetmore, and Erica Gralla, "A Systems Framework for International Development: Supporting Intervention Design" (2020)

2.5.3. Other activities

Outside of POMS and INFORMS, the MSM presented at USAID internal brownbag lunches, university departmental research talks, and other conferences. Katherine Picchione gave an MIT departmental research talk, spoke to a group of high school science focused students, and Katherine presented this work at the 2018 International System Dynamics Conference in Iceland (August 2018). Courtney Blair wrote a blog post for the USAID learning Hub highlighting MSM's ongoing work. MSM delivered a brown bag talk on indicator development for systems at USAID/Washington for the systems group led by Dr. Tjip Walker, Senior Policy Advisor for Local Systems of USAID's Bureau for Policy, Planning, and Learning. Megan Peters contributed to a blog post in November on SDG Knowledge Hub titled "Using a Systems Approach to Achieve Inclusive Development: The Case of Agriculture in Sub-Saharan Africa".

In addition, MSM's COVID-19 work was shared in the following conferences:

- "Adapting Programming and Protecting Logistics for Food Assistance during Pandemics and Other Crises," The Future of Food Assistance for Nutrition: Evidence Summit II (USAID Bureau for Humanitarian Assistance and Food Aid Quality Review Project), virtual. (2020)
- "The COVID-19 Impact on Ugandan Agricultural Markets," Mennonite Economic Development Associates (MEDA) Convention, virtual. (2020)

Lastly, Courtney Blair, a former MSM researcher and currently a DPhil Candidate in International Development at University of Oxford, has finished a draft paper contributing to the literature on agricultural technology adoption using the FMES dataset to analyze the drivers of uptake of agricultural inputs in a sample of Ugandan households. This study is among the first to analyze whether the risk of counterfeit inputs induces changes in farmers' behavior.

3. Contact

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