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FEED THE FUTURE UGANDA MARKET SYSTEM MONITORING: MARKET SYSTEM MAPS VI.0



October 31, 2016

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USAID/UGANDA FEED THE FUTURE MARKET SYSTEMS MONITORING ACTIVITY

Market System Maps v1.0

October 31, 2016

DISCLAIMER

Views expressed in this publication do not necessarily reflect the view of the United States Agency for International Development or the United States Government.

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Abbreviations

4A	Acceptable, available, accessible, and affordable
BRC Map	Behaviors-relationships-conditions map
FTF-VC	Feed the Future Value Chain project of USAID/Uganda
GAP	Good agricultural practices
GBP	Good business practices
MSM	Market System Monitoring activity
SACCO	Savings and Credit Co-operative Society
SCR Map	Supply chain role map
USAID	United States Agency for International Development
VA	Village agent
VLSA	Village Savings and Loans Association

Executive Summary

The Market System Monitoring (MSM) activity develops new approaches that assess the impact of activities using a market facilitation approach in the USAID/Uganda Feed the Future Value Chain (FTF-VC) project.

In order to depict the market system for maize, beans, and coffee in Uganda, the MSM team has developed two types of maps. The first map captures roles in a value chain and material, financial, and service flows between actors that play these roles. The second captures pathways through which the market system changes; pathways consist of conditions, relationships between actors, and behavior changes by actors.

This report outlines the MSM approach and introduces version 1.0 of the 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.

1. Introduction and Goals

This document introduces system maps that depict the market system for maize, beans, and coffee in Uganda. The maps were developed in order to provide a common understanding of the system that is the focus of the FTF-VC project in Uganda. They are intended to be “living” documents, which are updated regularly and may be used and modified by any organization for its own purposes. Major updates of the maps will be formally released once per year for the duration of the MSM activity. Versions with minor changes may be released as needed in the interim, in the style of software releases. The maps were developed by the MSM activity, with input from many FTF-VC stakeholders.

Two types of maps are included in this release: a supply chain role map and a behaviors-relationships-conditions map. The supply chain role map provides an overview of main roles in the system and the most important flows among them (materials, finance, services). The behaviors-relationships-conditions map provides a picture of the potential pathways for change in the system by depicting behavior changes, relationship changes, and system conditions, connected by arrows indicating elements that enable others.

The remainder of this document is structured as follows: the MSM activity is discussed, system maps are introduced and explained, gaps and limitations are discussed, and an update cycle for maps is presented.

2. Background on the Market System Monitoring Activity

Goals of the MSM activity are to develop new approaches that assess the impact of market facilitation activities in the FTF-VC project and to assess systemic change in markets in cooperation with the relevant partners. This effort should complement monitoring and evaluation efforts of individual activities with methods to assess how the combination of activities in the project portfolio is enabling systemic change in markets. The MIT-GW team brings 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 conducts analysis on two levels: the entire market system and subsets of components in the market system (subsystems). At the *market system* level, we aim to identify, understand, and analyze the relationships among the system components. Based on this understanding, we can identify key parts of the system that may be measured to assess systemic changes. At the *market subsystem* level, we aim to analyze key dynamics, actors, supply chains, and other interacting components to refine the indicators identified at the market system level. To do so, we develop subsystem models, using methodologies appropriate to the unique characteristics of each subsystem and aligned with the purpose of the analysis.

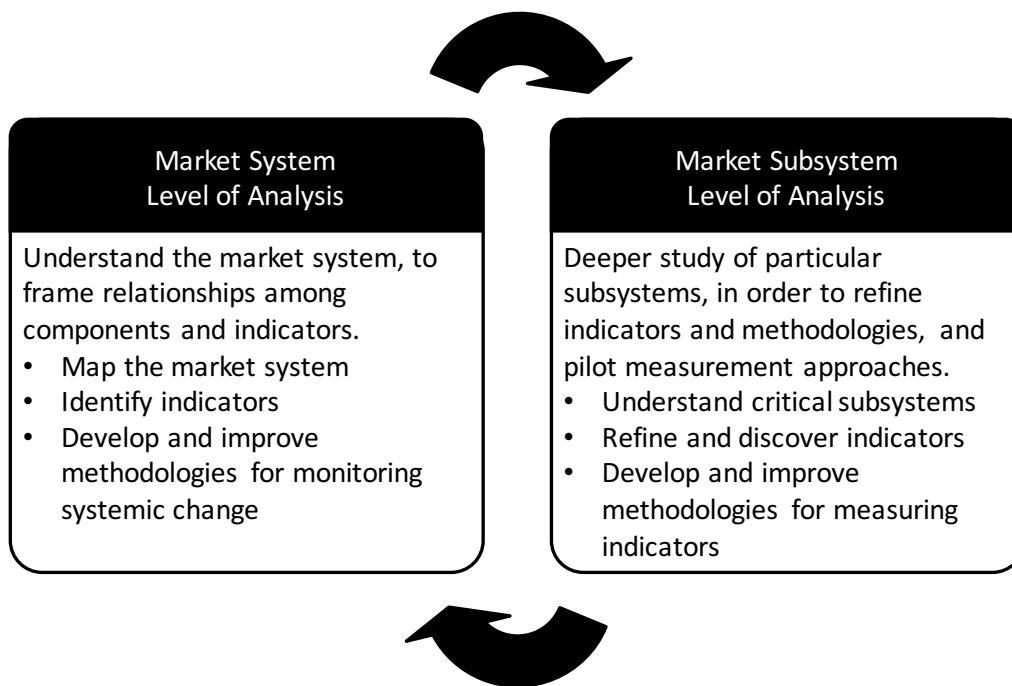


Figure 1: Approach to develop market system maps and system-level indicators

Our approach is to iterate between these two levels with methodological development, data acquisition, and analysis at each level (depicted in Figure 1). For example, we begin 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. Next, we select some of these potential indicators for further study at the subsystem level of analysis. We identify a subsystem for which indicator(s) have been proposed, and study 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 change in the subsystem. In this manner, we aim to refine the proposed indicators and develop a method for measuring them. Finally, the insights from this deeper study can be 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 identification of additional indicators and selection of additional subsystems. This iterative approach invites collaboration, learning and adaptation across activities.

3. Maps Creation

The MSM team proposes two types of system maps as a starting point: a supply chain role (SCR) map and a behaviors-relationships-conditions (BRC) map.

3.1. Building the supply chain role (SCR) map

The SCR mapping approach could be applied to mapping any supply chain system where it is beneficial to depict different types of flows and roles. MSM's map may be modified, or new maps drawn for application in other contexts.

Often supply chain maps concentrate on specific actors in a value chain. Based on observations that specific actors can play several roles in agricultural value chains, the SCR map focuses on the key roles in the value chain and the material, financial, and service provision flows that connect them. This effort enables characterization of actors' activities and helps to visualize and simplify complex relationships across the value chain.

To begin using this type of map, depict roles in a value chain (for example, sequencing by time or phase). Then think about other roles that will be necessary to depict, and categorize them by type if necessary. Drawing black arrows to represent product or material first is recommended, followed by other types of arrows. Material and financial flows represent transactions; this may be enough, or one may want to add another type.

One could delete these and/or add other types of arrows, such as actors or signals that contain a specific type of information. We use de facto swim lanes in our SCR map for roles that transform products (e.g., manufacturing, milling), move products, and provide services. Drawing swim lanes on a map may be the right approach if there is value in explicitly categorizing actors by type. If it is beneficial to present types of roles along one swim lane, one may depict these in another color or shape (See Figure 2). If the type of role is relatively unimportant with regard to other map content, perhaps swim lanes are not useful. If swim lanes are useful and stage of process is also important, one could introduce vertical swim lanes (See Figure 3) to depict supply chain phase.

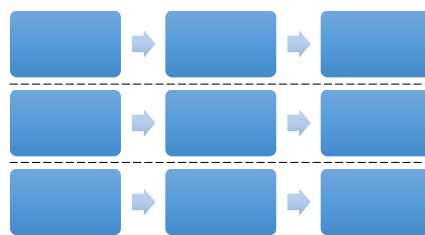


Figure 2: Horizontal swim lanes

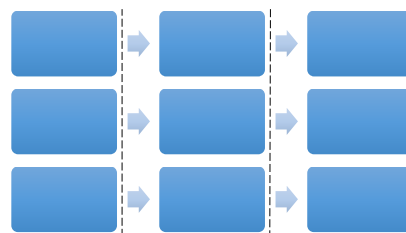


Figure 3: Vertical swim lanes

3.2. How to use the SCR map

There are as many interpretations of a market system as there are people analyzing it. The SCR is useful as an introduction into an existing analysis of a value chain. It aligns participants considering a value chain on a common terminology and scope of the value chain analysis. This ensures that knowledge is easily transferable and exchangeable.

In presenting this type of map, we suggest first presenting the core supply chain or set of processes, then adding roles or boxes throughout the discussion. It can also be helpful to introduce one type of arrow at a time. If one portion of this map is of particular interest, one may choose to focus on this without losing the rest of the system’s content with clouds on either side.

The resulting SCR map clearly communicates the roles and linkages of interest to your analysis and supports the terminology and methodology to be used in further discussions.

3.3. SCR map content

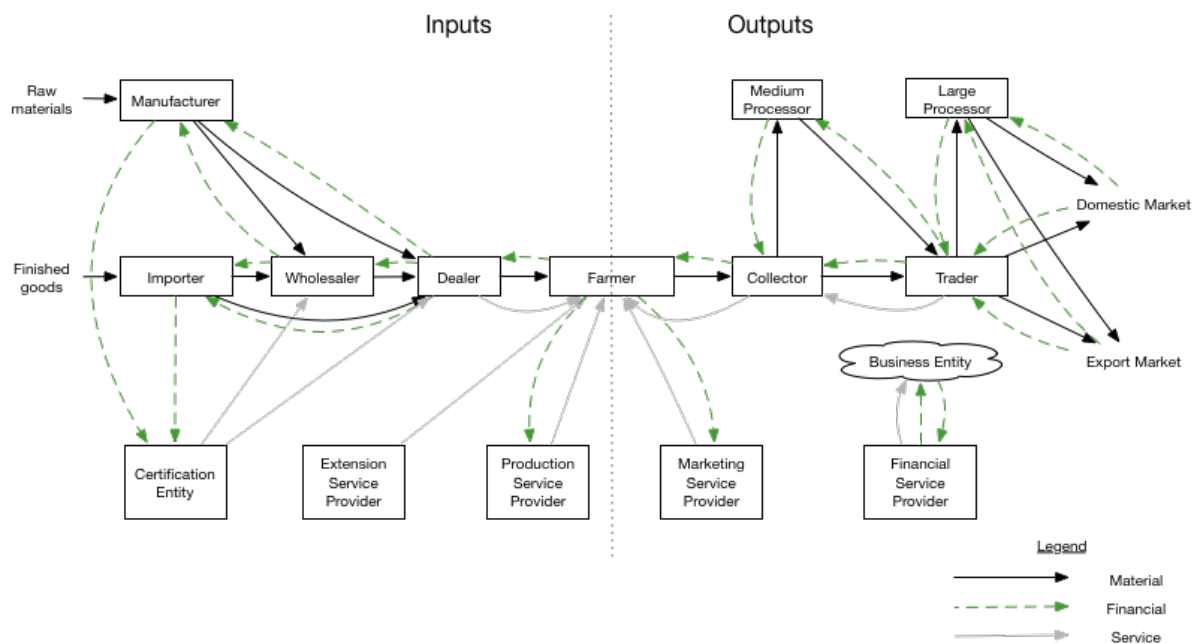


Figure 4: Supply chain role map

This SCR map highlights the roles in the value chains for maize, beans, and coffee in Uganda. In these value chains actors play multiple roles, actors are called by different names, and overlapping definitions exist for common actors. By focusing on the flows between the roles, the SCR map allows for discussion of all the types of roles that actors play in the value chain.

To capture the interactions on the map, we use different arrows for these flows from one role player to another.

- Material: movement of raw materials, inputs, processed products, and finished goods along the value chain.
- Financial: both flows of cash to pay for goods and services or financial products that enable investment.
- Service Provision: tasks performed along a value chain to increase knowledge, quality/quantity of finished goods, or to enable investment. Often these tasks are performed in exchange for compensation.

These types of flows are used to connect the roles played along the value chain. Roles in value chain (see Figure 4):

- Transformation of products
 - Manufacturer: a company or person that creates goods for sale (e.g. producing seeds, making equipment).
 - Processor: a company or person that transforms agricultural commodities for consumption (e.g. grain milling or packaging).

- Movement of products
 - Importer: a company or person that imports finished goods for sale.
 - Wholesaler: a company or person that sells agricultural inputs to other businesses.
 - Dealer: a company or person that sells agricultural inputs to farmers.
 - Farmer: a person or group of people who own or manage farms.
 - Collector: a person or group of people that buy agricultural goods directly from farmers.
 - Trader: a company or person that buys agricultural goods from collectors, but not farmers.
- Service Provision
 - Certification: an entity, either governmental or non-governmental, that evaluates if goods (e.g. seeds) or individuals (e.g. dealers) are recognized as meeting certain predetermined standards.
 - Extension: a provider of agricultural information and expertise (e.g. DLG extension agents or input dealers).
 - Production: a provider of pre-harvest production services (e.g. planting, weeding, or spraying).
 - Marketing: a provider of post-harvest marketing services (e.g. drying, sorting, or storage).
 - Financial: an entity such as banks, VLSAs, SACCOs, producer organizations, collectors, traders, or dealers that provides or facilitates financing.

The farmer is centered in the map at the boundary between the input and output sides of the value chain. Inputs flow from the left to right. After harvest, product continues to flow to the right from the farmer to markets. Roles that transform goods are located above the main product flow. Service providers are below the product flow and are connected with service and financial arrows. The financial service provider is of note as it shows a connection to a cloud. If every financial service linkage was shown on this map, the map would be unreadable. These linkages are shown using the “business entity” cloud to represent the many linkages present and still capture the importance of financial service provision.

The SCR map brings clarity around the roles of actors in the value chain. In a value chain as complex as this, there are numerous business models in which actors participate. As an example, Village Agents (VAs) are actors in the value chain that buy crops from farmers. This is represented as “collector” on the SCR map. A VA can also offer privatized, mobile extension services and provide financing or other services to farmers. These additional roles taken on by the VA are represented by the various “service providers” on the SCR map. If a VA also sells agricultural inputs to farmers, a role also undertaken by stockists and agrodealers, they assume the role of a “dealer” on the SCR map. This results in the ability to describe an actor, not just with a name that could entail various roles and business models, but by exactly the roles that they fill. For example, a VA could act as a “collector-dealer” or a “collector-production service provider”.

In another example, the term agrodealer can encompass several different business models. An agrodealer in a town center may act as both a “wholesaler” and a “dealer”. In the countryside, agrodealers, also known as stockists or retailers, may only sell to farmers as a “dealer”. Separating these roles enables the SCR map to capture ways importers and manufacturers may market direct to “dealers” in the countryside thereby bypassing “wholesalers”.

3.4. Building the behaviors-relationships-conditions (BRC) map

The BRC map depicts key concepts in market systems, including behavior changes by actors, relationship changes among actors, and enabling conditions. This map connects key concepts to each other by showing what enables what, without claiming causality. In other words, an arrow from A to B indicates that A enables B, even if A may not cause B.

The framework used for the BRC map is depicted in Figure 6. This is based on a theory that facilitative interventions by activities enable existence of conditions within the market system that further enable behavior changes by and relationships among actors. When behavior and relationship changes occur together at some scale, system level results are affected that result in project impact. Feedback arrows exist from system level results to relationship and behavior changes, as well as to conditions. A feedback arrow also exists from relationships and behavior changes to conditions. Feedback means that the enabling can occur in either direction.

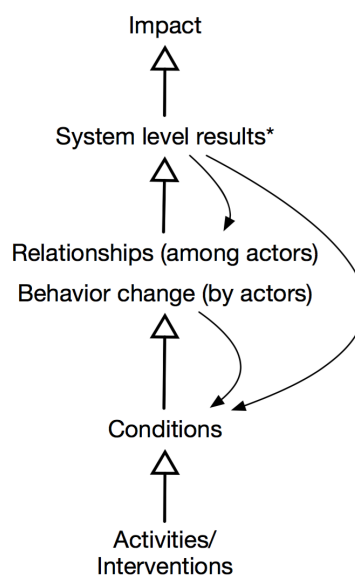


Figure 6: BRC map framework

Figure 7: demonstrates how the above framework becomes a map. Magenta circles represent relationships, blue squares represent behavior changes, items in black letters with no shape outline are enabling conditions, and green ovals represent interventions by activities. In this case, an intervention enables two conditions, each of which in turn enables a behavior change. In addition, a relationship between actors enables a behavior change of one actor to affect the behavior of the other.

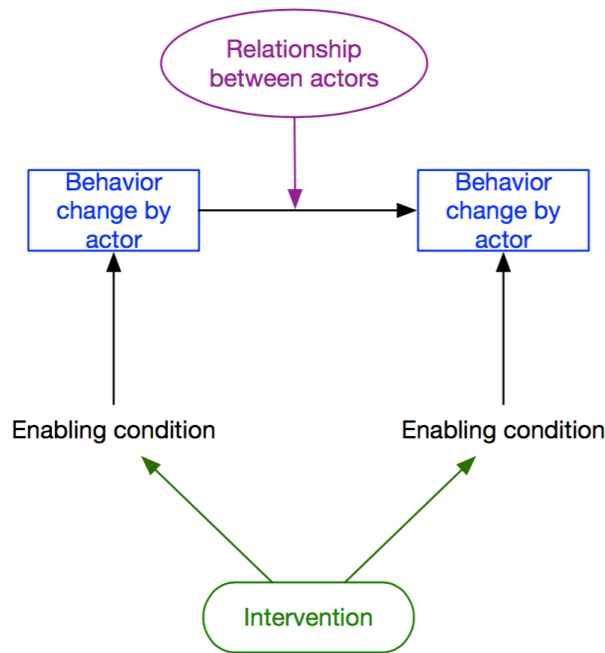


Figure 7: Translating BRC framework into a map

An example of the above mapping approach is shown in Figure 8. A rolex is a food item sold on the street in Uganda. Different vendors use different types of packaging. Starting at the top of the map, a relationship between a newspaper and a rolex vendor enables a condition: a newspaper is less expensive than a plastic bag. This, along with no customer preference for the type of bag, enables a behavior change: the rolex vendor uses fewer plastic bags. The cloud enabling this behavior change represents many other things going on in the market system that also enable the behavior change.

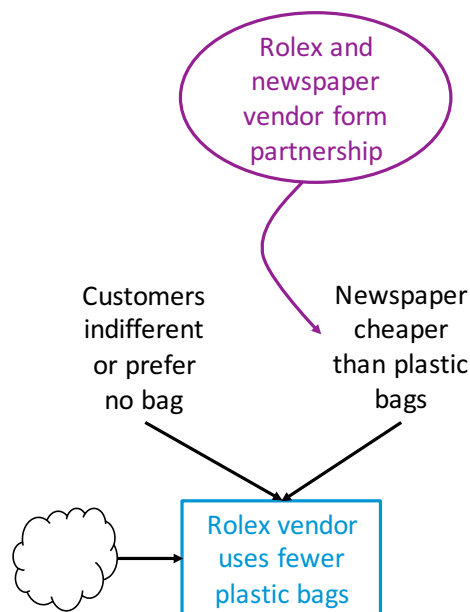


Figure 8: Rolex example

Next we consider an example from the BRC map... starting with the desired behavior of “Farmers buying quality inputs” there are two enabling conditions. Both “4A retail input markets” and “Farmer sees value in quality inputs” enable farmers to buy quality inputs, but they are not the end of the story (see Figure 9).

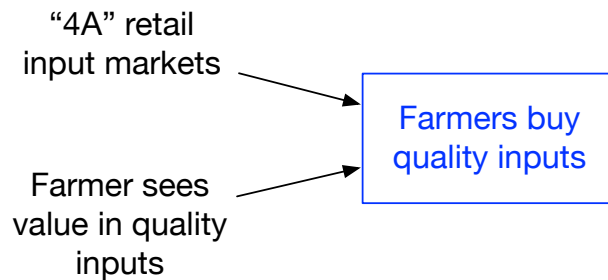


Figure 9: Enabling conditions for "farmers buy quality inputs"

Figure 10 shows the what enables a 4A (acceptable, available, accessible, and affordable) input market. First, there would be a behavior change where dealers sell then and there must be quality inputs available in a “4A wholesale input market”.

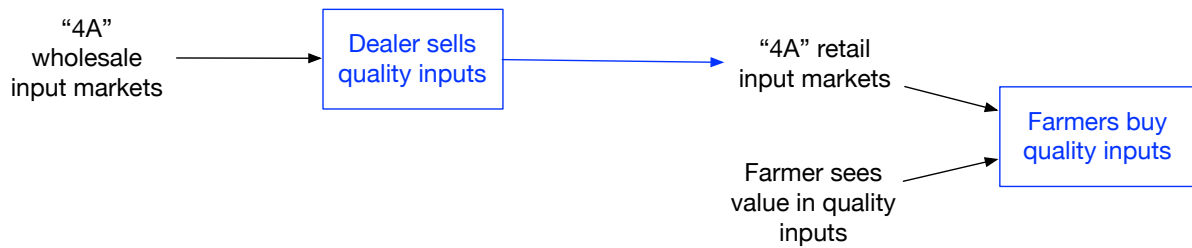


Figure 10: Enabling conditions and behaviors for "4A retail input markets"

Next, we build out from “Farmer sees value in quality inputs” and show the enabling condition “Farmer confidence in quality inputs”. This confidence that quality inputs are not counterfeit and their use shows results enables the farmer to see their value and purchase them. The strength of the relationship between the dealer and farmer enables that confidence.

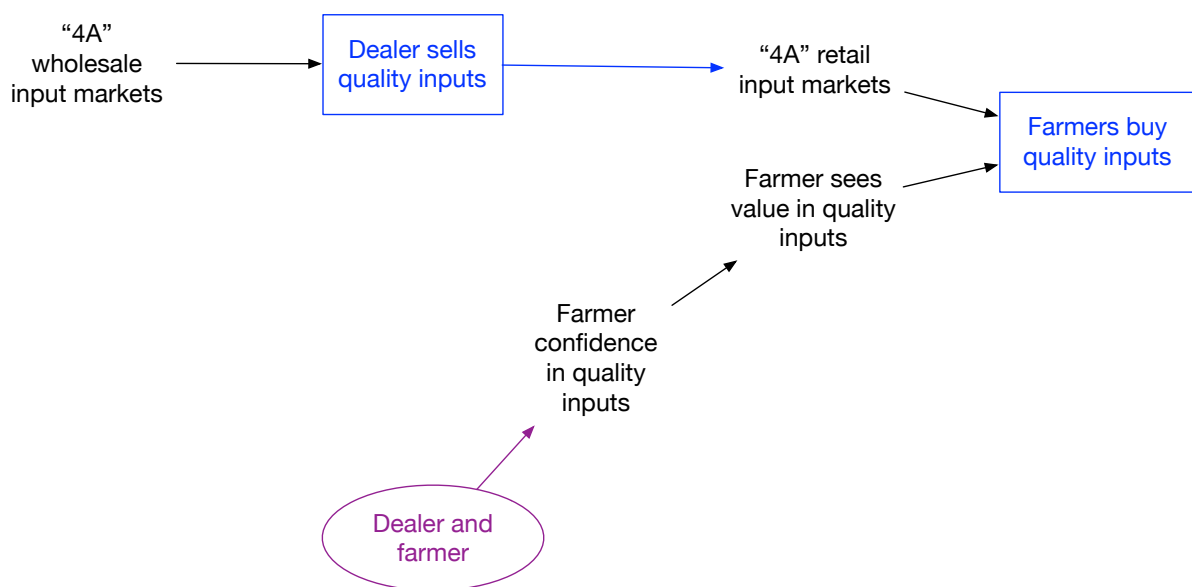


Figure 11: Enabling conditions and relationships for "farmer sees value in quality inputs"

Finally, in Figure 12, we draw subsystem boundaries around related behaviors and conditions. The boundaries of these subsystems are not hard or fixed and can overlap each other. It is important to remember that these boundaries do not change the relationships in the map, but only serve to group items and facilitate discussion.

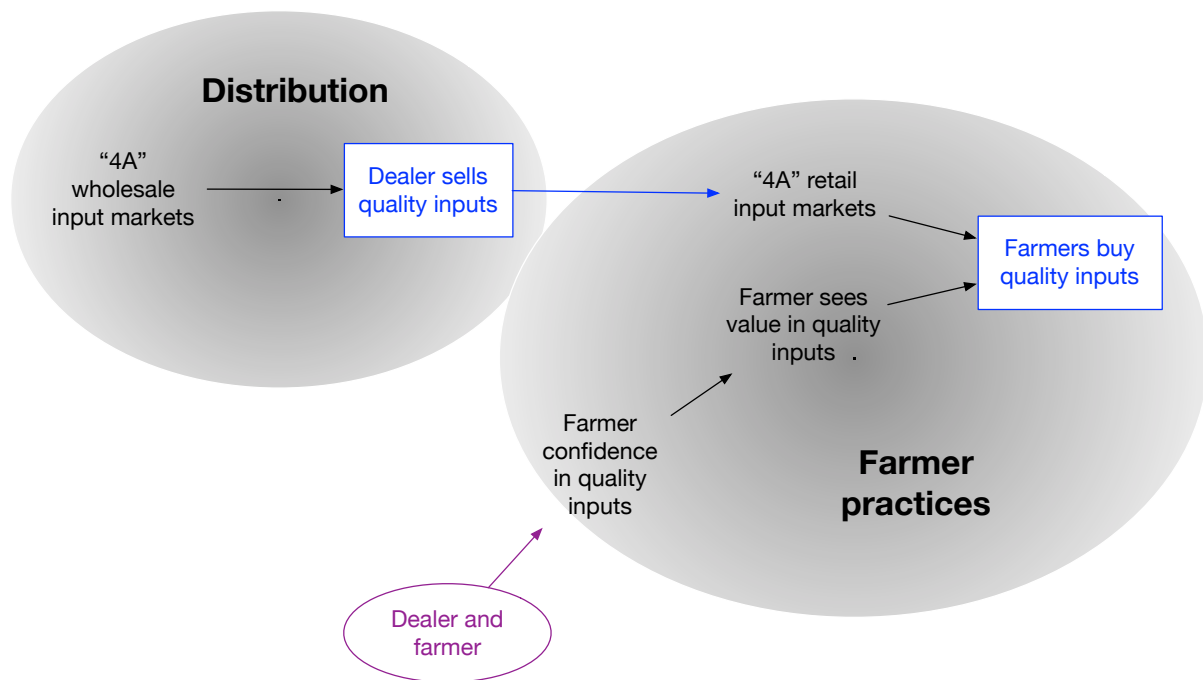


Figure 12: Subsystem delineations

3.5. How to use the BRC map

The BRC map has many potential uses. A BRC map is generally useful whenever a complex and dynamic (changing) system must be depicted. It is particularly designed to enable visualization of “pathways” by which changes can be enabled or blocked. Such visualization would be useful in many situations, such as:

- Capturing an understanding of a changing system;
- Connecting multiple theories about change, such as results chains, to see their interactions and/or conflicts;
- Coordinating activities with multiple stakeholders who can point to where they fit in the larger system, identify who is doing what where, etc.;
- Identifying gaps and designing interventions: areas where no one is working but change leverage appears to be strong, for example; and
- Identifying useful “measurement points” in the system that could be tracked as indicators.



Figure 13: Stakeholders at system mapping workshop

3.6. Modifying or building maps using the BRC mapping framework

The map may be modified, or an entirely new map created for a different context, using this mapping framework and its mechanisms for representation of system features. If changes, such as intervention in a system, create conditions to enable changes in behavior or relationships, then further map creation may be applied using the approach outlined in this release.

It may be helpful to begin mapping by identifying an important behavior change; then, ask the question, “What enables this behavior change?” Remember arrows mean “A” *enables* “B”, and not *causes*, or *affects*. Stated differently, arrows mean “A” is necessary for “B”, but perhaps not sufficient (i.e. a system must have “A” if it is to have “B”, but “B” may require more than “A”). Behavior changes should contain a verb, and enabling conditions should be a noun. To continue building out the map, for each new element added, ask the question “What enables this?”. For example, if “availability of affordable inputs” is an enabling condition, one may want to think about what conditions enable affordability. Any one of these features (behaviors changes, relationships, conditions) can enable any other feature (i.e. there are no rules for what enables what).

Drawing a boundary around the system map can be difficult. A mapmaker should consider all the behavior changes she has depicted, and ask whether or not these are all she cares about. The same question may be asked about conditions and relationships. The same question can be asked in terms of subsystems: “Have all the necessary subsystems been captured in sufficient detail?” In order to keep the map as manageable as possible, one should not add features to the map that are not necessary. Clouds may be used to depict a boundary: clouds indicate that “there is more going on here” even though it is not included on the map.

One could even expand the mapping framework. It may be necessary to make distinctions among types of market conditions: for example, distinction between macro- or micro-conditions, or between conditions representing technology, policy, training or finance. Distinction could be made with different colors.

It may be useful, especially when presenting the map, to highlight specific pathways to behavior changes or relationships. This could be done by walking through the chain of behaviors, relationships and conditions individually, using a circle to encompass the chain or highlighting them with different font attributes. If a subsystem is of particular importance, one may depict it alone without sacrificing other important content in the map by using clouds as the boundary.

Other examples of modification may be deletion of one feature or addition of another: for example, if relationships between actors are unimportant, but an enabling information technology system or policy is very important to depict. These could be depicted in different shapes and colors. If enabling arrows are still very appropriate, but another type of arrow such as information flow is important, it could be added to this type of map.

3.7. BRC map content

The complete BRC map shown in Figure 14 is large and dense, reflecting the broad and complex market system it represents. It is best viewed when printed on a large paper size. Below we provide narrative to navigate through the subsystems.

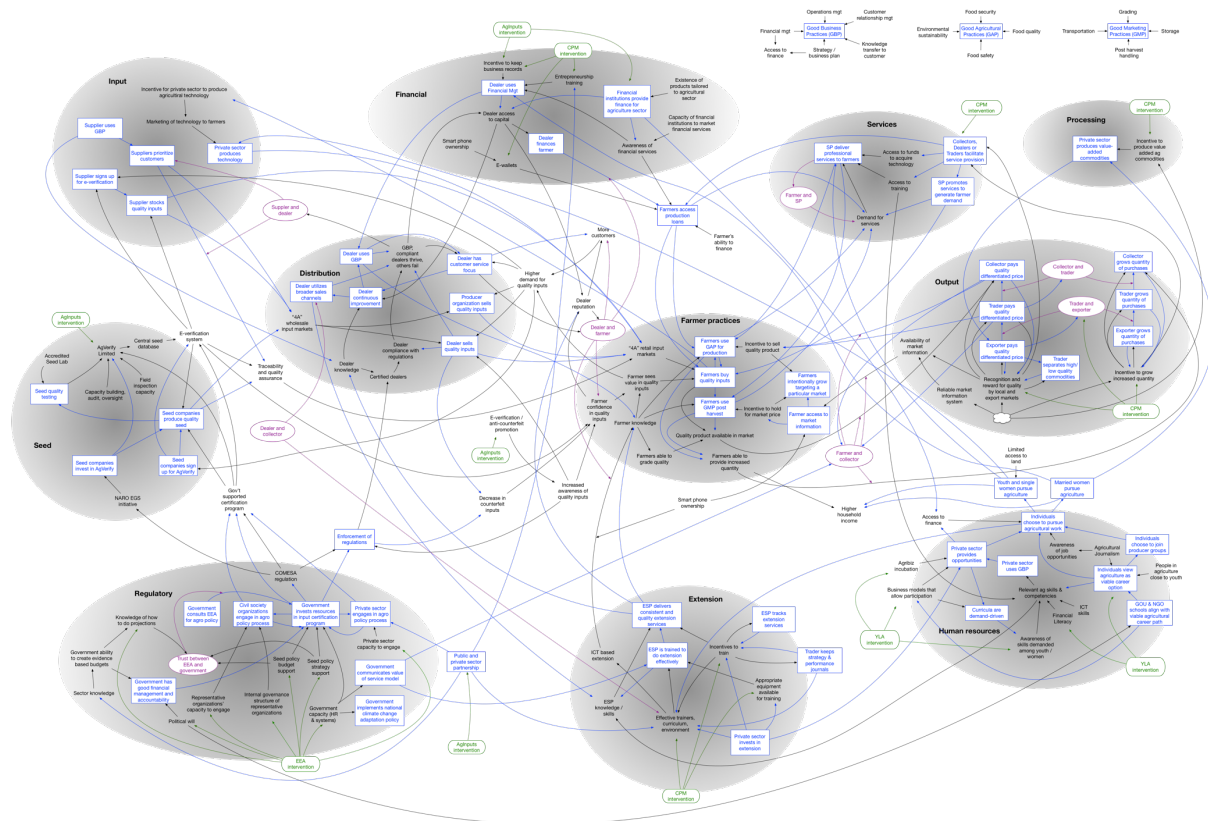


Figure 14: Behaviors-relationships-conditions map

3.7.1. Input Subsystem

The input subsystem describes four supplier behavior changes and one private sector behavior change. Suppliers in the BRC map are an aggregate term comprised of the roles of manufacturer, importer and wholesaler. This simplification is used to reduce complexity and concentrate on key behaviors and relations. The first two supplier behaviors are related to e-verification and quality inputs. The second two concern the use of good business practices (GBP). Both of these enable 4A wholesale input markets. 4A is the condition that states inputs are acceptable, available in the market, accessible, and affordable. In addition, there are two enabling conditions and a behavior change: incentive to produce agricultural technology, marketing of technology to farmers and private sector produces technology. These enable 4A retail input markets that farmers access.

3.7.2. Seed Subsystem

Some of the market conditions in this subsystem are enabled by interventions of the FTF-VC activity AgInputs. Conditions enabled by AgInputs include AgVerify and e-verification. Since the behavior changes in this subsystem are relevant to production of quality seed and verification of quality, it should follow that these three structures enable the subsystem's conditions. These behavior changes then enable other conditions or behavior changes. For example, AgInputs is enabling the existence of AgVerify Limited, which is necessary (but not sufficient) for seed companies to sign up for AgVerify. This behavior change enables another: seed companies produce quality seed. Seed companies producing quality seed enables 4A wholesale markets in the distribution subsystem.

3.7.3. Distribution Subsystem

The distribution subsystem contains six behavior changes, four of which are relevant to dealer business practices, and two relevant to the sale of quality inputs. 4A wholesale markets enable the sale of quality inputs. The remaining three enabling conditions concern compliance with regulations

and the fact that compliant dealers that use GBP succeed in the market while others that do not will exit the market. The other enabling arrows come from the input, seed, finance, regulatory, and extension subsystems. For example, the enforcement of regulations is necessary for there to be certified dealers.

3.7.4. Financial Subsystem

In the financial subsystem, we see AgInputs and CPM interventions. An activity may intervene to enable one or several market conditions in a subsystem. CPM enables the existence of entrepreneurship training, incentives to keep business records and e-wallet ownership. An incentive to keep business records, leads to the use of financial management that enables the financing of farmers.

3.7.5. Farmer Practices Subsystem

This subsystem is surrounded by the others. Smallholder farmer behavior is important to the system. Facilitative market intervention indicates we are intervening to enable conditions surrounding the farmer – activities do not directly enable any conditions, behavior changes or relationships inside this subsystem. The behavior changes here deal with good agricultural practices (GAP), good marketing practices (GMP), or the market for agricultural commodities. Most of the enabling conditions on the left side deal with inputs, and they are enabled by the input or distribution subsystems. The conditions on the right side deal with market incentives and access to market information; these are enabled by the output subsystem.

3.7.6. Output Subsystem

The output subsystem contains many of three elements of our map: behavior changes, relationships and enabling conditions. It also contains a cloud: this cloud contains everything else going on in the system that is currently outside of our boundary. Trust is very meaningful in this subsystem.

3.7.7. Processing Subsystem

In the processing subsystem, we have only one of each behavior change, condition and intervention. CPM is creating incentive to produce value added agricultural commodities, and this enables the behavior change where the private sector produces value-added commodities. An enabling arrow, married women pursue agriculture, connects to this behavior change from the human resources subsystem.

3.7.8. Services Subsystem

The services subsystem contains behavior changes that enable the delivery of services to farmers. These changes are enabled by many connections from outside the services subsystem. For example, the recognition of quality and incentive to grow quantity conditions found in the output subsystem enable the facilitation of service provision. The farmer practices subsystem enables service delivery by supporting the demand for services condition. Additional connections outside this subsystem are to the human resources subsystem where training in services enables skills and competencies and youth pursue work in agriculture enables service providers to deliver professional services to farmers.

3.7.9. Regulatory Subsystem

The regulatory system also has many behavior changes and conditions, with one relationship. It is highly connected to the seed subsystem. EEA is enabling many of these conditions. For example, EEA works with the Ministry of Agriculture to support seed policy strategy, which enables trust between EEA and the government of Uganda. This relationship enables something else: government consults EEA for seed policy is a behavior change, which enables another: government invests resources in

seed certification program. The relationship between government and EEA does not enable either of these behavior changes, but it does enable the “enabling.”

3.7.10. Extension Subsystem

The extension subsystem contains mostly behavior changes, around traders and agents primarily. The private sector is also important. This behavior change enables on in the final subsystem: human resources.

3.7.11. Human Resources Subsystem

The Human resources subsystem concerns three areas: interest in agriculture work, skills and competencies, and business models. All three of these areas feed into the behavior change where individuals choose to pursue agricultural work. From there two behavior changes further characterize the choice of work into a choice by youth / single women or married women. This distinguishes which group’s choice to work enables other parts of the map as they often choose different kinds of agricultural work.

3.7.12. System Indicators

Near the human resources subsystem is the condition “Higher household income”. We placed this indicator on the map to serve as an example of how system indicators can be incorporated into a BRC map. It is enabled by the condition “farmers able to provide increased quantity” and the behavior changes “Youth and single women pursue agriculture” and “Married women pursue agriculture”. This can be measured and its enabling behaviors, relationships, and conditions can be mapped.

3.7.13. Practices

To capture a set of practices common to multiple roles in the BRC map, a set of practices and their enabling conditions were summarized at the top right of the map. This simplifies the map by not repeating practices in each place they occur in the map. The practices are listed below:

Good Business Practices (GBP): techniques and concepts that lead to improved business results.

- Operations management
- Customer relationship management
- Knowledge transfer to customer
- Strategy / business plan
- Financial management
- Access to finance

Good Agricultural Practices (GAP): techniques and concepts that lead to improved agricultural production, either in quality or quantity.

- Food security
- Food quality
- Food safety
- Environmental sustainability

Good Marketing Practices (GMP): techniques and concepts that lead to improved agricultural products after the harvest.

- Grading
- Storage
- Post-harvest handling
- Transportation

4. Gaps and Limitations

These maps are meant to capture the dynamics of the market system for maize, beans and coffee in Uganda. This includes roles of actors within a value chain and in the structures that should enable it, as well as the pathways through which the system changes. As our understanding of the system grows, maps will be updated to reflect this. There are some gaps and limitations to consider when analyzing maps' content and the mapping approach:

- MSM captures actors' roles based on their functions within a value chain. This function does not necessarily align with the name given to the type of actor depicted by USAID and implementing partners. For example, one type of collector is a village agent, who may also play the role of service provider.
- Maps do not capture details specific to different types of commodities. For example, if there is important and distinct behavior changes in the processing subsystem for coffee, then new mapping approaches may be required to maintain the broad agricultural system scope.
- These maps do not capture the entire system. We will incorporate readers' input into the next version.
- The focus of a map is determined by an organization's strategic goals; there is no set objective. Several maps, each with focus on a different element, may be developed. When illustrating material, financial, or services, there could be a need for different maps in different seasons, such as planting versus harvest or possibly separate maps for each commodity. Maps are designed to help determine and execute strategic objectives; therefore, these maps must be created as a part of developing strategy¹.

5. Update Cycle

These maps will be released on a cycle similar to that of a software release, with v1.1, etc. as needed in the interim before v2.0 is released. Full versions (e.g. v1.0, v2.0, etc.) will be released along with documentation similar to this report on an annual basis.

We encourage engagement with users for discussion on the approach, framework and map content, as it will assist the team in further developing the maps. The team would like to know how users use this approach in other contexts, as well. Team members are happy to assist in application of the approach to depict other types of systems.

6. Contact

MSM welcomes feedback. Please contact us at msm.uganda@mit.edu.

¹ Gardner, John T. and Cooper, Martha C. "Strategic Supply Chain Mapping Approaches." *Journal of Business Logistics*. Vol 24. No. 2. 2003.