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NETWORK MAPPING IN MARKET SYSTEMS

UNDERSTANDING AND VISUALIZING COMPLEX, DYNAMIC SYSTEMS

microREPORT #179

OCTOBER 2011

This publication was prepared by Colleen Duncan of Engineers Without Borders Canada for ACDI/VOCA with funding from USAID under the Accelerated Microenterprise Advancement Project (AMAP) Knowledge and Practice II task order.

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I. INTRODUCTION

As managers and staff of value chain projects take on a market facilitation approach, managing large and complex networks of actors becomes increasingly important, but also increasingly challenging. As networks grow in scope and scale, so too does the difficulty of attributing the changes to any individual's actions, although this is an important step in learning about what is working and what is not. Market facilitators aim to foster trust among value chain actors and bring people together to form relationships that will stimulate new market activity[1]—not an easy activity to do or plan. Understanding and monitoring the relationships and actors within a market system is critical to designing appropriate interventions and establishing sustainable improvements. However, it can be difficult for project staff to keep track of these complex networks and also implement activities quickly and strategically. A particular and valuable portion of this knowledge can be assessed by asking two questions:

1) ***Who are the actors?***
2) ***What is the quality of their relationships?***

This is the project's network.

This document outlines the premise and purpose for mapping a network, and includes recommendations for creating and maintaining it, a network mapping workshop facilitators' guide and an exercise sheet.

[1] Refer to *Being a Market Facilitator: A Guide to Staff Roles and Capacities*. MicroREPORT #172. USAID. 2011.

II. FUNDAMENTALS OF NETWORK MAPPING

Taking stock and managing a network—big or small, simple or complex—requires a variety of tools. One tool is a simple contact management database (including details such as the actor's name, function(s), location, contact information, etc.), which can be kept through a contact management program like Microsoft Outlook, an Excel database or a notebook (see Figure 1, below).

Figure 1: Sample Contact Database

#	ACTORS		NAME		CONTACT INFORMATION				INDUSTRY			OTHER		NOTES
	Type	Name of Business	First	Last	Phone	E-mail	Town	District	Ist	2nd	3rd	Education	In Business Since:	
1														
2														
3														
4														
5														
6														
7														
8														
9														
10														
11														
12														
13														
14														

However, for complex, interconnected networks, understanding the relationships between actors is just as important as knowing the actors themselves. As a market facilitator's contacts and networks grow and change over time, managing this web of actors becomes increasingly challenging. Taking the time to periodically record and edit actors' contact information, their role(s) and the state of their relationships can help market facilitators quickly and clearly visualize the flows of information and resources—such as products and finances—through a market system. This in turn can enable a facilitator and project to make quick decisions based on evidence and information that will improve their ideas and implementation and ultimately the opportunities for market actors.

Network mapping is one method of managing complex relationships and networks by capturing the details of who is in the system and the quality of their interactions to assist market facilitators and managers in designing more strategic interventions. This visual representation has the benefit of getting valuable information out of staff members' memories and onto a page (or wall) so they can easily access, analyze and share the knowledge with others.[2]

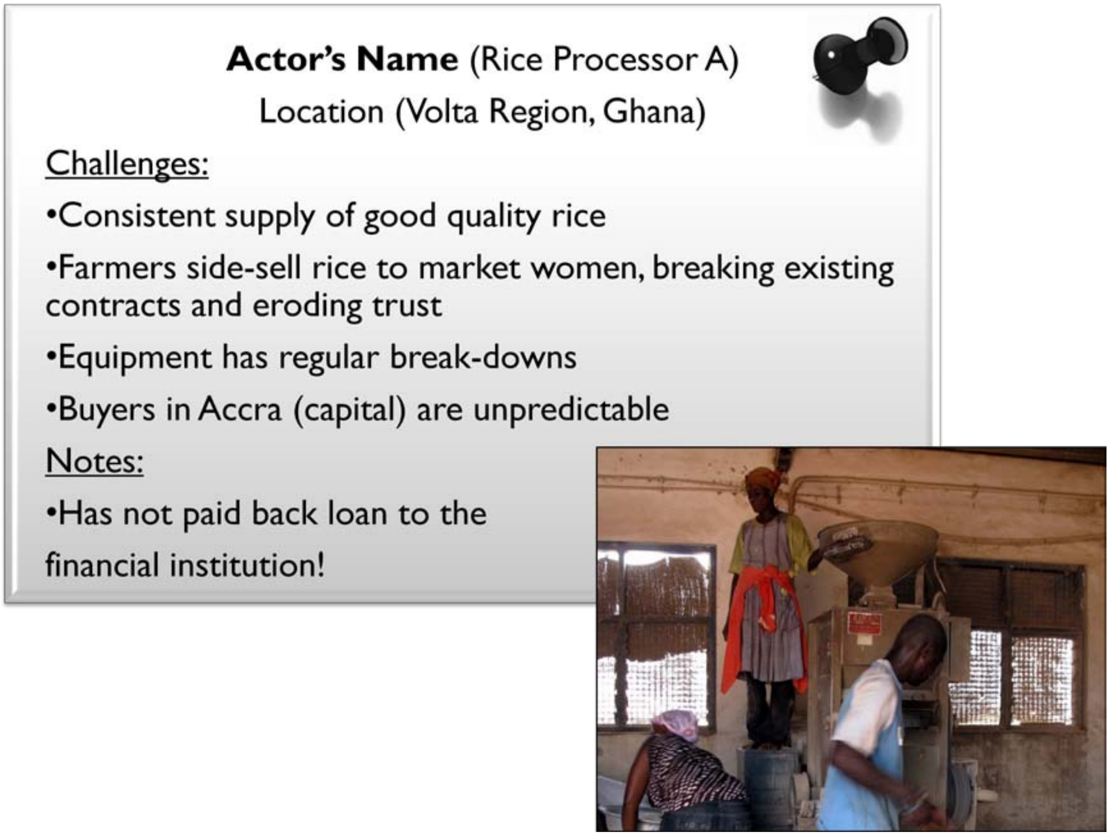
A good network map will contain enough information to provide valuable and potentially unexpected insights into the market system, but not so much that it becomes tedious, unwieldy or unmanageable. Finding this balance will be determined by each team and project, but some ideas for key information to include are:

- Actor's name
- Location of the actor's home or business
- Picture: this helps others quickly identify the actor (Remember the old saying: "A picture is worth a thousand words")
- A few of the most important challenges and/or opportunities facing this actor

[2] For more details, see *Understanding and Improving Knowledge Management Systems for Development.* MicroREPORT #170. USAID.

- Additional details about the actor's operations, relationships, attitude or background that would generate a better understanding of the actor and his or her role in the sector

Figure 2: Sample Note and Photo for Network Map



The trick is to be clear, succinct and up-to-date. Outdated information or relationship statuses will be ineffective for directing interventions and strategies. This will require that the network map be created, reviewed and updated frequently by multiple people in order to stay current, complete and objective. Some best practices for creating and using the tool are:

1. **Start basic and build**

   Project staff should not worry about capturing *all* the details of an actor or a market system at one time. Start with the key known actors and build up the network map through an initial workshop, future meetings, or encouraging staff to review it weekly or whenever they come back from the field. Creating and updating the network map will require some personal and team discipline, but a benefit is being able to see the progression of changes that the project is working on. The key is to get started.

   Note: Information that is not included on the network map after initial meetings may still be very important in the market system. Actors, information and ideas that don't initially make it on the map can be added later. The industry or system is emergent; the network map should be too.

2. **Display the network map prominently for the project team**

   A map that is hidden in the back corner of the office is not helpful. This map and the changing actors and relationships should be the centerpiece of the project's strategy and discussions. Ideally, place it in an obvious location where people see it every day, or place it in a meeting room so it is already there when a planning session occurs, allowing the team to refer to and update the map through the course of the meeting. Some caution should be exercised, however, so that sensitive or confidential information of partners or the industry is not displayed to the general public or other people who may visit the office.

3. **Update the map frequently**

   To be able to use the information about actors and their relationships to improve strategy and implementation decisions, this information must be up-to-date. The best way to do this is to make it part of the staff's daily or weekly routine so that they frequently look over the network map and make any required changes. There should be a photo or record of it taken periodically (see point 6) in case something goes awry. The better the information provided, the better the team's ability to use this map as a tool for discussion, debate and planning. As relationships and details of the actors change, staff members are better able to explore the reasons for changes, which can lead to deeper insight on future challenges or to an appreciation of the successes of the project.

4. **Ensure that everyone has access**

   Every member of the project staff, from the senior manager to field staff, should be given access to modify and update information. Not only does this demonstrate and create an open, trusting environment, but all staff will have access to different information that may prove valuable. A senior manager might better fill in big-picture information, while field staff will have detailed and experiential understanding of the challenges facing an individual or a firm.

5. **Have a sidebar**

   During the design and updating process, the team might think of an individual or piece of information that is potentially important, but does not yet fit. Do not feel constrained by the boundaries of the board. Use a sidebar (a space of the wall or board) to track uncategorized ideas or notes. As their relationships and position in the system become clearer, these ideas or actors can be moved to the main map.

6. **Include snapshots**

   Take a photograph of the emerging map on a regular basis (e.g., every month), date it, and put it up on the wall beside the main map. This will provide a historical record that can be used to assist with monitoring and evaluation, and will provide a visual representation of the project's progress in developing new and better relationships between different actors or groups in the industry. In case there are any problems or mistakes in updating the map, or if there is a disagreement, these pictures will help to put the pieces back in place.

Listing each individual that the project or team works with will quickly become redundant—especially if the characteristics are similar. It is recommended that the project staff decide what degree of detail is required. A simple rule of thumb is if the characteristics, challenges and relationships are similar or arranged through an organization, group these together (i.e. include a producer group rather than listing each farmer). If the characteristics or relationships are different, create a separate entry for each (e.g., different producer groups). This will enable staff to see the trends, the outliers and the key relationships or leverage points in the system.

Each staff member may want to have a smaller version of the network map that describes the network in the area he or she is managing. Staff could keep this for each value chain and update it on an on-going basis to improve and inform their decisions and interventions (i.e., a flipchart on their wall at home).

III. NETWORK MAPPING WORKSHOP: FACILITATOR'S NOTES

A. PREPARATION

Effectively running a network mapping workshop will require that participants prepare and think ahead about the actors they are working with and the relationships between actors. Provide staff with the following questions and a week to think about and gather any information, materials or photos that they might require. Within a project, there might be multiple industries of focus. For simplicity, start the mapping process with one industry. If this exercise is helpful to the team, suggest that it can and should be done for each industry or system in which the project is working.

Consider:

- Who are you working with within the industry? *(Who are the actors?)*
- What is their function in the industry? *(What does each actor do?)*
- What is their relationship with other actors in this value chain? Is this relationship effective for upgrading/improving the industry or not? Who should this actor be working with, but is not currently?

This should not be very difficult for staff to do, but it reminds them that the information is important and should be shared with others.

B. PREPARE THE NECESSARY MATERIALS

This workshop requires that some materials are prepared ahead of time in order to make the best use of the day.

Staff should bring:

- Printed photos of actors—individuals or groups—to put up on a wall (if possible)
- Their ideas for each of the above questions

Presenter/facilitator should bring:

Option 1 – Flip-chart or White Board	Option 2 – Cork Board
• Flip-chart paper with sticky notes or a large white board • Different colored markers (e.g., black, green, red and blue) • Exercise hand-out	• Large cork board • Push pins • Several colors of string (e.g., red, green, black, white) • Exercise hand-out

C. RUNNING THE WORKSHOP

1. INTRODUCE THE WORKSHOP

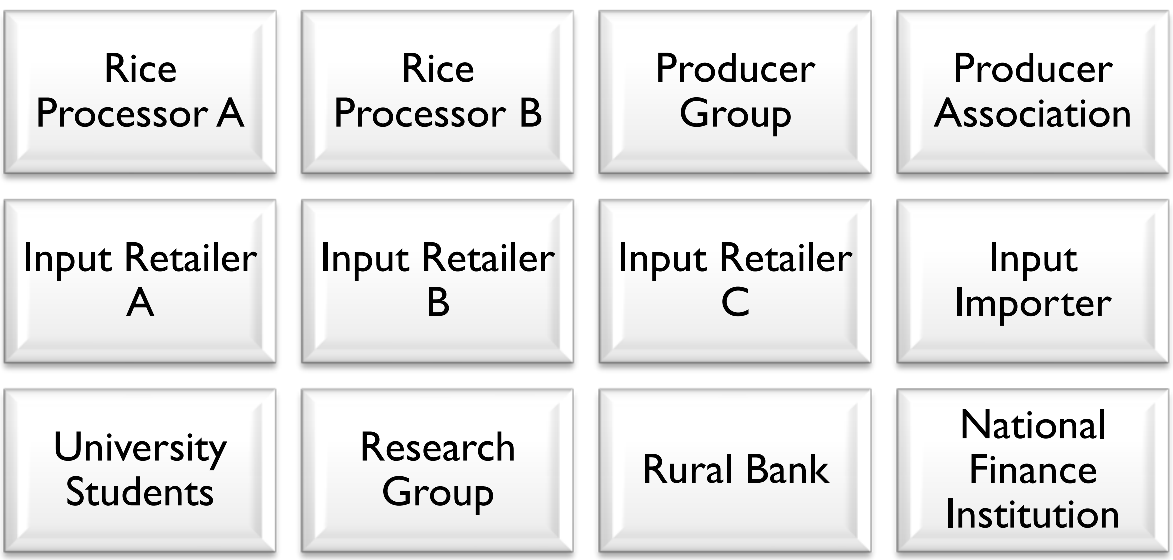
Explain what network mapping is and why you are doing this. Elaborating on the introduction to this document, explain the purpose:

- To understand and visualize the complex systems and industries in which we work
- To take advantage of our collective knowledge (individually we all know a lot, but collectively we may know more)
- To collect, analyze and communicate value chain actors' relationships and dynamics
- To *see* changes in the system over time

2. MAPPING THE SYSTEM

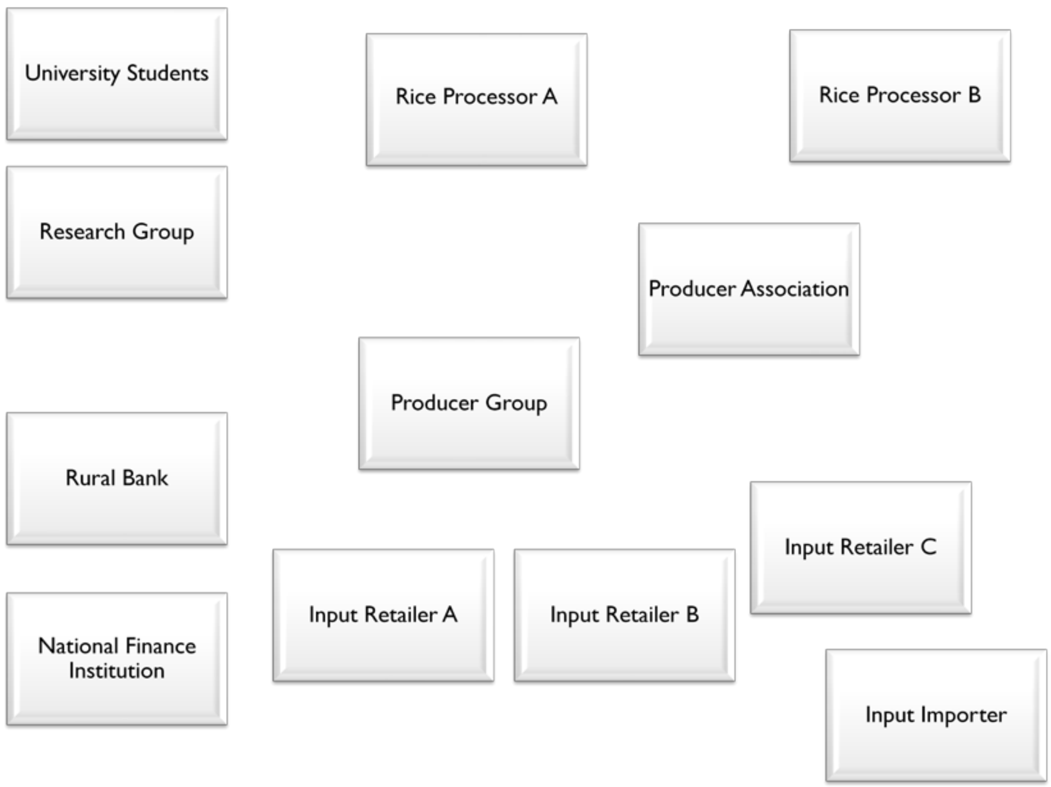
- Start by having one staff member share the actors (or groups of actors) in his or her network. Record this information on the board (flip chart, whiteboard or cork board).

Figure 3: List of Actors in Network

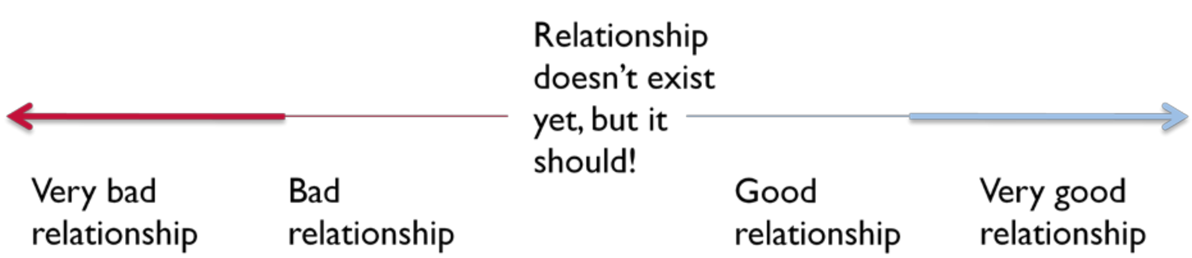


- If there are photos, match the photo with the name of the actor(s).
- Ask staff to share the opportunities and challenges of this actor in two or three points and record this under the name (as demonstrated in the introduction).
- Move the actors around the board until the placements make sense to the group (it might be useful to arrange them in the form of a value chain).

Figure 4: Actors in Network in Value Chain Layout

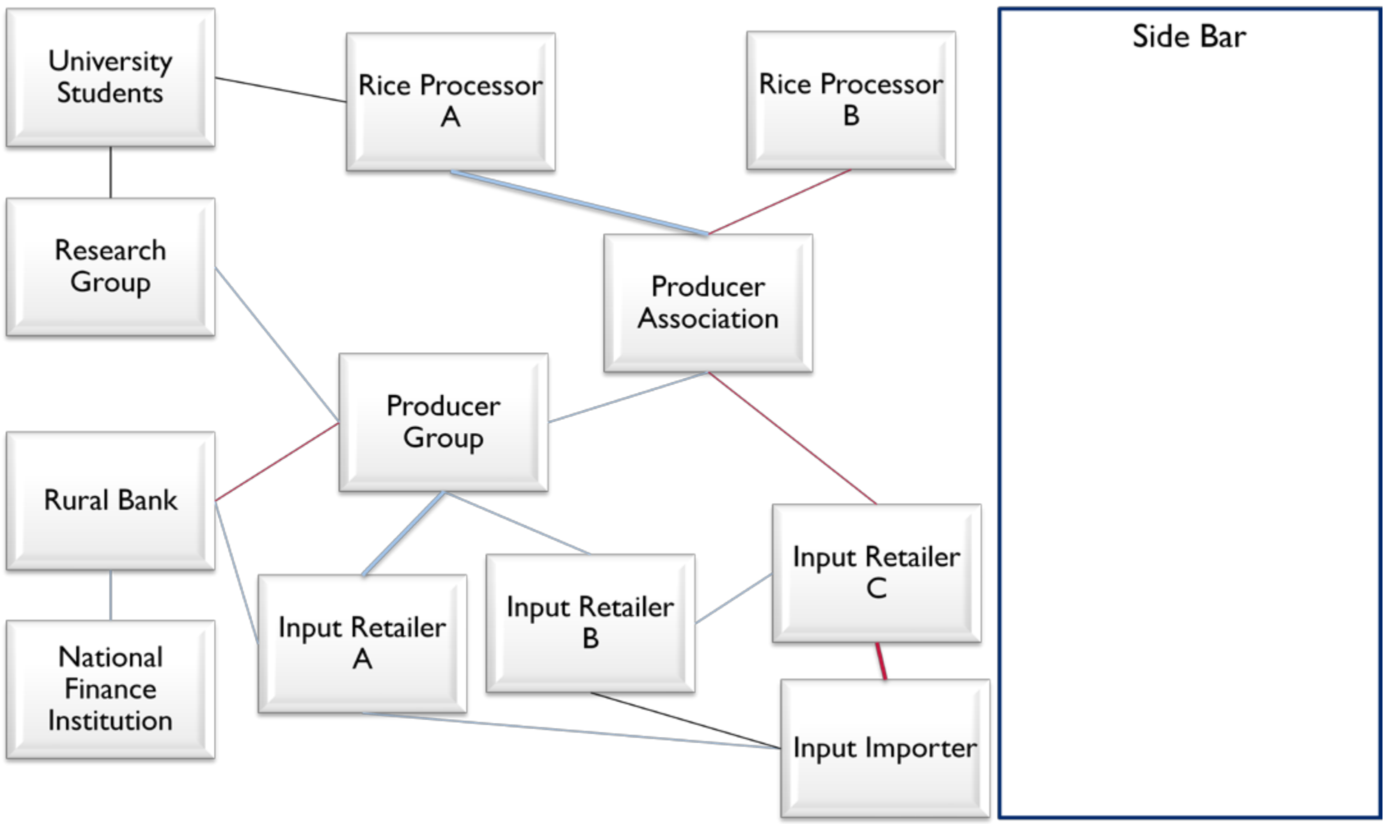


- As a group, decide on a color or marking scheme to differentiate the quality of the relationships. An actor's relationship should be assessed based on its current ability to improve or upgrade the value chain. Actors might feel like they have a good relationship if they are making a lot of money or working with their friends, but if staff see that this behavior is actually reducing the competitiveness or progress of the sector, then it might be an ineffective relationship and should be re-examined in light of the bigger picture. An example of a color and weighting scheme is depicted below:



- Either with one staff member starting or together as a group, draw the relationships/connections using the pre-determined scale.
- Which relationships exist? How is the relationship? Is it effective (good for the value chain)? Is it ineffective (preventing the development of the value chain)? Is it strong or weak?
- Continue this process until the team is satisfied with the initial network map.

Figure 5: Network Map with Relationships Color-Coded



3. STEPPING BACK TO UNDERSTAND THE SYSTEM

As the map is built, there will inevitably be discussion and debate over the relationships. Some useful questions to guide the discussion are:

- What do you notice? *[Mark these with '!' on a sticky note if you want to remember it.]*
- Where are the key nodes of information and finance?[3] *[Mark these with 'info' or '$']*
- Where are the constraints[4] within the system? *[Mark these with '><']*
- Where do we need to work in order to leverage and stimulate systemic changes?

While symbols (as suggested) are useful for capturing these insights on the map, the real value comes from the conversations and ideas that are generated. Whenever possible, ask "***why***"— it will generally lead to deeper insights than are initially apparent on the map and hence lead to better interventions and strategies. For example, why is the relationship between the "input importer" and the "input retailer C" very bad? What happened? What can be done to improve the relationship?

[3] Actors or relationships that are key to the transfer of information or finance are often a good place to start looking for levers for change.

[4] Constraints are reasons the system is not working as effectively as it could. This could be the result of a missing link (e.g., there is no aggregator) or a relationship that has deteriorated, preventing the transfer of products, services, information or finance. Identifying these constraints offers a useful starting point or lever for creating change.

D. UPDATING AND REVIEWING THE NETWORK MAP

At this point, a reasonably complete map of the industry will have been developed with all members of the team. Remind staff that the process has just started, since the map and information is only useful if it is current, complete and objective. Ask staff to review and update it regularly for the most effective results and intervention strategies.

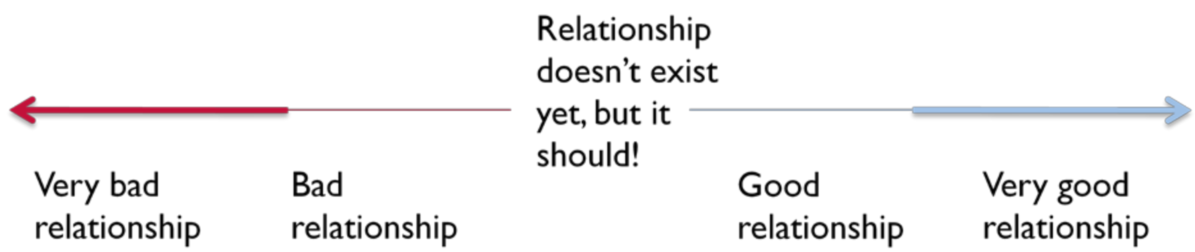
Figure 6: Network Map Example

IV. NETWORK MAPPING EXERCISE: HAND-OUT

UNDERSTANDING COMPLEX, DYNAMIC SYSTEMS

1) Introduction to exercise: what is network mapping and why are we doing this?

2) Build the map of the industry:
   - Discuss the actors and the network. Record this information on a board.
   - Put up photos beside the name of each actor.
   - All staff can add to and comment on the network map.
   - Draw or indicate actor relationships on the board using colored markers or colored string. Is the relationship effective for the actors and the industry? Is it ineffective? You can use a scale like this one, or develop your own.



This will create a large network map for the office that describes the current relationships in one industry. You may want to have a smaller version of this map that describes the network in the area you are managing. You could keep this for each value chain and update it on an on-going basis using a flipchart or your wall at home.

3) Network assessment and evaluation:
   - What do you notice?
   - Where are the nodes of information and finance?
   - Where are the constraints within the system?
   - Where do we need to work in order to leverage and stimulate industry-level changes?

Note:

This is a living and dynamic map—to stay relevant, it needs to be continuously updated with information and relationships (ideally whenever you come back from the field or once every week). It requires personal and team discipline, but the benefits are that you will see the progression of changes that you are creating.

V. ADDITIONAL RESOURCES

Davies, Dr. Rick. *Social Network Analysis as an Evaluation Tool: Experiences with International Development Aid Programmes*. www.mande.co.uk. 17 July 2007.

Schiffer, E., J. Hauck, and M. Abukari. *Influence Network Mapping: Mapping linkages of Water Users' Associations in IFAD-supported LACOSREP in Northern Ghana.* 6 November 2007.

Visual Complexity (http://www.visualcomplexity.com/vc/): VisualComplexity.com is a unified resource space for anyone interested in the visualization of complex networks. The project's main goal is to leverage a critical understanding of different visualization methods across a series of disciplines, as diverse as Biology, Social Networks or the World Wide Web.