LOCAL SYSTEMS PRACTICE

USER'S GUIDE

About Local Works and Local Systems Practice

WHAT IS LOCAL WORKS?

USAID's Local Works is about tapping into the creativity and resources of local communities and enabling them to drive their own development. It aims to pilot approaches and methods to strengthen local systems and networks, testing the theory that increasingly capable networks of local actors can own and lead development. One of the key principles of USAID's Local Works is using a systems lens.

For more information about Local Works visit usaid.gov/partnership-opportunities/ngo/localworks

WHAT IS LOCAL SYSTEMS PRACTICE (LSP)?

LSP is:

- A three-year (2017 – 2020) activity supported under the Local Works program
- A consortium of six organizations that can directly collaborate with Local Works missions and local actors in their countries

The goal of the LSP activity is to better understand and enhance locally-owned and led development through application of, and learning from, systemic tools and approaches.

LSP Partners

The Local Systems Practice team is composed of the following organizations:

LINC: an organization dedicated to strengthening local systems with an international development project portfolio including community and organizational development, network analysis, and systems analysis for design, monitoring and evaluation.

ANSER: a not-for-profit, public-service research institute helping government clients make complex policy decisions through the application of systems thinking.

AVSI–USA: an experienced development organization with rich experience in community development and ethnographic research.

Notre Dame Interdisciplinary Center for Network Science & Applications (iCeNSA): a university with a breadth of expertise in computer science applications of network analytics.

Practical Action: an organization with extensive experience in participatory approaches to systems design, applying these approaches to diverse sectors, including water and sanitation, local energy access, agricultural market systems and DRR.

University of Missouri: a research university with a strong Land Grant Extension Outreach program and expertise in survey methods and social capital analysis.
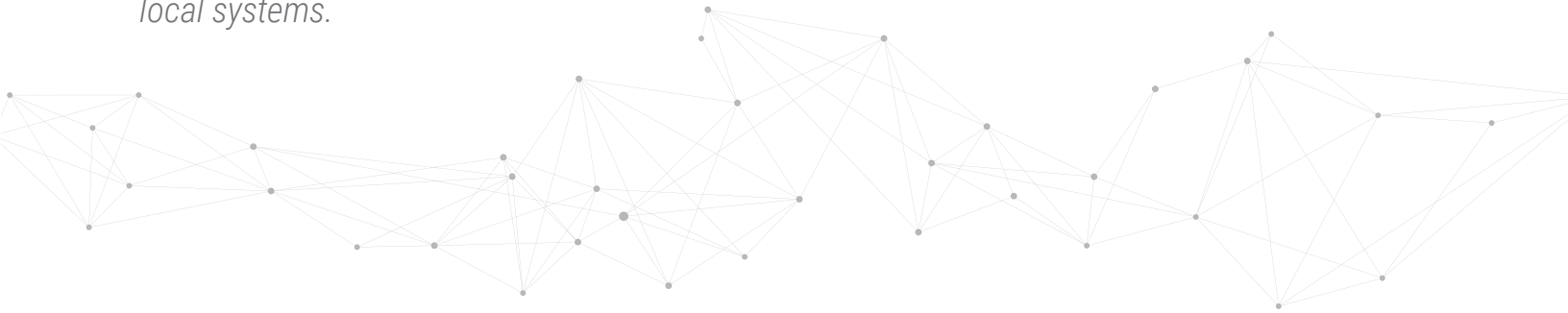
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Overview: Local Systems Practice User's Guide

Local Systems Practice (LSP) uses systems-based approaches to address complex development challenges and strengthen local systems.

ABOUT THE LSP USER'S GUIDE

This guide - developed by the LSP consortium - provides insights on several methodologies that can assist localworks missions and local organizations with applying a systems lens to drive their own development. The guide is geared toward better understanding:

- how these approaches work; and
- where and when to best apply them.

Additional resources are cited in each section for individuals that want to learn more about how to conduct and undertake these systems methods. The discussion of methods and tools in this guide is limited to the international development context.

For more information about localworks and Local Systems Practice, visit: https://sites.google.com/view/lsp-users-guide/home/about-localworks-and-local-systems-practice

WHAT IS A SYSTEMS-BASED APPROACH?

The Challenge:

Things do not occur in a vacuum.

- Problems and opportunities exist in a context. As such, to understand various phenomena, we need to treat them as part of a larger system in which different actors, factors, and processes interact to shape the broader outcomes and behaviors we observe. A system is a group of interdependent/interacting parts that form a unified whole to pursue a common goal.

- Although there are many types of systems (e.g., engineering, biological, and ecological), the most complex systems involve a strong human component. In these "soft systems," intelligent actors (i.e., people), who behave in light of their perspectives and experiences, learn from their interactions and adapt their behaviors. This causes the broader system to continuously change and organize itself in response to internal and external requirements, making behavior and outcomes difficult to predict or dictate externally.

The Systems Approach:

Enables a holistic view into the broader context and dynamics associated with complex issues or problems.

What is a Systems Analysis?

A system analysis is a snapshot of system in a single moment in time. A systems lens helps us identify the relevant individuals and entities, how they interact, and the dynamics that influence and govern the system.

What are the Benefits of a Systems Analysis?

A systems analysis can highlight potential areas of tension or dynamism. It can provide clues about how the system may change. What factors might be most influential? Who is marginalized and why? And how might localworks' engagement affect the system?

Systems analysis can help development efforts avoid unintended consequences that may distort the system or undermine existing local capacities.

OVERVIEW OF TOOLS & METHODS

Systems analysis can be conducted with a range of tools and methods. These tools and methods may be used in isolation, or in combination. While there is no magic formula for determining the right combination of tools and methods, selection generally depends on the system being analyzed, and the research question(s) being posed.

The tools and methods offered by the LSP consortium include:

Social Network Analysis *(diagram p.5)* to help identify actors best positioned to positively impact the network

Social Network Analysis (SNA) has been called an "X-Ray" for complex systems. It makes visible the critical but hidden web of relationships that make systems function. SNA results in a visual representation of a network, allowing for the identification of critical actors, key gaps, and leverage points.

Causal Loop Diagrams *(diagram p.5)* to understand what part of the system to engage in to initiate change.

Causal Loop Diagrams (CLDs) are used to conceptually model dynamic systems in a holistic manner, mapping how variables (i.e., factors, issues, processes) influence one another. These diagrams are particularly useful in uncovering a system's underlying feedback structures, and in identifying high and low leverage intervention points in a system. These diagrams also reveal the natural constraints within the system, helping us develop more realistic expectations regarding our ability to bring about change.

Ethnography *(diagram p.5)* to better understand behaviors and norms within a system

Ethnography allows us to gain an "insider's perspective" to increase our understanding of complex social dynamics in a given context or community. Ethnography can assist in the identification of actors, processes, and institutions which are commonly perceived as influential within a complex social process, while uncovering those which tend to be hidden. Ethnography also increases our understanding of local logics and rationale which deepens our ability to interpret behaviors and norms within a system.

Participatory Systems Analysis *(diagram p. 5)* to enable strategic actors to come together to gain a better understanding of their own system, create joint visions of how it could improve and agree on practical ways to do it.
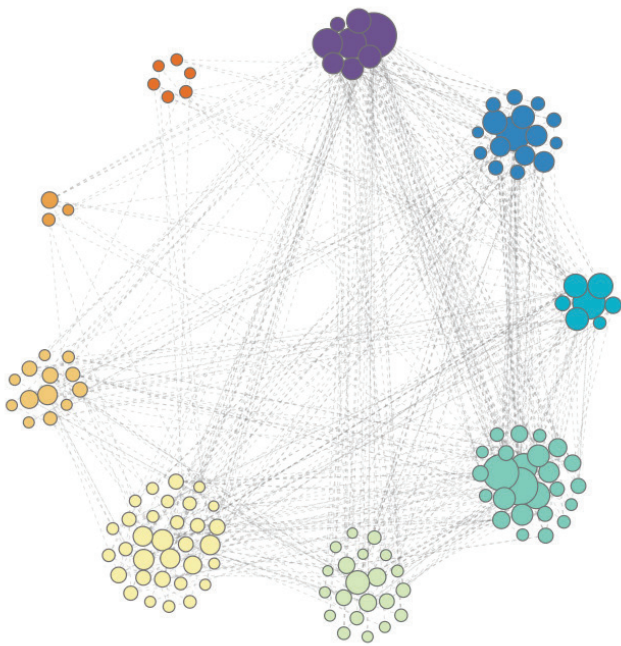
Participatory Systems Analysis puts the emphasis on the system actors and the processes that allow them to interact, learn from each other and find feasible areas for collaboration. PSA is not a tool that we can use to analyze the system; instead, it is an approach where multiples tools and techniques (including the ones in this guide) can be used to help the actors analyze the system they belong to. PSA must also promote a cyclical movement between analysis and synthesis (zooming in and zooming out).

WHY USE MULTIPLE APPROACHES?

The systems approach draws on multiple methodologies and tools. The ones presented in this User's Guide are not exhaustive, but rather represent a sampling of frequently used tools. These tools and methods can be applied in combination, and these combinations depend on the pragmatic needs to a particular inquiry (e.g. to describe a situation, to view changes over time, to learn about a situation, etc.).

This User's Guide will be updated to provide examples of how and why particular tools are combined in particular contexts.
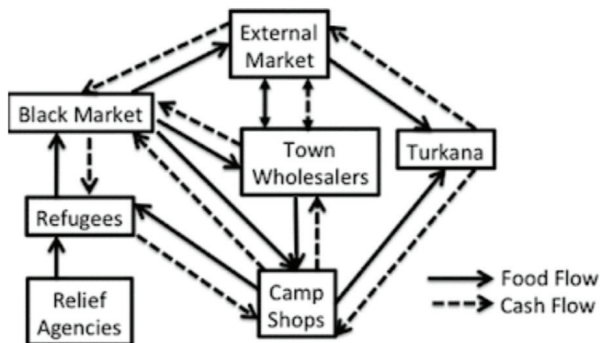
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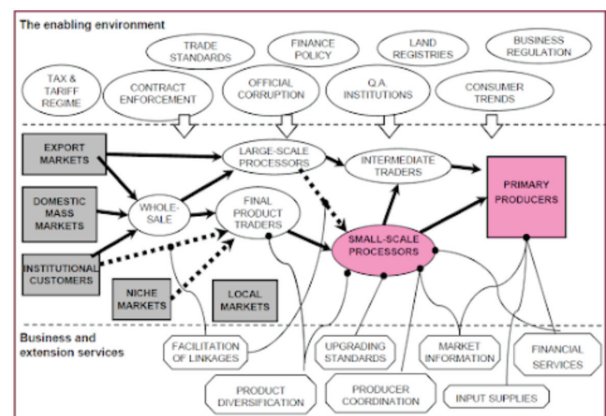

Social Network Analysis

Causal Loop Diagrams

Ethnography

Participatory Systems Analysis

Social Network Analysis

to help identify actors best positioned to positively
impact the network

Social Network Analysis
to help identify actors best positioned to positively impact the network

"An actor's position in a network determines in part the constraints and opportunities that s/he will encounter, and therefore identifying that position is important for predicting actor outcomes such as performance, behavior or beliefs."
- Analyzing Social Networks (2013)
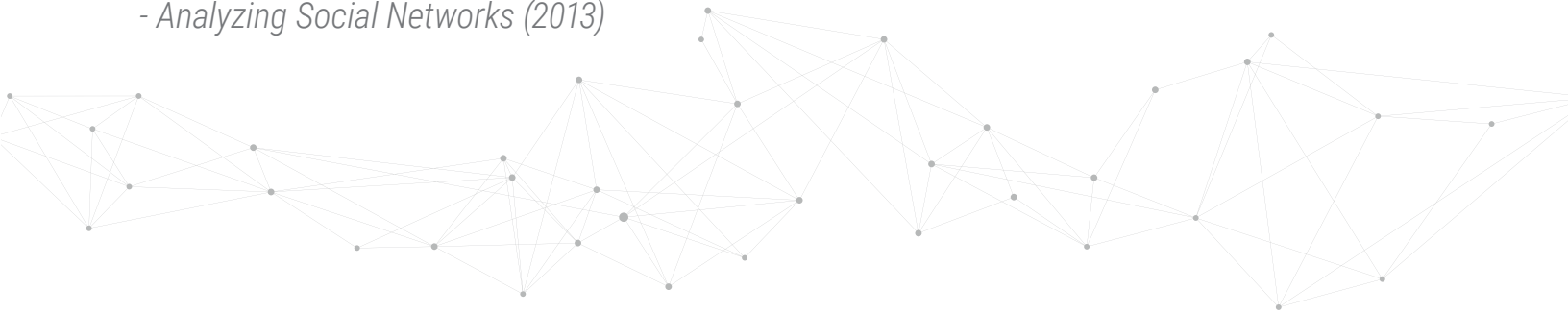
WHAT IS SOCIAL NETWORK ANALYSIS?

- A Social Network Analysis (SNA) is a visual representation of the structural characteristics of a network. Specifically, it shows the relationships among actors (individuals, groups, or organizations). Actors are represented via nodes and relationships are represented via edges. Attributes can be assigned to nodes (e.g. org type, sector, etc.).

- Relationships can be analyzed in both visual and mathematical terms. Social network analysis helps us identify actors, their relationships, and the factors that influence their interactions. Network analysis can highlight resource flows and directions of influence. Because the relationships among actors are dynamic, network analysis is an ongoing process and one that actively involves local people and organizations.

View and Explore an Interactive Map at
www.linclocal.org/nicaraguamap

WHAT MAKES SOCIAL NETWORK ANALYSIS A "SYSTEMS" TOOL?

- SNA is a classic systems approach, measuring complex interactions of actors at multiple levels. Network analysis is a means for understanding the complex interactions that occur among individuals and/or organizations. It helps us understand the nature of those connections, what is "flowing" between them (for example information, power, or financial resources); and the overall structure of all those relationships within a defined network of local actors.

- Networks exist everywhere, whether formal or informal, intentional or unintentional. Often, they naturally emerge when there is a need and a constituency. A network is any distributed system of individuals and organizations that come together to pursue a shared purpose. Networks are structured in different ways and operate through different processes emerging from their relationship-driven nature.

- Network analysis provides both visual maps and mathematical analysis to better understand these networks. For example, at the network level, we can assess the degree of interaction between actors by calculating the network density to determine if connections happen across all the organizations or only among a few of them. At the organization level, we can see which organizations are central or peripheral; if an organization is a broker or bridge with other organizations; or if organizations cluster together into smaller groups (cliques).

- Understanding the current condition of a network helps to better identify opportunities to build upon and strengthen the relationships that already exist, as well as target efforts for weaving together a stronger overall network.

WHEN MIGHT I WANT TO USE SOCIAL NETWORK ANALYSIS?

SNA is most useful for capturing complex relationships, and for capturing the structural characteristics of a network. Beyond identifying central actors within a network, it can provide measures of how tightly interconnected the network is, how fragmented the network is, and to identify subgroups within a network. All of these measures can help to provide insights about strengths and weaknesses in communication, power structures, and network

WHAT ELSE SHOULD I KNOW ABOUT SOCIAL NETWORK ANALYSIS?

- SNA is a way of thinking about social systems that focus attention on the relationships among actors in a system.

- SNA is a classic systems approach, measuring complex interactions of actors at multiple levels.

- SNA utilizes nodes (actors) and edges (relations).

- Attributes can be assigned to nodes (e.g. org type, sector, etc.).

- Analysis is conducted at the whole network and individual organizational level.

- ONA is a sub-set of SNA (organizational mode).

Social Network Analysis: Ways to Use

WHAT CAN SNA HELP ME UNDERSTAND?

Social network analysis can be a useful tool for both whole networks and individual actors. SNA provides a powerful platform for better understanding:

- a local system

- decision-making on partnering strategy

- program design

- and evaluation of progress during or at the conclusion of program activity

The results of an SNA can be used by network actors, project designers and implementers to:

- customize and calibrate interventions

- build-upon existing strengths

- and target particular constraints within the overall network

WHAT ARE SOME SPECIFIC APPLICATIONS OF SNA?

Social network analyses can be used to:

- **Identify network opportunities and constraints**: Conducting an SNA is much like analyzing a value chain. Relationships between actors are mapped out, visually represented in a network map, and opportunities and constraints

are identified. Key bottlenecks and pathways are mapped to match program objectives. This may include the targeting of specific local actors or organizations, or a grouping of each.

- **Measure rigorously**: A SNA can be conducted on an organization-by-organization basis as well as applied to the larger networks in which these organizations operate. A baseline can be conducted at the design phase, with follow-up mid-term and final evaluation at the conclusion of the program. Given sufficient sample power, quasi-experimental findings can be generated and applied to both the organizations surveyed and to the network as a whole. Data can be gathered to determine the extent to which the network was strengthened, and to determine how an intervention facilitated and improved development results or a stronger local system.

- **Design appropriately**: Oftentimes, the largest NGOs have high internal management capacities and are close to donors. But oftentimes, the largest NGOs are also distant from their constituents. SNA can help provide insights into whether organizations are well-positioned for community-level impact. In other cases, we may find vibrant connections between key NGOs and their constituencies, but weak overall sharing and learning among network members. SNA can help inform decision making regarding how to focus resources. SNA can reveal whether focusing directly on communities, or promoting

cross-organization collaboration and the creation of resource hubs would be most effective.

KEY APPLICATIONS & POTENTIAL LIMITATIONS

Key Applications:

- Systems mapping / stakeholder analysis
- Adaptive management
- Impact measurement
- Can be applied to multiple sectors whenever there is a need to better understand local systems

Potential Limitations:

- Census-based instrument, usually open-ended, leading to recall error
- Network must be carefully defined in advance
- Measurement typically in one mode (e.g. organizations, not individuals)
- Measures relationships between actors, not the nature or perceptions of actors themselves

Social Network Analysis: Method in a Nutshell

OVERVIEW OF METHOD

Like most complex analysis, social network analysis is iterative. The steps outlined below are meant to serve as a high-level guide to the process rather than a strict sequencing.

Key steps in conducting a social network analysis include:

1. Define your learning question
2. Define network parameters
3. Engage the network
4. Collect data
5. Analyze findings
6. Share results

1. DEFINE YOUR LEARNING QUESTION

What do you want to better understand?

One of the first steps when conducting a network analysis is to clearly define your learning question(s). What specifically do you want to better understand about the relationships among organizations in a particular network? Learning questions that may help you better understand a local system include:

- Who are the local organizations that other actors "go to" for help and assistance?

- How do organizations interact and collaborate with one another around a common goal?

  - Goals of networks may vary widely, from the very general to the granular.

  - For example, a general network goal might be to "help people to obtain jobs," or "make migrant populations more resilient." Examples of a narrower goal might be to, "reduce the incidence of HIV among unemployed males aged 18-25 in Timbuktu." This goal, no matter how general or specific, should be in what all of the organizations in the network are working towards.

As there is typically no opportunity for a re-do once data has been collected, it is important to think carefully about both respondent (node) and relationship (edge) attributes to be collected in order to answer your learning questions. This could include:

- functional groupings of actors (e.g. association, government, union, etc.)
- demographics (# of employees, women-led, etc.)
- subnetworks (e.g. industry)

2. DEFINE NETWORK PARAMETERS

Another critical step in the SNA process is conducting stakeholder consultations to define key network parameters. The parameters are used to refine and contextualize the survey instrument and the data

collection process, and are fundamental to ensuring that the network analysis will respond to the learning question(s). Some key parameters to establish are:

- **Network Boundary**: Which actors should be included in the network when collecting data? A clear definition of the network boundary must be established to capture data on as many network actors as possible, without including non-members. This typically includes clarification of a common goal of all actors, a geographic boundary, and potentially other characteristics dependent on the network.

- **Actor Attributes**: What other actor characteristics are important to network analysis? Actor attributes allow us to segment data and analyze subgroups of network actors based on those characteristics. This typically includes type of organization or institution, technical area interests, and size or age of the organization.

- **Relationship Content**: What types of relationships should be evaluated? Based on the learning objectives, types may include information-sharing, resource-sharing, collaboration, client-supplier, advice-seeking, or others. The quality of the relationships can also be evaluated by collecting data such as frequency of communication, level of the organization at which the relationship exists (e.g., executive, administrative, operational), utility, strength, or trust.

- **Establishing a Relevant Timeframe**: Just as boundaries must be set on whom to include in the study, also time boundaries must be set on which links to include and which to exclude between those in a network. For example, should all links between network members over the last 5 years, the last 3 years, the last year, or the last 6-months be included?

- **Target Respondents**: Who should be interviewed/surveyed within each network actor? Even for SNAs, evaluating relationships among organizational or institutional actors, relationships are managed by individuals. The analysis is most accurate when the correct individuals (e.g., executive director, board members, program directors, operational managers) respond to the survey instrument.

3. ENGAGE THE NETWORK

Before finalizing the survey instrument and beginning the data collection process, it is important to meet with representatives from organizations that will likely be a part of the SNA to discuss the study. This, will allow for ensuring a clear understanding of the purpose of the study, the type of insights that will come from it, and how to complete the questionnaire (or process for conducting the in-person interviews). Engaging the network can be done in a workshop setting with representatives from all the organizations expected to meet the boundary for the SNA, small group discussions, or online webinars.

4. COLLECT DATA

Primary Data

- A survey instrument needs to be designed and piloted to collect data on actors and their relationships. The questionnaires can be completed online using a computer or smart phone, or through phone or in-person interviews.

- While it may be preferable to be able to pre-identify all actors in the network prior to data collection, this is often not possible and important actors can be missed. In these cases, as known network actors are surveyed, additional network members are identified either through a "snowball" approach (the network expands until all network actors are identified) or an ego-alter approach (network expands a set number of times). Follow-up phone calls are generally required to get completed questionnaires or schedule an interview time.

- Survey results will need to be reviewed and cleaned in preparation for the data analysis phase. In particular, it is critically important that an organization's name appears in the exact same manner throughout the data.

Secondary Data

- Depending on the parameters defined, network analysis can utilize secondary data from organizational or public records such as contracts and agreements, emails and other communications, or meeting attendance sheets.

- Additional secondary data helps contextualize the results of the analysis. While SNA results are useful on their own, they also complement results of other tools to provide a deeper understanding of the individual actor and system-level constraints and opportunities.

Data collection and analysis can be completed once for a snapshot of the structural opportunities and

constraints in a network, or can be repeated at several points in time to evaluate network evolution.

5. ANALYZE FINDINGS

Once survey data collection is complete, network analysis software can be used to help examine the network as a whole (macro-level), and individual organizations (ego-level). It is typically most effective to first analyze the macro-level network for a few key metrics, which subsequently guide the analysis of individual organizations themselves. On this basis of this, results are analyzed and scores assigned to various indicators being tracked by a project or by network members themselves.

Several key variables are typically analyzed at the network level and for specific actors:

- **Density**: measures the number of ties between actors indicating the level of connectedness within the network. The density of a network may give us insights into such phenomena as the speed at which information diffuses among the nodes, and the extent to which actors have high levels of social capital and/or social constraint. It is measured by dividing the number of existing connections with the total number of all possible connections. If values have been assigned to these ties (e.g. strength, closeness), then the total sum of those actual values is divided by the total possible number in the network.

- **Centrality**: indicates which actors are most engaged and which are peripheral

- **Reciprocity**: measures the extent to which relationships reported by one actor are confirmed by the other actor. A network that has a predominance of null or reciprocated ties over asymmetric connections may be a more "equal" or "stable" network than one with a predominance of asymmetric connections (which might be more of a hierarchy).

- **Distance**: calculates the average number of steps for any network actor to reach another actor

- **Clusters**: indicate the existence of sub-groups of actors that are completely interconnected (and often only loosely connected to the rest of the network, if at all). Where distances are great, it may take a long time for information to diffuse across a population. Those actors who are closer to more others may be able to exert more power than those who are more distant.

Longitudinal data can be used to analyze changes in the network over time. As a network evolves, the SNA is able to track impact on local systems against activities undertaken by projects. As a result, network analysis feedback loops enable program implementers to appropriately calibrate their interventions as they progress and learn from them.

6. SHARE RESULTS

Below are some best practices for sharing results:

- Share-back with those that participated in the analysis itself to help to facilitate collective action processes. (In many cases this leads to a request to conduct more in-depth analysis on their own organization / networks.)

- Whenever possible, publicly post research and results, including any survey instrument utilized.

  - Other options include sharing results via workshops, blog posts, or other write-ups.

- If possible, conduct analysis using UCINET, NodeXL, or other open source platforms to make data sharing easier.

- ALWAYS ensure that any sharing you do complies with IRB requirements!

Social Network Analysis: Resources Required

Resources required can range from just a few days of effort to several months or years. There are a number of variables impacting this, including:

- Network size

- Will the network analysis be conducted at one moment in time, or in several iterations over the

life of a program?

- Can all of the network members be defined in advance of the research?

- Can all of the network members be reached virtually, using online instruments, or will you need to conduct in-person interviews?

- In cases where network members are not connected to the internet, how advanced are the data collection system and personnel (including ability to handle nominations, vet potential network members, utilize tablets, and avoid naming redundancy)?

- How narrowly is the network defined?

- How sophisticated will the analysis be?

- Extent to which theory of change is explicitly linked to the research.

As a general rule of thumb, the "Difficult" category of network analysis conducted on a longitudinal basis will require overall resources similar to that of an impact evaluation. Time estimates given below start with research design and conclude with submission of SNA report.

Levels	Preconditions/Goals	Time	Human Resources
Easy	• All network members defined in advance and connected to internet • Basic analysis • Integrated data collection and analysis platform	1-3 weeks	1 designer/analyst/supervisor
Medium	• All network members defined in advance but not necessarily connected to the internet • Basic-to-high level analysis • 100-500 network members	1.5-3 months	1 designer/analyst 1 supervisor 3 enumerators
Difficult	• Some, but not all network members defined in advance • Most respondents not connected to internet • High level analysis • 100-500 network members	3-5 months	1 designer 1 analyst local experts 3-7 enumerators

Social Network Analysis
Case Study

Tracking Social Capital in Eastern DR Congo
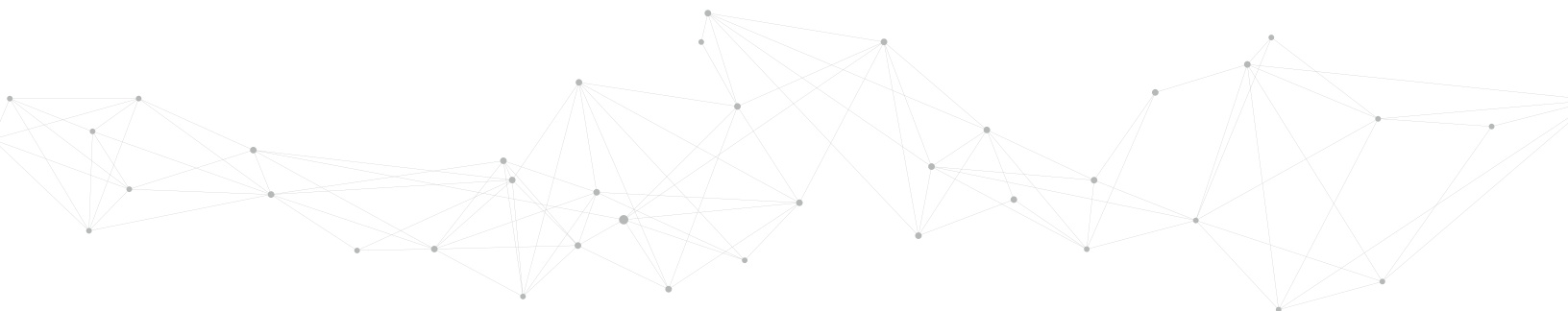
CHALLENGE

LINC was asked to facilitate understanding of formal and informal networks for collaborating, resolving issues and influencing decisions related to water and sanitation service provision at the local, municipal, provincial and national levels.

APPROACH

LINC completed baseline research in the Goma and Bukavu municipalities of eastern DR Congo, assessing social capital and accountability for public service utility provision utilizing Social Network Analysis (SNA).

The research was based on a census of 767 organizations, informal groups, business and government institutions active in public service provision in the two municipalities. These organizations reported 4,790 relationships among each other. Social capital of these actors was analyzed against a host of attributes, including organizational type, sector of participation, female / male-led, size, etc. *(Network Map p.14)*

KEY INSIGHTS

Below are some of the highlights of what we learned about the social capital of these groups:

- The overall public service governance network is sparsely connected and fragmented.

- Although smaller subgroups of organizations within the network are working together, these groups are somewhat disconnected within the context of the larger system.

- It might benefit the network overall to work on both bridging and bonding social capital ties, first

working on building strong partnerships within sectors or types, and then facilitating introductions across these groups.

- Local NGOs composed the largest group of actors working on public service governance in the Goma and Bukavu municipalities. They are well positioned to bridge across the network, but constrained in their levels of influence.

- Community Based Organizations (CBOs) were found to have weak presence in the network with a small overall population, very little bonding social capital among them, and most of their activities focused on the health sector.

RESULTS

The baseline report, completed in the summer of 2016, presented a series of findings and recommendations to be incorporated into the design, monitoring and evaluation of interventions undertaken by the DFID-funded IMAGINE project implemented by Mercy Corps in Goma and Bukavu municipalities. A final evaluation using the SNA method will be conducted in 2019 at the program's conclusion.

You can read more about this project at linclocal.org/portfolios/public-service-provision-network-analysis-in-the-drc/
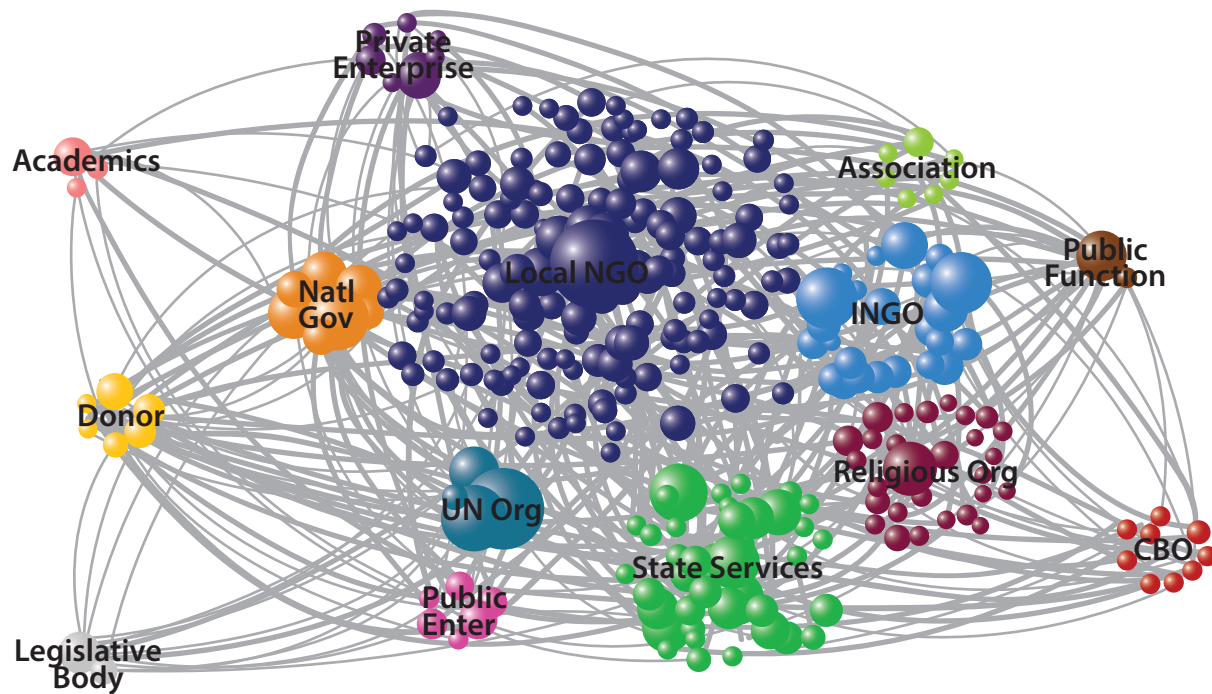
NETWORK MAP

Public Service Network Maps

The research in the Goma and Bukavu municipalities of eastern DR Congo assessed social capital and accountability for public service utility provision. It was based on a census of 767 organizations, informal groups, business and government institutions active in public service provision in the two municipalities. These organizations reported 4,790 relationships among each other. Social capital of these actors was analyzed against a host of attributes, including organizational type, sector of participation, female / male-led, size, etc.

Social Network Analysis
Case Study

Youth Workforce Development in Nicaragua
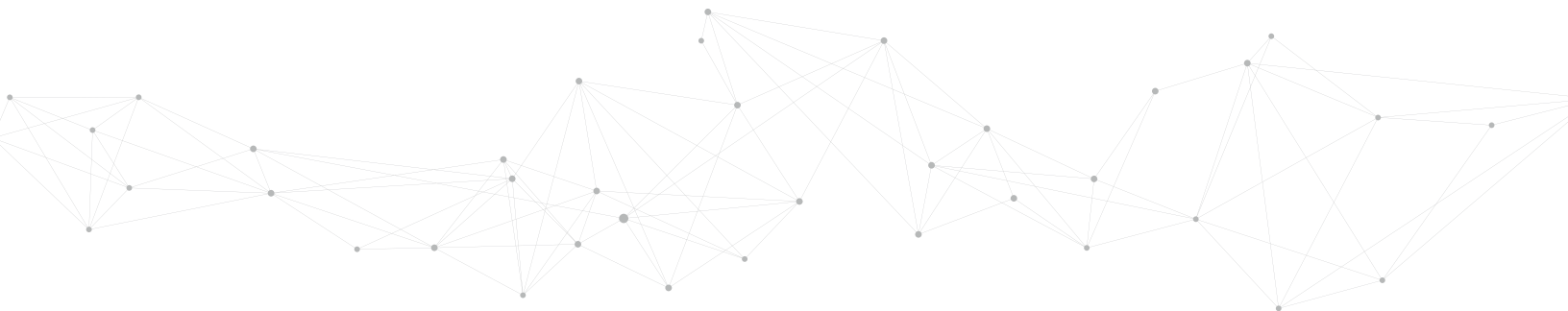
CHALLENGE

In Nicaragua, 65% of the unemployed are under 30. Services provided by training institutions, employment agencies, and other workforce development actors are only weakly aligned with the demands of employers and job-seekers, and there is little apparent collaboration among them. It was on this basis that LINC was asked by USAID to help to design a new youth workforce development project in Nicaragua. Despite being aware of the major gaps between supply and demand, information was nonetheless very limited on specific actors and leverage points, essential ingredients to well-informed design.

This provided the scope for application of LINC's Organizational Network Analysis (ONA) tool to assess existing relationships and identify opportunities for youth workforce development network strengthening. Throughout the spring and summer of 2015, LINC undertook a network analysis of 131 actors in Nicaragua's youth workforce development (WfD) sector, identifying 506 unique organizations and 1,248 partnerships. The findings provided clear, actionable design insights to USAID and other donors, a roadmap to relationships in the sector.

APPROACH

LINC took a deliberate approach to the Nicaragua research, ensuring that the network analysis was framed-up within current workforce development thinking and would result in clear observations and actionable recommendations that could be designed into new donor-supported projects.

Assess research feasibility

First, LINC focused on identifying data sources, collection methods and research objectives. LINC

opted for a snowball (nomination) method to data collection, given that we were not able to pre-identify all actors in the network. Our research objectives were three-fold:

- Address critical WfD program design information needs

- Assess specific functions within the WfD system

- Provide comparative insight

Develop a Theory of Change

Linking the research to a theory of change enhances prospects for actionable recommendations. Borrowing from the World Banks SABER working paper series, our research was couched within well-established thinking related to coordination, information and relationships (the very core of network analysis). Specifically, "alignment of skills demand and skills supply is central to a well-functioning WfD system. In systems where the match is good, significant benefits can accrue in the form of a dynamic and productive workforce, and higher rates of employment and labor utilization."

Define the network and relationship question

Networks are often informal, and need to be defined in advance. Ultimately we focused on a goal-based definition overlaid with some specific parameters, asking respondents the following network question: "Please list the organizations / institutions / companies that support workforce development with which your organization has had a relationship with during the past 12 months."

Design questionnaire to capture learning objectives

As there is no opportunity for a re-do once the census has been completed, it is important to think carefully about both respondent (node) and relationship (edge) attributes to be collected. In our case this prominently included:

- functional groupings of actors (e.g. association, government, union, etc)

- demographics (# of employees, women-led, etc.)

- subnetworks (e.g. agriculture, construction, tourism)

To view the actual questionnaire, see Annex B of the final report:
linclocal.org/wp-content/uploads/2017/02/
Report_NicaraguaONA_LINC_FINAL.pdf

Implement census and analyze results

In the case of this study, data collection was done through traditional in-person enumeration. This was the most time-consuming part of the process, requiring 2 full-time equivalent enumerators and 1 supervisor / cleaner over the course of 2-3 months. Analysis was conducted by a four-person team in iteration and soliciting feedback through presentation events over the course of the final two months.

For a more detailed presentation of the Nicaragua study's methods and results, please visit: linclocal.org/wp-content/uploads/2017/02/Pres_LocalSystemsCommunity_LINC.pdf

KEY INSIGHTS

The network analysis captured several previously uncovered insights, important for design of new programs and strategies. If you wish to explore the map, please visit: linclocal.org/nicaraguamap. Some of the more salient findings concerned NGOs, Donors and Employment Agencies, including:

NGOs *(NGO Network Map p.17)*

NGOs are plentiful and entrepreneurial partners in the workforce development space, but constrained by a lack of power and influence, making them less suitable for leadership of advocacy initiatives.

Donors *(Donor Network Map p.18)*

Among all organization types, donors are the most highly engaged and central to the network, introducing questions as to the extent to which they should directly intervene in the system rather than playing a more facilitative role.

Employers and Educators *(Employers and Educators Network Map p.19)*

Major gaps exist linking graduates of training institutes to employers and employment agencies, serving as impetus for workforce development programming to link these actors.

RESULTS

As a single iteration network analysis, the information collected on actors and their relationships in this study is a snapshot in time. This means that until we go back and re-survey the exact same actors, we are unable to assess changes in the network, and thus utilize the study for monitoring or evaluative purposes.

Nonetheless, the study was designed to inform future workforce development programming / strategy, and has met with significant uptake in that regard. Most tangibly, USAID utilized the findings from this study in their design of a new youth workforce development program in the Fall of 2015. Beyond this, a group of donors in Nicaragua came together soon after the completion of our study to review its findings, with particular attention to the report's observations on donor involvement in the sector, and specific recommendation to play more of a facilitative role in the network. While feedback from this group has been anecdotal, we understand that a number of these recommendation have been incorporated into donor strategies, particularly those of LuxDev and SDC.

Next, we have been encouraged that the Nicaragua Network Analysis has generated quite a lot of interest and utilization in the broader development community. We attribute this to a number of factors, including the quality of the study and its early application. Nonetheless, we can also point to some specific measures taken by LINC to encourage participation and learning. This included presentation and feedback events with various stakeholders both in Washington and Managua before, during and after the study. Further, we have been diligent in posting the findings of our research, detailed presentations and reports, available for review and download on the LINC website: linclocal.org/portfolios/youth-workforce-development-in-nicaragua/

Lastly, we have been encouraged by the interest that the study has generated on the part of respondents themselves. These are actors in the network interested in learning more about their own place in the network, and facilitating more relationships within it. Results presentation events that LINC conducted in Managua were attended by approximately forty network actors, some of which were interested in commissioning LINC to conduct more detailed analyses of their own networks.

YOUTH WORKFORCE DEVELOPMENT IN NICARAGUA

NGO NETWORK MAP
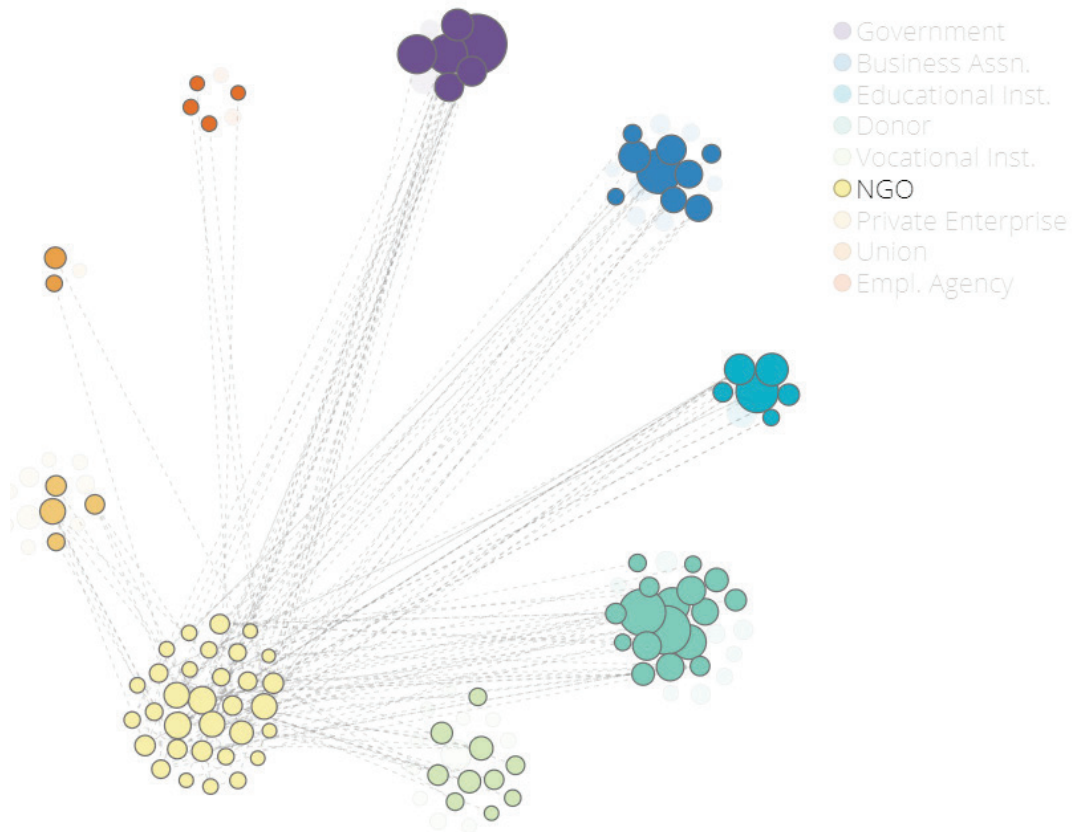
NGOs

NGOs are plentiful and entrepreneurial partners in the workforce development space, but constrained by a lack of power and influence, making them less suitable for leadership of advocacy initiatives.
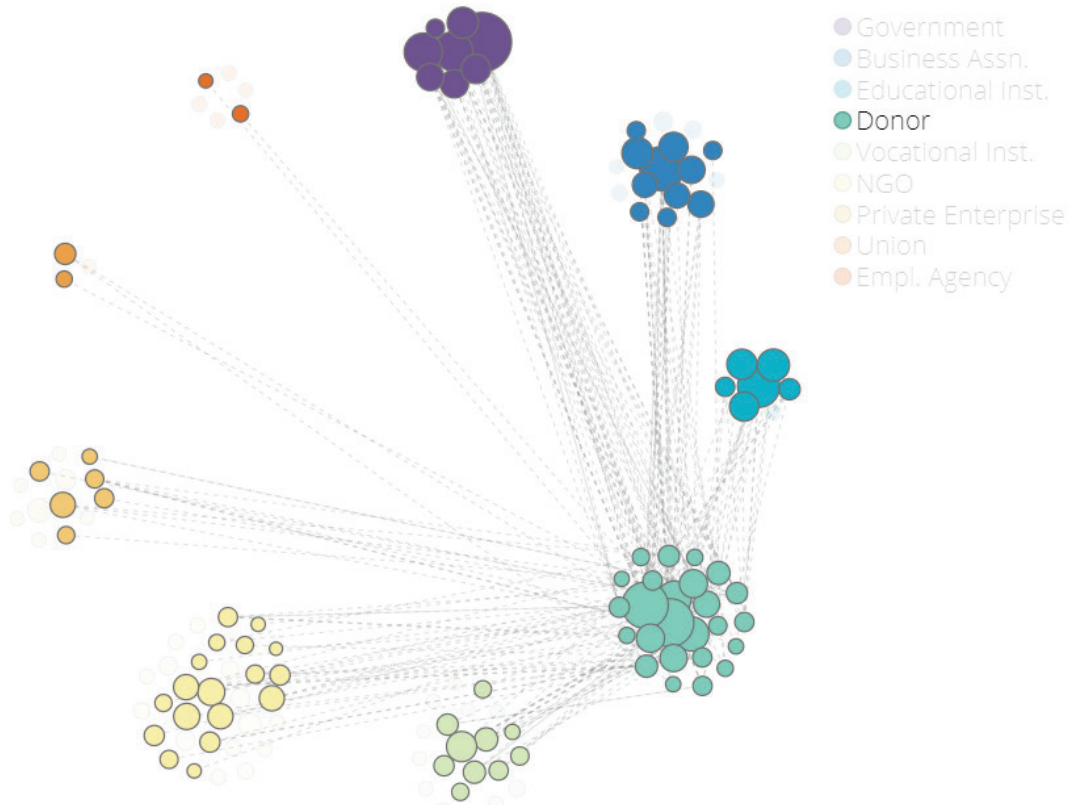
Donors

Among all organization types, donors are the most highly engaged and central to the network, introducing questions as to the extent to which they should directly intervene in the system rather than playing a more facilitative role.

YOUTH WORKFORCE DEVELOPMENT IN NICARAGUA

EMPLOYERS AND EDUCATORS NETWORK MAP

- ● Government
- ● Business Assn.
- ● Educational Inst.
- ● Donor
- ● Vocational Inst.
- ● NGO
- ● Private Enterprise
- ● Union
- ● Empl. Agency
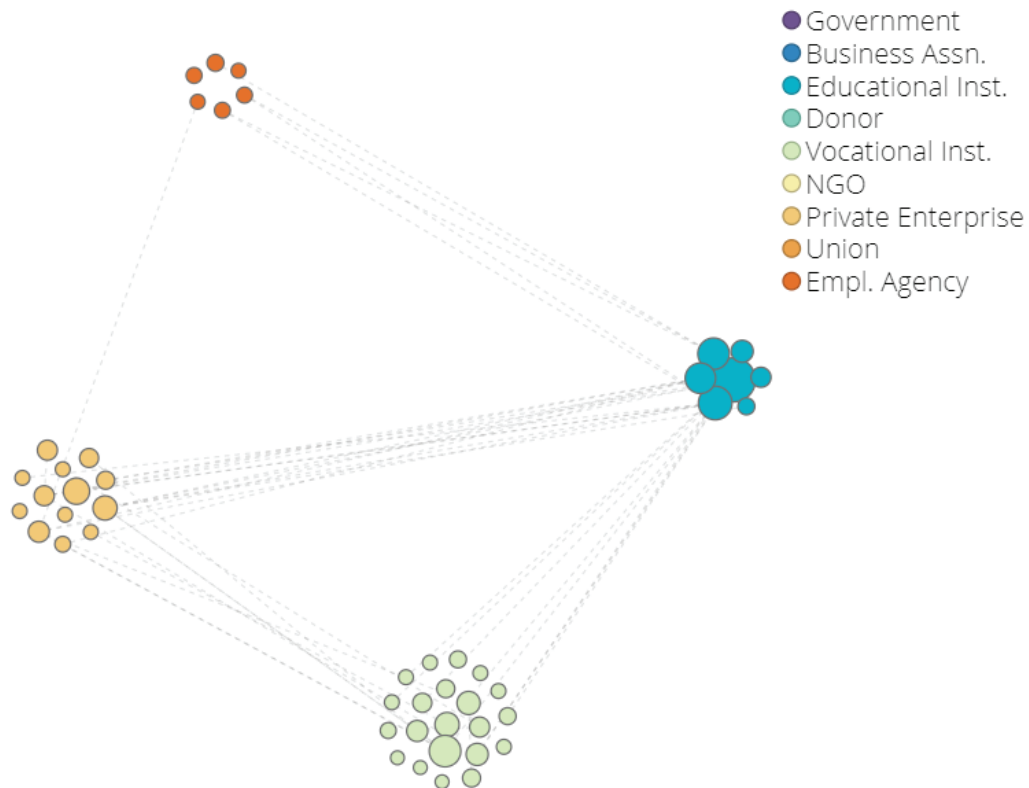
Employers and Educators

Major gaps exist linking graduates of training institutes to employers and employment agencies, serving as impetus for workforce development programming to link these actors.

Social Network Analysis
Case Study

Rice and Diversified Crops Bangladesh

CHALLENGE

LINC was introduced to the Rice and Diversified Crops (RDC) project in the Winter of 2017, soon after the RDC project's launch. LINC assisted the RDC project to utilize network analysis combined with qualitative interviews to better understand systems dynamics and change in the network of grantees assisted by the RDC project. In its first full year of implementation, the activity goal of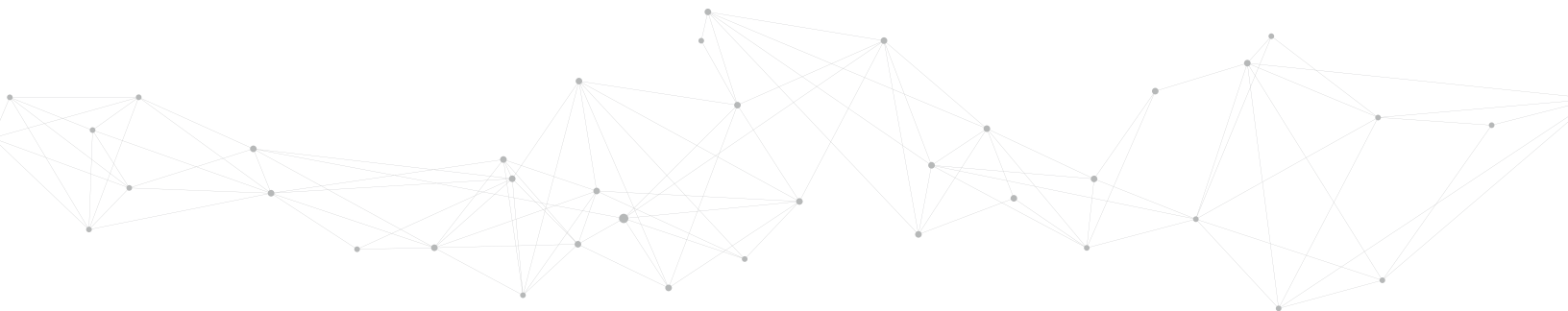 RDC was to improve food security through systemic changes that increase rural incomes by catalyzing market systems changes that promote a diversified farm management approach oriented to intensified rice production and/or diversification of higher-value nutrient rich crops.

We spent several weeks exchanging documents and becoming more familiar with the design and objectives of the RDC project. We understood that the project was interested in utilizing network analysis to both a) assess system change; and b) identify successful and promising approaches for scale up. We further defined the following parameters:

- The network analysis should include observations to inform RDC strategy

- The network analysis should be iterative to assess change

- The approach should be replicable, able to be integrated into RDC's MEL system

APPROACH

LINC took a deliberate approach to the Bangladesh research. The work was structured in the following phases:

Assessment of systems change

We first learned that grantees of the RDC project (also referred to as "lead firms") were expected to be the key nodes of systems change for this activity. Grantees would be funded for a range of activities, and a major focus of the project MEL activities. Successful grant activities would be scaled up over time, and understanding the relationships that they forge with other actors in the network would be an important element of assessing systems change. Approximately 60 grant projects would be funded over the course of the project, and 9 such grantees had already been developed.

Responding to an interest on the part of RDC staff, we next examined the possibility of utilizing network analysis to capture systems change attributable to the RDC project. The possibility was quickly dismissed however, given that this would require a time and resource-intensive control group approach, similar in scale to an external impact evaluation.

We then examined options for conducting a network census. This is the classic approach to network analysis, a census in which all of the actors in the network are identified and surveyed against a pre-defined network boundary. The difficulty in our case was that the RDC project at this stage sought to capture quite broad interactions among a diversity of actors, and was not able to pre-define / name all of the actors in the network. This would have required a snowball data collection approach that would have likely taken multiple months and a great deal of staff time.

Given the constraints to conducting whole network analysis, and the objectives and parameters of RDC, we

ultimately decided to undertake grantee ego-net analysis. Egonets are significantly more manageable that whole networks, as they focus only on the grantee and their relationships with alters. This is a slice of the whole network, focused on an actor of high interest to the RDC project. It gives a good understanding of the ego, but has short-comings in couching the ego's relationships within the overall system/network.

To gain a better understanding of the broader network/system of relationships beyond the ego, we married our quantitative network analysis with in-depth qualitative research. This meant fielding a qualitative researcher with expertise in Bangladesh's market systems, to conduct follow-up interviews with surveyed egos / grantees, sharing preliminary maps with them, in some cases revising, and discussing relationships of interest. Further, the qualitative researcher interviewed several alters to gain an understanding of their relationships and perspectives, although these alters were never surveyed with the quantitative network analysis tool, only named by the egos.

Identifying successful grant activities

The RDC projects Collaborate, Learn, Adapt (CLA) approach meant that grantee success and failure should be captured on an ongoing basis, subsequently scaled-up or scaled-back, replicated and/or adapted. While we knew that network analysis could not do this on its own, we thought that the tool could have an important role to play.

Based on this, we elected to design-in an iterative/longitudinal ego network analysis approach. Conducting network analysis in iteration allows us to capture dynamic relationship qualities rather than a fixed snapshot in time. While attribution is still problematic due to the absence of a control group, appropriately targeted questions can give a strong indication of change as a result of the RDC project when assessing grantees themselves before and after grant activities. Ideally, we would conduct network analysis with each grantee before (baseline), during (midterm), and after (endline) the completion of the grant award from RDC. After learning that grant awards would normally extend 6-9 months, we determined with the field that it would most likely only be possible to undertake baseline and endline analyses.

Local transfer/uptake

SPACES is a research and development project that supplies international expertise to projects undertaking systems initiatives. Generally, this means that the project conducts its research and fieldwork,

and disappears. In this case, we wanted to make sure that this didn't happen. This consideration was particularly critical for RDC, which we agreed would utilize this as a monitoring/adaptive management tool throughout the life of project. Both RDC and SPACES thus committed to full transfer of the tool, agreeing to:

- SPACES and the local RDC MEL team should work closely together throughout the engagement, transferring skills as we go

- SPACES should conduct a field mission to train local RDC staff in network analysis, survey administration, and integration into RDC MEL systems

- SPACES should conduct the baseline network analysis for all grantees identified to date (n=6), providing an example and templates that staff could utilize going forward

- At the end of the engagement, SPACES should hand-over all finalized tools and templates and would be available for ad-hoc remote consultations

KEY INSIGHTS

A baseline report was authored by SPACES and finalized in November 2017, available for review at: linclocal.org/wp-content/uploads/2017/05/SPACES MERL_whitepaper-2016_07_13_abridgedversion.pdf

The report was conducted to pilot the method, present baseline quantitative data for subsequent follow-up change measurement, present qualitative analysis, and provide observations to inform RDC program strategy. The report had the further benefit of serving as a template for utilizing network analysis as a monitoring tool going forward. Below are the highlights of the insights uncovered in our baseline report.

- **Utility of the egonet tool**: The egonet tool was particularly useful in identifying structural dynamics and social norms and biases that appear to constrain either the egos' operational performance and/or that of the market system. Unlike other approaches that predominate in the market systems space, the egonet approach lends the capability of visualizing and quantifying structure and relationship strength. As opposed to a whole network survey, it is also manageable from both a time and resource perspective. Marrying quantitative and qualitative approaches is essential to providing ego analysis with insights on the overall framework and structure of the system.

- **Structural dynamics uncovered**: The network analysis uncovered several key structural observations that may inform strategy and follow-up change measurement/adaptation, including:

  - Gaps in relations with service providers – Only eight connections revealed among all six of the egos surveyed. Notably absent are service providers for marketing, advertising and promotions, especially given the competitive pressures for promotions indicated.

  - Weak coordination between seed companies and research institutions – There are gaps in knowledge and communications, with no industry association currently positioned to streamline coordination and communications.

  - Narrow distribution and supply channels – Lead firms generally relying on large numbers of small interconnected firms, fairly established relationships, and small exclusive territories. Poses challenges for scaling and value addition.

- **Social norms and biases uncovered**: Overall observations suggest that all egos struggle in managing their supply or distribution channels, to shift the business strategies of their suppliers and distributors from traditional extractive ones to value-additive ones. Specifically, we see:

  - Lack of growth among suppliers and distributors (alters), as seen in the narrow distribution channels and minimal investment in upgrading of business systems, infrastructure, or staffing despite strong volumes.

  - Lead firms (egos) expressing desire for their trading partners to adopt more value-add strategies.

  - Lead firms (egos) indicating that their relationships with larger suppliers and distributors are those that are best able to satisfy their most important values and preferences.

- **Systemic leverage points identified**: Network analysis observations revealed that the supply and distribution channels of lead firms are predominantly narrow, and businesses largely engage in extractive strategies. In fact, it appears that these dynamics are mutually reinforcing. For example, where extractive businesses do not invest in growth or upgrades to operations, supply and distribution channels remain narrow.

Furthermore, as a result, demand for support services is likely low and stagnant; businesses who are not growth-oriented have seemingly little need for expert services.

Ultimately, these patterns have negative implications for small-holder farmers who typically have difficulties accessing higher-value markets and improving productivity. Part of the RDC project's theory of change is to rectify these dynamics such that farmers instead are connected to broad supply and distribution channels where actors compete on value-additive strategies, providing farmers with input supply channels that can respond to their needs to improve productivity and output market channels that offer opportunities and incentives to improve production. Our analysis recommends five leverage points that the RDC project may address to promote this shift, indicated in the **map on page 24**.

RESULTS

As of the authoring of the case study, soon after the completion of the baseline in November 2017, we had already seen results informing application of the tool itself, program strategy and the viability of network analysis for monitoring. We anticipate this case study to be updated as we learn more from follow-up network analyses conducted by RDC, resultant change data, and the extent to which the tool informs ultimate scale-up or scaling-back of grantee activities.

Feasibility as a monitoring tool

So far the Bangladesh RDC work has demonstrated that it is possible to develop a network analysis approach that can be transferred locally and integrated into program monitoring systems in a reasonably cost-effective manner, similar to the way in which a periodic grantee survey would be incorporated into a more traditional M&E system. This is important, as there are presently few examples of international development projects that have successfully mainlined iterative quantitative network analysis data collection into project M&E systems/processes.

It is however important to note that the chief driver of this feasibility is adaptation of the network analysis method. We utilized egonet analysis, a hybrid approach that makes data collection straightforward but does not capture the entire system. Complementary qualitative approaches are required for that additional perspective.

There remains additional work to do in streamlining data collection processes for RDC so that the network analysis tool can be self-administered by grantees via internet. The online data collection system has been established and utilized in the piloting. Efforts to streamline the questionnaire instrument are in progress.

Tool transfer

While the baseline network analysis conducted by SPACES took six months to complete, we saw a high degree of enthusiasm on the part of the RDC project staff once the report was finalized. The final report showed the value of network analysis to the project on both a strategy and monitoring basis. As well, the final report along with tools and templates provided, served as a roadmap for the RDC team to undertake subsequent analyses going forward. Based on this experience and others, we strongly recommend tool transfer approaches that not only train, but co-implement, and demonstrate the utility of these tools through documentation such as this baseline report.

Knowing that transfer of the tool was a key objective, SPACES infused both theoretical and practical training modules into our engagement with RDC. We conducted a two-day, in-person training early in the engagement, once the quantitative instrument was finalized prior to the data collection phase. Including thirty participants from the RDC staff, this proved to be a good tool to raise awareness of network analysis and build some basic understanding and skills. Nonetheless, significantly more practical, hands-on training was required with the MEL staff who would be responsible for taking the tool forward. This was provided on an ongoing basis, both in-country and from remote.

One thing that we lacked in local transfer of the tool was a local institution firmly rooted in Bangladesh with some level of specialization in systems and/or MEL. We worked directly with the RDC project staff, employed by two international organizations, ACDI-VOCA and Action for Enterprises (AFE). While their staff are Bangladeshi and based in Bangladesh, we would have generally preferred to transfer the skills and tools directly to a local organization that might have had stronger prospects for institutionalizing the method locally.

Strategy insights

We have known for some time that network analysis can be an excellent exploratory tool producing insights that do well to inform program strategy and design. This has again proven to be the case with this Bangladesh network analysis. Field staff have pointed out insights that were new to them, particularly those insights related to the composition of supply and distribution channels. On this basis they have initiated a number of discussions on how those might be broadened. In our own estimation, we came away from the study encouraged by the extent to which the analysis informed network structure and the social biases of network members. Importantly though, these insights were the product of combined quantitative and qualitative data collection and analytics, not one or the other in isolation. This bolsters the case that we have been making for some time, specifically that quantitative network analysis data is meaningless in the absence of qualitative insights.

Reliability of strategic insights

Strategy insights derived from our baseline report may have limited reliability, as they are derived from quantitative data that includes only six egos. While the qualitative component did much to compensate, as the population of grantees participating in RDC's network analysis grows over LOP, we anticipate that those results will be increasingly robust and generalizable. As egos progress through the grant cycle, we anticipate that change data from follow-up analysis will inform adaptation, providing leads on what is and isn't working, identifying promising prospects for scale-up.
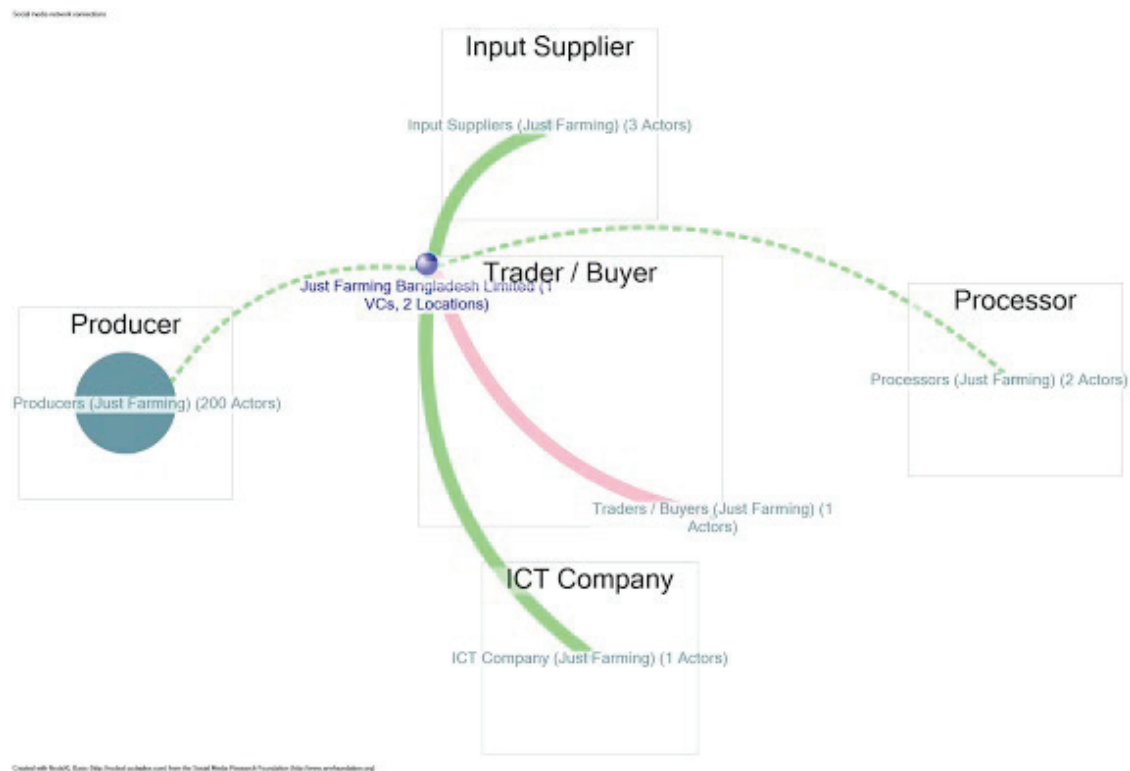
EGONET MAP

Egonet Map

The attributes, or variables, visualized in this map include:

- Ego: Firm 4
- Role: Trading/buying firm
- Number and role of alters: producers (n=200), processors (n=2), input suppliers (n=3), and ICT service provider (n=1)
- Frequency of communication: dotted line (low), solid line (med.), thick line (high)
- Effectiveness of communication: pink (low), grey (med.), green (high)
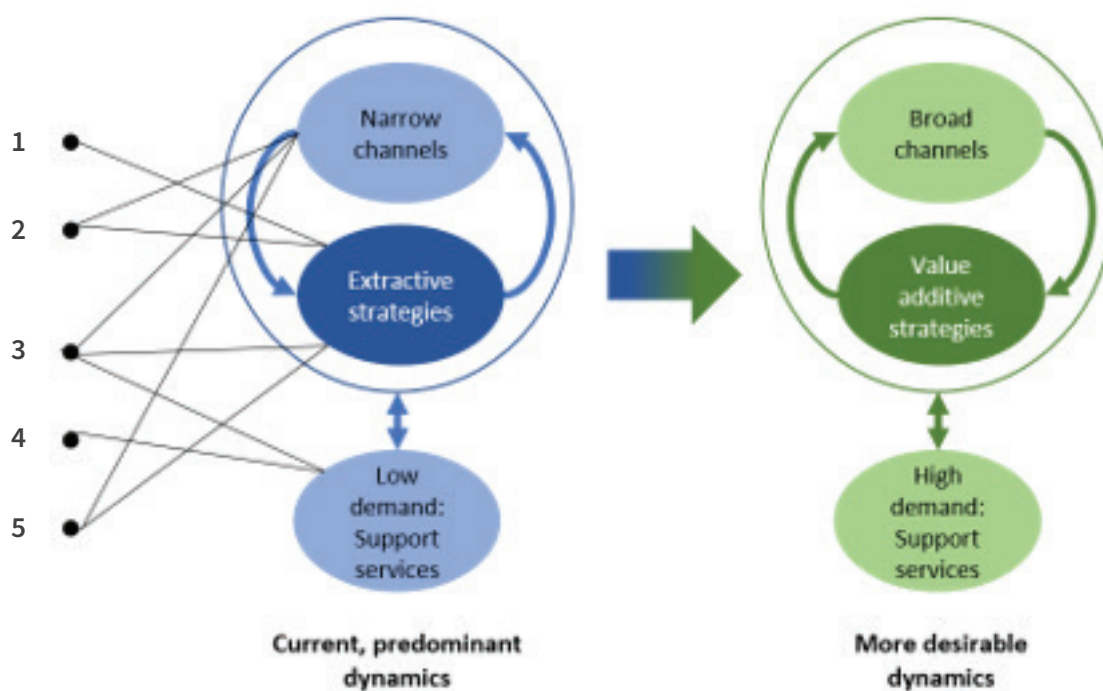
LEVERAGE POINTS

Leverage Points Inform RDC Strategy

Five strategic leverage points were identified in the baseline network analysis to inform program strategy. They included:

1 Incentive strategies reward value-additive strategies

2 End-market opportunities create pressure for value additive strategies

3 New service providers to egos and alters

4 Seed industry association ensures collaboration

5 New entrants disrupt distribution channels

Causal Loop Diagrams

to understand what part of the system to engage
in to initiate change

Causal Loop Diagrams
to understand what part of the system to engage in to initiate change

"When you are confronted by any complex social system, such as an urban center or a hamster, with things about it that you're dissatisfied with and anxious to fix, you cannot just step in and set about fixing with much hope of helping… You cannot meddle with one part of a complex system from the outside without the almost certain risk of setting off disastrous events that you hadn't counted on in other, remote parts. If you want to fix something you are first obligated to understand… the whole system… Intervening is a way of causing trouble"
- On Meddling (1974, Lewis Thomas)

WHAT IS A CAUSAL LOOP DIAGRAM?

A Causal Loop Diagram (CLD) is:

- A causal loop diagram is a "snapshot of all relationships that matter." It is a visual representation of key variables (i.e., factors, issues, processes) and how they are interconnected.

- These diagrams show variables represented as texts and *causal* relationships between them represented as arrows. Arrows indicate the direction of causality, the nature of the relationships (i.e., proportional or inverse), and whether there is any delay in an expected effects' occurrence.

(Example CLD p.34)

WHAT MAKES A CAUSAL LOOP DIAGRAM A "SYSTEMS" TOOL?

- Causal loop diagrams address the core principle of systems thinking: *One cannot understand an issue or its constitutive parts (factors, actors, processes) in isolation.* In a system, everything is related to everything else. The relationships (and not the parts themselves) drive the outcomes and behaviors we want to understand. Without understanding these relationships, and if necessary modifying them, we cannot possibly change outcomes/behaviors in a lasting manner. However, it is not easy to identify and account for these relationships.

- In complex systems, cause-effect relationships are often separated by time and space, making connections obscure. Additionally, the sheer number of connections between causes and effects as well as across causes themselves

challenge the abilities of normal language and human mind, both of which are more suited to account for limited number of relationships at a time. Yet, while each relationship is individually important, it is the collective impact these relationships have on a system that shapes the outcomes/behaviors we want to understand.

- By providing a snapshot of all relationships that matter on a single sheet, CLDs allow us to gain a "big picture" perspective on a problem; that is, we can see the processes through which different parts (factors, actors, and processes) interact to generate a problem, or how a problem interacts with its broader environment. This is the first step in adapting a systems perspective and avoiding the common analytic tendency to see things in isolation. It is important to note that CLDs represent a tool for continued system analysis, and not the end product of the effort itself. Ideally, developing a CLD that accurately portrays the system being studied will yield insights that further the analysis and deepen the user's understanding of the relevant causes and effects.

WHEN MIGHT I WANT TO USE A CAUSAL LOOP DIAGRAM?

When you want to model a dynamic system in a holistic manner.

- CLDs are used to conceptually model dynamic systems in a holistic manner, mapping how variables (i.e., factors, issues, processes) influence one another. We tend to think of issues in terms of simple, linear and independent cause/effect statements. This is partly because of the limited ability of language and the human mind to process interdependent series of complex cause-effect

chains. CLDs offer a language that can capture and convey this complexity.

When data are not available to provide a precise characterization of a complex system.

- There are various qualitative methods to analyze a CLD to obtain critical insights about how a system works. For example, we can examine a CLD to uncover a system's underlying "feedback structures," which arise from interactions of factors, actors, and processes in a system over time. These structures may otherwise be difficult to identify as its parts may be separated by time and space. However, understanding feedback structures is critical as behavior and outcome patterns in a system are shaped and conditioned by them. This understanding enables us to differentiate between symptoms and root causes of problems and identify high and low leverage

intervention points in a system. With such insights, we are better equipped to design effective strategies to engage with a system and anticipate as well as preempt unintended consequences. CLDs also show the natural constraints within the system, helping us develop more realistic expectations regarding our ability to bring about change.

WHAT ELSE SHOULD I KNOW ABOUT CAUSAL LOOP DIAGRAMS?

If and when data are available, CLDs can be transformed into stock and flow diagrams, in which each variable is represented by an appropriate mathematical equation, and various changes in variables of interest can be simulated to see the net effects in a system.

Causal Loop Diagrams: Ways to Use

WHAT CAN CLD HELP ME UNDERSTAND?

A CLD is a powerful systems thinking tool to characterize operation of a complex system or a problem. A CLD visually maps key variables and their causal relationships. Variables may include:

- factors

- issues

- processes

- actors' behaviors and perceptions

Additionally, a CLD can be used to uncover underlying structures and associated feedback loops that produce recurring patterns of events over time.

WHAT ARE SOME SPECIFIC APPLICATIONS OF CLD?

At a high level, CLDs help us do the following, which can form the foundation for many program design, monitoring, and evaluation activities:

- **Defining the problem**: Effective program design efforts must begin with a robust understanding of the local context/system and the problem to be addressed. CLDs provide an integrated view into all key variables (i.e., all relevant stakeholders and their perspectives, STEEP factors, and processes)

and their causal relationships in a local system. (STEEP stands for social, technological, economic, environmental and political factors.) These causal relationships form feedback loops through which we can trace the chain of events/influences that condition and inform behavior patterns and outcomes in a local system. By examining a CLD, we can identify root causes of problems and causal pathways that sustain the problem. Additionally, a CLD captures stakeholder interests, perspectives and concerns as they relate to the operation of various factors and processes within a local context. As such, they help us uncover incentives and sanction structures built into the local system that motivate certain behaviors. This can help program designers understand which stakeholders need to be incorporated into collaboration efforts and how they can be incentivized for cooperation. These insights strengthen a program's theory of change and the odds of success for its engagement and intervention activities.

- **Identifying intervention points**: Because a CLD maps causal interactions and interdependencies that explain how problems emerge and are sustained in a particular environment, it can also provide insights into how we can initiate change for system-wide improvement. Through leverage analysis, a CLD can be assessed to identify actionable points within a system (e.g., hub points, parameters, buffers, information flows,

rules, power structures, governance, roles, etc.) and high and low-leverage intervention points can be compared for trade-offs in various effects.

- **Informing monitoring and evaluation efforts**: CLDs can also inform the measurement scheme supporting system-wide monitoring and evaluation efforts. Key variables in causal pathways associated with outcomes of interest provide helpful input into the design of monitoring and evaluation frameworks, helping identify what critical factors to track and measure during the course of program implementation and evaluation.

- **Enhancing stakeholder participation and input**: CLDs are shown to be most effective when developed through a participatory modeling process that brings together diverse stakeholders to share information and ideas about their system. CLDs help externalize stakeholders' mental models while helping them develop a shared understanding of the problem and a sense of ownership of the resulting program efforts.

KEY APPLICATIONS & POTENTIAL LIMITATIONS

Key Applications:

- Characterize complex causal relationships between key variables

- Uncover feedback structures and root causes that drive systemic outcomes

- Identify system parts/variables separated by time and space

- Consider the entire system together and recognize outcomes are a result of the entire system working together

Potential Limitations:

- Represent simplification of the reality

- Based on modelers' subjective perspectives

- Reveal qualitative (not quantitative) insights

- Cannot conclusively predict outcomes

Causal Loop Diagrams: Method in a Nutshell

OVERVIEW OF METHOD

Like most complex analysis, causal loop diagramming is iterative. The steps outlined below are meant to serve as a high-level guide to the process rather than a strict sequencing.

Key steps in conducting a causal loop diagramming include:

1 Define your learning question

2 Define CLD parameters

3 Identify stakeholders

4 Collect & model data

5 Analyze CLD

6 Share results

1. DEFINE YOUR LEARNING QUESTION

The first step in developing a CLD is to establish what you are trying to better understand. Your goal may be to understand a system (e.g., healthcare in general) in its entirety or a sub-part of the system (e.g., prenatal healthcare). You may be trying to understand how a system/organization operates or characterize a context (i.e., problem space) to see how a phenomena or problem emerged and is sustained by related processes, stakeholder behaviors, and perceptions. Or, maybe the goal is to capture and convey a theory of change that underlies a new program or initiative. Whatever the goal may be, it should be established through consultations with key stakeholders before modeling efforts commence.

2. DEFINE CLD PARAMETERS

Since CLDs are often used to understand complex issues, modeling efforts can get overwhelming quickly unless proper parameters have been identified and agreed upon by key stakeholders. Some of the key parameters to consider include:

- **CLD Scope**: Establishing boundaries to determine the scope of the modeling effort is critical to avoid developing an unnecessarily complex model. There are different ways to

establish scope for a CLD. For example, developing definitions for key concepts associated with the theme of investigation makes some things part of the CLD while leaving others outside the scope of assessment. Similarly, geographical or temporal boundaries can help establish scope for a CLD assessment.

- **Level of Abstraction**: The goal of a CLD is never to model everything – in fact a key point to remember about systems analysis is that it helps manage complexity by taking a step back and seeing the "big picture." As such, determining the level of abstraction for the modeling process ensures keeping everyone on target while ensuring consistency in treatment of various issues across the CLD. A CLD should not depict one part of the system in significant detail while only providing high level coverage of another part. The desired level of abstraction can be established through an initial discussion with key stakeholders and is often linked to the research question. While providing a high level overview may be appropriate for a CLD that provides a general understanding of a local environment or problem context, a detailed depiction may be more appropriate for a CLD that zooms into a problem issue. Those involved in development of a CLD should be mindful of the inevitable tradeoff between depth and breadth and make decisions based on the desired analytic product and purpose of the analysis.

- **Number of CLDs**: Although most learning efforts will require development of an all-encompassing, single CLD, there may be cases in which multiple CLDs are warranted for a complete assessment. For example, if you would like to contrast the "before and after" states of an organization or a community following an intervention to characterize differences in processes, perceptions, and behaviors, developing two CLDs may be a desirable goal. If you are exploring issues or problems that operate as a system of systems, nested or linked causal loop diagrams can be developed to allow analysis of cross-cutting relationships and dynamics. Similarly, if the goal is to visually depict alternative initiatives or programs and their associated theories of change, you will need more than one CLD to facilitative a comparative assessment. How many CLDs will need to be developed is closely tied to the learning question and should be part of the initial stakeholder consultations. However, CLD development process is iterative and requires a flexible approach as the necessity for additional CLDs may be determined during the modeling

effort in light of a growing understanding of the system.

- **Data sources**: The information that feeds into a CLD can come from various sources. It could rely on literature review and previous studies, interviews with experts and stakeholders, focus group discussions, or working group sessions that physically bring key stakeholders together. Usually it is best to use multiple data sources for information triangulation and representation of both objective and subjective realities. Moreover, CLDs have shown to be most effective when developed through participatory modeling process in which different stakeholders argue for and reconcile their perspectives. As such, depending on the learning question and the phenomena being studied, a CLD that only reflects a literature review may fail to capture key issues just as a CLD that conveys only stakeholder-driven information may neglect dynamics that are unknown to the specific group involved.

3. IDENTIFY STAKEHOLDERS

If the CLD incorporates information elicited from stakeholders, who will be included in the modeling effort needs to be determined. Once the high level categories of stakeholders (e.g., academics, practitioners, local farmers) associated with the issue of interest are determined, specific individuals who will represent each category need to be identified and contacted. One key consideration in this stage is to ensure that diverse stakeholders as well as diverse perspectives within each stakeholder category are represented during the data collection efforts.

4. COLLECT & MODEL DATA

During this step, a literature review is conducted to identify key variables and relationships relevant to what is being modeled. Literature reviews can include previous studies, program evaluations, government documents, statistics, newspaper articles, and any other documentation that relates to the identified learning question. A critical component of this literature review is to investigate behavior over time associated with the key variables identified. If data are to be collected from stakeholders or key informants, semi-structured interview questions and focus group questions should be prepared. Alternatively, stakeholders can be brought together in person for a real-time, facilitated discussion and participatory group modeling. If the CLD will be developed through participatory group modeling process, several sessions will be conducted to capture all relevant perspectives as well as emergent ideas and thoughts. During the

first session, stakeholders can be presented with a simple, core feedback loop to kick-start discussions.

During the data collection process, some of the key questions considered include: What are the key variables, issues, forces, dynamics and outcomes essential to explain this system or problem? How do they relate to one another? What are some of the key cause-effect relationships, interactions and interdependencies? How can these relationships be reflected in terms of reinforcing (a series of relationships that appear to cause exponential growth or decline in a phenomena) and balancing loops (a series of relationships that appear to prevent change with a push in the opposite direction)? Which one of the effects are immediate and which ones are delayed? How do stakeholders perceive each other, their place in the system and key dynamics associated with the problem? What are some of the economic, social, political, and cultural norms and structures in place and how do they influence the operation of the system and key outcomes? Are there any real or perceived delays in cause-effect relationships identified?

Often data collection and CLD modeling happen simultaneously. As data accumulates and our understanding of key dynamics and forces evolve, mapping key variables and relationships begins.

Once a CLD is formed, its variables or relationships can be color coded to convey another layer of information. For example, variables associated with different domains (e.g., economic or social) can be colored differently; similarly, arrows (that represent relationships) can be color-coded to reflect different types of relationships (dependency, information flow, compliance, etc.).

CLD development is an iterative process. Before the analytic team and key stakeholders feel comfortable with the resulting CLD, the model will almost always go through several revisions and adjustments in light of new information and group learning. Similarly, once a baseline CLD is developed, it can periodically be updated to reflect the ways the system, local context, or problem may be changing as a result of program interventions or natural evolution.

5. ANALYZE CLD

Once a CLD is developed, it is time to take a step back and examine the model for original insights. Synthesis of different perspectives and information often reveals information that you cannot see by examining individual parts. A CLD lends itself to different types of qualitative assessment, including:

- **Trend analysis**: In this type of assessment, empirical trends about key STEEP (social,

technological, economic, environmental and political) variables associated with important outcomes are researched, analyzed and overlaid to the model. Trend analysis is often conducted to anticipate the direction of the system or problem in the near future. Trend analysis is a critical input into decisions that are concerned with prioritization of problem areas and response initiatives (particularly where multiple programs and initiatives may be considered) and help make resource allocations decisions.

- **Causal pathway analysis**: This is an explicit assessment of inputs and outputs associated with key outcomes. Usually outcomes of a causal pathway serve as inputs into another casual pathway, highlighting the complex connections present in a system or problem context. Along each causal pathway, inputs and outputs are sorted into different groups (technology, economic, social, resources, methods, perceptions, etc.) and ways of measuring them along with related indicators are identified.

- **Leverage analysis**: In this type of analysis, a CLD is analyzed to identify systemic levers (actionable points for intervention) for positive change and assess their effectiveness. While high leverage intervention points enable system-wide, lasting change with relatively small resources, low leverage points in a system allow for limited change that requires continuous application of resources to sustain positive results. Leverage analysis often relies on the seminal work (1999) by Donella Meadows, who identified 12 different places to intervene in a system with differing levels of effectiveness such as constants, parameters, numbers; driving positive feedback loops; the rules of the system; and the distribution of power over the rules of the system. Accordingly, a CLD is analyzed to determine how many of the twelve actionable points are present in the depicted system/context. Alternatively, a CLD can be examined to identify leverage points based on other forms of qualitative assessments such as feedback loop intensity and influence/exposure scoring of individual variables. Available intervention points are then assessed for alignment with program objectives and stakeholder desires as both high and low leverage interventions may be needed in a problem context.

- **Cascading effects analysis**: Since everything is related in complex systems, a change in a key variable often causes changes in other, sometimes distant parts of the system, as its effects travel through extensive causal pathways. A cascading

effect analysis can help us anticipate unintended consequences of programmatic actions and take timely action to offset related dynamics. Cascading effects analysis not only enriches our understanding of a specific problem, but also improves our ability to assess feasibility and desirability of various programmatic actions. Where cascading effects are inevitable, this type of analysis can alert us to the timeline of effects expected, and whether simultaneous interventions in different parts of the system are needed to remedy negative developments.

- **Complex Adaptive Systems Assessment**: In complex adaptive systems (CASs), we cannot control or dictate actors' behaviors – we can only hope to influence them. However, previous research has identified key principles that help with managing human behavior in complex systems. With CAS assessment, local incentive and sanction structures that govern stakeholder behaviors are analyzed to see how they can be modified for alignment with practices and principles that are known to work in CASs. Once a CLD is developed, problem-related outcomes and their connections to various human behaviors are

explicitly analyzed to uncover critical incentive and sanction structures that are built into the local system. Understanding how to modify these structures in order to mobilize and motivate people towards desired outcomes is a critical task in many programmatic interventions.

6. SHARE RESULTS

For the best results, CLDs should not be presented as a single page analytic product. Typically, a complex CLD can be presented in two ways:

- **Story-Boarding**: One way to present a complex CLD is to story-board it. In story-boarding, a CLD is broken into consumable chunks that represent meaningful, distinct parts of a broader story. These parts are then presented through consecutive scenes to tell a story, gradually building towards key findings.

- **Causal Trees**: Another way to present a CLD and its findings is through causal trees. In causal trees, selected causal pathways are visualized to depict how a series of variables contribute to a particular outcome of interest or how a selected variable impacts a series of other variables in a system.

Causal Loop Diagrams: Resources Required

There are no standard resource requirements for development of a CLD, as the amount of resources often depend on the consideration of a number of factors. Developing an initial map can typically take between 1 - 5 months depending on how many people are involved and the level of complexity and detail desired. Key considerations include:

- How complex is the learning question?

- What is the scope of the CLD?

- How detailed is the requested CLD?

- What is the extent of previous research and empirical knowledge about the subject of investigation?

- How many CLDs will be developed?

- Will CLDs be periodically updated or maintained?

- Will the CLD development rely on literature review alone or also on group model building with stakeholders?

- If group model building is desired, how many stakeholder will be involved in the effort?

- How accessible are the stakeholders to provide input for iterations of the CLD?

- How sophisticated will the analysis be?

(Resources required chart p.33)

Levels	Preconditions/Goals	Time	Human Resources
Easy	• Problem and learning question defined • Available information and/or working with a small number of stakeholders (less than 5) • High level characterization of key loops • Approximately 20-30 or fewer variables	1-2 months	1 senior analyst 1 junior analyst
Medium	• Parts of problem and learning question defined • Limited information and/or working with more than 5 stakeholders • Detailed level characterization of key loops • Approximately 30-50 variables	3-4 months	1 senior analyst 1 junior analyst
Difficult	• Problem and learning question not defined • Limited information and/or working with more than 10 stakeholders • Participatory modeling required • Detailed level characterization of key loops • Approximately 50 or more variables • Additional systems analysis based on CLDs	6 months or more	1 senior analyst 1 facilitator 2 junior analysts

CAUSAL LOOP DIAGRAM

EXAMPLE CLD
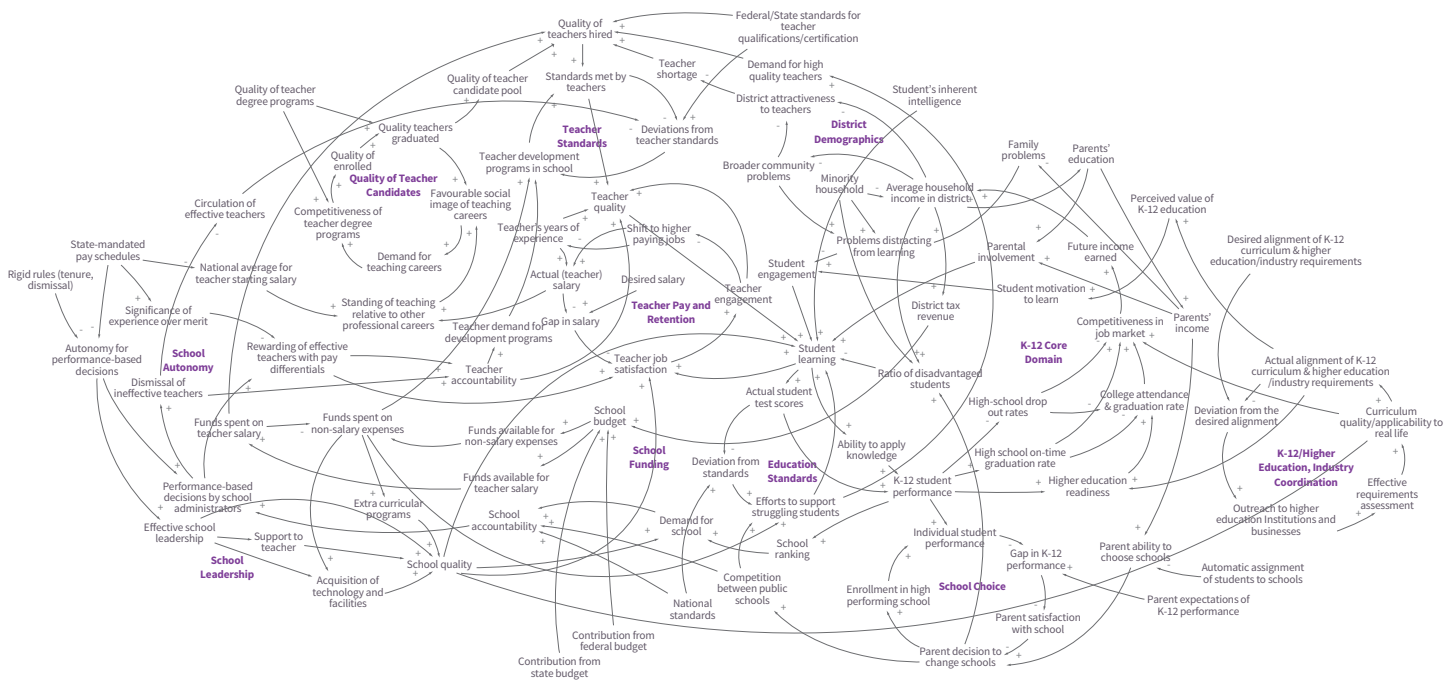
Example of a Causal Loop Diagram

A Causal Loop Diagram (CLD) is:

- A causal loop diagram is a "snapshot of all relationships that matter." It is a visual representation of key variables (i.e., factors, issues, processes) and how they are interconnected.

- These diagrams show variables represented as texts and *causal* relationships between them represented as arrows. Arrows indicate the direction of causality, the nature of the relationships (i.e., proportional or inverse), and whether there is any delay in an expected effects' occurrence.

Causal Loop Diagrams
Case Study

Mexico's Cartel Problem
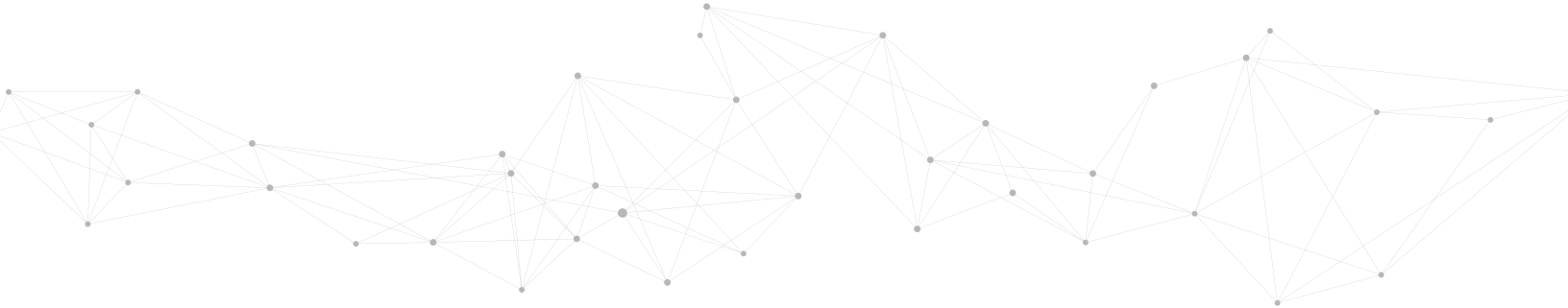
CHALLENGE

Mexican cartels have corrupted the social, political, and public life in Mexico for some time. However, over the last decade, these cartels have evolved into complex criminal networks engaged in various illicit activities, such as human trafficking and smuggling of cash and weapons. The unprecedented increase in recent years in cartel-related violence has presented growing challenges to Mexico's socio-economic stability as well as to the United States' (US) National interests. ANSER analysts were asked to identify key dynamics associated with Mexican cartels and their operation, and assess the existing response strategies' potential to bring about systemic change.

APPROACH

ANSER approached the cartel problem as a complex system. Following a thorough literature review, the study team identified key social, economic, political, and legal variables that shape the broader environment in Mexico that contribute to, facilitate and tolerate cartels' organized crime activities. Using CLDs, the study team characterized the dynamic relationships and complex feedbacks between these variables involved in different domains of cartel operations, identifying in the process the inherently systemic causal factors (*Figure 1 p.37*).

KEY INSIGHTS

The CLD characterization of the cartel problem context in Mexico revealed several insights. Some highlights include:

- Many systemic ills served as root causes that enabled cartel's survival and flourishing within Mexico. These root causes ranged from poor socio-economic conditions to political and legal shortcomings in Mexico's public institutions. For example, problems with education system exacerbated economic underdevelopment, helping cartel recruitments or encouraging illegal population flows into the United States. Similarly, widespread corruption in critical public sectors (e.g., police force, judicial system, prisons and customs) created an environment that lacks credible deterrence from crime, allowing cartels and their affiliate criminal organizations operate with impunity.

- While these factors are individually important, it is their collective impact on the Mexican domestic environment as well as individual perceptions that provide the incentives, motivations, and favorable cost/benefit evaluations that nurture continued cartel operations.

- An assessment of the then-leading response strategy (a joint US-Mexico program, the Merida initiative) indicated that authorities invested much of their resources in low-leverage law enforcement measures (e.g., training of Mexican law enforcement personnel and procurement of equipment) addressing what CLD analysis revealed to be the symptoms of the problem (e.g., capture of cartel leaders, seized contraband). These quick fixes promised only short-term improvement that could not be sustained in the long run as the root causes of the problem went unaddressed.

- Without high-leverage interventions that address the deeper economic, social, and political root causes (of illicit activities), lasting change (e.g., decreasing recruitment success of cartels, increased rates of prosecution and punishment of

cartel members) is not possible. A key goal should be restoring key public institutions' reputation and credibility.

- Low-leverage interdiction operations led to the unintended consequence of unprecedented levels of violence as cartels began fighting for turf and seeking new resources to maintain their fighting capabilities.

RESULTS

The study presented practical policy recommendations informed by the systemic assessment of the cartel problem. The assessment acknowledged the demands for and necessity of quick-fix solutions in Mexico in light of the growing public safety concerns and recommended that these solutions be coupled with high-leverage, long-term reform initiatives that simultaneously and systematically address the shortcomings in economic, social, and political institutions within Mexico.

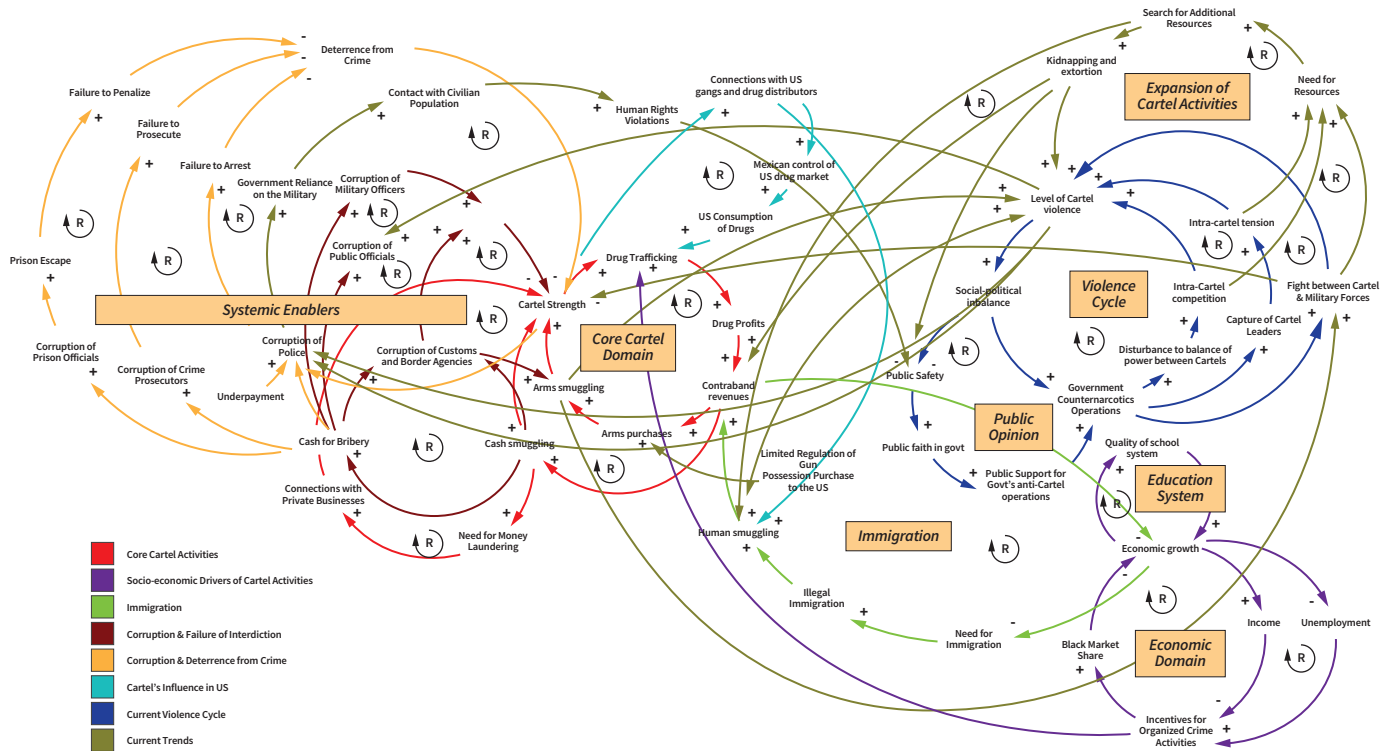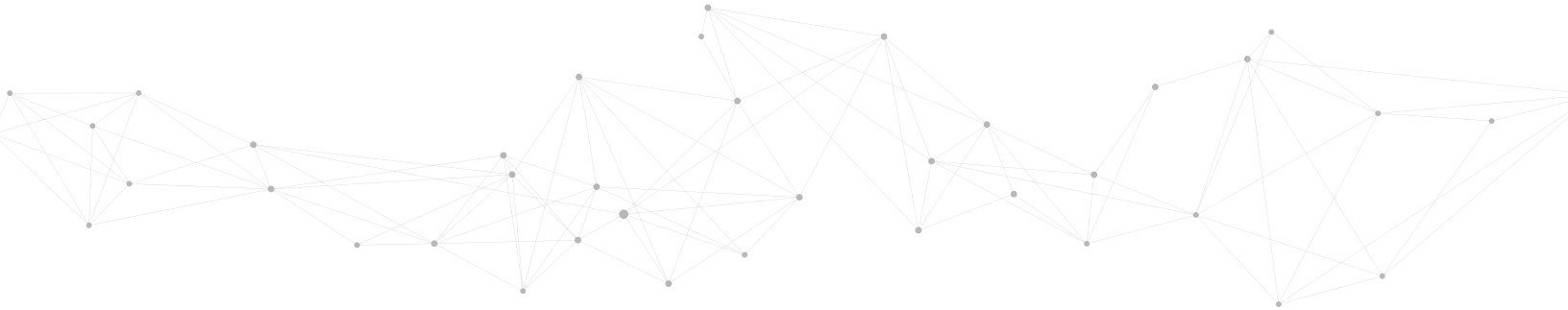Read more about this project: anser.org/docs/asyst-doc/Mexican_Cartels.pdf

Figure 1: CLD of Mexican Cartels Operations and Problem Context

Description

Causal Loop Diagrams
Case Study

US Public Education

CHALLENGE

US public education system is characterized by some undesirable performance problems such as low test scores, graduation rates, and readiness for college as well as achievement gaps and low scores in international standardized tests. ANSER analysts used systems thinking to understand the root causes of these problems.

APPROACH

ANSER analysts approached US public education as a complex adaptive system, arguing that its performance problems are not driven by a single factor or issue. Rather, many of the behaviors we observe in the public education domain are deeply rooted in the internal structure of this system, including the associated rules and practices that can be collectively considered as the governance of the system.

The study team identified key actors, factors, processes, and issues that are involved in the public education system and how their causal interactions and dependencies result in various performance problems. A key focus area was identification of governance forces, rules, and practices (e.g., school districts, teacher union constraints, funding practices, school choice, teacher quality, and compensation guidelines) that shape the behaviors of key education stakeholders (parents, students, teachers, and administrators), ultimately contributing to undesirable education outcomes. Identified factors, dynamics, and relationships were mapped and analyzed for additional insights using the causal loop diagramming technique *(Figure 1 p.39)*. As part of this analysis, the team also identified and compiled many attributes of complex adaptive systems as well as the suggested governance strategies and practices that have been found to be effective in managing performance in other complex

adaptive systems. These strategies have been compared to those employed by US public education for identification of discrepancies and misalignment.

KEY INSIGHTS

The CLD characterization of the US public education and its assessment as a complex adaptive system revealed many insights. Some highlights include:

- US public education is a complex adaptive system but is not governed as such.

- The very design of the US public education system constrains its governance practices and condition its performance outcomes.

- Some structural properties of this system (e.g., rules, incentive and hindrance structures, accountability measures) make it artificially uniform, orderly, and predictable. They also fail to motivate stakeholders toward different practices that are likely to improve education outcomes.

RESULTS

The study proposed a number of recommendations to modify rules and practices pertaining to US public education system, concluding: *to improve performance of the US public education, policy-makers need to revise its governance structures to encourage more emergence, innovation, dynamic adaptation, and self-organization – qualities that are often found in successful complex adaptive system.*

For details of this study, review the following journal article: sciencedirect.com/science/article/pii/S1877050 914012988/pdf?md5=0a1341817cada9739627f989609a 6b0b&pid=1-s2.0-S1877050914012988-main.pdf

Figure 1: CLD of US Public Education Problem Space
(McGee and Edson 2014, p.136)

The study team identified key actors, factors, processes, and issues that are involved in the public education system and how their causal interactions and dependencies result in various performance problems. Identified factors, dynamics, and relationships were mapped and analyzed for additional insights using the causal loop diagramming technique.

Causal Loop Diagrams
Case Study

2014 Quadrennial Homeland Security Review
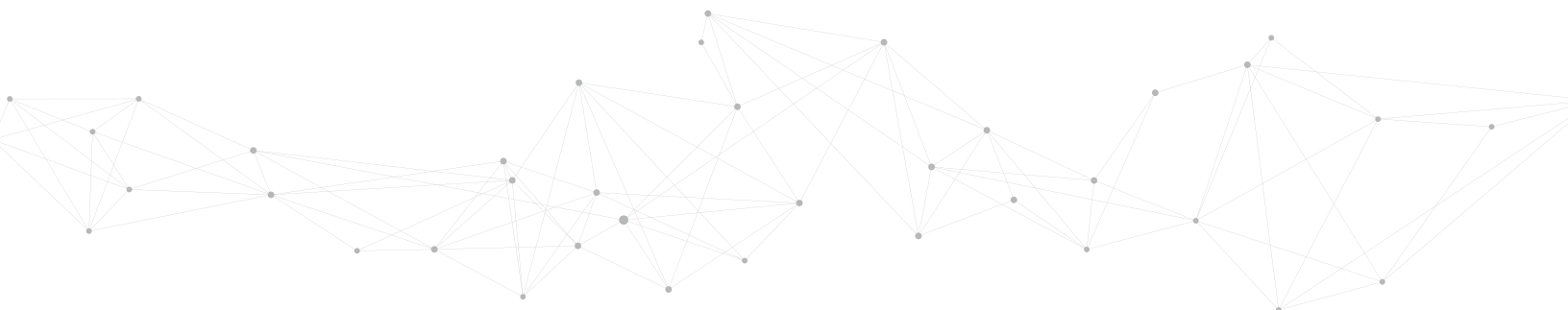
CHALLENGE

The Department of Homeland Security (DHS) is congressionally mandated to conduct a review of its long-term strategy and priorities every four years, resulting in the Quadrennial Homeland Security Review (QHSR). ANSER analysts were asked to provide systems assessment support to DHS to conduct the 2014 QHSR. The study included characterization of various risk areas (e.g., terrorism, organized crime, and cybersecurity) to understand key dynamics, current trends, and priorities for action.

APPROACH

One way to conduct this assessment would have been to help each individual office assess their mission area, identify relevant risks, think about current activities and trends, identify gaps, and make recommendations for future strategies. Instead, this study brought together diverse stakeholders from many DHS offices in multiple participatory working group sessions. Stakeholders were asked to collaboratively discuss the risk areas they are responsible for, providing information, experiences, and input. Using CLDs, the study team mapped key variables and relationships associated with each risk area based on the information elicited from participating stakeholders. With additional research, relevant current trends were identified and overlaid over the risk CLDs to anticipate how each risk area may evolve going forward. *(Figure 1 p.41)*

KEY INSIGHTS

Several key insights emerged from this exercise that would have otherwise been difficult to obtain:

- Systems assessment helped stakeholders realize that some risk areas considered were not independent of each other, but rather they operated as a system of systems. They were characterized by complex relationships that tied key actors, their operations, incentives, and means together. Designing effective response strategies required understanding these risk areas as a whole so that they could be addressed simultaneously through the relationships identified.

- Some existing response strategies (e.g., interdiction) were identified as only capable of addressing symptoms rather than the root causes. Additionally, CLDs made it clear that strategies like interdiction that address a risk area in isolation had the potential to shift undesirable behaviors into other risk areas (owing to complex relationships), shifting the burden of mitigation to another DHS office.

- Identified relationships and dependencies that connected various transnational organized crime risk areas indicated illicit finance to be an additional risk area for consideration. Illicit finance was operating to enable outcomes in other risk areas and could serve as a high-leverage intervention point to curb many undesirable behaviors in different domains simultaneously.

- Effective mitigation strategies required close coordination and collaboration not only among different DHS offices, but also between DHS and other government agencies that share responsibility for homeland security risks.

RESULTS

A participatory CLD mapping process served as a key part of the 2014 QHSR methodology. Insights helped inform DHS's 2014 QHSR to Congress. The CLDs also formed the foundation for quantitative risk assessment in later stages of the QHSR process.
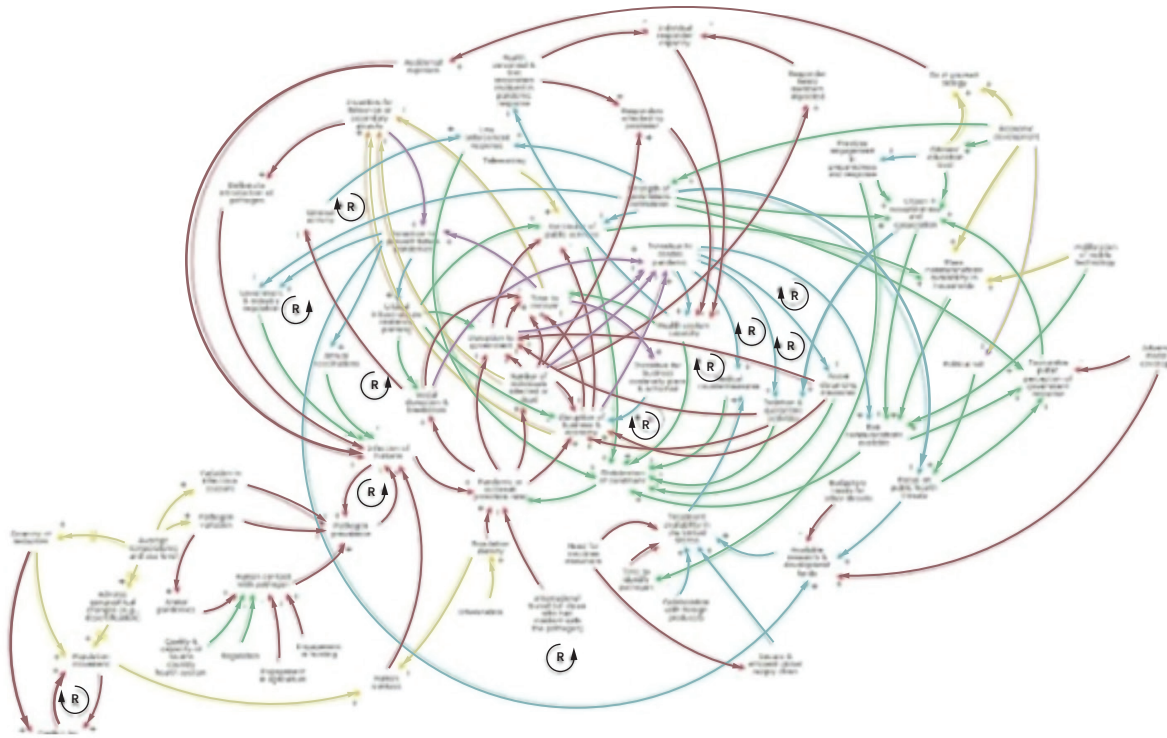
Figure 1: CLD characterization of a risk area

Using CLDs, the study team mapped key variables and relationships associated with each risk area based on the information elicited from participating stakeholders. With additional research, relevant current trends were identified and overlaid over the risk CLDs to anticipate how each risk area may evolve going forward.
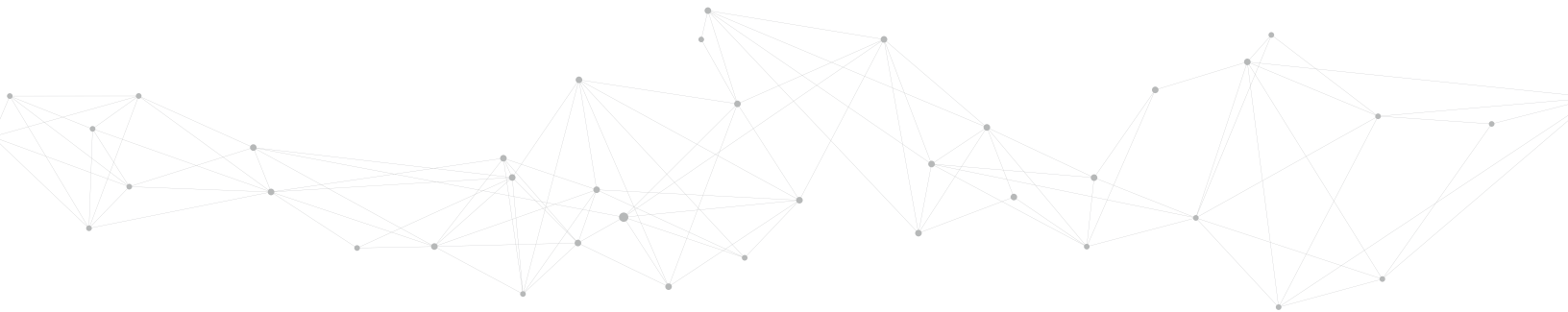
Ethnography

to better understand behaviors and norms within a system

Ethnography
to better understand behaviors and norms within a system

WHAT IS ETHNOGRAPHY?

Ethnography means 'writing about people,' and is the primary tool for data collection and analysis among anthropologists, sociologists, and, increasingly, historians and political scientists.

- **Cultural Immersion**: First developed and defined methodologically in the early 20th century by the anthropologist Bronislaw Malinowski (1922), the primary approach used by ethnographers is cultural immersion where the ethnographer lives with the community, group, or settlement under study, and participates in various aspects of the people's daily lives.

  Gaining such access usually requires significant investment in time spent with the community, and (usually) involves ethical review clearances, research permits, and numerous and repeated conversations with various members of the community. The primary outcome of these interactions is trust-building between the ethnographer and the members of the community. This enhanced access and trust enables the ethnographer to engage with the community members in informal conversations, discussions, and also participate in daily and ritualized activities processes. The trust built up between ethnographers and respondents usually results in data and observations that are closer to the people's lived realities. In this regard, ethnographic approaches result in more accurate and precise descriptions and explanations of complex social and cultural processes than questionnaire-based surveys or formal and structured one-time interviews conducted by hired enumerators.

- **Smaller Sample Size**: Due to the intense effort and time commitment required to build trust and gain access, ethnographic data collection and related analysis is usually based on a fewer number of respondents than survey-based research. The smaller sample size also suggests that ethnographic data is not easily conducive to quantitative or statistical analysis. Furthermore, the strength of ethnographic research is based on trust between respondent and ethnographer, and networks of trust between ethnographer and the community, and not usually based on random sampling. Hence, despite its greater accuracy and precision, ethnographic data collection and analysis is not easily scalable, generalizable, or transferable.

Recent efforts however have resulted in a variety of methods to move beyond subjective interpretation towards more quantitative analysis. These include Domain Analysis, Consensus Analysis, Decision Modeling, Social Network Analysis, and Causal Loop Programming, etc. (Bernard 2012; Bernard et al. 2016). These techniques have enabled ethnographers to a) generate generalizable and verifiable analysis that could be applied in regional and global contexts, b) partner with other social scientists in multi-disciplinary collaborations for analysis of complex social, economic, and political systems, and c) bring ethnographic techniques to various disciplines across the scientific spectrum including biology-ecology, engineering, and architecture.

Ethnography: Ways to Use

WHAT CAN ETHNOGRAPHY HELP ME UNDERSTAND?

Ethnographic data collection techniques enable researchers to:

- Elicit data that is more accurate and precise, primarily due to trust-building between ethnographer and respondent

- Access information that the respondents would not ordinarily share with external parties

- Obtain information or responses that are not based on their own agendas or their perceptions of the ethnographer's focus and agenda

- Observe real behaviors and lived experiences in addition to recalled responses

- To compare real vs. reported behaviors

WHAT ARE SOME SPECIFIC APPLICATIONS OF ETHNOGRAPHY?

Specifically, ethnographic techniques can be used to:

- **Identify various actors, processes, and institutions commonly perceived as influential within a complex social process**: Analysis of responses using both interpretive and other analytical approaches such as Consensus or Domain Analysis can often shed light on hidden complexities that are invisible to external observers.

- **Understanding Local Logics and Rationale**: Ethnographic data usually consists of detailed and extended notes on conversations, formal and informal interviews, group discussions, as well as observations of real behaviors, events, and lived experiences of the people in their own cultural and physical histories and environments. This enables ethnographers to gain an 'insider's or the emic perspective' while maintaining some distance to retain the 'outsider's or the etic perspective' (Harris 1979). Often, the combination of emic and etic perspectives can serve to bridge the gaps between local and external actors' needs, wants, desires, agendas, and interpretations.

- **Identify Endogenous Factors and Contingencies**: Ethnographers usually gain valuable insights into local complex dynamics and develop ways to identify endogeneity (confounding variables, casual loops, interdependency) and contingency (history, accident, randomness) in social processes and trajectories.

KEY APPLICATIONS & POTENTIAL LIMITATIONS

Key Applications:

- Gain firsthand valuable insights into local complex dynamics

Potential Limitations:

- Not easily conducive to quantitative or statistical analysis

- Not easily scalable, generalizable, or transferable

Ethnography: Method in a Nutshell

OVERVIEW OF METHOD

At its very root, ethnography consists of spending time with people and recording their responses and behaviors. The classic ethnographies such as the Argonauts of the Western Pacific (Malinowski 1922) or The Nuer (Evans-Pritchard 1951) would attempt to observe and record all aspects of societies including social, economic, political, and ideological organization, religion and belief, landscape, subsistence, kinship, conflict, marriage alliances, etc.

This was possible as ethnographers spent multiple years in the same site.

Recently, the focus has changed to question-oriented or question-driven ethnography where the ethnographer goes to the field and gathers data to answer a posed question. While this approach still requires trust building between respondents and ethnographers, the specific focus usually means that ethnographers today spend less time in the field than did their predecessors.

The methods used today in a nutshell are:

- Participant Observation
- Interviews
    - Open-Ended
    - Semi-Structured
    - Structured
- Focus Group Discussions
- Questionnaire-Based Surveys

PARTICIPANT OBSERVATION

Using participant observation, the ethnographer engages with the respondents and the community, to gain an etic and emic perspective. This is the primary strength of ethnographic techniques since it enables comparison of reported behaviors and norms with observation of practiced and lives behaviors and norms.

INTERVIEWS

Interviews are usually informal or formal conversations specifically meant to elicit data and information from respondents. Interview techniques used in ethnographic research can range from:

- **Open-Ended Interviews**: These are Broad/Deep Listening dialogues between ethnographer and respondent where the conversation is not structured and the respondent usually determines the direction and nature of conversation in an organic dialogue with the ethnographer. These interviews result in long narratives without structuring themes, and are the key to trust building between ethnographer and the community. These interviews are often repeated to maintain the dialogue and the trust. Many ethnographers employ the open-ended interview in the initial phases of the field work to build relationships with the local community. While seemingly unstructured, aforementioned analytical techniques can be used to detect patterns and themes in the data that can be verified or tested with other interviewing techniques.

- **Semi-Structured Interviews**: Here the ethnographer has a list of themes around which the questions will be asked and which will structure the interview. The responses are usually in the narrative form. However, the semi-structured interview usually leaves space for the respondent to go off topic, to elaborate, to explain, and to draw analogies or inferences akin to the open-ended interview, and hence is valuable for providing context to the responses.

- **Structured Interviews**: Here the ethnographer asks scripted questions that call for elaborate narrative responses but do not allow deviation from the questions. The strength of structured interviews is that all the questions asked are identical and hence make comparative analysis easier than open-ended or even semi-structured interviews. However, the primary drawback of the structured interview is the loss of contextual data or seemingly tangential information that emerges in the open-ended or semi-structured interviews.

FOCUS GROUP DISCUSSIONS

These are not as actively used in most academic ethnographic approaches, but can be used to gain access to information and data from a large group of respondents in relatively little time. The ethnographer usually asks structured questions, and may ask each respondent in the focus group in turn, or may allow the focus group to determine the nature and order of responses. Often, the ethnographer has to maintain control over the group to enable the quieter people to speak up and to prevent a few respondents from dominating the conversation.

QUESTIONNAIRE-BASED SURVEYS

Usually employed by ethnographers interested in scaling, transferring, or generalizing their research, surveys are used to increase sample size and often ask questions that have already been tested and verified through participant observation, and other forms of interviews. Specifically, the surveys are used when the ethnographer has already built trust in the community and hence can be reasonably sure of getting more accurate and precise responses from the respondents.

Ethnography: Resources Required

The amount of resources, namely time, financial and human resources, needed to do ethnographic data collection and analysis will depend on a number of factors. Key considerations include:

- Research question and scope of field of inquiry

- Availability of trained data collectors and barriers to building trust

- Research design, either one-off deep analysis or analysis of factors over time

- Level and type of analysis

- Access to software and electronic means of data collection

At the very basic level, ethnographic research requires sufficient amounts of paper, writing materials, and translators or knowledge of the language. However, in recent years, ethnographers are observing and recording their data using audio and audio-visual technologies that are easily available as apps on any smartphones or tablets. These recording are then transcribed using human or software expertise, and then analyzed for patterns and trends, depending on the research question asked.

AVAILABLE SOFTWARE

Some key software for ethnographic research and analysis:

- **Social Network Analysis**

  - Visone

  - UCINET

  - Gephi

  - SocNetV

  - Pajek

- **Quantitative Analysis**

  - SAS

  - Stata

  - R

- **Qualitative Analysis**

  - NVIVO

  - Dedoose

- MAXQDA

- R

- **Transcription Softwares**

  - Dragon Nuance

  - transcribe.wreally.com

  - support.google.com/docs/answer/4492226

Ethnography
Case Study

Food Assistance and Dignity in Kakuma Refugee Camp, Kenya

CHALLENGE

This ethnographic research, carried out by Principal Investigator Rahul Oka, Anthropologist from Notre Dame University, was intended to assist UNHCR and partners understand the source of this expressed dissatisfaction and related challenges in the delivery and utilization of food assistance in Kakuma Refugee Camp in Northern Kenya.

Over the past few years, 'dignity' has emerged as a focal point for development and relief efforts across the world. However, the definition and parameters of 'dignity' as a process, goal, attitude, behavior, remains highly ambiguous. This case study shows how ethnographic research can help to define and operationalize 'dignity' for the benefit of all stakeholder populations at Kakuma Refugee Camp in Northern Kenya *(right)*. With a population of almost 200,000 refugees from more than 10 nations and 20 ethno-linguistic groups, the camp and the surrounding town have co-evolved into an urban settlement in the middle of a harsh, hot, and arid landscape. The refugees are provided with basic food, lodging, and health by the United Nations High Commissioner for Refugees (UNHCR), the Government of Kenya (GOK), and various NGOs and civic bodies that operate under the UNHCR umbrella.

While acknowledging the severe logistical constraints and donor fatigue that affect the various relief organizations active in Kakuma, the refugees of Kakuma reported major dissatisfaction with the food and other services being provided. While this dissatisfaction had been observed by many surveys conducted by the World Food Programme and other organizations, there was a huge gap in understanding

Location of Kakuma Refugee Camp, Kenya

the ways in which refugees understood and internalized their dissatisfactions and the relief shortcomings, and in exploring ways by which refugees transformed from being passive recipients of relief largesse to being active participants in their own lives.

APPROACH

In our ethnographic research conducted at Kakuma from 2008 – 2013, we turned our 'ethnographic gaze' not only on the refugees but also on the Turkana host community and the relief organizations, to better understand how attitudes, beliefs, actions, and agendas of the various stakeholders intersected and interfaced with each other. The dissatisfaction expressed by the refugees extended to every part of their life at Kakuma, but interestingly was extremely focused on the food package. While nutritionally adequate (~2000 calories/day), the food aid basket consisting of maize grain, oil, sorghum, and beans was not considered as desirable foods by the refugees. Most official responses by relief agencies saw the refugee rejection as ungrateful and inappropriate as it seemed to sully the hard work by the relief agencies in bringing the food over.

Here is where the ethnographic research came in to underscore the complexities of the process and also, to outline an incipient process in which refugees agentively used the relief basket to intersect with the commercial economy, and to gain some sense of normalcy and dignity.

Data collection methods used included lengthy participant observation and intensive repeated interviews.

KEY INSIGHTS

The following key insights were uncovered as a result of this process:

1   Dissatisfaction over food basket went well beyond quality and was linked to cultural traditions and identity.

2   Refugees actively transformed food aid into a vehicle to create normalcy, sustain traditions and regain dignity.

3   Food assistance (as delivered at the time by UNHCR and partners) represented one of many factors in the life of a typical refugee living in a protracted refugee settlement which undermine the dignity of life.

Each insight is described in more detail below.

1. Dissatisfaction over food basket went well beyond quality and was linked to cultural traditions and identity.

The refugee complaints over the food were not just that it was low quality (some of it was, having been

sent from relief zone to relief zone over the past 10 years), but that:

- The food could not be eaten unless processed. The processing required water (beans), fuel (wood), or technology (grinding maize) that are scarce and require payment.

- The food was culturally inappropriate. Somalis could not and did not eat sorghum and it made their children ill. One man said that sorghum, for example was "not part of [the Somali] diet and it gives [the children] stomach aches. The leaders have spoken to the [relief agencies] again and again. But they don't care."

- The food types represented the low position of African refugees in the UNHCR and WFP hierarchy. As one man said "Though we are refugees, we know that there is a difference between African refugees and other refugees. We are just Africans so of course we will eat sorghum, beans, and maize; that's what they think. But we Somali eat basta [pasta], we were under Italian rule. We know that the Bosnian refugees were given pasta while we have to eat sorghum. So why can't they treat us like humans and give us food that makes us feel as normal humans, not some rubbish that is forced upon us? [Interview, June 2008]

2. Refugees actively transformed food aid into a vehicle to create normalcy, sustain traditions and regain dignity.

- The refugees used the relief food they were given and sold some, most, or all of it into the black market *(Figure 1 p.50)*. The money received would then be used to buy food that was culturally appropriate, desired, of a higher quality, and something that could be enjoyed. The participants said that when they go to the market with money they have earned or credit that they have negotiated through structured relationships, and they buy foods that taste good, that remind them of the lives they left behind, of better times ahead, they felt normal. When they felt normal, they felt that they had regained some dignity in their lives. Of note was the constant use of the KiSwahili words 'heshima' (meaning dignity) and kawaidha (normal) or the Somali words 'sharfa' (meaning dignity) and 'caadi' (meaning normal).

3. Food assistance (as delivered at the time by UNHCR and partners) represented one of many factors in the

life of a typical refugee living in a protracted refugee settlement which undermine the dignity of life.

- Seen in the larger context of relationships, the ethnographic analysis showed that refugees live in a permanent state of transition, trying to make homes in inhospitable climates, reconstructing shattered pasts, and looking to uncertain futures. Every bureaucratic hurdle they face comprises of long lines with decisions subject to official scrutiny and often indifference and even abuse. They can remember the times when they were doctors, lawyers, farmers, pastoralists, traders, craftspeople, now relegated to waiting for food, for health, for water, and for settlement.

- The participant observation and the intensive repeated interviews enabled us to understand the fact that normalcy and dignity are usually the victims of the 'refugee wait.' In this larger process, the refugee community channels its anger at the food basket, converts it as agents into cash or credit, and buys desired foods to be given to children, to friends, and family. This returns some normalcy and creates dignity.

RESULTS

This research proved invaluable to the UNHCR that was seeking an alternative to the never-ending need to provide relief food to refugees in protracted encampment situations such as Kakuma. This ethnographic research suggested that refugees had created a huge commercial economy with 13 locally owned and operated banks, and more than 2,300 shops, restaurants, etc *(Figure 2 p.51)*. It showed that the refugees could be partners in managing refugee settlements, rather than passive recipients, in ways that would 1) make the refugees and host community full agents and stakeholders in their own lives, 2) ease the burden of providing protracted relief from the relief agencies, and 3) potentially generate a self-sustaining settlement where refugee and host community skills talent and labor would make Kakuma a desirable settlement.

For the UNHCR, the ethnography showed how refugees themselves perceive and operationalize dignity, and demonstrated a feasible alternative to the indignity of encampment or warehousing. Agentive consumption and engagement with the commercial market to buy what you want, and to feast life or death in culturally appropriate and desirable ways, were pathways to dignity. Understanding this complex pathway would be beyond the mapping or observable ability of mainstream surveys.

FOOD ASSISTANCE AND DIGNITY IN KAKUMA REFUGEE CAMP, KENYA

FOOD & CASH FLOW

Figure 1

Refugees actively transformed food aid into a vehicle to create normalcy, sustain traditions and regain dignity. The refugees used the relief food they were given and sold some, most, or all of it into the black market.
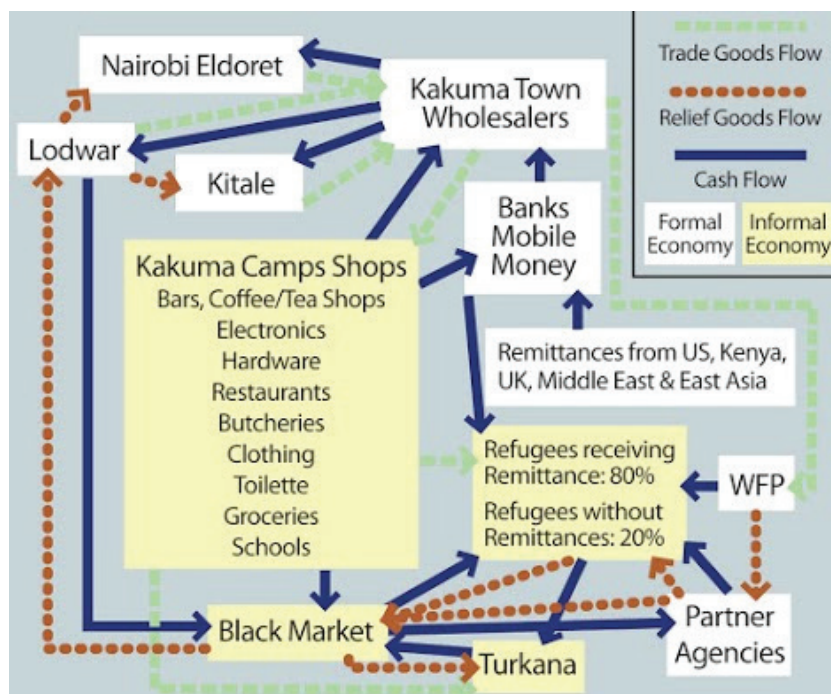
GOODS & CASH FLOW

Figure 2

Using semi-structured interviews, focus group discussions, and structured interviews with Somali traders of the region, we elicited data on firm histories, behaviors, and network connections of wholesalers on the Kitale-Juba route. This data provided a larger network within which the commercial economy of Kakuma Refugee Camp operated.

Ethnography
Case Study

Understanding Psychological and Nutritional Impact of Refugee Presence and Activities on Host Communities in Kakuma Refugee Camp, Kenya

CHALLENGE

This ethnographic research, carried out by Principal Investigator Rahul Oka along with Rieti Gengo and Lee Gettler (all anthropologists from the University of Notre Dame), was intended to assist the World Bank and UNHCR in understanding the psychosocial and physical impact of refugee presence and activities on the Turkana Host Community living near Kakuma Refugee Camp in Northern Kenya. Like most refugee camps, Kakuma Refugee Camp is in northwestern Turkana County that is characterized by arid and harsh landscapes, usually not conducive to high-density settlement and any socio-economic activity such as pastoralism (livestock herding) and minimal subsistence horticulture. The Turkana people, who live around the camp, have coexisted with the refugees for over 25 years, but are economically marginalized and politically disenfranchised. They are among the most impoverished groups of people across the world. They have welcomed the refugees and over the years have developed a complex system of interaction that has resulted in mainly peaceful coexistence through the development of a patron (refugee) – client (Turkana) relationship mitigating exchange of food, labor, and commodities, and occasionally inter-personal or inter-group violence.

In 2014, UNHCR, the office of the Governor of Turkana County, and the Government of Kenya called a roundtable to discuss the idea that the refugees and the host community of Kakuma (total pop. 220,000) could pool their various skills, expertise, and forms of capital to convert Kakuma into a self-sustaining 'city.' There was a lot of anecdotal data and ethnographic observations that suggested that this idea was not inconceivable. The first step was to measure the

Location of Kakuma Refugee Camp, Kenya

impact of refugees on the Turkana community. The World Bank gathered a team to look at both the social and the economic impacts of the refugees on the local Turkana peoples and economy. Oka and colleagues led the field work and data collection/analysis of the Social Impact Assessment at Kakuma from May to July 2015.

APPROACH

The primary approach for the social impact analysis was through ethnographic engagement, building on previous trust relationship established by the Notre Dame team with the Turkana and refugee communities *(see Ethnographic Case Study on Food Assistance and Dignity)*. We decided to use semi-structured interviews, focus group discussion, and structured interviews with the Turkana and refugees of Kakuma, and the Turkana communities of three other settlements: Lodwar (County Capital, 96 km SE from Kakuma), Lorugum (Developed Area 150 km S of Kakuma), and Lokichoggio (UN base of Sudan Relief efforts until 2008, 120 km NE of Kakuma) *(map p.52)*. The approach paralleled the economic team that was comparing the economic well-being of the Turkana of Kakuma with that of Turkana sites similar to Kakuma prior to the establishment of the refugee camp in 1992.

However, we also decided to add a survey-based interview and questionnaire in addition to the longer ethnographic interviews that would elicit data on psycho-social and nutritional well-being of the Turkana in four sites: Kakuma, Lorugum, Lokichoggio, and Lorengo (a small pastoral village 50 km SE of Kakuma). We wanted to measure the impact of engagement and interactions on Turkana perceptions of psychosocial well-being, and health (measured through nutrition). Respondents were asked to free-list worries or concerns regarding their daily 'lived' experiences and the presence and activities of refugees. They were also asked to speak to their own reactions to refugee presence, whether the refugee presence was good/bad, or if it brought benefits/harm. These questionnaires were devised with a team of Turkana researchers and interpreters and then data was collected from 75 men and 75 women from each site, for 600 individuals in total. This data was analyzed in conjunction with the ethnographic data.

KEY INSIGHTS

Our previous ethnographic work had served as the basis for our prediction that the Turkana living close to the camp and interacting with refugees would have more nuanced interaction and engagement, and hence more complex perceptions of refugee presence and activities, and would also be benefiting from the presence of the refugees through the exchange of food, labor, services, and commodities, as well as the refugee commercial and black market economy (see Ethnographic Case Study #1). Specifically, our ethnographic research in all the aforementioned sites seemed to suggest that the Turkana living close to the camp and who engaged with the refugees on a daily

basis saw the refugees as friends, neighbors, partners, and fellow sufferers. In addition, they also saw the refugees as the violent 'other,' as interlopers, as recipients of aid that should be given to the Turkana and not foreigners. We also concluded that given periodic and frequent famines affecting Turkana County, the Turkana of Kakuma, who received cereals and food from refugees as gifts or in exchange for commodities, labor, or services, would show greater nutritional well-being.

The analysis of both the ethnographic and survey data showed:

- Turkana men and women of Kakuma showed significantly greater energy status measured by body fat content (Sum of Skinfolds) than the Turkana of Lokichoggio or Lorengo, but not Lorugum, a relatively developed area *(Figure 1 p.55)*. This indicated that refugees and the relief mission at Kakuma might be filling the development gap seen in Lokichoggio and Lorengo. In particular, we conclude that the Turkana of Kakuma show greater nutritional well-being than their compatriots due to their access to relief food through the networks of exchange with the refugees.

- Turkana men and women of Kakuma showed greater variation and number of worries compared to Lorengo, Lokichoggio, or Lorgum, but this was primarily due to worries about education, employment, and social mobility *(as seen in Figure 2 p.56)*. These worries were not present at the other sites where the predominant worries were food, water, security, and health. This suggested that the presence of the refugees and relief mission might have resulted in reduction of concerns over basic necessities, opening the Turkana of Kakuma to opportunities and goals that their compatriots concerned with basic needs could not envision.

- The perceptions of refugees was directly correlated with distance and hence interaction/engagement. *As seen in Figure 3 (p.57)*, while the negative perceptions of refugees are not significantly affected by distance/interaction, the positive perceptions are highly affected by distance/interaction. This was one of the key findings, that suggested that communities hosting and regularly interacting with refugees developed nuanced ideas towards the refugees and are more likely to have coexisting positive and negative perceptions than communities that live far away and do not interact

with refugees, who tend to have predominantly negative perceptions.

RESULTS

This study was highly lauded by various scholars and policy-makers as a complete study that showed that refugees have a positive impact on their hosts. In the case of Kenya, this study was seminal in convincing both the local Turkana and the national Kenyan government that refugees can be beneficial for local and even national host populations. This study along with the economic assessment (that came to similar conclusion) was also foundational in the current UNHCR proposals to convert Kakuma Refugee Camp into a self-sustaining settlement for both refugee and host communities alike.

References:

Gengo RG, Oka RC, Vemuru V, Golitko M, Gettler LT. Positive effects of refugee presence on host community nutritional status in Turkana County, Kenya. Am J Hum Biol. 2017;e23060. doi.org/10.1002/ajhb.23060

Vemuru, V., Oka, R., Gengo, R., & Gettler, L. (2016). Refugee Impacts on Turkana Hosts. A Social Impact Analysis for Kakuma Town and Refugee Camp Turkana County, Kenya. World Bank Press, Washington D.C. openknowledge.worldbank.org/handle/10986/25863

Ethnography Case Study

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Understanding Psychological and Nutritional Impact of Refugee Presence and Activities on Host Communities in Kakuma Refugee Camp, Kenya

PSYCHOLOGICAL AND NUTRITIONAL IMPACT OF REFUGEE PRESENCE AND ACTIVITIES ON HOST COMMUNITIES

SUM OF SKINFOLD THICKNESS GRAPHS

1a: Sum of Skinfold Thickness by Gender

1b: Sum of Skinfold Thickness, by Age (Female)

1c: Sum of Skinfold Thickness, by Age (Male)
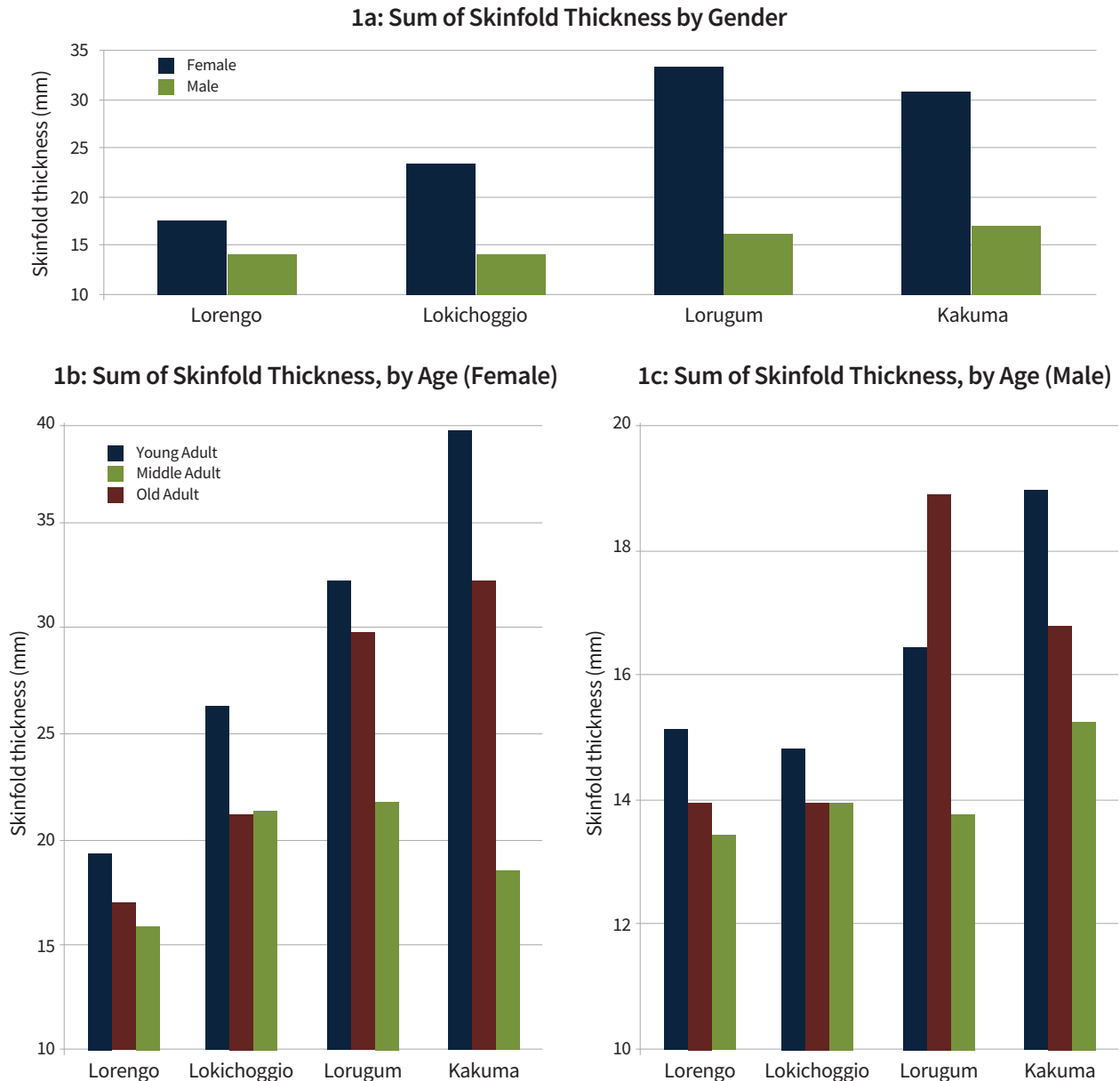
Figure 1:

a) Average SSF for men and women across Turkana County

b) Average SSF for young, middle-aged, and older women across Turkana County, and

c) Average SSF for young, middle-aged, and older men across Turkana County.

NUMBER & DIVERSITY OF WORRIES GRAPHS
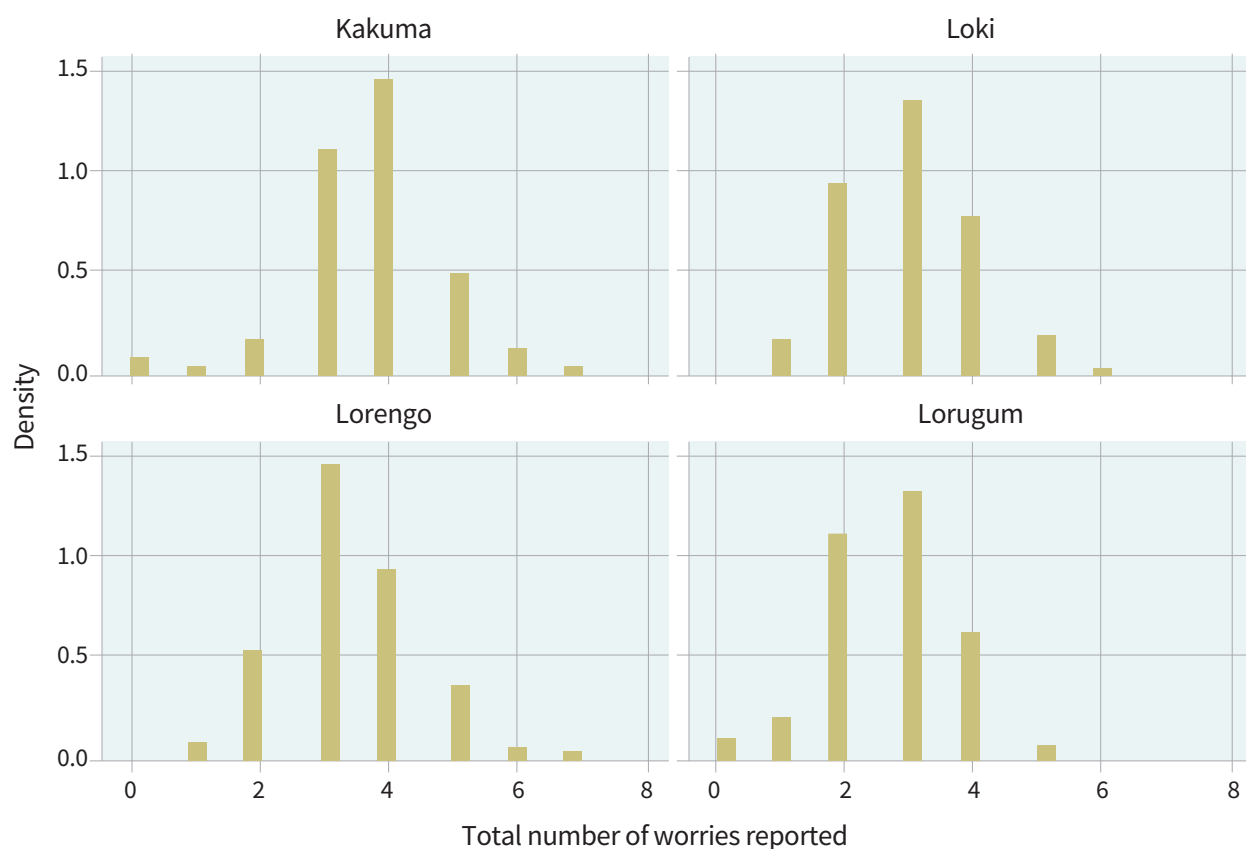
Graphs by Location

Figure 2: Number and Diversity of Worries and Psycho-Social Stressors by Location

Turkana men and women of Kakuma showed greater variation and number of worries compared to Lorengo, Lokichoggio, or Lorgum, but this was primarily due to worries about education, employment, and social mobility.

POSITIVE & NEGATIVE TRENDS GRAPH

Figure 3: Trends in Positive and Negative Perceptions of Refugees among the Turkana of Kakuma, Lorengo, Lokichoggio, Lodwar, and Lorugum

The perceptions of refugees was directly correlated with distance and hence interaction/engagement. As seen in Figure 4, while the negative perceptions of refugees are not significantly affected by distance/interaction, the positive perceptions are highly affected by distance/interaction.

Ethnography
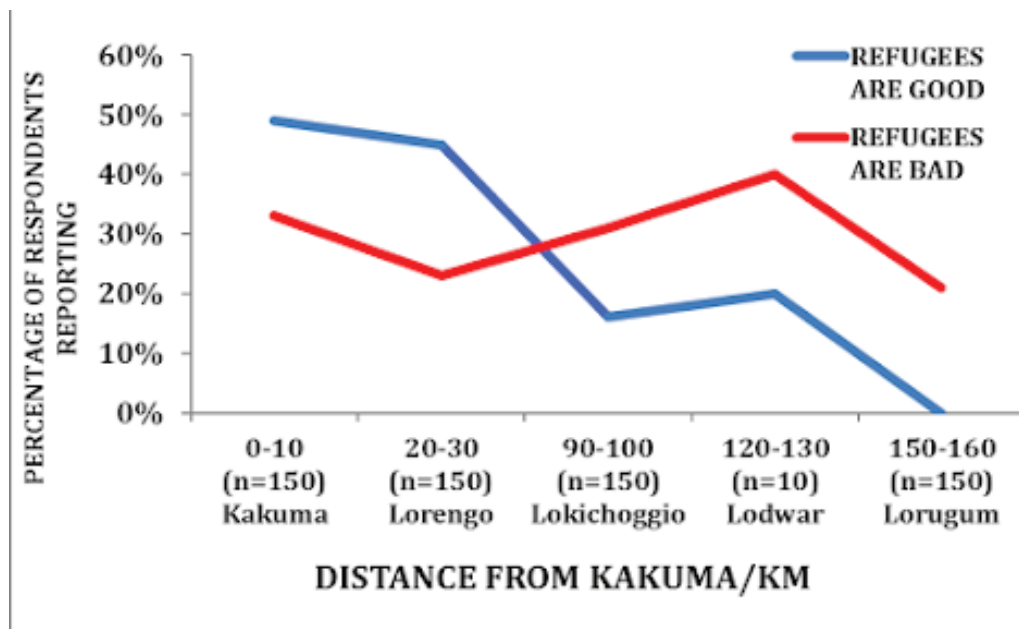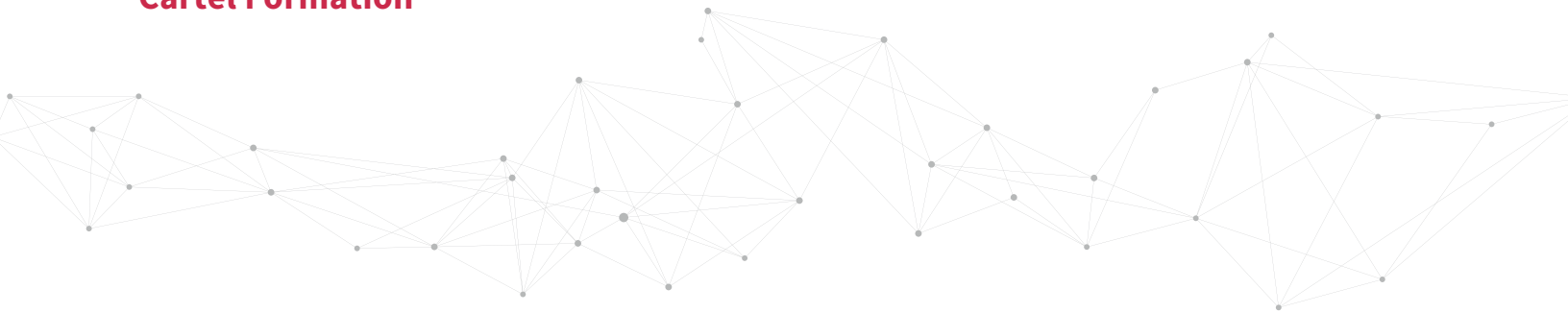## Case Study

Understanding Trader Responses to Changes in Regulation with Implications for Cronyism and Cartel Formation

CHALLENGE

This ethnographic research, carried out by Principal Investigator Rahul Oka (Anthropology, University of Notre Dame), Nitesh Chawla (Computer Engineering, University of Notre Dame), and Yang Yang (Kellogg School of Management, Northwestern University) aimed at mapping the changes in structure of trade networks of traders Western and Northern Kenya with respect to changes in political stability and regulation, specifically looking at the emergence of cartels and cronyism. Most current mainstream economic models for conducting business and enhancing economic growth in emerging markets or other unstable areas stress and encourage deregulation of business practices. It is argued that deregulation would reduce the restrictions on business growth, innovation, and expansion, and hence lead to job creation and overall economic growth. Previous ethnographic research involving traders and business peoples from Asia, Africa, Europe, and the Americas suggested that deregulation might in fact lead to increased cronyism and decline in open competition within emerging markets. In other words, when local economies are deregulated, previously entrenched and politically connected traders would stand to dominate the growing markets and exclude new or smaller traders with impunity. These phenomena have also been observed to be highly correlated with post-de-regulation adjustments in (formerly) highly regulated economies.

In 2012, Oka teamed up with Chawla and Yang to examine the impacts of deregulation on the highly regulated economy through a combination of ethnographic and social network analysis. The primary challenge was to examine the relationship between trader responses (political connections, investment in trader vs. political networks, sharing of clients and markets) and changes in network structure as the economy shifted from regulated to deregulated. This research would have significant impact for policy-makers when considering the implications of deregulation as part of structural adjustment programs.

APPROACH

Using semi-structured interviews, focus group discussions, and structured interviews with Somali traders of Kitale, Lodwar, Kakuma, Lokichoggio, (Western and Northern Kenya) and Juba (South Sudan) (*map p.47*), we elicited data on firm histories, behaviors, and network connections of wholesalers on the Kitale-Juba route. This data provided a larger network within which the commercial economy of Kakuma Refugee Camp operated (*Figure 2 p.51*). · Between 2008 and 2012, we collected behavioral, network, and historical data on 76 traders operating in Kakuma and using repeated interviews, reconstructed the trader networks of Kakuma between 2005 and 2012. We also collected data on the political relationships maintained by traders for the years 2008, 2010, and 2012. This was to discern between traders who preferred investing in their own networks with fellow traders and the traders who opted for and invested in political elites for patronage and advantage. Using ethnographic interviews, we also gathered data on regulatory and stability conditions from the perspectives of trade-friendliness.

Our primary hypotheses were:

1   During times of high or even predatory regulation, we would see parity between most of the traders regardless of their investment in trader versus political allies. We may even see a cartel effect emerging as traders enter into close cooperation with each other, sharing, resources, markets, customers, information, and connections, and eschewing overt displays of wealth and power. In particular, we expected to find that times of high regulation, the trader network structure would be more egalitarian with lower variation in status, influence, and centrality of individual traders, despite political connections.

2   During times of low or even deregulation, we would see growing disparity between traders, with the politically connected traders gaining greater status, influence, and centrality within the network. These traders, protected by their political allies would be able to indulge behaviors characteristic of cronyism: anti-competitive market capture, seeking monopolies, and bringing violence against competitors, even members of family and friends.

We used the ethnographic data to generate these above hypotheses within the context of a larger model for network convergence during high regulation and network bifurcation during low regulation (*Figure 1 p.61*). The network data was analyzed at both node level (centrality, status, influence of key actors through Social Network Analysis) (*Figure 2 p.62*) and structural level (network transformation through machine learning approaches) (*Figure 3 p.63*). We also used machine learning approaches to identify politically connected versus trader network dependent actors. We also developed a cartel detection algorithm to see if the traders were indeed in a cartel, and another algorithm to measure changes in political patronage and cronyism over time (*Figure 4 p.64*).

KEY INSIGHTS

The ethnographic data showed that the period between 2005 and 2009 was characterized by high or even predatory regulation by local political actors, consisting of onerous rules, ad hoc informal taxation (bribes) and a large turnover of political and bureaucratic staff that ensured that traders had to continuously negotiate with different political elites to ensure business stability and continuity. The period between 2010 and 2012 was characterized by greater political stability and deregulation as Western Turkana

District was split into two, more personnel were brought for longer periods of time, and the ad hoc informal taxation systems were reduced. The ethnographic data suggested that some traders, emboldened by the deregulation after 2010, decided to indulge in anti-competitive behaviors, targeting their own kin, and increasingly depended on their political connection to insulate themselves from the repercussions of their actions.

As seen in Figures 4-6, the analysis of both the ethnographic and network data between these two-time periods showed:

*   Between 2005 and 2009, the traders of Kakuma showed great parity, with very low variation in individual node centrality, status, rank, or influence. No one trader enjoyed monopoly or significantly greater access to resources, consumers, or markets than any other. The wholesalers inadvertently formed a cartel through which goods and capital flowed between Kakuma Refugee Camp economy and the larger trader network. The network structure is characterized by high density of links, redundancy, and balance.

*   Between 2010 and 2012, the deregulation of the economy and the greater political stability is significantly correlated with increasing disparity between some politically connected traders and the other network invested traders. 2-3 traders who were already politically connected came to enjoy much greater influence over the market, and quickly created monopolistic relationships with actors in new and established markets. The network became increasingly hierarchical with the politically connected traders showing much more fluctuations and variation in their centrality, status, influence, and rank, and the network dependent traders. The algorithm was able to identify this economy as a crony capitalist economy.

*   The algorithms were able to capture network transformation (convergence and bifurcation) with ease and high degree of accuracy, and identify and distinguish politically connected portfolio capitalists from network dependent traders even without using data on political connections. These tools have enabled us to identify hidden actors with high potential to dominate or alter markets and competition, especially in the face of deregulation.

RESULTS

Given the high accuracy of prediction and identification of network transformation and political connection, this research is being considered by UNHCR and partners in their attempts to convert Kakuma into a self-sustaining settlement by enhancing the abilities of local business to expand in both size and efficiency and to help new and emerging businesses by ensuring fair competition and access to markets. On a larger scale, this research is being replicated in other parts of Kenya, South Sudan, and India to operationalize the impacts of over or under-regulation using both ethnographic and network approaches.

MODEL OF TRADERS-POLITICIANS
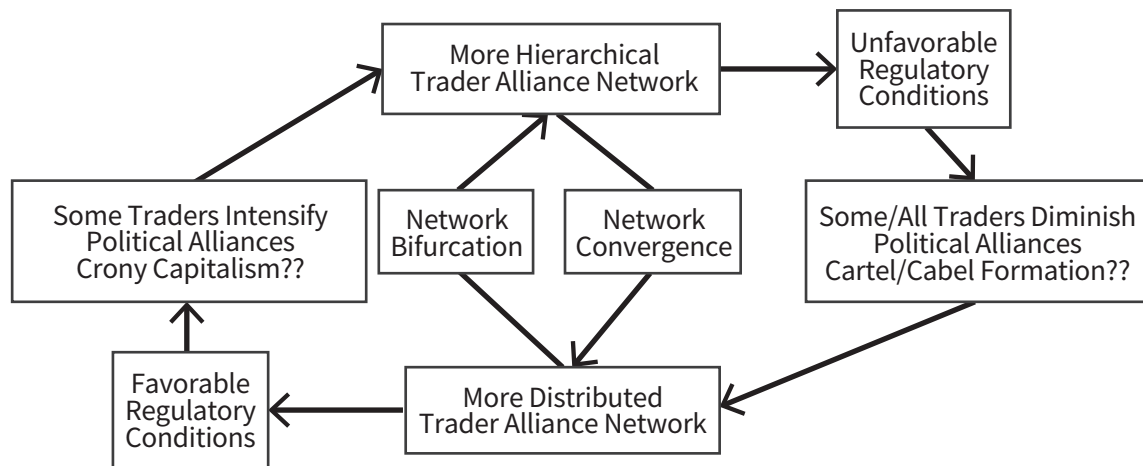
Figure 1: Modeling Trader-Politician Relations, Regulations, and Network Transformation

We used the ethnographic data to generate the hypotheses within the context of a larger model for network convergence during high regulation and network bifurcation during low regulation.

Figure 2: Mapping the Change in Wholesaler Trader (Variation in Betweenness Centrality - 2005-2012)

The network data analyzed at the node level (centrality, status, influence of key actors through Social Network Analysis).
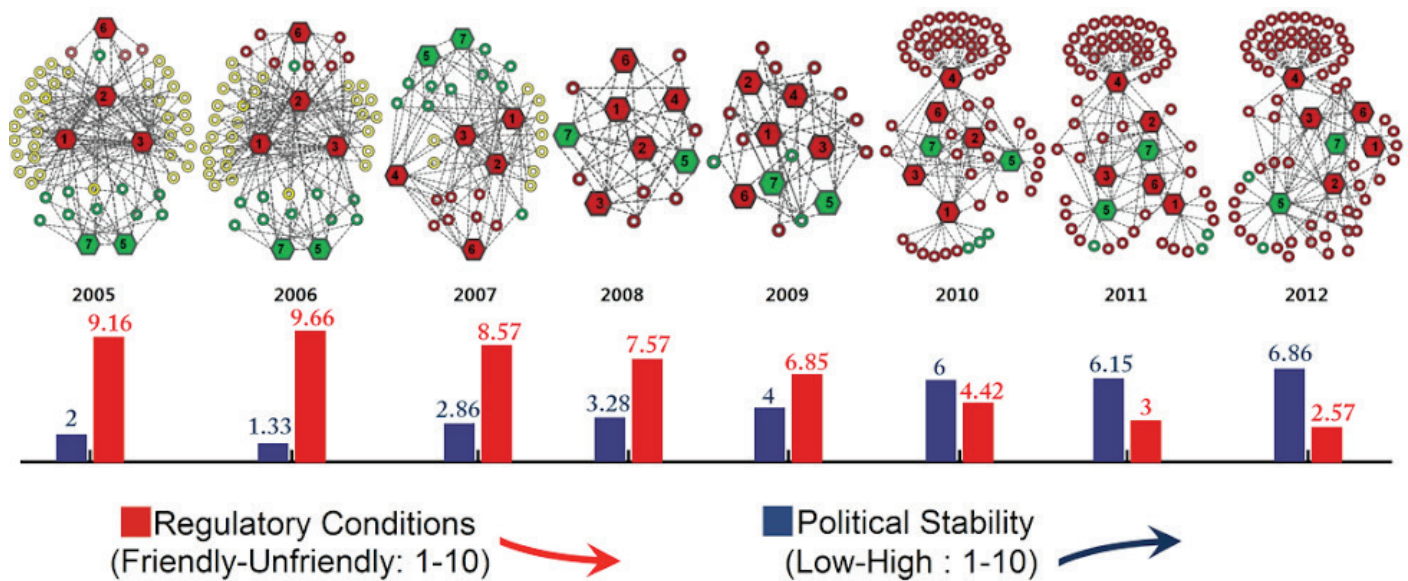
Figure 3: Network Transformation Through Machine Learning Approaches

The network data analyzed at the structural level (network transformation through machine learning approaches).

TRADER RESPONSES TO CHANGES IN REGULATION

CHANGES IN CARTELS AND CRONYISM OVER TIME

Cartels Detected

2005   2006   2007   2008   2009

No Cartel but Cronies

2010

2011

2012
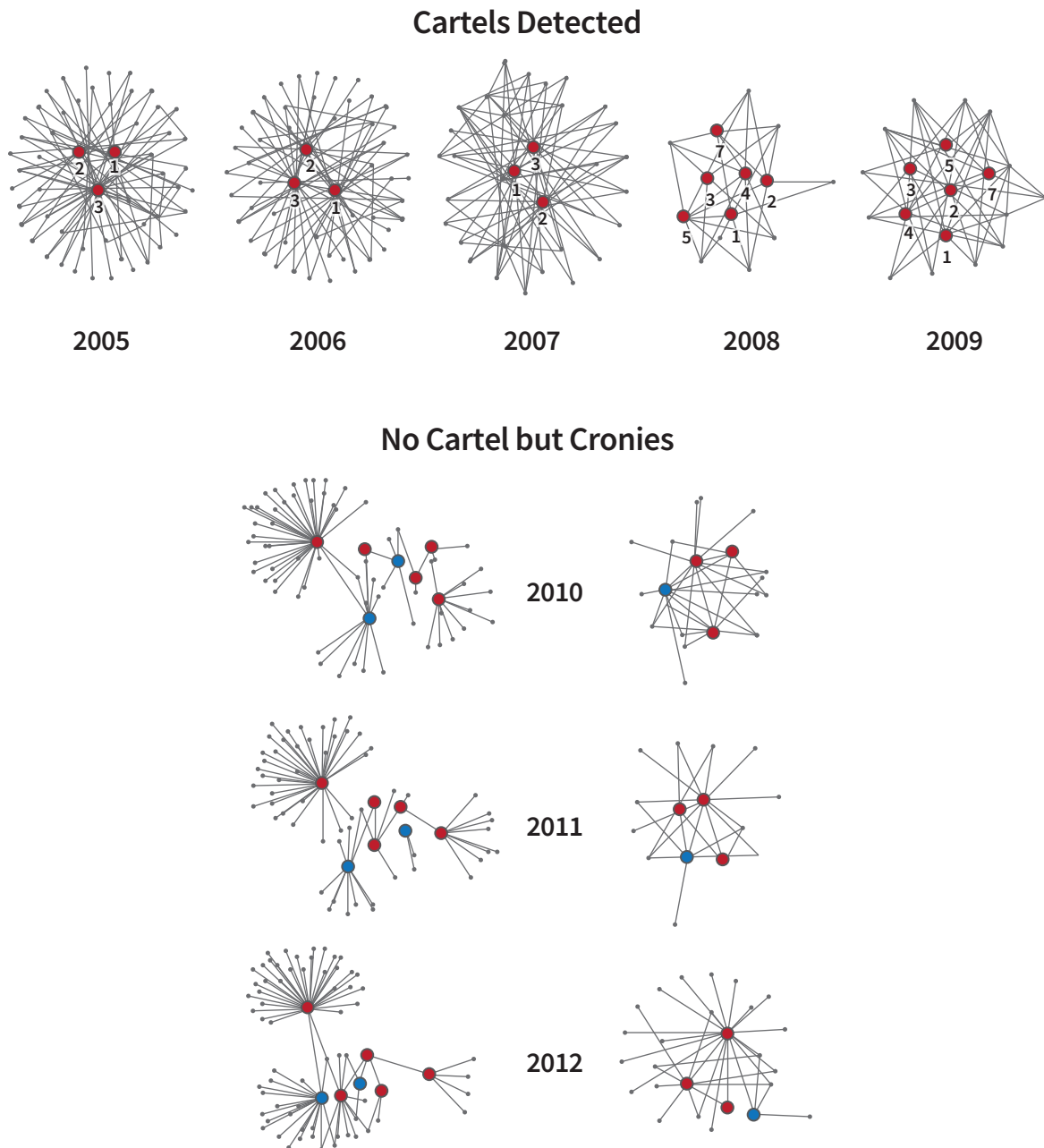
Figure 4: Cartels and Cronyism

We developed a cartel detection algorithm to see if the traders were indeed in a cartel, and another algorithm to measure changes in political patronage and cronyism over time.

Participatory Systems Analysis

to enable strategic actors to come together to gain a better
understanding of their own system, create joint visions of how
it could improve and agree on practical ways to do it

Participatory Systems Analysis

to enable strategic actors to come together to gain a better understanding of their own system, create joint visions of how it could improve and agree on practical ways to do it

"We can't impose our will on a system. We can listen to what the system tells us, and discover how its properties and our values can work together to bring forth something much better than could ever be produced by our will alone."
— *Donella H. Meadows, Thinking in Systems: A Primer*

WHAT IS SOCIAL PARTICIPATORY SYSTEMS ANALYSIS?

Participatory Systems Analysis (PSA) enables strategic actors to come together to gain a better understanding of their own system, create joint visions of how it could improve, and agree on practical ways to do it.

Participatory Systems Analysis puts the emphasis on the system actors and the processes that allow them to interact, learn from each other and find feasible areas for collaboration. PSA is not a tool that we can use to analyze the system; instead, it is an approach where multiples tools and techniques (including the ones in this guide) can be used to help the actors analyze the system they belong to. PSA must also promote a cyclical movement between analysis and synthesis (zooming in and zooming out).
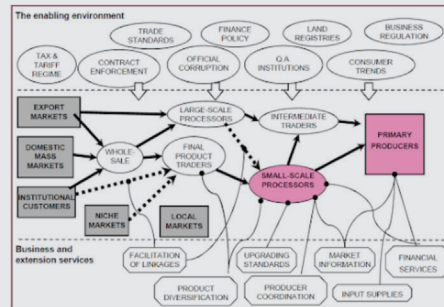
Local systems are open and driven by human motivations and perceptions. On one hand, an open system is one where, no matter where we decide to put its boundaries, there will always be something external to it that affects it. The more open a system is, the more it interacts and depends on its surroundings. On the other hand, in a human-driven system the individuals (and the groups and institutions they belong to) are constantly learning, adapting, competing and collaborating according to the information they possess. Most of this information is limited and some is wrong.

These two prominent features of social systems (openness and human-driven) mean that it is impossible to change them from the outside in ways that are sustainable, scalable and predictable. In some cases, a project can change a system from the outside but changes do not last; in some others, changes last but they benefit just a lucky few; and in other cases, changes last and their effects are broadly felt but end up harming people and the environment.

WHAT MAKES PARTICIPATORY SYSTEMS ANALYSIS A "SYSTEMS" TOOL?

Participatory systems analysis is particularly effective when we are trying to help the system actors deal with complicated and complex problems[1]. Complicated problems have many variables and can be interpreted in different ways by different actors (e.g. how to carry out a vaccination programme). Complex problems, on the other hand, are constantly shifting and changing depending on the decisions of different actors; they are also interpreted differently by different actors (e.g. how to improve the productivity and efficiency of the livestock market).

Complicated problems can be identified and understood by experts, but if their implementation (including the prioritisation of activities) requires the agreement and engagement of a wide range of actors, then experts can't solve them through a top-down, command-and-control approach. Complex problems are even more demanding because it is very difficult to identify them or define them and to unveil their root causes.

It is precisely the very nature of the mentioned types of problems and the fact that it is impossible to solve sustainably without the engagement and alignment of a wide range of system actors that make PSA a systems tool.

For an effective analysis of complicated and complex problems in a social system the following principles must be considered:

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[1] These concepts are based on the Cynefin Framework. The framework is currently undergoing improvements but this article provides the basics: hbr.org/2007/11/a-leaders-framework-for-decision-making

- **Social systems are living organisms.** They cannot be approached as a machine that must be fixed by outside experts. The system will likely pick up on any unfamiliar actors and resources (e.g. donor funding) and react to it. In some cases, it will reject them; in others, it will adapt to and exploit them, often to their own short-term benefit without any real, lasting change.

- **Participatory analysis is an intervention in itself.** Helping the system actors to look at themselves and the system they inhabit creates enabling conditions for change (even without any funding to intervene in the system).

- Systemic analysis is a conscious and strategic exercise of **zooming out** to see the bigger picture **and zooming in** to focus our interventions on a few critical leverage points that will create good conditions for structural change.

- **Social systems are made up of several sub-systems.** These subsystems are networks with different degrees of formalisation (from formal laws, government institutions and private corporations to informal networks).

- **People have different perspectives of the system they belong to.** Each actor sees reality differently from others. The perceptions of actors are not to be judged but understood and leveraged to enable change. Sometimes, actors with negative perceptions about our interventions or who are "difficult to manage" can be those who care the most about the system and can drive the biggest changes if we understand how to channel their energy.

- **Participatory analysis must be driven by real possibilities of change.** Analysis for the sake of it will not get people to show up and stay engaged. We must communicate clearly to each actor what they can realistically get out of their participation. The actors must understand that systemic change will depend mainly on themselves and that we are there to enable participation and facilitate convergence around a wide range of interests and challenges.

WHEN MIGHT I WANT TO USE PARTICIPATORY SYSTEMS ANALYSIS?

- When the overall objectives are clear (e.g. making a market system more inclusive and productive) but the specific problems and their root causes are not clear.

- When the implementation of solutions depends on the alignment of interests of several actors and their active engagement (e.g. collaboration, coordination and investment).

- When the objectives and solutions are clear, but the strategies and implementation priorities (what should be done first) are not clear and must be agreed upon by several system actors.

- When higher levels of trust and mutual awareness between actors are required to enable or unlock implementation (e.g. in highly volatile, conflict-ridden, hierarchical and traditional contexts).

WHAT ELSE SHOULD I KNOW ABOUT PARTICIPATORY SYSTEMS ANALYSIS?

- It is a process. The final products, such as maps and workplans, are important to document the process but what is really important about PSA is the convergence, learning and trust-building that takes place as a result of the gathering and interactions between system actors.

- It is highly political. Actors will always prioritize the defense of their own interests and try to protect the status-quo if it benefits them or if it feels safer than untested solutions.

- It is highly influenced by cognitive biases and hampered by cognitive dissonance (the discomfort produced by new ideas that contradict existing ones).

- It can get messy and tense. PSA generates high levels of emotion. In most cases, it manifests in motivation to do things collaboratively; but it can sometimes manifest in conflict or resentment (especially when participants cannot voice their ideas/interests).

Participatory Systems Analysis: Ways to Use

WHAT CAN PSA HELP ME UNDERSTAND?

Participatory systems analysis can be used to:

- describe a system in its current state

- facilitate or advocate for its transformation

- learn about its evolution

- learn about its most feasible pathways of transformation

Participatory systems analysis can add value to a project because it reduces the risk of rejection by the system actors when it is implemented. The strategies and activities of a project that has been analyzed and designed with the stakeholders are more likely to be appropriate for their needs and driven by themselves (rather than pushed out by the project). This, in turn, leverages the resources of the system actors and increases the commitment of their participation.

Participatory analysis with stakeholders helps us gain a better understanding of:

- Actors

  - Who the system actors are and which actors we have been missing or ignoring.

  - The main forces and factors influencing the behavior of the actors.

  - Which actors are close to each other; who trusts who and where the grievances and tensions lie.

- Enabling Factors

  - Enablers and disablers. What are the enabling and hampering forces or factors?

- Sequencing of Activities

  - Activities that are more likely to succeed than others.

  - Which activities should be implemented first?

  - Where are the "low-hanging fruits" or entry points that build momentum and engagement?

  - Which activities have more traction amongst the system actors and which are more likely to be rejected?

WHAT ARE SOME SPECIFIC APPLICATIONS OF PSA?

The following are examples of how participatory systems analysis can be used with different stakeholders:

1 With the project team:

   Participatory analysis can be done by a project team internally. It can be done at any stage of the project cycle. For example, to select target populations, specific geographic areas within a larger region, an issue (children's health) or subsector (coffee).

   Participatory analysis within the team is useful to:

   - Build a baseline and monitor changes in the system.

   - Clarify and challenge assumptions and theories of change.

   - Leverage all the different experiences and perspectives of the team.

   - Improve the design, implementation and adaptation of projects.

2 With local system stakeholders:

   After the team has acquired a reasonable understanding of the system they are trying to influence, they should engage strategic stakeholders to:

   - Contrast and adjust the team's initial ideas.

   - Build trust and collaboration amongst stakeholders.

   - Help the stakeholders agree about challenges and opportunities within their system, come up with joint visions and joint strategies and action plans.

   - Help the stakeholders to form groups that commit to implementing activities agreed by the broader group of stakeholders. These groups can be made up of one or multiple types of stakeholders *(see Method in a Nutshell)*.

   - Create communication and accountability processes to guarantee that the above mentioned groups inform the rest of the local system actors about what is going on and how they can contribute.

3 With donors and investors:

Participatory system analysis makes the project more appropriate for the needs of local stakeholders and increases their ownership and long-term engagement. It can also reduce the risks of delays, extra costs, and harmful impacts on people and the environment. This can have positive effects on the donors' overall assessment of the project and on their willingness to invest in it.

4 With policy-makers:

Participatory system analysis convenes a broad range of stakeholders and constituencies to produce information and evidence that can influence the design and improvement of policies. From the perspective of policy-makers, strategies and initiatives for policy change that are the result of participatory systems analysis are more legitimate and have more political appeal than those that come from a project team.

KEY APPLICATIONS & POTENTIAL LIMITATIONS

Key Applications:

- Collective understanding of the system.

- Collective visioning and planning.

- Trust building and communication between system actors (which enable smoother, more effective, more efficient implementation).

Potential Limitations:

- Takes time to engage and win trust of key system actors.

- Results depends on actors' availability and interest to participate.

- Requires experienced facilitators.

Participatory Systems Analysis: Method in a Nutshell

OVERVIEW OF METHOD

There are different variations of participatory systems analysis, but they are all deeply shaped by three features that emerge as common threads to all methods and approaches[1]:

- An understanding of **interrelationships**.

- A commitment to **multiple perspectives**.

- An awareness of **boundaries**.

In order to achieve this, the following steps are recommended:

1 Get to know your team members

2 Understand the system

3 Identify and engage the collaborators

4 Get the actors to engage in a process of dialogue to understand and transform their own system

5 Conduct the analysis together and iterate

1. GET TO KNOW YOUR TEAM MEMBERS

Note: This step assumes you are already part of a project team.

It is very important to blend the different experiences and perspectives of the members to produce a team that can: (i) mobilize itself and adapt quickly to unexpected challenges and opportunities; (ii) mobilize the resources of its own organization and local partners; (iii) engage coherently with system actors. These are some ways of doing it (not necessarily in this order):

- Talk about your life stories; the principles and assumptions that have led you to where you are now.

- Share how you see your work and the project you are part of. How is the organization and the project aligned with your personal mission?

- Share your understanding of basic concepts like "system", "local", "community", "facilitation", etc.

2. UNDERSTAND THE SYSTEM

Some of the following steps inform and influence each other; do not follow them in a linear sequence.

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[1] Inspired by Williams, B. and R. Hummelbrunner (2010) Systems Concepts in Action: A Practitioner's Toolkit, Stanford University Press, page 3.

- The team members share what they know about the system (from studies, reports, newspaper articles, verifiable facts, anecdotes, beliefs, rumors, etc.). Take note of what is shared and draw one or more **maps of actors, relationships and forces and/or feedback loops maps.**

- The team members discuss their visions of an improved system. What do they want to see after the interventions in the long- and mid-term (3-5 years)?

- The team members reflect about **"Who Does, Who Invests, Who Benefits"**[1]**.** When thinking about who benefits, think also about who loses out. Those who benefit will enable and even drive the process; those who lose out may hamper and even attack the process and the people involved.

- Think about the **entry points**. Entry points are those parts or issues of the system that represent an opportunity for the team to engage, build trust and start "unlocking" the system. For example, you convince a well-connected agricultural distribution company to pilot an improved seed-distribution model targeting marginalized farmers. With evidence of success, you organize a business meeting with competitors to show them what the company achieved.

- Think about the **no-go zones**. No-go zones are parts or issues in the system that you know will be very difficult to change with the available resources. For example, you discovered that improving a road would allow farmers to sell their produce 40% cheaper in the local market but the government has confirmed that resources for this will not be allocated during the current budget period. Can the products reach the market by boat? Is the value of the product so high that buyers will take higher risks and costs to pick it up at the farm gate? If so, why is this not happening already?

- Think about the **ethical implications** of the participatory analysis (and subsequent activities). How will the drivers of change be affected by those in power? Will their assets, jobs, reputation and even lives be at risk? How do we justify such risk? In this case, it is very important that the actors are well informed about the implications of participating in the process and they are the ones deciding that they want to do it, not simply because we are asking them to do it.

3. IDENTIFY AND ENGAGE THE COLLABORATORS

These are the actors that will work with you to try out

new ways of doing things and drive change from within the system.

- The mapping process should have allowed you to identify some of these actors. In cases where the actors belong to a very large group (e.g. slum dwellers), engage influential representatives.

- Invite the collaborators to participate in the analysis of the system. Engage with them using a language they understand and show them clearly the possible benefits of participating. The more marginalized or vulnerable the collaborators are, the more you will have to help them build basic networking, analysis and negotiation skills.

- Get to know the collaborators well and build trust with them. Understand their current situation (needs, potential, fears, expectations, etc.), history (how and why they got to where they are) and visions of the future (what is likely to happen without the project and because of it).

Tips to identify the right actors:

- People who can contribute to the discussion, identify barriers and commit themselves to implementing solutions.

- People searching for opportunities, and/or those who have been trying hard to transform the system.

- High-level officials and other actors with power to transform the system but also people who can reach those with creativity and the will to change.

- In politically sensitive environments, those least interested in hijacking the meetings and those who can verify that the meetings are not a threat to incumbent, powerful actors.

4. GET THE ACTORS TO ENGAGE IN A PROCESS OF DIALOGUE TO UNDERSTAND AND TRANSFORM THEIR OWN SYSTEM

This is the heart of the participatory analysis process. This is where co-creation starts. Co-creation is the process of collaboratively creating new visions of future possibilities, and strategies and initiatives to move towards that future.

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[1] Adapted from the slogan "Who Does, Who Pays" proposed by the M4P Approach. See "The Operational Guide For The Making Markets Work For The Poor (M4P) Approach, page 21

- The co-creation of a future that engages most actors is based upon a good collective understanding of the history of the system (i.e., why are we here? What have we done that contributes to where we are now?), its current state (i.e., what are the challenges and possibilities of our system?), what it could become in the long term, and what we can do together now that will move us closer to that vision.

- This participatory process of analysis is very similar to steps 1 and 2 but it is done with the collaborators. Therefore, the team must have the skills to get the collaborators to show up and stay engaged (creating the spaces where they feel comfortable analyzing their system) and support them to drive their own initiatives.

- Getting the actors to show up: this is a tricky process because actors may feel threatened or uncomfortable about the idea of working with others; they could also be very busy or feel that this is not a priority for them. In all cases, you should work to understand their interests and motivations *(see step 3)*.

- Creating a safe space for productive dialogue: this is about creating the right conditions, such as physical space, mood and dynamics that will help the participants relax, open up and work with others to gain a deeper and better understanding of their own system.

- As facilitators, we must develop skills and sensitivity to transform negative feelings (e.g. fear, mistrust and resentment) into springboards towards higher levels of engagement, participation, openness and creativity.

Tips to create a safe space:

- Encourage the participants to hear what others are saying. We must help the participants to become aware of when they are not listening properly and talking across each other. Often, as others talk we are preparing our "ammunition" to attack what the others are saying (or what we think are saying). We must help the participants to cultivate the discipline of suspension of judgement and preconceptions.

- Help the participants be more aware of the assumptions they are making at every step and help them to share them with other actors. This may involve some respectful prodding and challenging of participants' views.

- Communicate clearly and demonstrate with actions that we are non-judgmental and neutral,

in the sense that we are there to help them improve their own system, not to benefit a specific group or set of one individuals.

- Pay attention to body language (including facial expressions) and "ways of saying things" (tone, volume, sarcasm, etc.).

- Encourage participants to take responsibility, to shift at the appropriate moment from complaining to saying what they can do to be constructive, but always within their possibilities and without pushing too much.

- Help the participants to understand the history of their system, but also to let go of the past and focus on what is they can do now, together.

- Encourage participants to let the others know why they value them. This can contribute to more openness and trust.

5. CONDUCT THE ANALYSIS TOGETHER AND ITERATE

As the participants engage in a productive dialogue, we must document the process and help them synthesize their findings and insights, prioritize and sequence their initiatives and assess whether more rounds of participatory analysis are necessary.

- **Capturing**: it is ideal to have one person observing and taking notes of what goes on during the analysis (i.e. "a fly on the wall"). This person will notice things that the facilitator can't and during the breaks or at the end of the day, s/he shares with the facilitator her/his insights and take-aways. For example, one participant that has not spoken or that looks threatened by others, or a moment when the facilitator imposed his/her views on the participants.

- **Synthesizing**: during and after the workshop, the facilitators help the participants cluster similar findings under categories and highlight connections between clusters.

- **Prioritizing and sequencing**: as the participatory analysis moves forward, the participants will propose strategies and activities to address blockages or exploit opportunities. The facilitators must help the participants agree on what can be done in the short- and mid-term. The participants must understand the teams' possibilities to support their initiatives: Will you behave as a facilitator during the implementation phase? Will you be able to subsidize some initiatives? If so, how and when will you be able to do that? How will you phase out your support?

- **Iterating**: During the first round of participatory analysis, you will realize that you missed something. It could be an important actor that was invisible during the analysis you did within your team or an issue that requires more research or the participation of experts. Be prepared for more than one session; hopefully not more than two.

- **PS: Remember to Exit Before You Enter.** From the moment the team gets together to imagine the project and as you help the participants analyze their system and agree on strategies and activities, you must keep in mind your exit strategy and avoid becoming trapped in a vicious circle of dependency.

Participatory Systems Analysis: Resources Required

Resources required will depend mainly on the nature of the issues/problems that the project sets out to address and the diversity of actors/perspectives and. Normally, issues/problems in a local system are complicated or complex.

The following table categorizes these scenarios according to the combination of nature of issues/problems (complicated or complex) and the diversity of actors/perspectives (low or high).

In all scenarios the objective is to analyze the system with the participation of strategic stakeholders and agree on strategies, action plans and working groups. Implementation is not part of the scope of the table.

Tips to accelerate the process:

- Preparation: Do a good analysis within the team before you convene the system actors. Try to back your information with credible sources. Do everything you can so that people trust what you say and perceive you as a neutral and fair player.

- Communication: Use the analysis you did within the team as a reference point for the collaborators. Invest heavily in the visual and communication aspects of your analysis. Use this tip only in case you do not have time to let the actors do their own analysis from scratch.

- Facilitation: Select the most engaging facilitators in your team to share the information. They must energize the participants and help them break the ice in a very short time. Remember that, despite time limitations, you still want the stakeholders to interact between them, not just with you and your findings.

- Feedback: Mix different types of participants in small groups to discuss in depth about what they agree and disagree with the team's analysis and come up with broad strategies to address

blockages and opportunities together.

- Working groups: Take the lead and be proactive when forming and nurturing working groups to implement solutions. Invest heavily in follow-up calls and meetings with individual participants or small groups.

OTHER GUIDELINES

Short time available for the analysis – typically 1-2 days:

- **Prepare very well**: Do a very good analysis within the team. Try to back your information with credible sources. Do everything you can so that people trust what you say and that you are being neutral and fair to all.

- **Communicate very well**: Use the analysis you did within the team as a reference point for the collaborators. Invest heavily in the visual and communicational aspects of your analysis. Select the most engaging presenters in your team to share the information. You must energize the participants and help them break the ice in a very short time. Remember that, despite the short time available, you still want them to interact between them, not just with you and your findings.

- **Gather feedback and prioritize**: Mix different types of participants in small groups to discuss in depth how they agree and disagree with the team's analysis and come up with broad strategies to address blockages and opportunities together. If you have two days, groups can use approximately half of one day to do their own analysis (see additional resources below). Make sure they present their findings, insights and proposals to the whole group.

Once the participatory process has ended, the team must take on the responsibility of synthesizing findings and next steps, and reporting back to the group.

- **Create and nurture working groups**: The team must take the lead in forming and nurturing working groups to implement solutions. Invest heavily in follow-up calls and meetings with individual participants or small groups.

Longer time available for the analysis – typically 3-5 days:

- **Allow the participants to convince each other**: Prepare well but, given that the participants will have more time to build trust and share their experiences and perspectives about the system, the investment here can be reduced.

- **Let the participants lead the analysis**: Rather than influencing the participants with your analysis, you can allow them to do their own analysis from scratch. In this way, they are not influenced by your conclusions. Once the analysis is done, or at critical points during the analysis (e.g. if the participants get stuck), you can disclose bits of what the team discovered.

  Select the best facilitators in your team to engage the participants. Invite reputable experts to present about issues that the team identified as critical (e.g. issues where views are polarized or that are dominated by wrong assumptions).

- **Let the participants gather feedback and prioritize**: Use some time to explain to the participants how to use mapping, brainstorming, dialogue and clustering techniques to gather feedback.

  Splitting the group into smaller groups works here as well. Get the participants to identify challenges and opportunities. Then, rearrange them according to their interest in the issues identified. The objective here is to encourage these working groups to propose concrete strategies and activities to the broader group.

  Give the group time to validate and prioritize the activities identified.

- **Nurture working groups**: In longer workshops, the participants are more likely to create the groups they want to work with during the implementation phase.

  The main role of the team is to nurture the groups and serve as a technical secretary; for example, helping them meet regularly, access information and expertise, keep track of their decisions and informing the other participants about what the working group is doing.

Levels	Preconditions/Goals	Time	Human Resources
Easy Complicated and low diversity i.e. vaccination programme for children in a small village	• The team can make significant progress doing their own analysis. • One-on-one interviews and focus groups can provide a significant volume of information that can lead to feasible and sustainable interventions.	1-3 days	1 facilitator with basic knowledge about the issue If resources allow it, a support facilitator/observer
Medium Complicated and high diversity i.e. improvement of secondary education curriculum *or* Complex and low diversity i.e. improving access of cane sugar from large plantations to international markets	• The team can make some progress on its own but requires more inputs from experts than in the "easy" scenario. • One-on-one interviews and focus groups can be done but real-time interactions gain importance. If the group is not very diverse, some decision can be made via phone conferences and other virtual means. • In contexts of high diversity, workshop facilitation gains importance. Preparation, clear messaging, and facilitation skills become critical.	3-5 days per round It may require more than one round of analysis. Requires time for diverse actors to build trust and agree upon common objectives. Requires coaching and following up of working groups.	2 facilitators (1 lead and 1 support/observer) Thematic experts (depending on the issues that the participants raise and that cannot be addressed by facilitators)
Difficult Complex and high diversity i.e. improving the productivity of cocoa smallholder farmers (a crop with a high international trade volatility) in a post-conflict, high migration context	• The team must do its own analysis but mainly to identify strategic actors and prepare for potential conflicts. An ex-ante search for solutions may serve fundraising purposes but does little to put together a feasible, stakeholder-led action plan. • External experts are important, but it is important that they can interact with the system actors directly. • Interaction with people (from other systems) who have had experience in similar issues/problems can inspire key system actors to engage and invest. • One-on-one meetings (or meetings with similar types of actors) are important to find out the reasons why key actors are not participating or why they are hampering the process • Additional to very good workshop design and strong workmanship facilitation skills, it is necessary to have very good improvisation and conflict resolution skills/sensitivity.	3-5 days per round It may require more than one round of analysis. Requires time for diverse actors to build trust and agree upon common objectives. Requires coaching and following up of working groups.	2 facilitators (1 lead and 1 support/observer) Thematic experts (depending on the issues that the participants raise and that cannot be addressed by facilitators)

Participatory Systems Analysis
Case Study

Dairy Market Mapping and Analysis in Nepal
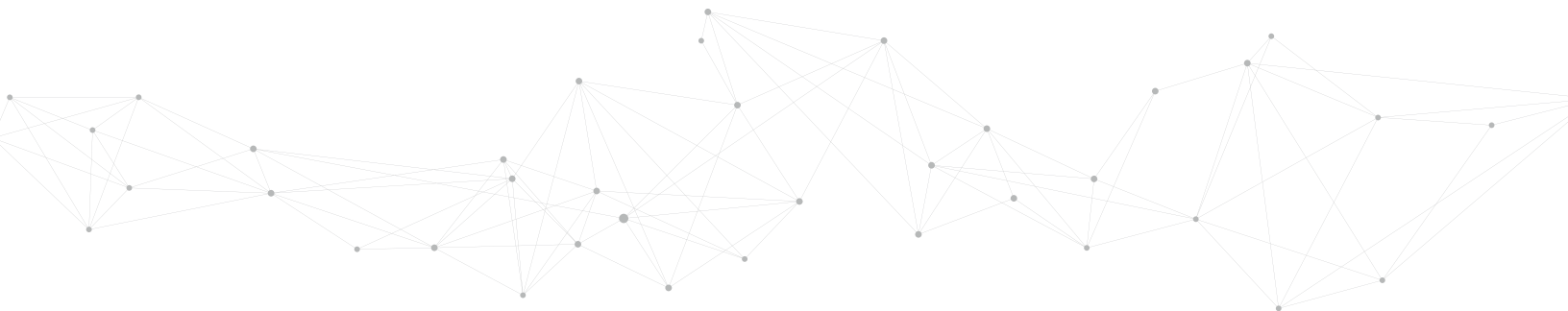
CHALLENGE

In 2009, Practical Action Nepal used Participatory Market Mapping to design a DFID-funded project called Dairy Market Access for Smallholder Farmers (Dairy MASF). The aim was to improve the dairy markets in the districts of Chitwan, Tanahu, Dhading and Gorkha to enable at least 10,000 poor farmers to commercialize household milk production and pull themselves out of poverty. The team designed the project with the market actors using Participatory Market Mapping Workshops (PMMWs). After the project was designed, in October 2010 the team used four more PMMWs to build momentum for collaborative action.

APPROACH

Practical Action used Participatory Market Mapping Workshops (PMMWs) to help marginalized dairy farmers in Nepal gain access to more functional markets, increase their incomes and contribute to a more favorable business environment. Working with the system actors as a facilitator, PA and the local facilitator built a shared understanding of the market and increased levels of trust and influence.

Using a visual representation of the market system – the Market Map – facilitators in the field used PMMWs to bring public and private market actors together to identify and discuss blockages and opportunities for increased coordination and collaboration. Practical Action's approach is based: systemic thinking, participation, and facilitation. (*diagram to the right*)

The Nepal team carried out this PSA process in three phases:

1. Preparation and analysis done by the team
2. Facilitation of the PMMWs
3. Follow-up activities

By mapping the market for dairy in four districts of Nepal – Chitwan, Gorkha, Tanaha and Dhading – Practical Action, together with farmers themselves, cooperatives, businesses and the government, identified basic health of cattle as one of the big problems in the sector. Nutritional deficiencies in cattle meant that poor farmers had not been able to produce high quality milk in large enough quantities to attract the interest of cooperatives and companies to buy their milk. This limited the growth of the industry nation-wide.
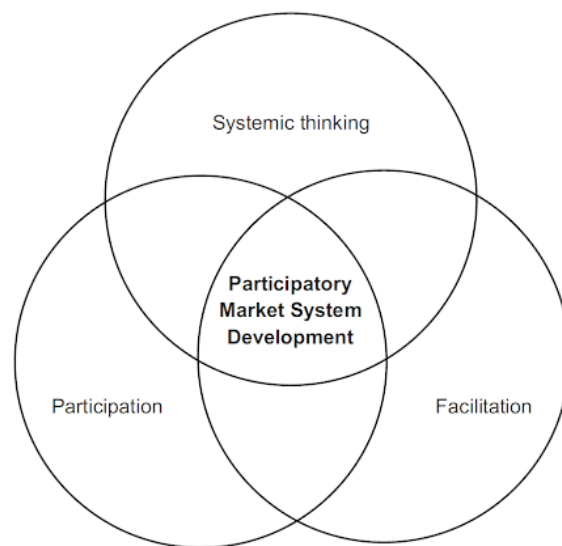

KEY INSIGHTS

- Team members attempting to implement PMMWs must be trained in systemic thinking, participatory methods and facilitation. They

must also know the working area well and have good relationships with the local market actors. A basic level of trust between the facilitators and the market actors goes a long way to get the get the PMMWs off to a good start.

- Making sure that marginalized or vulnerable actors are well prepared for participation in the PMMWs is important to minimize the risk of biased analysis and unsustainable/un-scalable action plans. This preparation is mainly about helping them to understand the importance of the workshops and the opportunity they present for them to voice their opinions and work with others on issues that matter to themselves; not about coaching them on what to say.

- Be prepared for some participants to lose interest during the mapping exercise (plotting actors and relationships, etc.), even if you design the workshop to be highly interactive. This is normal. Be mindful of body language and try to re-engage actors by splitting the group into smaller mapping groups or asking them to team up with other -more engaged- actors to help them map the market.

- Avoid trying to map in too much detail. Keep in mind that the main purpose of the participatory analysis is to build trust and collaboration around a few critical issues. As the market actors collaborate, they will add more information to the map and find new entry points.

- The team realized that offering the market actors the opportunity to promote themselves at the workshops can be a powerful hook.

- Pay attention to who invites and convenes the workshop. The Chitwan workshop -for example- was advertised to private sector companies by the Chamber of Commerce and Industry rather than the partner NGO, indicating a business-oriented event, as opposed to an NGO-driven one.

- If the preliminary analysis is done properly, facilitators should enter the workshops with a good idea of the constraints that are likely to be identified by the market actors and possible solutions for at least some of them. However, facilitators must be careful about how they use this information to manage the workshops. The purpose of participatory workshops is to achieve genuine ownership of the process by the market actors themselves.

- Market actors often need some cues to help them orient their thinking towards win–win solutions but they can disengage if the facilitator coaxes

them too heavily towards a set of predetermined solutions.

- It is important to manage expectations of market actors, the project team and partners. Trust builds over a period of time and however successful a PMMW may seem, one cannot expect fast progress towards optimal arrangements from the very beginning. Nonetheless, a focus on low–hanging fruit constraints can be a powerful catalyst. If market actors feel that something has been achieved early on, they will be more open to continuing the market system development process, and the project team and partners will be able to continue to nurture trust and develop relationships between them, leading to further transformations in the future.

- PMMWs are an important first step in the process of local systems change but they must be followed by well-planned and adequately resourced implementation.

- As market actors come to agreement on what to do to address constraints, the facilitator should help them put this down on paper. These joint action plans document how different market actors would each take individual but coordinated actions to achieve a common goal.

- It is important for the facilitators to know when to take a back seat and let the market actors deliberate and come to their own arrangements. These arrangements may not be what the facilitators expect or deem optimal, but strong ownership of the solutions by the actors is almost always preferable and more sustainable. Different solutions may also emerge in different locations despite similar contexts. Specific arrangements will depend on the characteristics of local market actors and dynamics of their relationships. The role of the facilitator is to nurture interaction to build the trust of market actors.

RESULTS

In its mid-term evaluation, the Dairy MASF reported that 93% of responding households stated they had experienced an increase in annual income since commencement of the project. This increase was on average US$366, equivalent to a 38% increase in income. In Tanahu, where the poverty of the target populations was particularly acute, average annual income grew by more than 110%. The causes of these increases were consistently attributed by the respondents to the Dairy MASF project conceived through the PMMW process.

Practical Action facilitated market actors across the

system to interact, find and test out possible collaborative solutions to make the market system more efficient and work better for smallholder farmers. As a result of strengthening relationships between market actors, a number of partnerships were formed to pilot innovations targeting the different bottlenecks across the system: cattle loans, dairy chapters in district chambers of commerce and industry, Nepal's first low cost, high nutrient cattle feed, and a business plans for investment of large-scale processors in animal health camps.

Since 2010 efforts have also focused on facilitating media markets to communicate successful pilots to a wider audience, in order to turn isolated achievements into deep transformations across the system.

Facilitating the dairy market system in Nepal: A participatory approach. Available from: developmentbookshelf.com/doi/abs/10.3362/ 2046-1887.2011.015

Participatory Systems Analysis
Case Study

Tackling Poor Animal Health in Zimbabwe's Livestock Market System
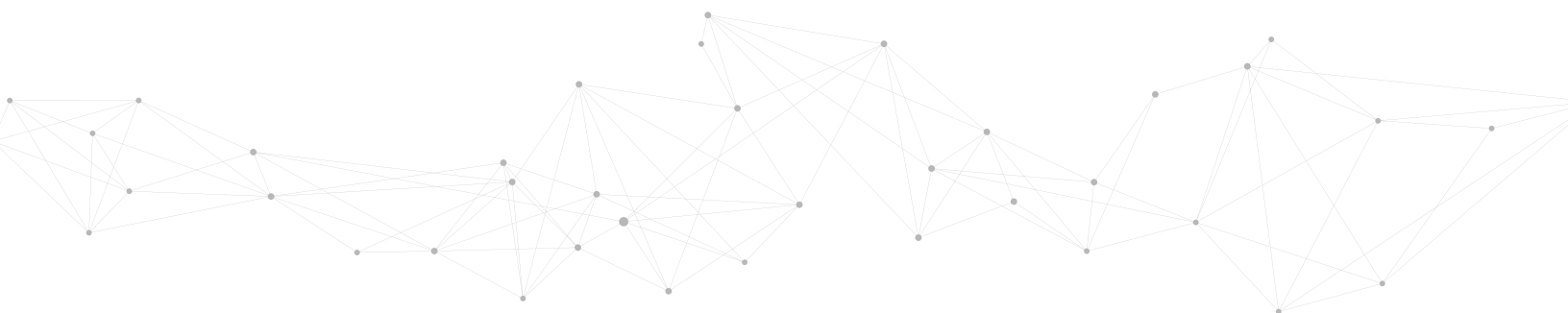
CHALLENGE

In Zimbabwe, the beef sector was less competitive than it could have been as a result of a general issue with poor cattle health. The poor health of cattle translated into poor quality meat, limiting the prices that it fetched and the markets it could reach. The problem of animal health was particularly acute in the case of poor livestock farmers, excluding them from higher-value markets.

Improvements in veterinary care were not materializing because there was a coordination failure between multiple market actors. The government Department of Livestock Production and Development (DLPD) had limited coverage to deliver veterinary extension services. Drugs firm VETCARE could not see enough demand for its products to invest in extension services. Local animal health workers (para-vets) were poorly trained; they operated within community systems that had limited interaction with public and private actors. Farmers had knowledge about the importance of animal health but did not know how to deal with the issue. Traders and other market chain actors did not see animal health as their problem.

Recognizing the importance of cattle farming to livelihoods in rural Zimbabwe, along with the extreme fragility of the livestock market, Practical Action embarked on a project to improve incomes for farmers by facilitating a positive transformation of the market. The project focused on Guruve district in Mashonaland central province.

APPROACH *(Approach p.81)*

In 2005, local farmers, buyers, suppliers of inputs and services, community-based organizations, and relevant government departments were brought together in a series of participatory market mapping workshops, to identify key opportunities and constraints in the livestock market chain. Guruve is a typical example of the significance of livestock farming in rural Zimbabwe: of the district's 20,000 households, 80% keep cattle with a total number of 169,500 animals in 2005.

Identifying an increasing demand for better quality animals, carcasses, and meat, market actors discussed their market system and its blockages, and the issue of animal health in particular. Farmers participated in the process through 'Market Opportunity Groups', which continue to meet on a quarterly basis. These groups are made up of four or five lead farmers who represent other farmers at regular meetings with buyers to negotiate prices and discuss livestock purchasing logistics. This increased collaboration has led to developments benefiting both farmers and buyers, such as pre-arranged market days. VETCARE and Agriseeds emerged as two key private companies that saw opportunities in working with the farmers. (VETCARE is the name we have used for the large national veterinary products company, as permission to use their real name has not been obtained.)

Practical Action recognized that this sub-sector had significant potential for a positive market transformation that could produce higher, more consistent and more sustainable incomes for farmers and other market chain actors. Such a market would increase farmers' access to competitively priced inputs and services, increase capacity of farmers to develop commercially beneficial relationships with buyers and persuade government to implement more enabling policies to support further market change.

Over the course of two-and-half years, the project brought stakeholders together in a process that was intended to identify what blockages were hindering the

development of a competitive, fair and effective market before facilitating new approaches to addressing those obstacles in a way that would benefit all. To this end, Practical Action embarked on a series of participatory market mapping workshops, involving farmers, buyers, suppliers of inputs and services, local Community-Based Organizations (CBOs) and relevant government departments. The aim of these workshops was to identify key opportunities and constraints in the existing livestock market chain and address the role that each actor could play in tackling blockages in the system. Involving all actors in the process of systemic market change proved to be an effective approach, inspiring a number of practical innovations to mitigate market blockages and leading to significant and sustainable improvements to incomes.

KEY INSIGHTS

- Poor farmers, buyers of livestock, private enterprise and government departments can collaborate for mutual benefit if the right incentives exist and are collectively identified.

- Viable and sustainable markets can develop even in a challenging external environment when all actors in a market chain recognize the potential for enhanced profits. This process can be stimulated through a participatory approach and dialogue between all stakeholders.

- Market opportunity groups are an effective tool for addressing actors' interests and constraints, especially if driven by participants themselves.

- Resource constraints on government departments and extension services can be a catalyst for collaboration with other agents, leading to innovations in the delivery of cost-effective services.

- The development of community-based actors in the market chain has been a particularly effective solution to the problem of improving access to livestock healthcare which has brought mutual benefits to all market actors.

- Community-based actors, specifically local para-vets, can be an effective mechanism for the distribution of important inputs (drugs, training and advice) which are critical in improving competitiveness and incomes.

- Access to feeds in the dry season plays a critical role in animal health and productivity of livestock. Improving the availability of alternative fodder has a positive impact on incomes and therefore encourages farmers' interest in caring for their livestock.

- At the start of the project, relationships between the market actors were characterized by mistrust and lack of confidence in the benefits that would be derived from collaboration. Mistrust started to disappear and relationships improved as all actors in the market began to derive tangible benefits from the project.

- Transforming relationships is key in the pursuit of more efficient market chains that benefit the poor. The PMSD approach has been instrumental in creating an environment of trust and optimism among participants. A main driver in the process was the buyers' early commitment to pay more for larger, healthier animals.

RESULTS

Through a process of discussion and information sharing, the Department of Livestock Production and Development, drug firm VETCARE, local para-vets and farmers agreed to develop a new arrangement: VETCARE and the DLPD co-invested in a training programme for local para-vets. These para-vets in turn raised awareness and delivered much improved veterinary assistance to farmers. Traders and other market chain actors took a keen interest, seeing the cattle and meat that they traded improve in quality, and assisted in the awareness-raising work for good animal health.

Linkages were established with two agribusiness companies–a supplier of seeds for fodder and cattle feed, and a veterinary drugs firm. The latter worked closely with the government's Department of Livestock Production and Development to train 800 lead farmers to qualify as para-vets. These community-based vets, who each serve around 20 farmers, ensure that services reach poor farmers who would otherwise be unable to access drugs, training and advice.

Including lead farmers and para-vets in the market chain has been an effective solution to the problem of improving access to livestock healthcare, which has brought mutual benefits to all: farmers have seen improvements in incomes by producing healthier cattle; buyers are able to access a higher quality product; para-vets have increased status, role and incomes; and the drugs company has developed its market for drugs and healthcare training.

Joint action plans aimed at tackling blockages in the system have been drawn up by stakeholders involved in the market mapping workshops, and are being taken forward by an Interest Forum consisting of farmers, buyers, policy makers and para-vets, which is facilitated by the Lower Guruve Development Association.

By starting new commercial relationships between farmers and suppliers of veterinary drugs and a new public-private partnership to train skilled farmers as para-vets, the project increased the uptake of veterinary services among an estimated 20,000 farmers.

These services improved the quality of cattle for sale and thus the price of cattle from the region. This has resulted with cattle prices increasing by at least 8% in real terms between 2005 and 2008, leading to improved incomes for 20,000 livestock farmers and their families – over 100,000 people in total. In addition, the prevalence of livestock disease reduced by 20%, and the number of cattle being sold for slaughter doubled during the same period. This approach is now being replicated in four other districts in Zimbabwe's Mashonaland Central Province.

Read more about this case at practicalaction.org/docs/ia2/promising_practices_pmsd_livestock_zim.pdf

3 upper levels in PMSD approach

Goals (Vision)

IMPROVEMENTS IN LIVELIHOOD
for significant numbers of
MARGINALIZED SMALL-SCALE RURAL PRODUCERS

Outcomes

TRANSFORMATIONS IN MARKET SYSTEM
at three levels:
- Business Environment
- Value Chain Actors / Relationships
- Provision of Inputs & Services

Outputs

EMPOWERED PRODUCERS
exploring more and better business opportunities for themselves & their communities

MARKET SYSTEM ACTORS (IN PROJECT AREA)
working together to change critical issues and relationships in the market system

MARKET SYSTEM ACTORS (ELSEWHERE)
inspired to adopt and adapt lessons and business models emerging from the project

Appendix

Key Terms

SYSTEMS THINKING

- **Boundary**: An imaginary line that marks the edge or limit of a system. It is what defines what is inside and outside of the system. There are no right or wrong boundaries; only those that include the necessary actors and factors required to start transforming the system. As we know more about the system, we should assess if the boundary must be changed by adding or excluding actors and factors.

- **System**: A group of interdependent/interacting parts that form a unified whole to pursue a common goal.

- **Systems Analysis**: Analysis of issues or problems as part of a broader structure or system.

- **Soft Systems**: Systems that have a strong human interaction, perception, and cultural component.

SOCIAL NETWORK ANALYSIS

- **Attribute**: A characteristic or property of a person, group, organization, etc.

- **Betweenness**: A measure of the number of times that a node lies on the shortest path between two other nodes.

- **Bonder**: Members in a network that if removed would fragment the entire network more than any other member.

- **Bridge**: A node that connects/links two different groups together in a network.

- **Centrality**: Indicates which actors are most engaged and which are peripheral.

- **Community**: A group of people who have something in common. This may include living in the same geographical are or sharing common attitudes, interests, or lifestyles.

- **Cluster**: A group of nodes in a network that are more densely connected to each other than to other nodes in the network.

- **Density**: The number of actually-occurring relations or ties as a proportion of the number of theoretically-possible relations or ties.

- **Distance**: Calculates the average number of steps for any network actor to reach another actor.

- **Ego-alter approach**: A data collection approach; the network expands a set number of times.

- **In-degree (prominence)**: A measure of the

number of connections a node has that were identified/named as a relationship by others in the network.

- **Inclusiveness**: The percentage of nodes that are connected to other nodes in the network. The more nodes are isolated, (no connection to any other nodes in a network) the lower the inclusiveness.

- **Interrelationships**: The ways in which two or more issues or actors are connected and affect one another.

- **Node**: Represents a person, group, and/or organization in a network.

  - **Core**: A highly interrelated group of nodes at the center of a network; typically hold the network together.

  - **Periphery**: A group of nodes that are at the edge of the network and therefore less connected than those nodes located in the core.

  - **Out-degree (influential)**: Nodes that report many interactions with other nodes.

  - **Tie/Links**: Represents the connections between nodes in a network.

- **Perspectives**: A particular way of seeing, considering or understanding something.

- **Reciprocity**: Measures the extent to which relationships reported by one actor are confirmed by the other actor.

- **Snowball Approach**: A data collection approach; the network expands until all actors are identified.

CAUSAL LOOP DIAGRAM

- **Causal Loop Diagrams**: A systems analysis tool that visually maps conceptual elements/parts/variables of a system along with their interactions and relationships.

- **Variable**: Any factor that can change and is related to the phenomenon under investigation.

- **Linear**: In the context of CLDs, linear is a type of relationship between two variables that is proportional, reproducible, and additive.

- **Feedback Structures**: Interactions and relationships that underlie patterns of behaviors or outcomes in a given system.

- **Intervention points**: Places that you can intervene in a system to bring about change.

- **High-leverage intervention points**: Places in a system where interventions can bring about lasting, system-wide changes with minimal resources.

  - **Low-leverage intervention points**: Places that in a system where interventions can bring about limited/temporary change with relatively large amount of resources.

- **STEEP Factors**: Social, technological, economic, environmental and political factors.

- **Feedback Loop**: A series of relationships that form a complete, closed loop. Through this loop, a change in a variable travels through other variables in the loop and eventually feeds into itself. Facilitates non-linear thinking as an effect in the system turns into an input into the same system through the circular process captured.

- **Root Cause**: The underlying reasons in a system that lead to the emergence of a problem.

- **Causal Pathways**: A trail of cause-effect relationships that help trace first, second and third degree drivers of an outcome.

- **Leverage Analysis**: A type of analysis that aims to identify the most effective points in a system to intervene for positive change.

- **Mental Model**: Someone's understanding of how something operates. It is informed by perceptions, biases, beliefs, experiences, and knowledge.

- **Reinforcing loop**: A loop in which the series of relationships captured causes exponential growth or spiraling decline in the phenomenon of interest.

- **Balancing loop**: A loop in which the series of relationships captured represent an opposing force to change in the system.

- **Trend Analysis**: A type of analysis that reviews recent trends about selected variables to anticipate the direction of change expected within a system.

- **Cascading Effects**: Waves of effects experienced in a system that are triggered by a change in a given variable.

- **Complex adaptive systems**: A complex system that is comprised of interacting intelligent actors. These actors adapt their behavior in light of their experiences, interactions with other actors and changing conditions and perceptions. As a result, the overall system also changes. In these systems, behavior patterns emerge as a result of interactions of its many actors rather than an external intervention or organization. This concept applies to biological, natural, and ecological systems as well as social systems.

- **Story-boarding**: A presentation style in which smaller pieces of ideas/findings are organized into consecutive scenes to slowly build the overall story.

- **Stocks and Flows**: Stocks represent the concept of accumulation in a system and refer to the quantity or level of a variable at a particular point in time (e.g., population). Flows (rates) refer to those variables whose quantities are measured over an interval of time (e.g., birth and death rates). Flows are closely associated with stocks as they may be inflowing or outflowing, changing a stock's value. To know how a stock variable will behave, we need to know how respective flows are changing. This will allow us to see "its net rate of change" (Sterman 2000, 140).

- **Stock and Flow Diagrams**: A quantitative system dynamics model that is used for decision-making purposes. It is simulated to understand the net effects in a system of a change in a given variable(s).

PARTICIPATORY SYSTEMS ANALYSIS

- **Community participation:** A process (and approach) whereby community members assume a level of responsibility and become agents for their own health and development.

- **Entry points**: Parts or issues of the system that represent an opportunity for the team to engage, build trust and start "unlocking" the system.

- **No-go zones**: Parts or issues in the system that will be very difficult to change with the available resources.

ETHNOGRAPHY

- **Ethnography**: Writing about people; the primary tool for data collection and analysis among anthropologists, sociologists, and increasingly historians, and political scientists.

- **Cultural immersion**: Living with the community, group, or settlement under study, and participating in various aspects of the people's daily lives.

- **Domain Analysis**: The study of how people in a group place objects or think about lists of things that somehow go together. The way people categorize the world around them – physical,

observable or conceptual things.

- **Consensus Analysis**: A method of analysis under domain analysis that is a way of conceptualizing and coping with individual variability; as a theory, it specifies the conditions under which agreement among people can be seen as a sign of knowledge.

- **Decision Modeling**: A method of predicting the choices that people make under specific circumstances. Any recurring decision can be modeled based on asking questions, sorting out some logical rules about how the questions have to be ordered and laying out the order in a picture or in writing.

- **Emic perspective**: Insider's view and understanding of a system or phenomenon.

- **Etic perspective**: Outsider's view and understanding of a system or phenomenon.

- **Open-Ended Interviews**: Broad/Deep Listening dialogues between ethnographer and respondent where the conversation is not structured and the respondent usually determines the direction and nature of conversation in an organic dialogue with the ethnographer.

- **Semi-Structured Interviews**: An interview style which uses a list of themes around which the questions will be asked and which will provide limited structure to the interview. The responses are usually in the narrative form.

- **Structured Interviews**: An interview style which uses scripted questions that call for elaborate narrative responses but do not allow for deviation from the questions.

- **Focus Group Discussions**: A data collection technique in which the ethnographer usually asks structured questions of a small group of respondents, either by asking questions of individuals in the focus group in turn, or by allowing the focus group to determine the nature and order of responses.

- **Questionnaire-Based Surveys**: A data collection technique that uses pre-established questionnaire tools to increase sample size and ask questions that have already been tested and verified through participant observation and other forms of verification.

Appendix

Additional Resources

LSP LEARNING

- **Critical Success Factors for Development Initiatives: Which Local System Attributes Help Shape Development Outcomes?**
  LSP / ANSER (2017)

  Research and report examining the attributes and foundations for LSP's Learning Statement 2. Reviewing sixty sources, this research paper assesses the extent to which there are qualities or attributes of local (country) systems that development researchers and practitioners have found to be critical in informing and shaping development outcomes.

  drive.google.com/file/d/1SIzzyRNuPqv0H_yscXrlh XGaJl8dbwZ0/view

- **2018 Multi-paper Presentation at the Conference of the American Evaluation Association (AEA): "Breaking News: We Can't Control Everything! Using Systems Thinking to Understand Context in Development Projects.**
  LINC / ANSER (2018)

  Multi-paper presentation at the annual conference of the American Evaluation Association (AEA), delivered November 1, 2018 in Cleveland, Ohio. Patrick Sommerville (LINC), Sibel McGee (ANSER) and Frances Veasey (ANSER) presented on their LSP research into attributes of health systems, systems thinking tools and resources for practitioners, and two cases of applying systems thinking in Afghanistan and Bangladesh.

  drive.google.com/file/d/19xlyfPRQC6war70i3f9BC 6sk-JqmHqxy/view

SYSTEMS THINKING

- **Thinking in Systems: A Primer**
  Donella Meadows (2008)

  A key resource that introduces many conceptual tools of systems thinking, including causal loop diagrams, and discusses their application to real world problems.

  wtf.tw/ref/meadows.pdf

- **Systems Concepts in Action: A Practitioner's Toolkit**
  Williams, B. and R. Hummelbrunner (2010)

  This book presents a wide range of methods from the systems field.

  sup.org/books/title/?id=18331

- **The 5Rs Framework in the Program Cycle**
  USAID (2016)

  An excellent resource for practitioners in the early stages of crafting a systems framework for practical project/activity design purposes.

  usaidlearninglab.org/sites/default/files/resource/ files/5rs_techncial_note_ver_2_1_final.pdf

SOCIAL NETWORK ANALYSIS

- **Strengthening Local Systems through Network Analysis**
  LINC

  Learn more about how LINC applies Network Analysis to understand and map complex systems and strengthen local systems and actors.

  linclocal.org/network-analysis/

- **PACT Organizational Network Analysis (ONA) Handbook**
  (2011)

  A practical guide to the ONA tool created for practitioners and development professionals. While it assumes the reader's general familiarity with networks, the handbook provides practitioners and managers with the information they need to understand how ONA works, and how best to incorporate it in their country strategy or program.

  pactworld.org/sites/default/files/ONA%20 Handbook_ext.pdf

- **University of Michigan School of Information Social Network Analysis**
  Online Course

  Professor Lada Adamic of the University of Michigan teaches an online course that introduces basic concepts in network theory, discusses metrics and models, and imparts ways to use software analysis tools to experiment with a wide variety of real-world network data. The online class utilizes Gephi, NetLogo and R tools to cover network theory, analysis, and application to help learners observe and understand different networks as well as their structures.

  youtube.com/watch?v=VjOVhWfh6iI

- **Video on Network Theory**

  Created by Complexity Labs, this video provides a simple and tangible explanation of Network Theory and discusses the most common terms.

  youtube.com/watch?v=-ckaLBsCoxo

- **NGO Network Analysis Handbook: how to measure and map linkages between NGOs**
  Save the Children (2011)

  This handbook is designed to help practitioners understand what network analysis is; how network data is collected; how to create visual maps of the network, and how to analyze the network data for program/project development or evaluation.

  docs.google.com/file/d/0B2Ss9SWcL0DgYjNlMTM 2YWYtODQwZS00ZjZiLWJhNTgtZmI4N2Y4NjkyYzY4 /edit?hl=en

- **Not everything that connects is a network**
  Overseas Development Institute (2011)

  This paper seeks to address the following questions: are networks always the most appropriate vehicle? Where they are appropriate? How can we make the best use of them? The paper argues for a more rigorous understanding of networks' nature, particularly their value (and costs), and presents a revised Network Functions Approach as a model for rationalized investment in networks.

  odi.org/publications/5137-networks-network-function-approach-rapid

- **Learning about Analyzing Networks to Support Development Work**
  Simon Batchelor (2011)

  This paper presents four cases where social network analysis was used in a development program. It focuses on the analysis of connectivity in real world networks, particularly in cases that were unintentional networks.

  researchgate.net/publication/267327989_ Learning_about_Analysing_Networks_to_ Support_Development_Work

- **Catalyzing Networks for Social Change**
  Monitor Institute and Grantmakers for Effective Organizations (2011)

  This guide is for grant makers who are just beginning to explore and experiment with networks and for those who are further along and want to reflect on their practice.

  jimjosephfoundation.org/wp-content/uploads/ 2012/01/Catalyzing_Networks_for_Social_ Change.pdf

- **A Bird's Eye View: Using social network analysis to improve knowledge creation and sharing**
  IBM Institute for Knowledge (2002)

  This guide provides four different network relationship dimensions which are important for effective learning. The research discusses and analyzes how applying these dimensions to important groups of people within an organization can facilitate and improve knowledge creation and sharing.

  analytictech.com/borgatti/papers/cross,%20 parker%20and%20borgatti%20-%20A_birds_eye _view.pdf

- **Social Network Analysis Handbook**
  International Rescue Committee (2016)

  This handbook provides a step by step guide to the application of SNA. The approach draws on Social Network theory, discussion-based tools, and graphical software applications.

  rescue.org/sites/default/files/document/1263/ socialnetworkanalysise-handbook.pdf

- **Social network analysis of multi-stakeholder platforms in agricultural research for development: Opportunities and constraints for innovation and scaling**
  PLOS One (2017)

  This paper explores three multi-stakeholder platforms (MSPs) in Burundi, Rwanda and the eastern part of Democratic Republic of Congo (DRC). The researchers apply SNA and Exponential Random Graph Modeling (ERGM) to investigate the structural properties of the collaborative, knowledge exchange and influence networks of these MSPs, and compare them against value propositions derived from the innovation network literature. Results demonstrate a number of mismatches between collaboration, knowledge exchange and influence networks for effective innovation and scaling processes in all three countries. The results illustrate the potential of Social Network Analysis and ERGMs to identify the strengths and limitations of MSPs in terms of achieving development impacts.

  journals.plos.org/plosone/article/file?id=10.1371/ journal.pone.0169634&type=printable

CAUSAL LOOP DIAGRAMMING

- **Systems Thinking Applied: A Primer**
  ANSER

  Reference source on systems thinking for beginners that explains key methods of systems analysis, including causal loop diagrams.

  anser.org/docs/systems_thinking_applied.pdf

- **Leverage Points: Places to Intervene in a System**
  Donella Meadows (1999)

  Seminal work that identifies 12 types of levers within a system and discusses their effectiveness in bringing about change.

  donellameadows.org/wp-content/userfiles/Leverage_Points.pdf

- **Business Dynamics: Systems Thinking and Modeling for a Complex World**
  John Sterman (2000)

  Key textbook in which MIT professor discussed system dynamics approach and its application to problem solving efforts in business, organizational, social and physical science domains.

  researchgate.net/publication/44827001_Business_Dynamics_System_Thinking_and_Modeling_for_a_Complex_World

- **Guidelines for Causal Loop Diagrams**
  Daniel Kim (1992)

  Offers some suggestions on the mechanics of creating causal loop diagrams, and general guidelines that should help lead you through the process.

  cs.toronto.edu/~sme/SystemsThinking/GuidelinesforDrawingCausalLoopDiagrams.pdf

- **Systems Grantmaking Resource Guide: Causal Loop Diagramming**

  Brief profile on Causal Loop Diagramming, and how it relates to systems grantmaking.

  systems.geofunders.org/systems-resources/causal-loop-mapping

PARTICIPATORY SYSTEMS ANALYSIS

- **Cynefin Framework**
  Snowden & Boone (2007)

  The framework is currently undergoing improvements but this article provides the basics.

  hbr.org/2007/11/a-leaders-framework-for-decision-making

- **The Operational Guide For The Making Markets Work For The Poor (M4P) Approach**

  A guide to thinking about who benefits and who is likely to lose out.

  beamexchange.org/uploads/filer_public/9e/47/9e477a7c-8865-4ae6-8424-845cdd84c961/m4pguide_full.pdf

- **The Systems Practice Workbook**
  Acumen+/Omidyar

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Appendix

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