

# Network Analysis for Evaluating On-Farm Conservation Projects

## Fact Sheet

On-farm conservation projects, as well as most projects that use research to foster development, usually involve multiple partners who play different roles, bring diverse perspectives and influence the project in multiple ways. These partnerships should not be seen in isolation or as piecemeal, but as a network of actors that enable the implementation of a project, influence its success or failure, generate learning and allow its implementers to achieve goals that would have been beyond the scope of a single institution working in isolation. This network of partners usually involves actors working at different scales from the local to the global, and bringing in as well their own informal networks and contacts to support the established partnership. Thus universities, national and international research centres, local and international NGOs, community-based organizations, the private sector and international organizations can all cooperate within a project for the achievement of its final impact. They may play, however, very different roles determined by their diverse nature and capacity to influence the implementation process.

Conducting a network analysis of partnerships is crucial at both the project planning stage (*ex ante*) as well as after its implementation (*ex post*). During the former, it allows project implementers to identify and link with strategic partners that can enhance the chances of project success. During the latter, understanding the network's structure, depicting the degree of the actors' interaction, their roles in influencing and determining the final results, and assessing any transfer of influence from the project implementers to project beneficiaries are crucial exercises for determining the real impact of a project. Therefore such an analysis should be embedded in a project from its inception, including the required budget.

An excellent methodological tool for a network analysis of partnerships in the implementation of a project is Social Network Analysis (SNA), which constructs a 'map' of the linkages among different actors, their relationships and information flows

between them using easy-to-understand and verify matrices and diagrams. Thus the focus of an SNA are the relationships and knowledge flows among interacting agents. Central issues include the interdependency of actors and the channelling of material and non-material resources between actors through relational ties or 'linkages.' The unit of analysis is therefore the relationship, not the organization itself.

In the context of the McKnight Foundation-funded project entitled *Assessing the Success of On-Farm Conservation Projects in Delivering Conservation and Livelihood Outcomes: Identifying Best Practices and Decision Support Tools* coordinated and implemented by Bioversity International and carried out between March 2010 and May 2012 in the High Andes of Ecuador, Bolivia and Peru, we used SNA to examine six projects that supported on-farm management of native crop diversity and sought to increase livelihood benefits derived from it. This analysis was done only *ex post* since *ex ante* data and information were not available.

## Network Structure

The measures of interest for the Andean study regard the concept of network centrality, which refers to the position of a network actor relative to other actors. Relationships between a pair of actors can be reciprocal (two-way) or univocal (only one-way). The analysis centres on relationships among different organizations and institutions and not among particular people. In this analysis there are three important parameters for network centrality: degree of centrality, closeness centrality and betweenness.

The study focused on the first two measures and did not apply the closeness measure because the researchers lacked sufficient information on the relationship between all the different pairs of actors in the network and only had access to information from the point of view of the implementing institution.

**Degree of centrality** of an actor is the number of other actors to which it is adjacent. It represents how much an actor is well-connected, how many 'choices' it has received and therefore how central it is in the network. It is a measure of local centrality because it ignores the indirect connections the actor may have.

**Betweenness** is the degree to which an actor is an intermediary between two other actors inside a group. It is a concept based on local dependency: an actor depends on another if the paths that connect it to other actors pass through this specific actor.

**Closeness centrality** represents the centrality of an actor as being as close to any other one in the graph. An actor is globally central if lies at short paths or distances from many other actors.

The relevant links in the network were defined according to four categories:

- **Money:** these include the links based on one actor providing financing to another, e.g. from the donor to the project-managing institution or from the latter to the institution that carries out activities in the field.
- **Research:** links based on one actor providing research activities to another, e.g. a university carrying out laboratory analysis for the implementing institution.
- **Training:** links based on capacity building activities, e.g. training in food preparation given by the implementing institution to a community.
- **Exchange of information:** this category includes all the links based on simple interaction between two actors who exchange relevant information related to the project or who participate in the same workshops, conferences, seminars.

To address the structure, links and influence of network actors, the study collected data from key informants of the implementing institution of each project and from the available project reports. In particular, to define the influence of an actor in the network the researchers asked the relevant key informants to gauge the intensity of the relationship with each actor involved in the network on a 1 to 4 scale. In this way it was possible to assess which actors have contributed more to the achievement of relevant project outputs and outcomes. It should be pointed out that ideally, data should be collected from every network member through participatory activities or through questionnaires, not just those in the implementing institution. However, due to timing and budgetary constraints this could not be done, so that the researchers had to rely only on two sources of data:

- **Secondary data from project reports:** These data allowed the researchers to map out all the actors involved in each project and their direct or indirect linkages to other actors in the network. From this analysis of secondary data, an overview of the relationships between different actors involved in each project and of the eventual interactions between different projects was developed.
- **A survey of key project informants:** The survey was submitted to project leaders in order to validate and complement the information from secondary data. Respondents were asked to add other missing actors relevant to the project. The survey asked whether the relationship between the implementing institution and the other actors was direct or indirect; what services were provided to and received from these institutions (money, research, training etc.); and the intensity of the relationship with each institution involved in the project.

The information obtained from key informants was cross-checked with secondary data from reports and updated in order to obtain a final matrix of actor-by-actor relationships that accounted for the direction, the type and the intensity of the relationships.

## Network Analysis Results

From the network analysis, researchers gathered some interesting insights into the network characteristics and links involved in the six on farm conservation projects we analyzed (Table 1). Variation was noted in the network parameters among projects both in terms of *degree centrality* and *between centrality*, with half of them having high levels on both parameters, as is shown in the table.

The relationships between network partners (the ways in which they interacted and were linked) were based on differences and similarities in terms of *type*, *focus* and *scope*. The **type** of relationship was characterized as research, training or exchange of information. The most common type of link was "exchange of information", followed by training. Research links were only present in half of the projects.

In terms of **focus**, which to a large degree determined the strength of an institution within the network, some projects concentrated on research

activities with universities and private institutions, while others aimed at a rural development focus on training activities and dissemination of information. Not surprisingly, projects with a strong research focus included among their partners universities or national research institutes that were also linked to other similar types of organizations that network together.

**Table 1: Key Parameters of Network Structures**

Network structure	
Degree of centrality	Number of projects
Low	1
Medium	2
High	3
Between centrality	
Low	0
Medium	3
High	3
Type of predominant links (not mutually exclusive)	
Research	3
Training	4
Exchange of information	5
Influential actors	Number of actors
Mean	5.8
Minimum	4
Maximum	9
Total actors	
Mean	25
Minimum	15
Maximum	37

The **scope** of a project, particularly the levels (international, regional, national, local) on which it operated, was crucial in determining the number of influential actors and the total number of actors (see table above). There is wide variation in the number of partners in the network among projects, but only a fraction of them could be considered influential.

Public institutions involved in projects tend to attract other public institutions as their main partners. Half of the projects involved universities among their main partners: collaborations are strong especially in terms of academic research, student training and knowledge transfer. This kind of collaboration seems beneficial both in increasing collaboration seems beneficial both in increasing

the research capability of implementing institutions and in providing opportunities for universities to gather data and training students as part of larger research or development projects. International organizations have a significant role in all the projects studied as they leverage resources, provide technical assistance, capacity building, and sometimes research activities. Finally, national institutes are present in all six projects, a fact which points to an interest in this kind of project at a public level. These institutions usually provide funding, but in some cases they also offer technical assistance and capacity building. It should be pointed out that the majority of institutions involved in the projects have livelihood improvement as their main goal.

## CONCLUSION

This brief introduces the importance of analyzing and understanding the network of partnerships that underpins any on-farm conservation project and presents Social Network Analysis as a useful tool. As an illustration of how this methodology can be applied, the brief provides a summary of its use in the study of six on-farm conservation projects and the resulting variations found among them. However, due to data limitations, its use in the case study in-depth analysis of the contribution of partnerships to project success was limited, but should still motivate project designers and implementers to take a more systematic approach to planning, analyzing and understanding the network of partnerships in the projects they intend to implement (*ex ante*) or have implemented (*ex post*). For the former, network analysis serves for mapping out information flow, power structure and bottlenecks in a network and for understanding which actors can aid or impede the successful development of the project as well as the channels that would lead to greatest dissemination. For the latter, network analysis provides an understanding of the type and intensity of interactions created in a project, whether they were successful in linking relevant actors and in effecting dissemination and then relating these insights to the project outcome. Alternatively, network analysis could simply be used as a tool for *ex post* analysis or impact assessment. This is an area that merits further research and application.

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