Assessing adaptation options for climate change:
A guide for coastal communities in the Coral Triangle of the Pacific
5. Social Network Analysis

Scoping —— Identifying options —— Evaluation of options —— Planning implementation

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Introduction

Assessing options for adapting to climate change is an important part of building resilient fishing and farming communities.

This brochure is part of a series that collectively detail how a community-based assessment of climate change was used in partnership with coastal communities and provincial and national-level stakeholders in Timor-Leste and Solomon Islands. The assessment contains four distinct, but related, steps (Fig 1) focused on supporting community-level decision-making for adaptation through a series of participatory action research activities. Each brochure in this series details a specific activity in the four-step assessment.

This series of eight brochures is primarily aimed for use where resources are limited or where it is more appropriate to use a rapid, qualitative and non-data intensive method of assessment. Community leaders, local NGOs and regional and national-level government representatives in developing countries may find this series useful.

In this brochure we provide details of an activity relating to the 'Evaluation of options' step of the assessment, namely Social Network Analysis (SNA). This activity was conducted with community members and aimed at understanding the social networks that influence the capacity of fishers and farmers to produce food for consumption and cash sales. More specifically, the following questions were posed:
- Who do fishers and farmers engage with in relation to their livelihood activities?
- What are the resources that flow between different people and organizations (referred to as actors) in fisher and farmer social networks?
- Who in the fisher and farmer social networks is important for enabling the implementation of adaptation options? Are the links to these actors effective and able to deliver the necessary resources?
- Are there any actors missing from the social networks that would help improve effective implementation of adaptation actions and their sustainable use?

Scoping

What are key natural resource issues and drivers of change impacting the resilience of fishers' and farmers' livelihoods?

Research method:
Climate analysis

Identifying options

What are likely impacts of a changing climate and what adaptations might be useful?

Research method:
Impact and adaptation assessment workshop

What does a desirable future farming/fishing livelihood look like?

Research method:
Community visioning activity

Evaluation of options

What are the cost of adaptation options?

Research methods:
Decision-tree analysis; partial cost-benefit analysis

Who will design, implement and maintain adaptations?

Research methods:
Social Network Analysis; governance and institutional capacity analysis

What is the likely impact of adaptations on natural resources?

Research methods:
Landscape Function Analysis; ecosystem services mapping

Planning implementation

Can an informed decision be made about how to adapt? What are the first steps to implementation?

Research method:
Implementation planning

Fig 1: The four steps taken by community, local NGOs and regional and national government representatives in developing a plan to respond to climate change. Each step addresses specific questions likely to be asked by community members needing to adapt.

What Is Social Network Analysis?

Social Network Analysis can be used to visualize the connections between different people or organizations to understand how they are connected and what resources pass between them.

Creating a visual 'map' of the social interactions and flows of resources needed for enabling fishing and farming livelihoods is useful to accomplish the following:
- highlighting the benefits of building a strong social network within communities, for enhancing capacity to adapt livelihoods in the face of uncertain change.
- providing a space for collectively exploring the relationships between community members in relation to fishing and farming livelihoods.
- envisioning how community members can individually and collectively plan and implement their response to any challenges or opportunities that adaptation may bring (Fig 3).
- bringing together knowledge from science, development practitioners, government and community domains.
- building capacity in local partners in terms of skills, knowledge and networks.

Social Network Analysis Method

Social network mapping was undertaken with community members in Timor-Leste and Solomon Islands. The social network maps produced by community members in Timor-Leste focused on understanding their fishing and farming networks. Social network maps were also produced by fishers and farmers in Solomon Islands who were interested in developing aquaculture as a way to enhance the resilience of their livelihoods. In all these activities, mapping the social network aimed to identify the following:
- Who are the key actors presently supporting farming, fishing, or pond aquaculture activities?
- Who provides or receives information such as weather forecasts?
- Who provides or receives financial support such as loans, grants, or project funding?
- Who provides or receives physical support such as fishing nets, seeds, or fingerlings for aquaculture?
- Who provides or receives support services such as training?
- Who helps solve problems related to farming, fishing and pond aquaculture?
- Who is helpful or unhelpful in the effective flow of resources across the network?
- How does the social network need to change to enhance adaptation of farming, fishing and pond aquaculture activities?

Fig 2: Data records suggest the climate has changed in both Timor-Leste and Solomon Islands over past decades.

Fig 3: Engaging community members in drawing a social network map enables them to envision how individuals and groups can collectively plan and implement their response to any challenges that adaptation may bring.

Network Mapping

1. Introducing social network maps
   - Farmers and fishers attending a community workshop were provided with an explanation of social network maps and examples of their use. These were discussed by the participants.
   - The nature of the social networks to be drawn was considered; for example, to support fishing, farming, or aquaculture activities. Focus groups were established to work on each of the networks.

2. Identifying actors and flows in the 'baseline' social network
   - Each focus group was asked to identify the key actors that presently influence their social network. The name and a small amount of detail about each actor were written on individual cards. The cards were then spread out on butcher's paper for all participants to see (Fig 6).
   - The flow of resources (information, financial, physical, services and problem solving) was considered in sequence, and lines were drawn between actors to show where a flow of resources existed. Using different colored pens for each of the five resources enabled the participants to see at a glance the different flows operating throughout the network (Fig 7).
   - As a line was drawn on the social network map, details of what the specific resource was (money, the use of a hand tractor, marketing of fish, etc.) was noted on a separate sheet. Arrowheads drawn on the lines were used to show the direction in which the resources flowed (one way or in both directions). In this way, a story was built about how the social network operated.
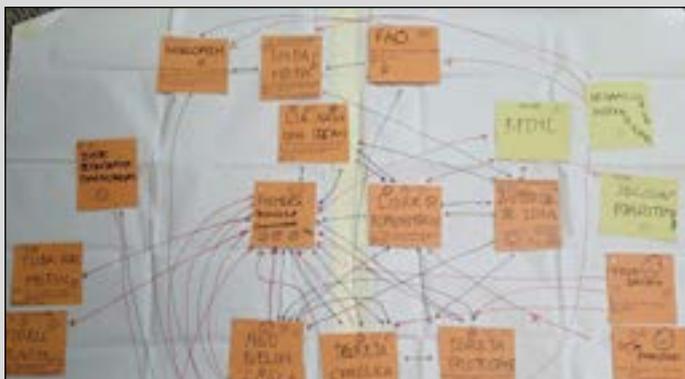
Fig 4: "We have never thought about our relationships like this. The network is very important…as all people create some good ways and links to each other." Fisher, Atauro.

Fig 5: Farmers and fishers interested in developing pond aquaculture in Malaita, Solomon Islands, drew their social network map at a workshop held in Auki. Ideas were discussed for how it might be strengthened so as to better enable them to explore and develop pond aquaculture in their villages.

Fig 6: Individual actors are detailed on each card as a starting point for developing the social network map.

Fig 7: Different colored lines show how a range of resources (information, financial, physical, services and problem solving) flow across a network. It also shows where the flow of essential resources is weak and needs improving.

3. Identifying attitude and power in the social network
   - In order to represent who is a helpful or unhelpful actor in the functioning of the network, a happy (helpful), neutral (neither helpful nor unhelpful), or sad (unhelpful) face was drawn on each of the actor's cards.
   - Power to make decisions within the network was then considered and each actor was ranked on a score of zero to five (with five being people with the most power to make decisions and therefore the most influential). The group placed a stack of counters on each card to indicate the scoring they gave to each actor (Fig 8).

4. Considering how the 'baseline' social network may need to adapt
   - After reviewing the social network map, the workshop participants were then asked to discuss how the existing social network may need to change for an adaptation action to be effectively planned, implemented and managed.
     NOTE: For details on how to facilitate a workshop for community members to identify appropriate adaptation options, refer to the impact and adaptation assessment workshop brochure.
   - As a consequence of this discussion, a number of current links were identified as needing to be strengthened (i.e., there was a need to have more resources flowing effectively across them).
   - Any actors considered a combination of both unhelpful and powerful (thereby a potential weakness within the network) were identified. The consequences of this were discussed in terms of the functioning of the social network and, where necessary, ideas were discussed for improving the relationship.
   - In addition to strengthening the existing network, the workshop participants also identified new actors and links that would need to be established if specific adaptations to farming or fishing, or the introduction of pond aquaculture, were to be effective. New actor cards were added to the map (see the blue box in Fig 9), the resources they would bring noted, and connecting lines drawn on the map to show who they needed to be connected to.
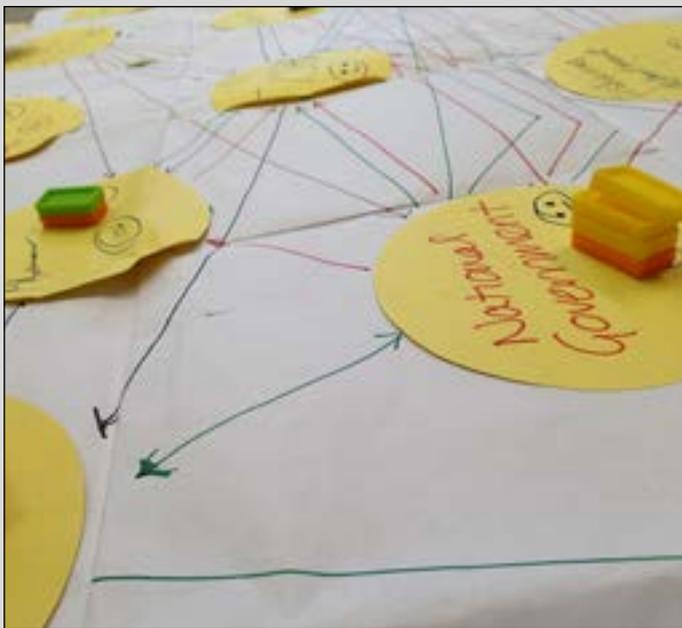
Fig 8: The stacks of plastic blocks indicate those actors in the network that have a lot of influence in making decisions that affect how the network functions. The higher the stack, the greater the perceived influence.
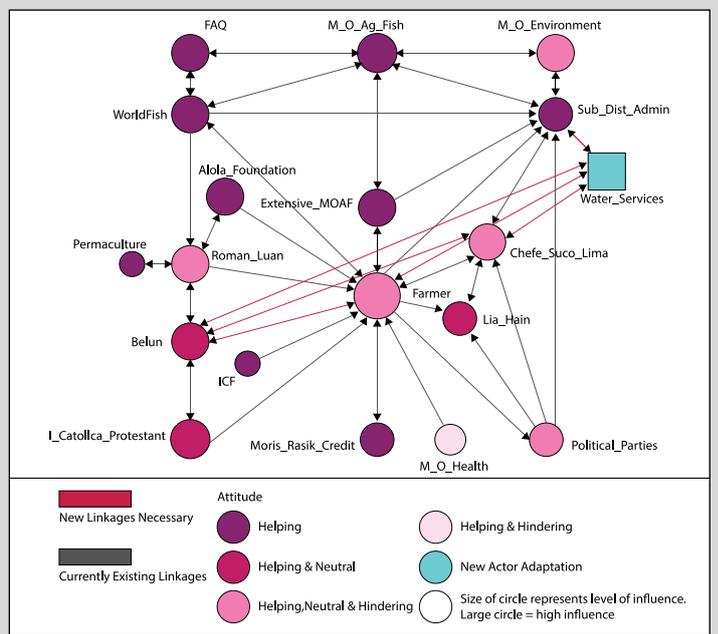
Fig 9: Actors that need to be integrated into the network (who are not currently part of the network) are shown as a blue square. The pink lines show how these would need to be connected into the social network.

Tips for Conducting Social Network Analysis

- When producing the 'baseline' social network map, remind the participants to detail only those actors and connections that currently exist, not future aspirations.
- Number the actors to make recording the linkages easier. It's much easier to write "Actor 2 passes information to Actor 5" than to keep writing out their names.
- Map different relationship types using different colored pens.
- Focus on one relationship type at a time. For example, go through all the information links before starting the financial links.
- Take pictures of the completed maps. This will assist greatly in referencing them later.

Key Documents

- Step-by-step instructions on how to input data into the software packages Ucinet and NetDraw: <http://boru.pbworks.com/w/file/13774940/ALL%20Intructions%20to%20draw%20maps-%20ENGLISH.doc>
- Schiffer, E., and Waale, D. (2008). Tracing power and influence in networks: Net-Map as a tool for research and strategic network planning. IFPRI Discussion Paper 772. Available at: <http://www.ifpri.org/publication/tracing-power-and-influence-networks>.
- This is the website to download free trials of the software packages Ucinet and Netdraw; these programs are used to create the Social Network Maps: <https://sites.google.com/site/ucinetsoftware/downloads>.

Results of Social Network Analysis

Timor-Leste:

In Timor-Leste the participants considered the social network maps they produced, and identified a few key actors who they could approach to help them plan the implementation of the adaptation actions they had assessed as potentially useful in the community workshop (Fig 10).

Fishers in Atauro identified the following potential actions and actors: working with extensionists to deliver information between the community and national levels; FAO (Food and Agriculture Organization) in order to get access to equipment; MAP (Ministry of Agriculture and Fisheries) to help share knowledge and enforce the management of protected areas; and NGOs to help set up fish aggregating devices.
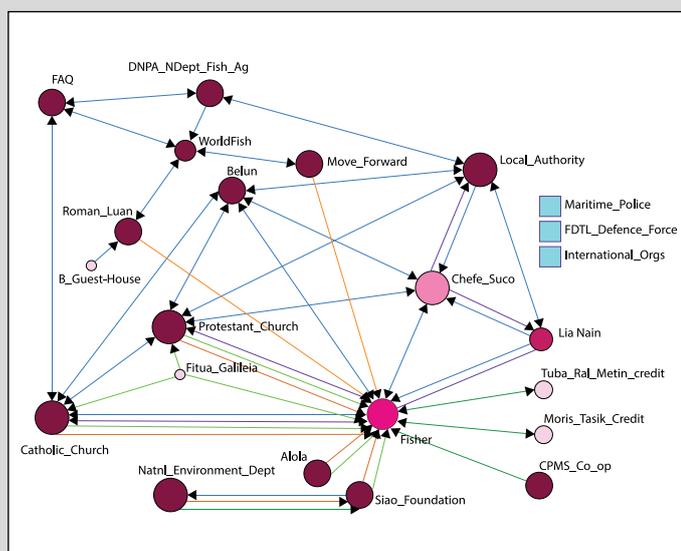
Fig 10: The fishers in Atauro considered how the three actors required for adaptation progress needed to be connected into the social network.

Fig 11: Participants found value in the maps as they reflected on their perspectives.

Similarly, the other groups in Timor-Leste identified key actors they would approach:

- The farmers in Atauro would liaise with: local and central government representatives and a number of NGOs.
- The farmers in Batugade would liaise with: the Chefe de Suco, the district and national governments and NGOs.
- The fishers in Batugade would liaise with: the Chefe de Suco, Chefe Aldeia, Chefe fishing group and the local MAP office.

Solomon Islands:

- In Solomon Islands the participants reviewed the social network maps they had produced to see if there were any links or actors missing that would help their attempts to develop pond aquaculture in their villages.
- The participants identified additional actors to bring into the network into the network: women and girls, youth and police (Fig 12).

Considering the Social Network in Terms of Capacity to Take Action

The fishers' and farmers' social networks in Timor-Leste and Solomon Islands included regional and national-level actors that influence the flow of resources and services. An additional activity to the social networks can be used to consider more critically the capacity of these actors to deliver at the community level.

Assessing this capacity is sometimes called institutional or governance capacity analysis. In many developing countries the capacity for regional and national-level actors to deliver vital resources can be low for various reasons. Interviews, workshops and literature reviews can be conducted to draw in the perspectives of multiple stakeholders related to both the formal and community institutions. This information can be used to understand why capacity is low and help identify actions to improve it.

The method used in this study to conduct the institutional capacity analysis in Timor-Leste and Solomon Islands was based on the one detailed in Govan et al. (2013). Solomon Islands: Essential aspects of governance for Aquatic Agricultural Systems in Malaita Hub. CGIAR Research Program on Aquatic Agricultural Systems. Penang, Malaysia.

Fig 12: The participants identified additional actors (on pink cards) to bring into the network.
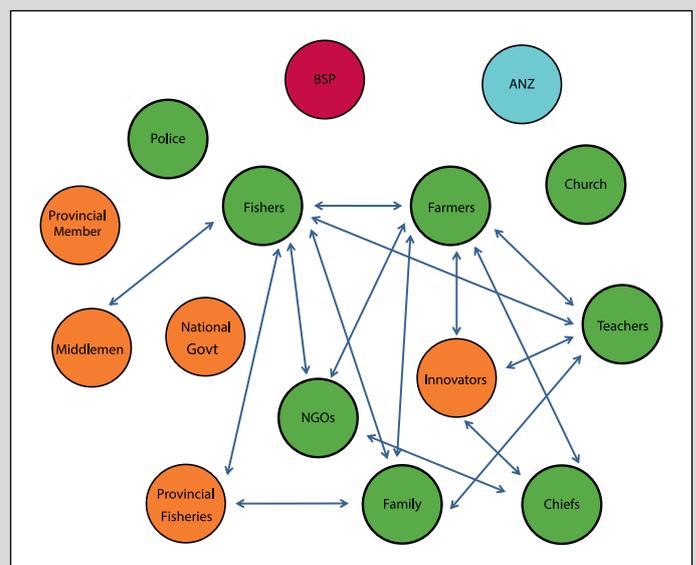
Fig 13: The flow of information relating to the development of pond aquaculture in Malaita, Solomon Islands, was drawn by community members and transferred into a computer program to aid analysis.