

# Social Network Analysis



## Tool factsheet

### IMPLEMENTING THE COMMON FRAMEWORK ON CAPACITY DEVELOPMENT (CD) FOR AGRICULTURAL INNOVATION SYSTEMS (AIS)

This factsheet is one of several useful resources that can be used in the preparation and roll out of capacity development projects for agricultural innovation systems (AIS). The tools described in these pages are designed with a view to the practical implementation of the principles of the Common Framework of the Tropical Agriculture Platform (TAP), a G20 initiative. They have been applied in the Capacity Development for Agricultural Innovation Systems (CDAIS) project, funded by the EU and jointly implemented by Agrinatura and FAO in collaboration with national partners in Angola, Bangladesh, Burkina Faso, Ethiopia, Guatemala, Honduras, Laos and Rwanda.

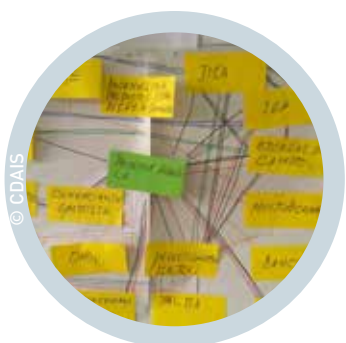
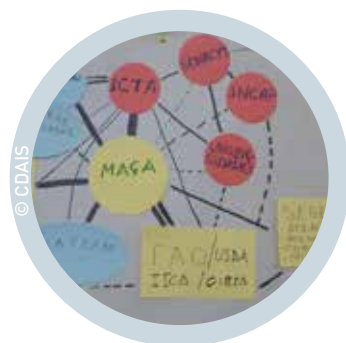
Innovation in agriculture flourishes when diverse and multiple actors put knowledge to use through collective thinking and action. A good understanding of how complex and dynamic interactions work is crucial for the planning of effective capacity development projects for agricultural innovation system (AIS). **Social Network Analysis** is a practical and useful tool that looks at the linkages present in an innovation network and monitors their development over time.

### Purpose of the tool

Social Network Analysis (SNA) is a tool for the quantitative and qualitative investigation of social structures. It considers the nodes of a network, which represent individuals, groups, organizations or institutions, and the links that connect the nodes to one another. When applied to an innovation network, the tool maps the relationships between the stakeholders in the network and highlights the changes between them. Input data for the SNA can be gathered using various methods, including the NetMap tool and network questionnaire.

The pen-and-paper **NetMap tool** actively engages workshop participants and therefore requires good facilitation. By mapping the position of the various actors, the tool, which is participatory in nature, reveals how the stakeholders involved in a given innovation network are linked, how they work together, and how they influence each other. The method is also useful for determining network boundaries and spotting potential bottlenecks and opportunities.

**A network questionnaire** is an alternative way of gathering data. Using, for example, interviews or online surveys, it can collect information about a wide range of distinct types of linkages. The data arrives in a format that can be easily used for further analysis.



Network questionnaire used for CDAIS capacity assessment workshop

However, this method offers less of a learning experience than stakeholder mapping, because the participants cannot visually identify the actors, linkages or the nature of the relationships when the information was collected.

Social Network Analysis (using both the foregoing tools) reveals the intrinsic power structures of a network, which helps users conceptualize and therefore integrate the needs and interests of disparate local and external groups.

Once the information is collected, a comprehensive Social Network Analysis is best performed by processing the data using specialized software.

## How to conduct a Social Network Analysis

Participatory stakeholder mapping and network questionnaires were used in the CDAIS project to collect data on innovation partnerships in selected countries. On the basis both of this experience and of the results produced by the NetMap tool, concrete step-by-step guidelines are now available.

### Stakeholder mapping with the NetMap tool

At the start of a stakeholder mapping session, the facilitators should clearly explain:

- Who the actors represented on the map are;
- What type of linkages should be represented;
- What level of detail is needed.

The following **steps** are suggested:

- Represent individuals and their names on the map, as well as their affiliation to an organization. This ensures that the map clusters individuals into groups corresponding to the organizations to which they belong. If more appropriate, you might simply represent a network of organizations (without referring to individuals or including their names);
- Clearly indicate the actors who are physically present at the workshop;
- Focus initially on relationships among participants and between participants and third-party actors who are not taking part in the workshop. At a later stage, map the relationships among third-party actors, if these are known;
- Draw connecting lines between any two actors who are in contact with one other. Add small arrows to the lines to show the direction of information flows and collaboration;
- If there are too many participants to work all together on one map, divide the participants into groups and have them produce their own maps. Afterwards, the different maps can be combined into a picture of the network as a whole, though this composite version will need to be validated by all participants.

### Network questionnaire

A network questionnaire can be used to collect data on innovation networks. The table below refers to data gathered during a workshop to assess an innovation partnership in Rwanda. It shows only the names of workshop participants, but the names of third-party actors who did not attend the workshop can also be gathered if needs be.

NAME OF PARTICIPANT	AFFILIATION	INFORMATION EXCHANGE	JOINT PLANNING	JOINT IMPLEMENTATION	ETC.
aaa	District office	RAB, MINAGRI, Farmers	RAB, MINAGRI	RAB	...
bbb	Cooperative	RAB, Farmers	RAB, Farmers	Farmers	...
...	...	...	...	...	...

Too much data collection by workshop participants can be counterproductive, and it is best to have a preliminary awareness of the issues and challenges to obviate this risk. Foreknowledge of such matters is helpful for deciding which linkages matter most in a given context, and for focusing the questionnaire on them. As with the stakeholder mapping tool, it is essential to validate the accuracy of the picture of the network resulting from the questionnaire.

## How to analyse data

There are many software options available to analyse the data from the stakeholder mapping and network questionnaire tools. NodeXL (<https://nodexl.codeplex.com>) is an Excel add-in, while Gephi (<https://gephi.org>) is a widely used stand-alone open-source software. Graph Commons (<https://graphcommons.com>) is a practical web-based solution for basic SNA, and was the one used to visualize innovation networks during CDAIS workshops in Laos and Rwanda. The table below shows how data from stakeholder mapping in Laos was entered on a spreadsheet. The data was later imported into the Graph Commons software to display the actors (nodes) and their linkages (edges). In this case weights were not used.

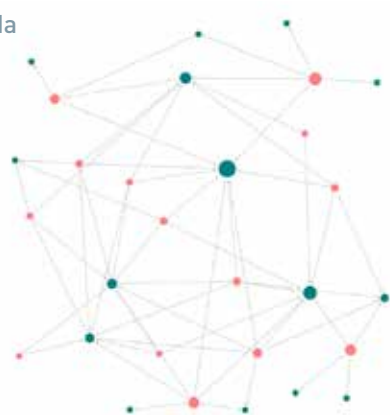
FROM TYPE	FROM NAME	EDGE	TO TYPE	TO NAME	WEIGHT
Participant	Yolee	has contact with	Other	Kannga	1
Participant	Yolee	has contact with	Other	Vixay	1
Participant	Ohlay	has contact with	Other	Kannga	1
...	...	...	...	...	...

Figure 1 on the right shows the network of a rice innovation partnership in Laos. It has been plotted using data entered into three pen-and-paper maps. The nodes represent individuals or organizations. The larger a node, the greater its influence on the flow of information. Larger nodes are the ones whose removal will most jeopardize communication in the network. Since the map was compiled by merging three pen-and-paper exercises, linkages, especially among participants (in pink) and among other actors (in green) are missing.

Using the Graph Commons software, the data from the network questionnaire is processed in the same way as the data from the stakeholder mapping exercise. However, here, as displayed in the example from Rwanda in Figure 2, the data is slightly different in nature from the Laos data. The nodes represent assessment workshop participants (in red) and organizations (in green), and the edges represent the flow of information in the innovation partnership.

Once the network map has been drawn, the stakeholders involved in the partnership should come together to validate the network map.

Figure 2: Example of NetMap from Rwanda



Spreadsheet showing data from stakeholder mapping that is format-ready for import into Graph Commons

Figure 1: Example of NetMap from Laos



For more information on the different CNA Tools and Approaches, see [www.tapipedia.org](http://www.tapipedia.org) and the *Trainer's Manual: Facilitating Capacity Needs Assessment*.



## For further information

### Tropical Agriculture Platform (TAP):

<http://www.fao.org/in-action/tropical-agriculture-platform/en>

Email: [Tropagplatform@fao.org](mailto:Tropagplatform@fao.org)

**TAPipedia:** <http://tapipedia.org>

Email: [info@tapipedia.org](mailto:info@tapipedia.org)

### Capacity Development for Agricultural Innovation

**Systems Project (CDAIS):** <http://cdais.net>

Email: [info@cdais.net](mailto:info@cdais.net)

## Common Framework products:



*Conceptual  
Background*



*Guidance Note on  
Operationalization*



*Synthesis  
Document*

*The implementation of the TAP Action Plan is supported by the EU-funded project  
Capacity Development for Agricultural Innovation Systems (CDAIS).*

*The Common Framework documents are also available in French and Spanish  
on the Common Framework pages of TAPipedia.*



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