

Guide to the Diagnostic Toolkit

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1. Overview of diagnostic tool

1.1 Why is a tool for diagnosing research projects needed?

More and more agricultural research projects are expected to create impact on the land, on-farm, and along the supply chain. This is not easy. In fact it is very challenging. Problems in agriculture are increasingly recognised as complex, uncertain, operating at multiple levels (from the paddock to global value chains) and involving social, economic and regulatory, as well as technological changes. Solving these problems involves the successful combination of new technology, practices, knowledge, social institutions, and regulatory arrangements. The agricultural innovation systems (AIS) approach recognises that the successful combining of these changes is a non-linear process in which solutions emerge from collaboration among many stakeholders and research disciplines interacting with and responding to continuously changing external social, institutional, economic and technological systems of which the stakeholders are a part. This means that more and more research projects are transdisciplinary, i.e. they involve multiple science disciplines (such as biophysical, social, economic) and diverse stakeholders from Government, industry, non-Government organisations and communities undertaking research together.

The barriers to and opportunities for research and innovation to create impact are, therefore, many and vary from research project-to-project. Identifying these barriers and opportunities requires a systemic view of a research project. Agricultural innovation systems (AIS) is a field of research into innovation that provides this systemic perspective on research and innovation. Recent work by AgResearch as part of the Adoption and Practice Change Roadmap, applied the AIS perspective to identify seven success factors for research projects to create impact:

1. Having a problem focus
2. Understanding next and end users needs
3. Creating an alignment of needs among different stakeholders
4. Regularly fronting up with results for these next and end users
5. Actively involving stakeholders in the research
6. Having the right team of researchers and stakeholders
7. Going through regular cycles of plan-do-observe-review during the project

The **activities** used to identify these success factors have been bundled together as a diagnostic tool for getting a systemic view of a research project. The activities in the diagnostic tool identify who needs to be part of the project (researchers as well as aligned stakeholders) along with how they are working together (or not) through the entire innovation process from setting research priorities to achieving change on-farm, in processing or in market.

1.2 Who is the diagnostic tool for?

The diagnostic tool is for research project leaders who are looking for opportunities to create or increase project impact or are frustrated by obstacles to their projects achieving impact. This tool can be used at any point during a research project to evaluate what the barriers and opportunities are to the project creating impact. The tool can also be applied at the end of a research project to identify “where to next?” or to provide lessons for “how to do even better next time?”

1.3 How to use the diagnostic tool for your research project

The level of analysis you require, and the time available, will influence the activity or activities you conduct. Table 1 provides a guideline to help you identify which activities are best suited to your research project’s needs. The sections following provide more detail on how each of the activities can help to identify opportunities to help progress research projects and achieve greater impact.

Table 1: Diagnostic toolkit activities to use, when, in which order and why

| Step | Activity | Purpose of activity | Comment |
|------|-----------------------------|--|--|
| 1 | Identifying participants | - identify a range of participants who can offer different perspectives on the problem & solutions | |
| 2 | Transdisciplinary survey | - provide a checklist to assist with managing aspects of the project that influence success - identify weaknesses and strengths that need to be addressed | - Step 1 & 2 provides an analysis of who is needed and how they are working together in the project - helps you understand the 'what' the issues are |
| 3 | Identifying project success | - help monitor and evaluate the project based on the 'success' criteria identified - identify if participant's needs align or don't align | - Good to use at the mid-point or end-point of a project - this can be incorporated into part of a workshop which addresses the other areas identified |
| 4 | Timeline analysis | - reflect on the challenges, successes, lessons and experiences of participants - identify and discuss sources of tension or friction - help with planning 'where to next' | - Step 3 & 4 provides more in-depth analysis of the project focused on sources of tension among different project participants; - help you understand the 'why' of issues identified in Steps 1 & 2 |
| 5 | Social network analysis | - describe the structure of a research collaboration - identify different types of relationships that exist within the research collaboration - examine & evaluate the function of collaboration | - If collaboration was identified as a key barrier after conducting step 3 &/or 4 step 5 will help you understand reasons 'why' these barriers exist |
| 6 | Monitoring and evaluation | - information on whether or not the project has been successful | - Ideally is set-up at the start of the project to evaluate progress - Will help you plan the 'where to from here' |

2. Identifying Participants

Successful adoption and practice change relies on how researchers, industry representatives, farmers, government and others work together from the very first stages of identifying the problem to solutions being applied on-farm or along the supply chain (including policy). To understand what makes projects successful the people involved in all of these stages from problem identification to solution application are needed.

3. Trans-disciplinarily Survey

The participation of a range of individuals and organisations, with a stake in the issue (from along the supply chain, Government and non-Government organisations), and multiple scientific disciplines (such as biophysical, social, economic), enables a wider understanding of the issue, leading to a more accurate and comprehensive understanding of the problem and integration of these perspectives in the potential solutions. The term 'transdisciplinary' is used to describe research projects with these characteristics; multiple stakeholders and science disciplines undertaking research together.

Small, Payne and Montes de Oca (2015¹) identified nine factors are associated with successful collaborative projects that involve multiple stakeholders and science disciplines from diverse backgrounds working toward a shared outcome. These factors are similar to the seven principles of success identified by AgResearch as part of the Adoption and Practice Change Roadmap. The nine factors are:

1. Project Leadership: balancing who has power in the project, including encouraging co-operation in the team
2. Project Leadership: communication and motivation
3. Team building and maintenance of trust among the participants
4. Collaboration amongst project participants (stakeholders) and disciplines
5. Defining the common project problem
6. Problem orientation of team members; the extent to which the project participants are focused on solving the problem
7. Interdisciplinary understanding and knowledge dissemination amongst the team; the extent that insights from biophysical, social, economic researchers and stakeholders are shared among the participants
8. Time and resource availability to the research project

¹ Small, Payne and Montes de Oca Munguia (in press) Developing Reliable and Valid Measures for Science Team Process Success Factors in Transdisciplinary Research *The International Journal of Interdisciplinary Organizational Studies*

9. Science team's perceptions of stakeholder influence on the project

These nine factors are a useful checklist to assist with the management of project activities that are known to influence the success of transdisciplinary research teams and projects. Additionally, these success factors, if administered during a transdisciplinary research project, can be used as a diagnostic tool for projects, identifying weaknesses and strengths in transdisciplinary project activities that need to be addressed.

4. How to identify what project success looks like

Identifying why a project was successful is not always easy to do. 'Success' can have a different meaning depending on the individual and the organisation, and what they want to achieve by being part of the project. As a project team it is important to identify what project success looks like so you can monitor and evaluate the project success based on the different criteria for success project participants have. Discussing project success provides the opportunity to identify where project participants needs align or do not align, and hence where changes to project membership or activities are needed to create alignment.

5. Timeline analysis workshop

Bringing together project participants to reflect, jointly, on the challenges, successes and lessons from the project is valuable for the project team to identify the causes of tensions, frictions or different understandings among the research project team and stakeholders. The timeline method provides an opportunity to do this. Depending on the length of the project and the number of participants it will take between 2 to 4 hours to run a timeline workshop.

A timeline analysis involves someone collecting information on project events over the life of the project and constructing a draft timeline as a starting point for discussion. The draft timeline is then shared at a participant workshop, or during interviews. It is important to get involvement from all workshop participants as people will remember different events. The aim is to gain agreement by all participants on the key events during the life of the project. Participants then identify key moments, highs and lows within the project, and moments of friction. Events which appear to be interpreted differently are important to focus on and discuss. Discussing these differences of interpretation will provide insights into the causes of conflicts that may have never been expressed.

The completed timeline can help the project manager to prioritise sources of tension among the project team and stakeholders and make choices about follow-up steps, based on what has been

discussed. The information is also useful when writing a project narrative as an evaluation, listing the key highs and lows, for use in a final report.

6. Social Network Analysis

Collaborative research projects, with a team of researchers and stakeholders are by nature social networks between individual researchers and organisations. Research social networks are unified by a common agenda or research question(s), which all parties within the network are motivated to work collaboratively (directly or indirectly) towards achieving. The motivation and the level of influence of each individual/organisation, within the network, to achieve the common goal will be different, depending on the perspective and the strength of certain relationships between individuals/organisations within that network.

Research collaborations can be difficult to understand unless we measure and illustrate these relationships clearly. Social network analysis (SNA) generates a model, displayed as a graphic, to describe the structure of collaborative research projects and identify different types of relationships that exist within the project. Social Network Analysis provides a method of examining and evaluating the strengths and weaknesses of the many interactions among researchers and stakeholders in a collaborative research project.

The benefits of conducting a SNA include the ability to:

- identify types of brokerage roles that enable (or not) interactions among research and stakeholders in the network;
- identify the strength or quality of the interactions among researchers and stakeholders in the research project network;
- identify knowledge brokers: an individual or organisation who are central to information flows in the project network;
- measure the direction of research relationships between individuals/organisations to understand how information flows within the network, and how it may need to change over time;
- diagnose where information needs to be shared in the network, but is not, to help prioritise resources to vulnerable relationships/interactions, or to employ a strategy for effective communication between individuals/organisations;
- objectively identify network 'gate keepers' which can help the research project reach into stakeholder organisations.

7. Monitoring and Evaluation Methods

Monitoring and evaluation are structured processes that are used to inform whether the project has been successful, both during the project and at its conclusion. An evaluation identifies what success looks like, i.e. what impacts/ outcomes are being sought, and how the project can prove that these were achieved.

A successful research project is more than just completing the milestones on time. If you have monitored and evaluated a range of success measures, then you will be able to articulate the difference that the project has made, both in the short and longer term.

An evaluation plan is an essential component of project planning. It is best built in from the start of a research project and should be run in alignment with activities throughout the project's life. However, introducing a monitoring and evaluation plan part way through an existing project will still add value. Some evaluations are undertaken after a project is completed; post project evaluations, however, have less opportunity to add value to the project.

While there are a few generic indicators that may be monitored in a project, these offer limited value in terms of real impact. Project specific indicators linked directly to outcomes and impacts provide best value. Both quantitative (e.g. numerical) and qualitative (e.g. views and perceptions) can be used to monitor and evaluate.