

Catching a Moving Feast – Monitoring and Evaluation of Extension with Multiple Players and Complex Contexts

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Abstract: Faced by the challenges of complex problems and fragmented delivery through a mix of public, private, industry and NGO organisations present-day agricultural extension requires collaborative action that recognises the different drivers, approaches and roles played in the innovation process while effectively monitoring and evaluating progress and outcomes.

This paper explores the theory and effective practice of monitoring and evaluation in a context where multiple, multi-sector organisations are engaged in an extension role in the agricultural innovation system. This paper draws on evaluation and innovation systems theory and a number of situations in New Zealand and Australia where these complexities exist and provide learning into how Monitoring and Evaluation could be framed and implemented in the broader international context. The paper concludes that there are some key principles that can facilitate effective collaboration in Monitoring and evaluation in an Innovation system. These are: Recognise the need for shared M&E when negotiating collaboration with Innovation Systems; Overtly recognise the different contributions of each party; Develop understanding, ownership and commitment to the task; Develop a common over-arching M&E framework, tools and metrics; Provide a common reporting platform; and Review and provide feedback on the M&E data provided.

Key words: Monitoring, Evaluation, Systems, Agriculture

Introduction

Faced by the challenges of complex problems and fragmented delivery through a mix of public, private, industry and NGO organisations present-day agricultural extension requires collaborative action that recognises the different drivers, approaches and roles played in the innovation process while effectively monitoring and evaluating progress and outcomes.

This paper explores the theory and effective practice of monitoring and evaluation in a context where multiple, multi-sector organisations are engaged in an extension role in the agricultural innovation system. In some cases, there may be a formalised coordinating mechanism for action – in others, there may be an informal understanding of the collaborative need to address an issue or seek an opportunity. The question that this paper addresses is how monitoring and evaluation can be used to simultaneously capture progress, identify barriers and inform collaborative action.

Monitoring and evaluation is relatively straight forward in circumstances where governments or individual organisations are responsible for addressing simple problems and achieving defined outcomes through extension. However, system-wide issues emerge where no one organisation has the resources, mandate, reach or capacity to address all aspects of complex issues or explore opportunities affecting the whole innovation system, making monitoring and evaluation more difficult. For example, there may be no reporting ‘obligation’ by collaborators; and/or because the desired outcome is ill-defined and emergent. And yet, it is in an effective monitoring and evaluation process that efforts can be guided, successes can be celebrated, barriers and solutions can be unearthed and real gains can be captured.

This paper will draw on evaluation and innovation systems theory and case studies in New Zealand and Australia, where these complexities exist and provide learning into how monitoring and evaluation could be framed and implemented in the broader international context. Critical to the process is a combination of participative development and commitment to the monitoring and evaluation framework and process as well as having a mechanism for capturing and reporting information in a way that can be used and fed back to collaborators.

Innovation Systems

The World Bank described an Innovation system as *a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect their behaviour and performance*. It emphasised that the concept embraces *not only the science suppliers but the totality and interaction of actors involved in innovation* (Hall 2006).

The critical element of an agricultural innovation system is the bringing together of stakeholders to work together to stimulate, support and develop appropriate innovation in a given context. Kilelu, Klerkx & Leeuwis (2013) refer to innovation occurring through *the collective interplay among actors and involving mutual interaction and adaptation over time between the technological, social and institutional components of an innovation*. They conclude that for (innovation) platform efficiency and effectiveness, a key issue is that overall facilitation should be in place to *minimise...divergence and maximise complementarities between different innovation intermediaries*.

This need was recognised in the New Zealand Innovation system. The fragmentation resulting from changing institutional arrangements with privatisation of RD&E in the 1980s and the *perceived shortcomings of using a science-driven, linear, technology transfer-oriented approach to innovation in New Zealand*, was explained as resulting in *interest in bringing relevant actors together from the agricultural sector to increase research and development efforts in a coordinated and interactive fashion through a 'co-innovation' approach* (Turner, Klerkx, Rijswijk, Williams & Barnard, 2016). Botha, Coutts, Turner, White, & Williams (2017) observed that with innovation projects *these systemic aspects of system innovation create new challenges for traditional monitoring and evaluation methods and tools such as logical frameworks, which were historically used to meet the accountability needs of commissioners*.

Evaluation

There are many definitions of monitoring and evaluation but the overall purpose is clear. Patton (1997) provided a definition that has stood the test of time, when he described evaluation as *the systematic collection of information about the: activities, characteristics, and outcomes of programs to make judgements about the program, improve the program, and/or inform decision about future programming*. The United Nations Population Fund (UNPF) (2007) describe evaluation as serving three main purposes: *Evaluation as a means to demonstrate accountability to stakeholders on performance in achieving development results, and on invested resources; Evaluation as supporting evidence-based decision making in order to achieve sustainable development results; and Evaluation as contributing to important lessons learned to the existing knowledge base on how to accelerate implementation* (p3). Stockwell, Eberhard, Bycroft & Coutts (2016) describe Monitoring and Evaluation frameworks as *setting the agenda for the measurement and assessment of performance so that processes can be improved, outputs, impacts and outcomes can be more*

effectively managed and achieved. They describe the dual purpose of M&E as: measuring the efficiency and effectiveness of investments and report on the progress; as well as driving progressive improvements in the intervention methods through adaptive management and continuous improvement and innovation.

Effective Monitoring and Evaluation is often a challenge within a single project or program and this is compounded when multiple organisations, layers and stakeholders are involved in contributing to common outcomes. The UNPF (2017) recognised this as an issue, noting that *for an evaluation to be used it needs to be relevant to the stakeholders aimed to use it, which requires efforts to ensure their participation. This requires stakeholders' consultations throughout the evaluation process to enable ownership. UNFPA evaluation policy states that evaluations should be ...planned and conducted ensuring national ownership and leadership of evaluation processes by rights holders and duty bearers (p5)*

There have also been issues raised across programs with respect to attribution of programs all contributing to the same outcomes (Coutts, Murray-Prior, Long & Coutts, 2017). This is a problem when different delivery organisations need to justify return on investment for the funding they have received and compete for funds in future rounds.

It is in this area of gaining ownership and commitment to evaluation and its joint reporting that has been the challenge in multi-stakeholder programs.

Methodology

This paper is based on the documented experiences of the authors in two case studies – one being a ‘co-innovation’ project working across agricultural sectors in New Zealand and the other being a review of extension programs targeting water quality improvements in the catchments feeding into the Great Barrier Reef lagoon in Queensland, Australia.

New Zealand Case Study – single program, multiple cross-industry projects

Both authors were involved in the monitoring and evaluation of the ‘Primary Innovation Project’ in New Zealand. The Primary Innovation project was complex, dynamic, transdisciplinary in nature, and involved teams from three sectors – forestry, horticulture and pastoral – and across eight industry organisations, Crown Research Institutes and universities, including the universities of Wageningen and Melbourne and involved knowledge brokers and facilitators.

The complex, flexible and inter-organisational nature of the project provided challenges to monitoring and evaluation of these networks. Its performance was monitored and evaluated using participatory action research guided by an Innovation Systems approach. On-going learning from applying the Innovation Systems approach to four key problems – dairy herd reproductive performance, potato crop pest management, forestry product links to market, dairy farm nutrient management, and water management in an irrigation scheme – anchored learning in broader institutions, organisations and industry structures to prevent ‘islands of success’ (Botha, Klerkx, Small & Turner, 2014).

During the course of the programme, the authors coordinated the monitoring and evaluation process, managed an on-line platform for capturing data and facilitated debrief sessions with staff from across the programme and projects. This documented experience of working across organisations and projects to report and evaluate on the common aim of developing and testing a co-innovation approach to improve the rate of innovation and adoption within the New Zealand agricultural innovation system provided the basis for learning from this case study.

Australian Case Study – common issue, multiple programmes.

Both authors were also involved in a review of extension programs being funded and being delivered by a range of organisations (public, industry and private) in the agricultural regions in the river catchments adjoining the Great Barrier Reef aimed at improving water quality entering the reef lagoon. The lead author has participated in a number of reviews over recent years of extension funding and programs directed towards this issue in the reef regions of Queensland. This has included updating an overall extension strategy, co-developing a common Monitoring and Evaluation Framework for extension and education programs and also a review of extension and education capacity.

In all cases, the common thread was the need for programs and organisations to work together to improve water quality outcomes for the reef as well as to maintain and improve productivity and profitability in the agricultural industries within the reef catchments. The second author contributed on an expert panel to guide the latter review and respond to findings as they emerged. This review involved extensive consultation across stakeholders from the different industries and sectors through interviews, regional and state workshops, an on-line survey and written submissions. A key element was the need for collective and consistent reporting to evaluate the impact of many diverse government and industry programs with this common aim.

Findings

Case Study 1: Primary Innovation Project New Zealand

The Primary Innovation project used an Innovation System inspired approach to address the weaknesses of New Zealand's primary sector. In this approach, participants in the New Zealand agricultural industries formed innovation networks *to co-develop solutions to New Zealand's primary industry problems, bearing in mind challenges that originate beyond the farm, orchard or forest* (Botha et al, 2014). This means problems and opportunities were addressed by a mix of technologies, practices, policies and market changes in a co-evolutionary fashion.

The program was built around a number of 'Innovation Projects' to explore how co-innovation approaches could be best employed to foster and speed up the innovation process in agricultural industries. Coutts, Botha & Turner (2014) described the criteria used for the selection of these projects which served as case studies included: *having a problem focus rather than focusing on a specific technology or practice (e.g. improving the reproductive performance rather than grazing practices for dairy heifers); covering several primary sectors to explore the influence of different industry structures on co-innovation; covering a range of voluntary, market and regulatory mechanisms for change (e.g. water use efficiency is strongly influenced by regulated allocations); and covering problems where potential solutions are largely uncontested among stakeholders.* The project chosen were very diverse and operated through a range of different organisations. They were: The TPP (Tomato potato psyllid) project – dealing with an invasive insect; The irrigation scheme water use efficiency project – inclusion of climate forecasting; The herd reproductive performance project – increasing dairy heifer fertility; The dairy farm nutrient management project – increasing the implementation of farm nutrient management plans; and the timber segregation project – better meeting market needs.

Given the diversity across these projects, the challenge was how to best manage monitoring and evaluation to permit learning across projects and allow reporting of the impact of the overall program. In this case, it was decided to use a logical framework to capture the dynamics typical to Innovation Systems projects to: demonstrate accountability to

stakeholders on performance in achieving results; collect information for supporting evidence-based decision making; and to assess learning (Botha et al, 2017).

Researchers and project staff involved in each of the projects across the different industries were involved in developing a picture of the project by jointly constructing a flow diagram of activities, outputs and desired outcomes using cards on the wall of a room (a draft log frame based on programme objectives had been circulated before this workshop to stimulate thinking). This involved workshopping the processes, objectives and targeted outcomes and their associated indicators with the different organisations involved. During the exercise, they gained a common understanding of what the overall purpose of the program was and what indicators made sense to monitor and report.

Botha et al (2017, p. 158) noted that this process enabled the diverse project teams to *develop a greater understanding and sense of ownership. This provided a focus for reflecting, discussing, understanding and refining the program and its change ambition, and highlighted the key elements for evaluation in order to generate accountability and enable learning.* Each of the four contributing projects – undertaken by different organisations – were then assisted in developing their own (flexible) Monitoring and Evaluation framework which cascaded up to the overall program log frame.

This approach to monitoring and evaluation provided *a point of convergence that stimulated project team members to spell out their assumptions about the relations between project activities and long-term goals as well as their own viewpoints and actions, and subject them to scrutiny and evaluation* (Arkesteijn, van Mierlo, & Leeuwis, 2015) (Botha et al, 2017, p. 160). Reflexive narrative – facilitated by a nominated member of the project team - helped participants to learn about each other’s viewpoints and actions, which is an essential component for identifying and addressing issues that hinder system innovation. Each year, the total program team came together again to revisit the ‘log frame’ and review any changes needed based on the experiences of the previous year. Botha et al (2017, p. 160) conclude *when logical frameworks are employed adaptively they can, like in Primary Innovation, enhance project functioning in ways that create change while maintaining accountability.*

For this program, a web-based monitoring and evaluation platform was used which provided a place to capture evaluation data such as activity feedback sheets, narratives (short vignettes of impact), case studies and reflections. It provided a basis for using common data collection headings, tools with consistent metrics as well as keeping the data across projects in one central location. This permitted review of the data coming into the program as well as provided a one-stop place to review and collate monitoring and evaluation data for assessment and reporting purposes.

The overall programme log frame, modified through the cross-project group processes, provided the framework to then collate and analyse monitoring and evaluation data for annual, mid-term and final reporting purposes.

From an evaluation point of view, this process worked very well and ensured that each of the projects was ‘on the same’ page and reporting across projects was enabled. Lessons learned from the experience were:

- The importance of jointly developing the overall M&E framework to provide ownership and understanding and agree on common metrics;
- The value of having a common approach to data collection tools (for example, similar demographic questions, common types of questions around knowledge and capacity gains, learning and impact);

- The need to work with the project teams to develop the ‘cascading’ log frame at project level to ensure that project level practicality and consistency with the program level;
- The value of having common reflective processes and reporting of learning from these across all projects; and
- The value of having a common central internet platform where data from all projects could be lodged and collated under similar headings and data sets.

Case Study 2: Reef Water Quality Extension in North Queensland, Australia

Extension and education programs, projects and activities addressing farming and water quality improvement are delivered across the six Queensland Great Barrier Reef regions (Cape York, Wet Tropics, Burdekin, Mackay Whitsunday, Fitzroy and Burnett Mary) (Coutts 2014). It is noted that this includes extension and education *delivery by government (DAF), the relevant Natural Resource Management bodies, industry and environmental non-government organisations with funding coming from a range of sources including the Australian and Queensland governments, industry producer levies and private sources.*

The Reef Water Quality Protection Plan Extension and Education Strategy Update and Implementation Guide (Coutts 2014) was undertaken to *provide a framework for the coordinated delivery of extension and education.* In the report, there is an emphasis on the need for regional agreed targets *that would provide a basis for evaluating and reporting on progress to funders and the Paddock to Reef program¹.* It was recommended that *to enable ease of collation of data between industries and regions – and effective reporting to the Paddock to Reef program...a consistent monitoring, evaluation and reporting framework will be needed.*

A subsequent project (Stockwell et al, 2016) aimed at developing such a monitoring, evaluation and reporting framework *to enhance the current Paddock to Reef Integrated Monitoring, Modelling and Reporting Program* proposed to apply the framework *across the Queensland Government as well as its collaborative partners and contractors.* The project arrived at a number of factors considered to be critical to such an effective framework, including:

- Having better alignment between Queensland & Australian Government programs, specifically relating to practice change M&E requirements.
- Using a more integrated approach, focussing on practice change (not just program delivery), but also incorporating the social dimensions of behaviour change.
- Capturing more property level data (profitability, productivity etc.) to allow better information and communication to producers.
- Linking in with current ‘Best Management Practice’ frameworks being used by the different agricultural industries and the need to integrate better with the Reef Water Quality Risk Framework as a foundation for the assessment
- Addressing of privacy issues related to individual property scale data
- Addressing issues associated with current use of multiple databases and data collection systems and processes associated with monitoring and reporting on changes in management practices.
- Gaining strong support for a core M&E framework that goes across industries, regions and investors.

¹ The Paddock to Reef program collates data to contribute to a ‘report card’ demonstrating progress in addressing management practices that impact on reef water quality.

The project recommended the following key elements for such a framework:

- (Agreed) Indicators to track the impact of programs on practice change and water quality, producer capacity, and economic dimensions.
- Detailed protocols for the collection of data that relates to capacity change and adoption of new practices.
- A list of higher order evaluation questions to assess lead indicators² at a program level.

At the time of the recent review (2017), the Monitoring and Evaluation Framework had yet to be fully endorsed and implemented. Some progress had been made, however, in aligning evaluation reporting. There have been examples of efforts to better bring together the monitoring and evaluation efforts across these programs and between agricultural industries. Two examples that will be considered here are: the use of the *Water Quality Risk Framework*³; and the *Reef Alliance*⁴ program.

Best Management Practice programs

The main agricultural industries impacting on reef water quality (sugar, grazing, horticulture) have *Best Management Practice* frameworks for providing a whole farm assessment of where enterprises are in relation to recommended practices. This includes production-related practices as well as practices that directly impact on water quality. This has provided a means for benchmarking practices, identifying where improvements can be made, directing extension and training effort and reporting changes over time. The Paddock to Reef program is an over-arching government initiative tasked with reporting on progress by agricultural industry in improving practices to benefit reef water quality. For its reporting and modelling it requires data in certain format – and spatially linked. Until very recently, Paddock to Reef needed to convert the various *Best Management Practice* frameworks to allow reporting against their ‘*Water Quality Risk Framework*’ – where there were some discrepancies between which what it considered best practice and that contained in the industry frameworks. A significant move has been much closer alignment between the various frameworks to improve the ability to directly use the data for reporting against national and international targets.

A further contributing factor which impacts on the interest and need for alignment is a move by government to *recognise and reward the efforts of producers to become accredited against industry Best Management Practice programs by providing the ability for these programs to be legally recognised as an alternative pathway for producers to meet minimum practice regulatory standards* (Queensland Government, 2017). Producers accredited against a recognised Best Management Practice program (or equivalent program) will be deemed as demonstrating compliance with the minimum practice regulatory standards.

There is still some progress to make: not all extension programs directed at agricultural industry use *Best Management Frameworks* as a reporting mechanism; only a minority of producers are ‘signed up’ for utilising the frameworks; some agricultural industries are reluctant to share spatial data (important for modelling nutrient and sediment catchment loads) because of producer privacy concerns; and there are still some discrepancies between what constitutes ‘best practice’ in some elements. A recommendation made in the latest extension review is to make it mandatory for programs receiving government funding to align

² Lead indicators are ‘in-process’ measures that are predictive in nature rather than results oriented

³ <http://www.reefplan.qld.gov.au/measuring-success/paddock-to-reef/management-practices/>

⁴ <http://www.qff.org.au/projects/reef-alliance/growing-great-barrier-reef>

their evaluation and reporting to the Water Quality Risk Framework – and provide spatial data. This is yet to be tested in practice – and voluntary cooperation is the preferred option.

Reef Alliance

Another program funded by government to facilitate agricultural and grazing practice to improve water quality outcomes is called Reef Trust (now up to Phase III of the program). Reef Alliance – a program under Reef Trust - is described by its partners as representing *an effective and ground-breaking development in catchment landscape management in Australia by bringing together industry, regional NRM bodies and the conservation sector with a common goal of assisting to secure the future health of the Reef*. The partnership enabled a high level of joint planning, information sharing and effectively using resources across most of the catchments impacting on the Great Barrier Reef.

This funding is distributed through the regional Natural Resource Management Bodies (autonomous organisations in each designated region that take responsibility for developing regional natural resource management plans) that are located in reef regions. Prior to the current round of funding, these organisations have captured their data and reported individually to government. Problems identified with data provided in the past around practice change reporting has been the doubling up of data and the inaccuracy around reporting of the type and extent of changes on farms – conflicting data.

With this recent phase of funding, the regional NRM Bodies in conjunction with some agricultural industry and environmental organisations are collaborating through a specially established *Reef Alliance Program: Growing a Great Barrier Reef (RAP)*⁵ to deliver and report on Phase III of the program. This phase has a stronger emphasis on extension and education and innovation than previous programs. To facilitate the collaborative reporting, the Queensland Farmers' Federation is undertaking/overseeing the evaluation function across the different regions and organisations. A key element to achieving this has been for each NRM body to use the same spatial database for reporting activities and management practice changes. This has been a significant jump in collaborative reporting. They are also committed to reporting as per the Paddock to Reef *Water Quality Risk Framework* requirements. A major driver for this move was a desire for efficiency (so that each region did not have to establish and maintain its own database) and a recognition of the importance of consistency across a major program.

The limitations are that: one of the regions has chosen not to participate; parallel government programs which use a similar spatial database do not yet share data on the same platform; and the spatial reporting does not capture 'lead indicators' for change such as gains in understanding, attitude, skills and intentions.

Conclusions and Recommendations

As discussed in the literature and explored in these case studies, traditional methods of monitoring and evaluating extension delivery that rely on single organisations or programs reporting progress and levels of 'adoption' of specific practices and outcomes are inadequate when addressing complex issues with multiple deliverers and overlapping objectives.

These case studies provide some insights into how this can be addressed and what more can be done. Based on the findings presented in this paper, we conclude that there are some principles that can be used to underpin improved collaborative monitoring and evaluation.

⁵ <http://www.qff.org.au/projects/reef-alliance/growing-great-barrier-reef/>

Principle 1: *Recognise the need for shared M&E when negotiating collaboration with Innovation Systems*

- It is widely recognised that monitoring and evaluation is best planned and commences at the beginning of an intervention program – rather than only coming in at the end of a completed program. This same principle needs to be brought into the discussion as different stakeholders (including funding organisations) take steps to interact and collaborate in addressing complex problems and opportunities. Along with agreeing on communication and joint activity protocols, M&E protocols need to be discussed and built into the process.

Principle 2: *Overtly recognise the different contributions of each party*

- Given the importance of attribution and justification of investment, each contributing program or organisation should be overtly acknowledged in relation to their specific strengths and inputs – where they value add to the overall process, and where the collaboration process benefits their ability to deliver on their specific objectives.

Principle 3: *Develop understanding, ownership and commitment to the task*

- Just presenting different actors with the M&E framework is not enough to ensure interest, commitment and the provision of appropriate data. What is critical is engaging the different cross-project/program/organisation personnel in the process of working through the logic of their collaborative activities and jointly deciding the monitoring and evaluation that makes sense to them and jointly committing to undertaking and providing it.

Principle 4: *Develop a common over-arching M&E framework, tools and metrics*

- Agreement in principle needs to be converted to practical steps and processes. Having a common overarching framework and agreed information provides that common direction, but this requires ‘lining up the ducks’ of common data collection tools (for example, similar or shared feedback sheets, surveys, case study formats and reflection structures), metrics used (for example, common approach to identifying farm and practice type, demographics of participants and descriptions of changes) and reporting headings.

Principle 5: *Provide a common reporting platform*

- Having a common on-line reporting platform to capture the different levels of M&E data across programs and organisations is a critical element to ensuring collaborative M&E. This helps to ensure common structures and data types, allows real time review and feedback and permits ready access for collation and overarching reporting – as well as for reporting at individual project or program level.

Principle 6: *Review and provide feedback on the M&E data provided*

- What kills on-going commitment to providing information is when it goes into a ‘black-box’ and the contributing parties see no personal benefit from their efforts. By providing relevant collated data back to contributing programs or organisations in a way that better informs them and assists their planning and reporting – and by facilitating regular reviews of the M&E process, achievements and gaps to improve its effectiveness – are ways to achieve this.

Monitoring and Evaluation is about completing the loop in an innovation system. It is critical to learning and (re)directing collaborative direction and actions to achieve the best outcomes. When this does not occur effectively across programs and organisations involved in the process it limits the innovation process. The principles that we have presented in this paper can inform such collaborative monitoring and evaluation and improve outcomes from deliberative innovation systems.

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