Evaluating for learning and accountability in system innovation: Incorporating reflexivity in a logical framework

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Abstract

Approaches to accelerate innovation have become more integrated and systemic over time, such as Agricultural Innovation Systems and co-innovation (Brunori *et al.* 2008; Knickel *et al.* 2009; Fischer *et al.* 2012). Primary Innovation is a New Zealand co-innovation program in which innovation is conceived as being 'co-produced' by stakeholders who contribute their unique knowledge to solving a problem or realising an opportunity. In co-innovation, cyclical processes of planning, doing, observing and reflecting enable innovation to emerge from interactive learning among stakeholders (Botha *et al.* 2014). The value of applying logic models, logical frameworks, programme theories or theories of change and concurrently evaluating the effects of co-innovation practices (particularly reflexive processes) in order to understand the extent of learning in and impact from systemic projects have been questioned and debated (Klerkx *et al.* 2012; Regeer *et al.* 2016).

In this paper we argue that when flexibly applied and adapted to capture dynamics typical in systems innovation projects, the Log Frame Approach (LFA) (Gaspar 1999; AusAid 2005; Kaplan 2015) and logical frameworks (Kaplan 2015) have considerable utility to support evaluation for both learning and accountability, and for identifying and addressing institutional logics, which leads to system innovation. We demonstrate this for the case of Primary Innovation, and compare our experiences with the limitations and solutions suggested by Regeer et al. (2016) when applying logic models, logical frameworks, programme theories or theories of change as part of an `adapted accountability framework'.

1. Introduction

Expectations of the impact from public and private investments in innovation are increasing as commissioners seek reassurance that innovation programs are successfully addressing the complex problems challenging global primary sectors (Coutts *et al.* 2014). As a consequence, a more systemic and integrated perspective of innovation is emerging in the form of Agricultural Innovation Systems theory and practice.

Agricultural Innovation Systems are complex adaptive systems characterized by a "large number of actors, diverse interactions and relationships, and constantly changing influences emerging from technological, market, policy, cultural and other socioeconomic factors'' (Spielman *et al.* 2009). From these complex adaptive systems, innovations emerge through a co-evolutionary process that combines technological, social, economic and institutional change (Klerkx *et al.* 2012). While such co-evolutionary processes generally take place autonomously (see Ekboir 2003), the principles behind these processes can also inform approaches designed to accelerate innovation (see for example (Nederlof *et al.* 2011 and Nettle *et al.* 2012). This implies a move from linear, technology transfer

(technologies invented by science and disseminated by extension) to wider system innovation (Fischer *et al.* 2012) involving interactive learning among all relevant actors in the agricultural sector, including farmers, growers, consultants, banks, agri-businesses, Government, NGOs and entrepreneurs. The key characteristics of system innovation projects are (Klerkx *et al.* 2010; Van Mierlo *et al.* 2010a):

1. Numerous stakeholders with multiple and often conflicting goals;
2. A focus on reflection, learning and action;
3. Co-evolution of technical, social, market and institutional changes; and
4. Emergent outcomes that are modified in response to changes in system understanding and external system changes.

In 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.

1.1 Evaluation for learning and accountability in a system innovation program: Primary Innovation

Primary Innovation seeks to explore ways actors in the New Zealand primary industries can work together to jointly learn and co-develop innovations to complex industry challenges, such as water and land management (Botha *et al.* 2014). The program also has wider system innovation ambitions to stimulate changes in the New Zealand Agricultural Innovation System so that adequate and complementary innovation policies, funding frameworks, and organisational cultures enable the optimal performance of innovation networks (Turner *et al.* 2016).

Achieving system innovation requires reflexivity, learning and action among multiple actors in the Agricultural Innovation System (Van Mierlo *et al.* 2010a; Van Mierlo *et al.* 2010b) in order to tackle the key institutional logics that hinder the formation and functioning of innovation networks (Turner *et al.* 2016). Institutional logics are historically built-up and persistent structures and institutional arrangements that lock systems into current arrangements (Fuenfschilling and Truffer 2014). Learning needs to stimulate structural (or system) change by participants in the system. This kind of learning is facilitated by a reflexive perspective, enabling things that are usually taken for granted to be challenged (Loeber *et al.* 2007; Van Mierlo *et al.* 2010a; Van Mierlo *et al.* 2010b). The outcome of reflexivity and learning in system innovation projects is practical action in the wider system and subsequent double loop learning from this action (Van Mierlo *et al.* 2010b).

In system innovation projects, such as Primary Innovation, monitoring and evaluation are not separate, but become an integral part of reflexivity and learning (Van Mierlo *et al.* 2010b). To be effective in this highly adaptive setting evaluation must be flexible to respond to: (i) learning from action, and (ii) external system changes, especially to seize 'windows of opportunity' (Van Mierlo *et al.* 2010a; Beers *et al.* 2014). This places evaluation in a constructivist perspective that recognises the importance of multiple perspectives and values in shaping system innovation (Arkesteijn *et al.* 2015). Evaluation also needs to deal with ambiguity and disagreement, and their influence on lock-in in systems due to existing institutional logics (Van Mierlo *et al.* 2010a).

At the same time, system innovation projects are also accountable to commissioners, who often have in place formal procedures for evaluating the efficiency and efficacy of project funding (Botha *et al.* 2014; Gosling and Edwards 2003b; Roberts and Coutts 2011). A common approach for achieving this is the use of classical project planning and evaluation such as the Logical Framework Approach (LFA) which has been characterised as a tool (Gaspar 1999), methodology (AusAid 2005) or approach (Kaplan 2015) for designing, executing and assessing projects and programmes (AusAid 2005). This approach was originally developed from an instrumental perspective, with the aim of meeting the accountability needs of project funders – upwards accountability (Gosling and Edwards 2003; Regeer *et al.* 2016). In this paper Logical Framework Matrix (LFM) (AusAid 2005) or logical framework

(Kaplan 2015) refers to a matrix with columns and a number of rows that show inputs, outputs, short-, medium and long term outcomes. Its purpose is to translate a Log Frame Approach into action, and as a document it forms the basis of an actionable work plan that guides implementation through the programme lifecycle (Kaplan 2015).

Applying logical frameworks - as tools for planning - to achieve upwards accountability has been based on rational planning and problem solving in which causes and effects are assumed to be predictable ex-ante and uncertainty reduced and managed (Arkesteijn *et al.* 2015). As has previously been observed, the use of such classical project evaluation creates tensions with the focus on learning that characterises system innovation projects (Botha *et al.* 2014; Regeer *et al.* 2016). This has led to five criticisms regarding the use of the Logical Framework Approach or log frame (Arkesteijn *et al.* 2015) in system innovation projects in which reflexivity, learning and action are essential:

1. It fails to recognise complexity and inherent uncertainty in system change
2. It focuses on what is agreed in formulating the project and does not make transparent the points of disagreement or conflict in system innovation
3. It assumes that society is amenable to rational design
4. Accountability outcomes tend to take priority over learning outcomes
5. Accountability to other stakeholders, besides funders, is ignored.

These criticisms raise several issues regarding the practical application of logical frameworks to support reflexivity and learning in system innovation projects while also meeting the upwards accountability needs of funders (Regeer *et al.* 2016).

Regeer *et al*. (2016) outline eight practical limitations to the application of logic models, logical frameworks, programme theories or theories of change in system innovation projects:

1. They cannot capture the diverse dimensions of accountability and learning because they are typically separated and not dealt with simultaneously in innovation (niche) projects
2. They are developed ex-ante to describe the expected causal relations between inputs, activities and desired program outcomes
3. They are often used ex-post to assess whether, and to what extent, program goals and objectives have been achieved – upwards accountability
4. They typically see accountability in terms of predefined goals and relationships with interventions that “presuppose a relatively stable programme, whose activities, goals and intended effects can be univocally described.” (Regeer *et al*. 2016: 9)
5. They adopt a goal-oriented evaluation that does “not sufficiently take into account the emergent nature of complex projects and their multifaceted environment” (Regeer *et al*. 2016: 10)
6. They fail to capture the effects of external and internal pressures on projects, which can affect the ambition for change, and do not reflect back these pressures as potential for structural change
7. They typically are not used during intervention processes nor include all stakeholders
8. They are commonly implemented by external evaluators and, depending on the commissioner, results may be publicly available. As a result, participants in the evaluation may be more inclined to defend the outcomes generated by their actions and decisions rather than be willing to internalise the findings and learn from them.

Recent work (Botha *et al.* 2014; Regeer *et al.* 2016) has called for the need to explore ways to reconcile these practical issues in meeting accountability needs from evaluation, with the reflexivity, learning and action needs of system innovation projects. This has stimulated modifications of logical frameworks to increase their flexibility (e.g. MERI (Monitoring, Evaluation, Reporting and Improvement) Dart 2007) and, to some extent, the Theory of Change (Funnell and Rogers 2011). Regeer *et al.* (2016) argue for a reframing of accountability to not only funders, but all stakeholders in system innovation, with the implication that evaluation is undertaken to address these multiple

accountabilities. Botha *et al.* (2014) call for 'learning by doing' to operationalize the use of logical frameworks for accountability, reflexivity, learning and action in a system innovation project. In this paper we present the insights gained from this 'learning by doing' in the Primary Innovation program. Botha *et al.* (2015a) discussed the challenges when using a logical framework (Kaplan 2015) in co-innovation projects and concluded that it worked well in Primary Innovation, was particularly useful in providing a monitoring and evaluation framework and guiding change, and matched a co-innovation approach to fostering change.

We argue that the practical limitations of the use of a logical framework to support both learning and accountability in system innovation projects, such as Primary Innovation, can be overcome by the way it is implemented during a project. We demonstrate this for the case of Primary Innovation, and compare our experiences with the solutions suggested by Regeer *et al*. (2016) to the eight limitations listed above.

The paper is organised as follows: section two provides a description of how a logical framework was implemented in Primary Innovation. The third section describes how the program addressed each of the eight practical limitations to using a logical framework in system innovation (Regeer *et al*. 2016). We conclude the paper with a discussion of the main insights on how to use a logical framework to simultaneously meet accountability, reflexivity, learning and action needs in system innovation projects.

2. Methods used to implement a logical framework in Primary Innovation

At the start of Primary Innovation, while there was no requirement to develop or use a logical framework there was a recognition that it was a complex program that required effective evaluation. To this end, the planned steps, process and aspirational outcomes needed to be defined and understood by the program team (researchers and social scientists across participating research organisations) and endorsed by its 23 stakeholders (Botha *et al.* 2014). The large number and diversity of Primary Innovation stakeholders makes it impractical for everyone to be involved in the logical framework and monitoring and evaluation throughout the life of the investment. While all Primary Innovation's stakeholders are familiar with the logical framework, a small team consisting of individuals from AgResearch and Plant and Food Research, as well as CouttsJ&R, a contracted evaluator, uses it to review the program's logic, expected outputs and theory of action, and evaluate impacts and processes rather than checking whether a predetermined path is unquestioningly pursuing contract milestones. The small team shares and discusses their findings and activities with the other 23 stakeholders through a newsletter, quarterly reports and other communication methods like phone calls, meetings, webinars and workshops.

The outcomes from Primary Innovation are emergent because system innovations have multiple socio-technical components that cannot be defined in advance (Wiskerke and van der Ploeg 2004). However, to secure funding, Primary Innovation was required to identify expected outcomes in the funding application and contract. These were used to help develop the first logical framework.

The levels used in the logical framework were (Coutts *et al.* 2014): Longer term Outcomes – towards which the program is intended to contribute along with other complementary initiatives; Key Result Areas – specific measurable short term impacts or achievements to which the program is planning to deliver on in its life (including unintended benefits or consequences); Uptake Strategies – approaches used to reflect, communicate, influence, assist and/or encourage appropriate people or groups to effectively engage; Underpinning Activities – Research, Development & Planning Activities and Outputs needed or used (from other sources) to provide the science, tools, information or materials to support systems change processes; Supporting Structures – resources, staff, management processes, Steering Groups and other structures to oversee and undertake program activities; and

Context – political, economic, climatic and other factors that can affect the success or otherwise of the program and process.

The first logical framework was developed by the program team with the assistance of CouttsJ&R who was embedded in the monitoring and ex-durante evaluation of Primary Innovation. This first draft was circulated for feedback to the program team and the content was developed in a workshop where they created a flow diagram 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. The logical framework was revisited annually over the next two years as a basis for reviewing the program and highlighting gaps in monitoring and evaluation data.

Three workshops were held with a monitoring and evaluation focus – all based around the logical framework. For example, the flow diagram developed in the first workshop was used at subsequent workshops to focus discussion, reflect on progress (including the ambition for change), analyse monitoring and evaluation data captured, and look for gaps. Re-visiting the logical framework also provided an opportunity for ongoing reflection and discussion of what co-innovation meant in practice and how best to evaluate it. Following the workshops, participants were provided with structured feedback sheets and asked to reflect on their learning about and understanding of monitoring and evaluation as a result of participating in the development of the logical framework.

A team member was appointed to support the evaluation process and collect data to support the utility of the logical framework. Amongst other responsibilities, a reflexive monitor also kept track of how team members were responding to changes in the wider Agricultural Innovation System that were affecting Primary Innovation, such as the establishment of new platforms for innovation; the National Science Challenges, as an opportunity for furthering program ambitions (Hekkert *et al.* 2007; Bussels *et al.* 2013; Rijswijk *et al.* 2015). A reflexive monitor's role is to help program participants reflect on process, action and progress towards agreed research goals (Van Mierlo *et al.* 2010a). It is a mechanism that the Primary Innovation team is using to help identify opportunities where co-innovation can enhance impact in the design or management of a series of innovation projects (case studies). Reflexive monitoring is also being used by the research team and stakeholders to remind them of their ambitions for system innovation, such as by challenging and changing presumptions, current systemic practices and underlying institutions (Botha 2013). This is different from the role of a facilitator, in that reflexive monitors challenge, as well as support, participants to reflect on and address how the way they work together enhances or hampers progress towards their shared ambition for change (Botha *et al.* 2014).

Narrative reflective processes during the workshops helped participants to reflect upon their own and others' learning (Schwind *et al.* 2012). These were recorded in a Dynamic Learning Agenda (van Veen *et al.* 2014).

The logical framework was also used for a mid-project evaluation during which available monitoring and evaluation data were analysed against the accountability performance measures at every level of the logical framework. This highlighted data gaps and issues that needed to be considered by the program team and stakeholders, providing another opportunity to reflect on the extent of learning underway in the program as well as increase accountability around program performance.

3. Results

This section provides a description of ways the logical framework was applied in the Primary Innovation program that may address each of the eight practical limitations, identified by Regeer *et al.* (2016), to using such a framework in system innovation. Lessons number two and three have been combined as they are closely related.

1.1 Logical frameworks do not deal with accountability and learning simultaneously

By using the logical framework in Primary Innovation in a flexible and reflective way, tensions that surfaced around learning across the program were identified quickly and addressed. For example, tensions arose during a program workshop about the speed of progress in the program between the management team, researchers and practitioners when discussing and reflecting upon processes, outputs and learning. Learning about and understanding co-innovation was more important to researchers than practitioners who preferred learning-by-doing, while program delivery and impact was important for upward (funder) accountability of the program management team. These tensions were dealt with through regular telephone and face-to-face conversations between program participants and a reflexive monitor for the program who helped discussions to focus on the shared ambition for change. This has resulted in increased involvement of leaders of Primary Innovation case studies in reflexive sessions as well as increasing their involvement in writing up the results of the research.

1.2 Logical frameworks are developed ex-ante and applied ex-post

In Primary Innovation the logical framework was for practical reasons constructed and reflectively used ex-durante in order to re-visit and discuss the underpinning 'theory of action' of the program and causalities assumed in the original project proposal. The ex-post evaluation is yet to be completed as the program is still underway. However, a mid-term review was undertaken using the logical framework. This review included consideration of changes in the logical framework itself.

1.3 Logical frameworks typically see accountability in terms of predefined goals and relationships

The use of monitoring and evaluation with a logical framework has, in the case of Primary Innovation, been used to identify where changes are needed. One example is the membership and functioning of the Community of Practice – a mechanism through which Primary Innovation intends to 'scale up' co-innovation across New Zealand (that is, to influence and stimulate system innovation at the Agricultural Innovation System level) (Botha *et al.* 2014). Over time, through reflection, considering member feedback, an openness towards adaptation and by being pragmatic and flexible the role and membership of the Community of Practice has evolved. As well, the program has created a Community for Change that consists of three integrated but smaller self-selected groups with sufficient homogeneity and focus as well as ambition for change, to achieve impact around three distinct opportunities to enhance New Zealand's Agricultural Innovation System. Further, two social scientists have joined the research team, bringing expertise in change management and using Communities of Practice to support institutional change, demonstrating how the logical framework supported identification of the need for new relationships. Another example of how the logical framework enabled accountability measures to be redefined is that one of the key measures of successful program impact, "rate of adoption", was changed to "rate of innovation" to better reflect the ambition for change in the program.

1.4 Logical frameworks fail to capture the effects of external and internal pressures on the ambition for change

Reflexive narratives by program participants provide evidence of the program's contribution towards system changes and how current interventions, like the Community of Practice and case studies, could be adapted to suit external changes in the primary industry. For example, severe market volatility in dairying provided an opportunity for systemic change, as well as adapting program delivery.

Although this took resources away from the dairy innovation project within Primary Innovation, it created opportunities to discuss with industry partners different modes of intervention, like co-innovation and its benefits and costs (Botha *et al.* 2015b). These discussions challenge current modes of operation and institutions and provide opportunities to explore structural and institutional changes at the innovation project-level as well as at the Agricultural Innovation System level.

1.5 Logical frameworks do not take into account the emergent nature of complex projects

The logical framework enabled a holistic view of Primary Innovation that included processes and assumptions like how program goals, in the form of outputs and outcomes, would be achieved, as well as the anticipated role and impacts of the Community of Practice. The focus was on the *type* of impacts that might be observed from the research program rather than specific pre-determined actions and impacts. This high-level perspective was critical to deep reflexivity because it raised and encouraged in-depth discussions amongst the team that went well beyond merely achieving pre-set goals. Avoiding a solely goal-oriented evaluation approach helped the program management team to 'see' the need for changes, like how the Community of Practice was being used. Combining reflexive narratives with the logical framework also helped to articulate and "picture" program outputs and impacts, and inform how anticipated interventions could be adapted to fit, and more strongly influence, the changing program environment.

1.6 Logical frameworks are typically not applied during intervention processes nor include all stakeholders

As mentioned already the logical framework was used on an ongoing basis to guide evaluation and reflection, i.e. ex-durante, and most stakeholders were involved in these processes. For example, feedback was sought from all participants, including farmer and Māori representatives, directly after Community of Practice workshops and again through interviews. Evaluation was ongoing and involved the full project team in reviewing information provided from interviews. All of the project team had access to evaluation data and reports as they were collected and collated during the project.

1.7 Logical frameworks are commonly performed by external evaluators

In Primary Innovation the external evaluator has been contracted for the duration of the program to support monitoring and evaluation, provide ongoing advice and build monitoring and evaluation capacity. However, rather than hindering the open exchange of views and learnings amongst the research team the external evaluator's involvement is treated as an essential component and a valuable, well-utilised program resource. For example, in the initial monitoring and evaluation workshop in 2013, which used the logical framework, 19 participants rated the extent to which the workshop process clarified the objectives and performance indicators of the program as good (7.5/10; range of 5-9), the extent to which they were comfortable with the monitoring and evaluation approach as 7.5/10, and their understanding of their role in the monitoring and evaluation process as 6.8/10. Seventeen of the 19 participants also indicated that they would consider the evaluation approach for other projects in their organisations. By the second monitoring and evaluation workshop (July 2014) there were a number of comments that some participants already had a good understanding of monitoring and evaluation (from the first workshop) and the value of reinforcement and review. One noted that *the ability to physically 'spread out' the monitoring and evaluation plan* (i.e., the logical framework) *on the wall was a huge bonus - I could see it. We were able to locate and augment the framework so it became a tool to enhance project planning and management. I can now see how monitoring and evaluation works!* Another pointed out the value in being able to pick up the gaps.

Through the involvement of the external evaluator during the research program the team's understanding grew over the three workshops and there was an increasing consensus and commitment built around the program aims and process as well as their role in its evaluation and reporting. As noted earlier, a team member was appointed to facilitate the evaluation process through the project with the external evaluator providing an ongoing source of mentoring and support that has created a high-level of trust and confidence in using the logical framework.

4. Discussion

This section of the paper discusses the main insights on how to simultaneously meet accountability, reflexivity, learning and action needs in practice in system innovation projects. We argue that the

ways in which logical frameworks are utilized determine their suitability to achieve system innovation while simultaneously meeting the accountability needs of funders.

System innovation is challenging and involves long-term change (Geels 2004). We are, however, realistic about what can be achieved through Primary Innovation and acknowledge – with Van Mierlo *et al.* (2010a: 144) – that, by definition, significant system change is complex with long time horizons. While this may limit what is achievable by a program like Primary Innovation, contributing to system innovation by stimulating learning in the sense of a change of thinking and acting is, at this stage, the Primary Innovation team's shared `ambition for change', towards which the logical framework is enabling steady progress to be made.

Co-innovation occurs when different stakeholders collaborate and over time, and share their unique knowledge to solve a problem or realise an opportunity. The mid-term review has shown that the logical framework has enabled participants, through joint learning, to reach consensus on the overall plan for this complex program by bringing the goals (impacts), objectives, outputs and activities together. This is important because shared goals, and a common understanding of the approach being taken to reach these, maximise the likelihood of research having impact (Campbell *et al.* 2015). Using the logical framework provided an agreed, consistent and coherent summary of the program to all the stakeholders, including the funders. It supported culture change and helped discussions to focus on the collective goals, or 'ambition for change' (see e.g., Van Mierlo *et al.* 2010c) by creating a shared visual record of where things are heading.

The logical framework was useful to guide responses to changes or issues because it was used in a flexible way. A flexible approach to monitoring and evaluating progress is very important in allowing for ongoing adaptation, particularly when sustainable solutions are pursued (Rijswijk *et al.* 2015). Consideration of any unexpected, or even expected, negative outcomes is provided for every time the program team meets to minimise the risk of them becoming fatal flaws and enable the program to adjust in order to manage them. The mid-term review has confirmed that the way in which the logical framework was used in Primary Innovation provided sufficient flexibility, allowed adaptation, and thereby effectively guided co-innovation, while also providing accountability measurements and responses to the funders.

By explicitly including the process and principles of co-innovation in the way the logical framework was designed and applied, the team has been able to continuously evaluate in real time how well the process and principles are being applied across the program work streams while learning together about the value of their application. It also facilitated accountability by measuring progress being made towards the delivery of program impact.

5. Conclusion

Our use of a logical framework 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 (see also Arkesteijn, van Mierlo, & Potter, 2007). This has helped participants to understand and, through reflexive narratives, learn about each other's viewpoints and actions. In our view this is an essential component of identifying and addressing institutional logics, which support system innovation.

When logical frameworks are employed adaptively they can, like in Primary Innovation, enhance project functioning in ways that create change while staying accountable. In our experience, when used adaptively, logical frameworks can greatly enhance the possibility of achieving impact by enabling reflection upon, and responding, to important contextual changes. We acknowledge that, when logical frameworks are used to control resource allocation and/or to manage contracts based on accountability, they can become a fixed and prescriptive mould that locks a project team into pre-determined actions, activities and outcomes while ignoring contextual changes.

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