

Learning from change – A case study method to support learning and evaluation within systems projects

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Abstract

Farming systems projects are under increasing pressure from RD&E investors to be “applied” enough to improve the adaptation and uptake of research results and technology and so contribute to achievement of sustainable industry goals. One challenge is how to attribute changes in industry performance to farming systems projects. Another challenge is for the projects themselves to continually adapt to industry needs.

This paper describes a method of case study analysis used to meet these challenges in an Australian dairy industry milk quality and udder health project. It provides an overview of the method and includes some results. The strengths of the method were the extent of learning by project management through exploration of aspects of farm-level change; a greater appreciation of the processes of change associated with the project; and an ability to explain issues around change to project stakeholders.

The paper concludes with a framework for the choice of such a method for other farming systems projects, including its use for program improvement, development of new products and services and the development of skills and capacity within a project team.

Introduction

Since 1980 the Australian dairy industry has seen the number of dairy farms halve, milk production more than double, milk yield per cow rise by more than 40 per cent, the average dairy herd size double to 190 cows and milk output growth rise at 5 per cent per year (ADC, 2002). In this time the industry has undergone de-regulation and the opening of milk markets, has an increased focus on export markets (due to fairly static domestic demand) and removed regulatory restrictions on competition (free market policy). In 2003 (a drought year) 10,654 dairy farms produced 10.3 billion litres of milk and more than 50 per cent of this production was exported for a total value in 2002/2003 of \$A2.5 billion. Australia accounts for 17 per cent of world trade in dairy products (ADC, 2003).

The Australian dairy industry vision for Research, Development and Extension (RD&E) is to have: “*A growing, internationally competitive, innovative and sustainable dairy industry through promoting a higher rate of improvement in farm productivity, promoting sound environmental practice and regulatory frameworks for farm and factory ensuring a strong R&D innovation base*”. (ADIC, 2002)

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Farming Systems RD&E

In Australia, a national (across States and regions) approach to farming systems research, development and extension has been justified by: the need to increase return on investment in RD&E and the rate of productivity gains in the farm sector; the reduction in, and restructuring of, government funding for extension; and an overall requirement to achieve triple bottom line outcomes (social, environmental and economic) (Crawford et al, 2003).

Farming systems research in Australia has evolved into a holistic approach, involving farmers, specialists and policy makers (Petheram and Clark, 1998). Researchers work with farmers and extension practitioners to ensure that research developments meet the needs of the end-users. There is also the recognition of a role for complementary social science to research the learning and understanding of user needs, and development and refining of learning opportunities (LEARN, 2001).

It is the complexity of farming systems projects, the need to continuously improve projects and to understand aspects of change that creates a challenge for evaluation. An analysis of the contribution of evaluation approaches to the demands of Farming Systems projects is presented next.

Evaluation approaches

Evaluation involves determining the worth or merit of whatever is being evaluated (Scriven, 1991). These judgements can be used to assess program impacts, improve program design or plan new programs. Owen (1993) categorises five main purposes of evaluation: evaluation for impact assessment, evaluation for program management, process evaluation, evaluation for design clarification, evaluation for program development. Most authors agree that the evaluation strategy and the form of evaluation should be considered prior to selecting methods.

A review by Dart, et al (1998) suggests that many evaluations of agricultural programs are driven by a focus on summative evaluation, i.e. focused on program or project impacts at or near the end of project life. The authors encourage closer examination and uptake of formative (program improvement focused) and qualitative approaches that can assist project innovation. In this vein, Flood (1999) suggests that different possibilities for improvement can be located by examining four areas: Project processes (i.e. the reliability of flows of events and control over flows of events); Project structure (i.e. the effectiveness of functions, their organization, co-ordination and control); Project meaning (i.e. people's viewpoints on the meaningfulness to them of what is going on and choices of improvement strategies); and Project knowledge-power (i.e. fairness in terms of entrenched patterns of behaviour where what is said to be valid knowledge and proper action is decided by powerful groups). He suggests these categories help locate types of issues and dilemmas encountered in project (and organisational) life.

Such an approach appears appropriate for complex farming systems projects and provides insight to the areas (or windows) for exploring "whole program" improvement. What is missing is a guide to specific steps (method) that a small team of people could develop for project improvement. Some authors criticise what they see as "methodological domination" of evaluative thinking towards *how* an evaluation is done (methods focus) instead of *why* (purpose focus) (Green, 2001). Alternatively, we would argue that evaluation methods should enable the purpose to be continually informed. What is

required is a theoretical framework to explore the relationship between purpose and method in evaluation. The framework that is suggested is based on practice theory that has as a central tenant “doing” as a basis for learning.

The “practice” literature and its relevance to evaluation

“Practice” (eg. the practice of evaluation, the practice of farming) is a social domain of action where *doing*, not knowledge is central (Gremmen, 1993). A “practice” theoretical approach sees the people (farmer, scientist, adviser) as actors in many practices, with these practices being social domains of action. The motivation to attain a competent level of performance within a practice comes from the reflection on and comparison of an individual’s current performance with what is defined as being competent. Such performance within a practice is rationalized and improved through the interaction with other practices.

In order for researchers, evaluators or project teams to enter into communities in ways that facilitate the gathering of information on learning processes and practices, observations of the rules¹ which describe and define action², an understanding of the people who take the action and the context within which they operate are required (Paine and Kenny, 2002).

What does this mean for projects looking to evaluate their performance?

A practice approach begins by studying the learner’s actions in a workplace setting or context. A practice perspective refers to the variations in performance among a community of practitioners as the basis for identifying new learning opportunities. A practice approach also observes performance as a result of a project by investigating changes in the practice itself.

In conclusion, a gap has been identified in the field of formative evaluation for the support of complex projects (such as farming systems projects). Practice theory was suggested as a theoretical framework that could support the development of a method to help project managers learn about project performance as well as refine their understanding of the relationship between purpose and methods in evaluation outcomes.

The next section of the paper demonstrates the steps in the development and application of a method that builds on practice theory to support the evaluation goals of a National milk quality project in the Australian Dairy Industry.

The context for the development of the method reported

As part of their dairy industry research and development role, the authors supported the Australian dairy industry national programs in project design and evaluation. One of the first National programs, Countdown Downunder³, had recently completed the first three years of the project (Brightling, 2001).

¹ Rules are used here to refer to the guidelines that define membership of a community.

² The focus in the evaluation and this paper is action rather than behaviour. That is, the focus is not solely on observable behaviour (eg. changing their teat spraying practices after the course) but on the subjective aspects of human activity (eg. their intentions in changing teat spray or what changing teat spray means to them and their overall orientation to milk quality). That is, the interest is in meaningful activity (termed action) rather than activity alone (behaviour).

³ www.countdown.org.au.

The Countdown Downunder project

In 1999 the Countdown Downunder project was instigated to promote best practice in terms of mastitis management on Australia's dairy farms. International expectations for milk quality were increasing, and with the high reliance on export markets by the dairy industry, the focus was on exceeding international standards. The project aim was to achieve progress toward a national cell count goal (90% of herd milk cell counts below 250,000 cells/ml and 100% of herd milk cell counts below 400,000 cells/ml), reduce the number of clinical cases of mastitis by 20% and contribute to sustainable and effective use of antibiotics in the dairy industry. The project design involved: the establishment of best-practice farm guidelines for mastitis control (developed by farmers, advisers and scientists); creating a regional advisory capacity for mastitis control and milk quality; choosing a new extension "frontline", promoting a multi-disciplinary approach to mastitis issues (promoting the "off-farm team" role whereby the different practices of farming, veterinary science, advisory services and technicians contribute to the achievement of goals); adding facilitation skills to technical strengths through a Countdown training team and supporting change toward best practice on farms through the Farmer Short Course.

The Countdown Farmer Short Course

The Countdown Downunder management team predicted that there would be two windows of opportunity to support change toward best practice on farm: firstly when farmers had direct one-on-one interactions with their advisers, and secondly when they participated in continuing education experiences designed to help them improve their management planning in mastitis and milk quality. This approach was underpinned by the recognition that the knowledge and skills to improve performance on farms already existed in the industry however these resources tended to be locked within disciplines and there was limited capacity for professionals to work together to solve complex, multi-factorial problems.

In 2000, Countdown designed the Farmer Short Course for farmers to develop practical plans to improve performance on farms. Although the Farmer Short Course was designed for all farmers, the project team recognised that many people were less inclined to participate in "formalised" learning. In addition, many farms consistently achieved low cell counts and low numbers of clinical cases. This was why the Farmer Short Course was just one element in an integrated approach that also emphasised the role of the off-farm advisory and industry support people and their capacity to give clear and consistent messages based on the best practice guidelines. A key target audience for the course were those farms with cell counts over 250,000 and/or high incidences of clinical cases (estimated at 25-35% of dairy farms³) and advisers were key people in motivating these farmers attendance at the course.

The course was designed to suit an environment where the milk quality specifications that determine farm goals are becoming increasingly stringent and the need for plans to include on-farm teams is necessary given the expanding herd sizes increase and increasing number of farm employees. The Farmer Short Course (still being delivered across Australia) offers dairy farmers, managers and staff involved in milk harvesting resources to manage mastitis and a framework for using and integrating service from dairy advisers. It also encourages farmers to build a team approach to issues on their farms and to be comfortable about seeking advice from professionals.

Over the course, participants build a "Mastitis and milk quality action plan" for their individual farms using the Farm Guideline recommendations. In the final session each participant is asked to present the plan for their farm to the group. This allows others to contribute comments and increases the chance of

individuals taking home plans that are meaningful and practical to implement. Since the start of Countdown Downunder, 77 courses have been held across Australia involving over 1600 farmers.

The basis of an evaluation method

In January 2002, the Countdown Downunder project had completed 6 months of their second funding cycle (2001-2004). Their focus was more toward working with the whole team of operators who influence farm performance (farmers, farm workers and external advisers) after the first project funding cycle (1999-2001) demonstrated strong progress toward industry cell count goals. The Countdown Downunder management team wanted to capture field experiences to design and promote high quality relevant services for dairy farmers, assess the impact Countdown Downunder has and is having on adoption of best practice on farms and describe the factors driving this change (AMAC, 2001). The purpose of the work therefore crossed the boundaries between formative and summative evaluation, and an interest in process (how the program is contributing to change in milk quality) and outcome (have desired outcomes been reached) evaluation.

The stated purpose of the evaluation became: *An evaluation of on-farm change through the Countdown mechanism. This will provide insight for stakeholders, the program management team, the regional managers, trainers and network members about the extent of on-farm change and the role of Countdown (particularly the farmer short course) and other factors in this change, as well as potential for improvement in the programs key domains of activity.*

To meet these aims the method was required to:

- study real farm experiences of milk quality management
- capture aspects of change in real time
- allow for learning at the program level
- enable understanding of the role of Countdown interventions in change.

Extensive quantitative and routine methods (surveys, statistics on cell count distributions, etc) were available to the project team to look at numerical change in milk quality across the national herd. For this study a qualitative approach that provided rich, first hand information was preferred by the project team.

Participants in the Countdown Farmer Short Course were highlighted as a key group of farmers at the interface of many of the project interventions. Although course participants represented farms that had a particular preference for learning in this mode and a particular issue with milk quality status (and therefore potentially viewed by some as “non-representative”), they were viewed as offering the greatest opportunity for project learning and the best way to access farming practice around milk quality and also allow exploration of the impact of the Countdown intervention and the relationship with the other practices involved in milk quality (i.e. technicians, advisers, veterinarians, farm employees).

Case studies

For Mitchell (1983: 191) the case study is *"the documentation of some particular phenomenon or set of events which has been assembled with the explicit end in view of drawing theoretical conclusions from it"*. For this project, case farms that had attended the Countdown Farmer Short Course were seen to be able to offer insight into general principles of change. It was considered important to the evaluation process to explore the ways in which respondents construct and report their views (Cassell and Symon,

1994: 1-12). It was also seen as necessary to explore processes of change through real-time (compared with a “one-off” capturing of information about changed practice).

Participatory research

A participatory approach was required between project management, the project team and social researcher in terms of data collection and analysis to ensure learning between the results of the study and the project team. This “action researching” approach is necessary to allow for learning and change to occur through the research. If the focus of the work was on practice – then changed practice, the way it is understood and the situations in which the practice is conducted is required (Kemmis and McTaggart, 2000: 595).

The method

Case farmers who attended a farmer short course were monitored over time to determine their achievements in terms of affordable milk quality and how the course, the use of the guidelines and the role of advisers contributed to their achievements (i.e. a focus on their *how* and *why*). The aim was to assess how the farmer short course influenced on-farm change (or not).

The data for these cases was obtained through semi-structured interviews with a selection of participants in the farmer short course from Southern Australia over 14-16 months. Cases were selected based mainly on a) a range of types of on-farm udder health problem experienced and b) the farmer approach to udder health management (ability to change, their concept of agency in change, beliefs about need to change).

Other components of case selection included a mix of characteristics in the following areas:

1. On-farm role (owner and family members, herd or farm manager, employees)
2. Participation in training in last twelve months (frequent participator in industry events, infrequent participator, non participator)
3. A mix of gender
4. Advisory network: (regular users of veterinary and advisory services, irregular users of veterinary and advisory services)
5. A mix of herd size (100-1000 cows)

The case selection criteria (above) was important as it allowed access to some farms that did not normally participate in “formalised learning” and were not necessarily involved in other dairy industry activities – offering key insight to what would normally be described as “non-participators”⁴. The case farms were chosen with the assistance of farmer short course trainers and regional project managers. The questions to case farmers revolved around farming practice in milk quality prior to and after involvement with the farmer short course and the place and role of Countdown resources. Questions that encouraged exploration of how case farmers grasped concepts and processes used in the course and the use of that knowledge were explored. The use of mastitis action plans and planning processes were examined over time, along with the role and contribution of advisers, the Countdown farmer guidelines

⁴ A common issue in farmer programs is the concern that those farmers that have a particular preference for group learning or formal “course-based” learning are the target of many programs and not enough emphasis is placed on those that don’t attend but may have a greater need for support. In this evaluation, understanding the processes of change on a whole range of farms allowed insight into the role of advisers in general – not just those participating in the course. However, further research in this area is warranted.

and seasonal events in change. Particular attention was focussed on any “outside routine” practices and how high and low performance and changed performance may be explained. All interviews were audio-taped and transcribed to allow for evaluation team analysis which occurred after each group of case farm interviews. Eleven case farms in total were studied over 15 months, with 4-5 interviews per case held within one week of finishing the course (face to face) and then during critical event times through the year (over the phone). Final interviews were held in September 2003.

“Insights to farmer progress” - Case study analysis

Two members of the project team conducted the interviews and these members, the project manager and social researcher were involved with analysis. After the first round of interviews, the group discussed the name of the evaluation task and decided on “*Insights to farmer progress*” demonstrating the importance the project team placed on learning from change that was occurring on farms as farmers implemented best management practice after course attendance.

Case study analysis involved reading through interview transcripts and identifying themes around changed practice and the role of the Countdown project. Each case study was then analyzed to look at change in milk quality status after course attendance and progress in putting in place their mastitis action plans. Key emphasis in the analysis was on the interaction between external events, actions taken by the farmers, planning, information sources and role of the on- and off- farm team in making progress.

The evaluation team examined the cases to observe change over time, what the stand-out features of the case were, what changes occurred and how and why (processes of change). From this, general themes, principles or concepts emerged from the cases. These were explored as they related to key questions of relevance to Countdown - they became the “Insights”. These “Insights” came from the conceptualising of learning and practice change and the role of Countdown.

These “Insights” were then used to inform the development of future Countdown activities, supporting advisers in enhancing their capacity to respond to farmers, informed the project steering group on the necessary strategic direction of Countdown and informed aspects of farming system and extension project design and delivery in other National dairy industry projects. A diagrammatic representation of the method appears in Figure 1.0.

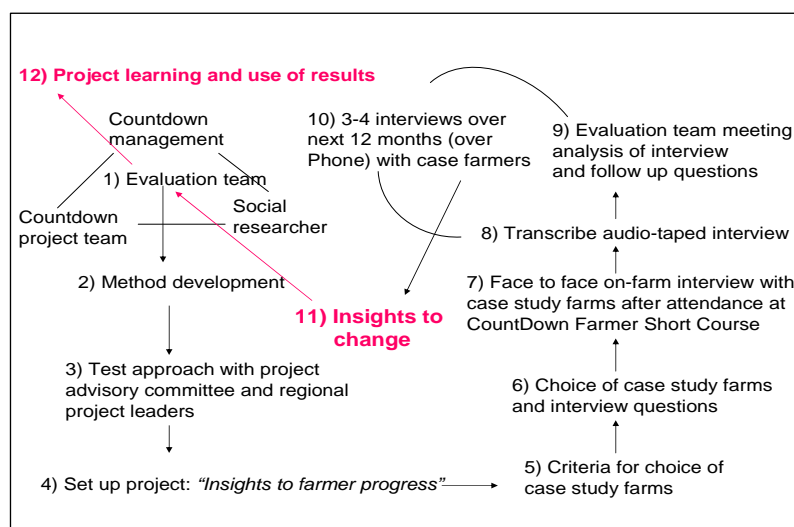


Figure 1.0: The development and application of the evaluation and learning method process in Countdown Downunder (represented as 12 steps)

Results

It is not the intention of this paper to report in detail the specific results of the evaluation work however, to demonstrate the role of the method in informing the project team and other practices, a summary of the findings and use of the findings from two case farms is presented here (Box 1.0 and 2.0).

Box 1.0 – A summary of results from Case Farm 1

The development dilemma

Steve and Carla milk 150 cows and are relatively new to dairying. Their farm is at a development stage and they are very keen to seek out lots of information. It was their vet who suggested they attend the Countdown farmer Short Course. As a consequence of their actions straight after attending the course they halved their bulk milk cell count, yet still had difficulty lowering the number of clinical mastitis cases at calving. They were having trouble prioritizing critical elements to success in reducing clinical cases with so many farm development needs, they were choosing easily implemented but partial remedies. They were not backward in seeking lots of information – however it tended to come from informal “chats” with various service providers and they did not develop a real sense of direction – more “clutching at straws”.

This suggests that their “Mastitis Action Plan” developed from attending the Countdown farmer short Course provided a useful framework for action in milk quality, but given the overall dairy system issues, Steve & Carla needed a clear path to adviser support – not just in the technical needs – but support to help them implement and review their plan and goals. The key finding was that advisers need to be able to identify this form of need and position their service appropriately. Countdown could have a key role in supporting advisers in being able to modify and position their advisory practice to identify and meet the needs of different farm trajectories. This “relational practice” had not been a focus of any previous interactions between the Countdown project and advisers. In addition, the project, although having a focus on milk quality – by building advisory capacity in such ‘relational areas’ would build overall industry capacity in support to farming system changes.

How did the project use this case study for project improvement? This particular case was used in a presentation to over 400 advisers attending Countdown conferences around Australia to help advisers identify different needs like that of Steve and Carla. As a result, many advisers gave thought to how they can better understand and meet needs.

This case also demonstrated to the project team (and stakeholders) the importance of the combination of farmer course work, trained advisers and tailored advisory support. For instance, Countdown learnt about the importance of supporting advisory capacity in the farmer-adviser relationship (eg. advisers need to look beyond what the milk cell count is telling them and look to the needs of management, advisers need to follow up farmers after course attendance and help farmer planning and focus, veterinarians need to look to promoting their herd level rather than individual cow level competencies). Countdown began to look at project opportunities in assisting advisers identify the triggers and business opportunities around better identifying needs and meeting them.

Box 2.0 – A summary of results from Case Farm 3

Can an employee make change happen?

Jason is a new herd manager on a 470-cow farm. The owner has an active role in the farm on a day-to-day basis – however they tend to operate separately – with each having separate working times and tasks – a bit like “ships passing in the night”. The owner also attended a farmer short course the previous year. Their cell count isn’t too bad - sitting under 250,000. Jason wanted to reduce clinical mastitis during lactation and to maintain a BMCC below 200,000. They had implemented quite a few things since the course such as scheduling monthly machine checks, and taking immediate action to reduce clinicals through culturing milk samples and treating with the appropriate antibiotic rather than treating repeat clinical case cows with the same treatment. Jason’s biggest challenge was to encourage the owner to allow more herd testing so better decisions could be made about problem cows. Jason’s confidence in tackling the mastitis issues for the farm had increased through the course and he continued to re-read the farm guidelines. He was able to reduce cell counts to under than 200,000 fairly consistently for 6 months, however he was not able to convince the owner to do the extra herd testing. A year later

Jason had left the farm and took up an opportunity on his family's farm where he was working on improving milk quality there.

This case shows the issues around the on-farm team as Jason struggled to implement his plan and reach his goals because he was unable to communicate this to the farm owner. In addition, rather than a cell count goal, Jason really needed a plan that included how to achieve the goals with the owner. A jointly decided goal and the processes to achieve it would have yielded a better outcome for the farm. Therefore, his mastitis action plan could actually have been a mastitis "process plan". Course trainers could help this process more. What happened instead was that Jason's "personal goal" of under 200,000 was superseded by the owners goal of remaining under 250,000 – an "industry acceptability goal". This suggests the need for discussion and priority setting around goals – and the need to be able to communicate and "advocate" for a particular goal between owners and employees. Advisers can play a key role in this. Despite Jason not able to fully achieve the change he desired on the farm – the skills he picked up were transferable to the next farm – and the principles learnt were being used as a basis for new forms of change there.

How did the project use this case study for project improvement? This particular case was used to help trainers understand the different needs of employees (or others not in key decision making roles) in relation to achieving their goals and the need to have joint action plans. From cases like this the Countdown project is developing a new product targeting employees and milkers. The case is being used to demonstrate a different aspect of the impact of milk factory price signals on changed performance whereby a greater capacity may exist to achieve higher performance – yet the price signal can prevent this capacity being exercised due to perceived "no financial benefit" from lower counts. This case once again shows the key role of advisers in supporting processes where employees can feel they are able to adequately influence farm practices as well as their role in supporting people in achieving the (not necessarily technical) change they desire.

Across all the 11 cases, the project team was able to build a conceptual model of change in risk management and on-farm practices across the cases and the role and mode of influence of Countdown. They were able to demonstrate concrete evidence of change attributed to Countdown (impact), through the variation across the cases and to explain the relative impact of Countdown on different types of change (eg. in milk quality). This provided an opportunity to develop guidelines for improving the support given to farmers to cope with implementing management plans outside of the short courses – the "where to from here?" The cases also allowed the project team to critically assess the place of the project elements like the best-practice guidelines, the current level of adviser training and the place of the course and modify and plan for improved future approaches. Further, the multiple disciplines involved in change and understanding change (farming practice, veterinary/advisory practice, social research) meant a depth in learning about each others practice, evidence of change within the practices, an assessment of the worth of such a methodology and the valuing of the social research by each practice.

Time and resources involved

The organisation and administration of the method, conducting and transcribing interviews and analysis of cases took approximately 56 person days over 16 months. The across-case analysis and documentation of the "Insights" for different project audiences took a further 10 person days over 3 months. The eleven cases were sufficient to generalise across many aspects of the whole Countdown project because of the variation they covered and the depth of analysis. The area least informed is that of non-participants in the course and their relationship with advisers, Countdown resources and change in milk quality.

Strengths and weaknesses of the approach to guide future use of the method

The method provides a realistic response to the criticism of evaluation focusing too much on methods rather than purpose by simultaneously addressing both levels (the why and how of evaluation and project purpose and design).

By maintaining a focus on the "doing" (farm practice around milk quality) as suggested by the framework of practice theory, the project team was able to understand practice change (who is doing what and why, what practices changed and by what process).

The development of “Insights” occurred for all project levels: participants, industry, project and stakeholders through this examination of practice and allowed the development of an appreciation of the how and why of change around a project intervention. The project team became intimately aware of the learning from the studies of change because of their involvement in data collection and analysis – compared with (say) an external report prepared by a consultant. The method allowed the development of new product ideas (eg. the project team are developing a new course for employees milking cows: “Cups on to cups off”, the Insights work has provided a guide to the development of this product).

It did not allow for attribution to the project at an across industry level (attribution was at the case level). There is scope for analysis at the industry level using survey research that is designed using the results from the ‘Insights’ study. The method may be viewed by some as expensive in terms of time and resources. Such judgements need to be weighed against the level of project learning, which is argued to be much higher through this approach than some other quantitative and survey based methods that operate external to the project team. In addition, the project management team are continuing to use the Insights results in discussions with project stakeholders.

Finally, method development was supported by a social researcher trained in agricultural systems. Such competencies within project teams are often either scarce or not seen as a priority capacity in projects. Support and input from a social researcher is a suggested way to improve the design and customisation of methods to meet specific project requirements.

The principles of evaluation using this method hold for programs that are sector wide, involve multi-faceted problems (systems based) and involve a mix of disciplines with a focus on learning and change.

Conclusions

The complexity of farming systems projects and the unpredictability of the environment in which farming systems operate has not diluted the call for more accountability and understanding of impacts of project interventions.

This paper has reviewed some of the challenges to evaluation approaches given these increasing demands. What was required was a method that enabled the exploration of the nature of changed practice at the farming system level – but involved the project teams in learning from this understanding to inform project development, understanding of impacts and ways to communicate project outcomes to stakeholders.

A method involving action research within a project team examining longitudinal case studies of farming and advisory practice change associated with project interventions was demonstrated. Such a method was suggested as appropriate for ongoing project learning and for developing a sophisticated understanding of impacts and change. Such “learning through change” is suggested as a suitable approach to other projects that are multi-disciplinary, have a focus on “doing”, involve numerous stakeholders and are seeking further understanding of the nature of change. The practice theory framework provides a strong basis for the development of methods to support evaluation frameworks.

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