

Critical success factors of a whole of business extension approach for increased capacity of beef producers and improved enterprise profit and sustainability

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Abstract. The ‘Research to Reality Project’ assisted beef producers in the Burdekin catchment of north Queensland to develop practical responses to a range of production and grazing land management challenges. The project involved three groups of beef producers encompassing 19 enterprises, 680 000 ha of land and the management of 162 000 cattle. The project was founded on a continuous improvement and innovation approach, and included an employed industry champion and multi-disciplinary project team who used a range of extension methods to identify, develop and implement on-property projects. Extension methods included one-on-one property planning activities, economic benchmarking, land condition assessments, on-property demonstrations, structured learning workshops and information products. The value of project evaluation to producers and the project staff is discussed. Further, the link between increased profitability and better land management was established for many producers. This learning is reflected in the uptake of recommended grazing practices and the decisions producer participants are now making about their grazing business.

Additional keywords: continuous improvement and innovation, evaluation, pastoral industry, practice change, producer teams.

Introduction

The Burdekin Dry Tropics region is located in north-eastern Queensland, Australia and covers an area of ~133 500 km², around 8% of the State. The region contains a diverse range of physical environments including mountain ranges, basement rock hills, coastal plains, floodplains, deltas, and undulating plains with escarpments. Soil types reflect the diversity of parent rock materials, landscapes and rainfall patterns. The extensive rangelands of the Burdekin region are open *Eucalyptus* savanna on relatively infertile soils. Mean annual rainfall is 650 mm and is highly variable (CV=40%). Precipitation is largely (70%) concentrated in the wet season between December and April.

The economy of the region is heavily reliant on natural resource based industries, particularly agriculture along with mining and tourism. Agriculture is the most important employer in the rural areas. Extensive beef cattle grazing is the main land use in the region (96%) producing around Au\$102m per year (Productivity Commission Report 2003). There are ~500 commercial grazing enterprises that range in size between 10 000 and 50 000 ha and run 2000–5000 head of cattle. More than 70% are family operated (McCullough and Musso 2004).

Managing for climate and market variability is a challenge to the long-term sustainability and profitability of grazing enterprises within the catchment. Land degradation has attracted attention to the area since the mid 1980s, and continues today (Landsberg

et al. 1998). There is wide-spread concern that increased loads of pollutants in local waterways, such as sediment and nutrient, may negatively affect the estuaries and in-shore reefs of the Great Barrier Reef lagoon (Furnas 2003). Maintaining beef enterprise sustainability and profitability in light of declining terms of trade requires producers to continue to make significant gains in production efficiencies and grazing land management. In most cases, achieving these gains requires the accurate identification of the problem followed by an assessment of a range of often complex possible solutions. Beef cattle producers are often managing a fine balance between maintaining good land condition and maximising animal turnoff and production goals.

Historically, this challenge has been approached by research, development and extension as discrete items rather than with consideration for the interaction of elements within a beef business and a strategic focus on outcomes. Moreover, Federal and State governments and research and development corporations have decreased funding into producer demonstrations and research in the last 10 years, leading to increased reliance on the direct transfer of technology from formal research projects to grazing enterprises. Despite general acceptance that the ‘technology transfer’ paradigm (Russell *et al.* 1989; Jiggins 1993) works in simple situations, it does not lead to accelerated adoption in complex systems (such as a beef enterprise), dynamic contexts or with more multifaceted practices and technologies (Woods *et al.*

1993). There are few project examples in the beef industry of a whole of business integrated approach focused on adoption and capacity building outcomes.

This paper focuses on the extension approaches that have been used to enhance the uptake of new technology in the rangelands of north-eastern Queensland. Central to the ‘Research to Reality Project’ (R2R) reported here was the application of a range of extension processes to analyse the whole enterprise, and build the capacity of producers to adopt practical solutions to animal production and grazing land management challenges. We focus specifically on determining which extension practices worked and ideas for doing things differently. Further, an evaluation of the process was undertaken as an integral part of the project.

Materials and methods

The R2R project was undertaken for 2 years (2006–08), and was managed by a multi-disciplinary team from the Queensland Department of Primary Industries and Fisheries (DPI&F) which was primarily based in Charters Towers. R2R involved three groups of beef producers from the Collinsville, Belyando and Northern Speargrass (Greenvale) areas of the Burdekin Catchment within Queensland encompassing 19 enterprises, 680 000 ha of land and the management of 162 000 cattle (large stock units) (Fig. 1).

The majority of participants were younger than 39 years of age (Fig. 2) and had a keen interest in advancing their business. When asked early in the project: ‘What would you change about your beef business that could have an immediate impact on your profitability?’ the participants commonly stated taking advantage of enterprise opportunities (25% of responses), business analysis (18% of responses) and land condition (16% of responses) (Fig. 3) as having the greatest immediate impact. These responses confirmed the need to take a whole of business approach to achieve positive natural resource outcomes.

The predominant extension model used was the ‘group empowerment and facilitation model’. Coutts *et al.* (2005) describe this model as one where participants increase their own capacity in planning and decision-making and in seeking their own education and training needs based on their situation. A facilitator is often used to support the participants define their learning needs and goals. This model is about building the skills of individuals, building community through group work, and empowering the people involved. Roberts and Coutts (2006) describe the philosophy of this approach as one where a facilitative framework allows participants to define their own problems and opportunities and to seek their own avenues to address these issues. Lasting and sustainable solutions are expected to result. The group empowerment and facilitation model was integrated with other models of engagement including the consultant/mentor and technology development/problem solving model.

The ‘consultant/mentor’ model is where a mentor or consultant works with participants – often over an extended period of time – to solve managerial, technological, social or environmental issues (Coutts *et al.* 2005). The ‘technology development/problem solving’ model often involves local trials, demonstrations, and fields days where people have worked together to advance practice or adapt technology for the benefit of

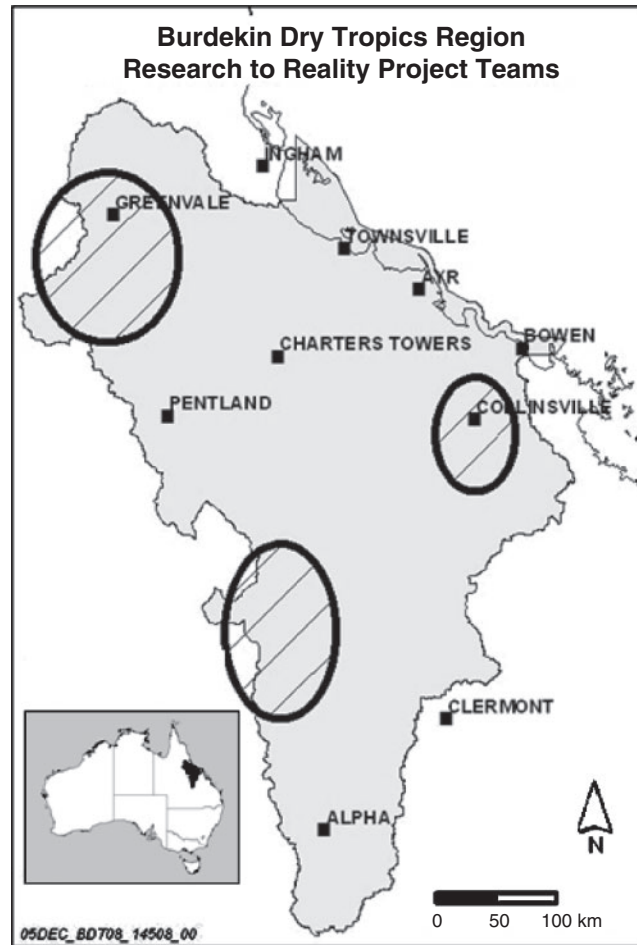


Fig. 1. Location of the study area in the Burdekin Catchment, Australia.

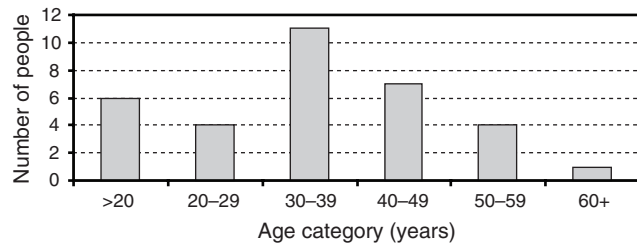


Fig. 2. Age distribution of R2R participants.

themselves and their community (Coutts *et al.* 2005). To a lesser extent, the ‘programmed learning/training and information access’ models were also used (Coutts *et al.* 2005). The learning/training model is where specifically designed training programs and workshops are delivered to targeted clients to increase understanding or skills in defined areas. The information access model is where individuals and groups can access information from a distance, whether it be based on a website, information centre or centralised locations (Coutts *et al.* 2005).

These five models of engagement were integrated and enhanced through project design and the implementation of a

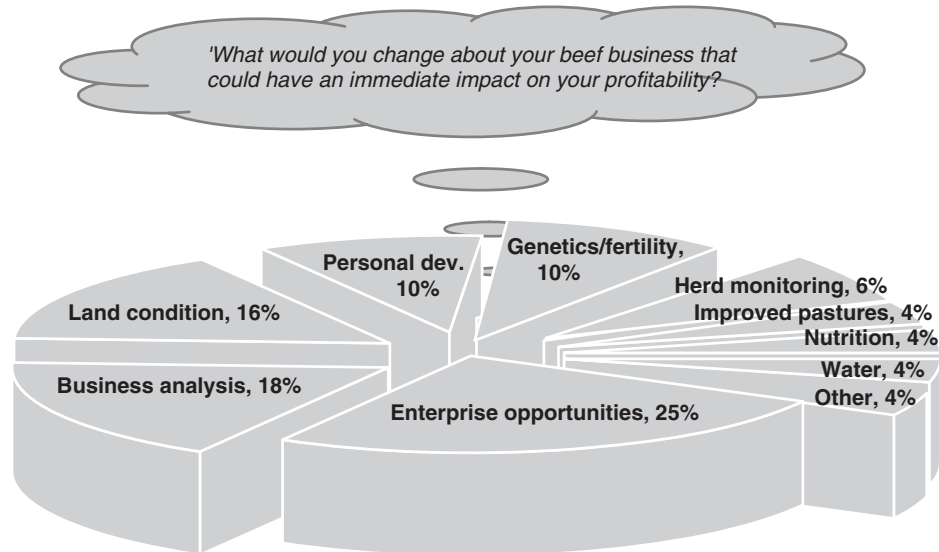


Fig. 3. Impacts on the beef business stated by the R2R producer team members.

continuous improvement and innovation process (CI&I) (see Fig. 4.) developed in Queensland from international and Australian research and adapted for rural Australia (Clark and Timms 2000). CI&I is a modified form of soft systems thinking designed to address innovation and change (Roberts and Paine 2004). CI&I involves individuals in teams, networks, and partnerships on a frequent and regular basis and focuses their thinking and action to achieve improvement and innovation. Knowing how to improve and innovate in any context can be inspiring for people, particularly when using shared tools and processes to support each other and achieve advances together. Measuring, recognising and sharing improvements and innovations is an important aspect of CI&I (Clark and Timms

2000). The CI&I cycle (Fig. 4) was used by the R2R team to foster adaptive management. A project system map was created by the R2R team to ensure the project was designed to achieve its focus (Fig. 5). The project system map shows the relationship between the elements, i.e. a positive relationship indicates influence on the element to which the arrow points.

Throughout the R2R project a range of extension methods and tools were used including:

- (1) working with three groups of beef producers, using the range of engagement methods described above in both group and ‘one-on-one’ situations;
- (2) on-property whole of business planning activities (Fig. 4) designed by the R2R team;

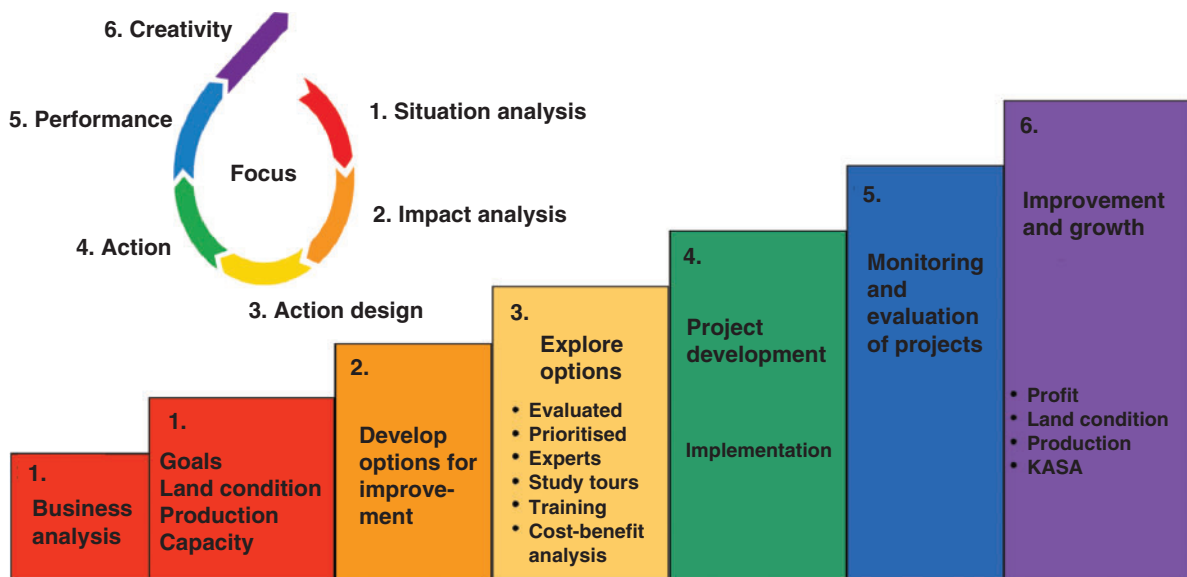


Fig. 4. Continuous Improvement & Innovation (CI&I) cycle and the broad project steps used by the R2R team (adapted from Clark and Timms 2000).

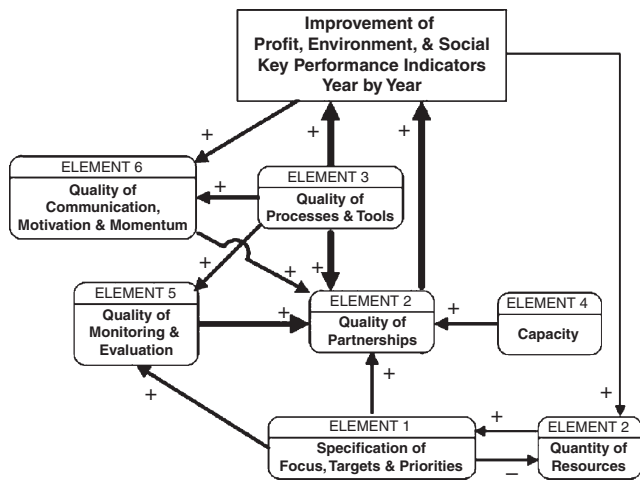


Fig. 5. R2R beef profit project system map showing positive and negative relationships between elements in the direction of the arrow.

- (3) best practice husbandry, nutrition, reproduction, and land management check lists developed by the R2R team to identify opportunities for improvement and economic options analysis;
- (4) individual business performance assessment using Resource Consulting Service's ProfitProbe business analysis system (Resource Consulting Services 2009). This is a systematic approach to analysing the whole of business and enables the producer and economic support staff to evaluate farm decisions on the basis of investment. ProfitProbe is a benchmarking tool where the benchmark is the average of the top 20% of producers within a major vegetation zone over the past three years. Individual producers can use the benchmark for each economic key performance indicator to gauge and track their performance over time;
- (5) land condition property assessments using the ABCD framework (Chilcott *et al.* 2003). The ABCD framework is a tool developed by the DPI&F for graziers to determine their current land condition status and trend over time in relation to management changes on a land type basis. Land in A condition is good, B condition is fair, C condition is poor and D condition is very poor;
- (6) economic option analysis using DPI&F's Better Decision's in the Business of Beef Breedcow and Dynama Herd Model (Holmes 2003) conducted within the 'one-on-one' planning process. Breedcow and Dynama software is used for budgeting. It is not an accounting package, or a paddock records package, nor does it record individual animals. The term 'herd budgeting' is used to emphasise the central role of herd dynamics in budgeting for a beef enterprise;
- (7) specialist speakers;
- (8) on-property demonstrations of technology, systems and management options;
- (9) tailored research and development (R&D) information;
- (10) creation of a social team environment to stimulate sharing of information on practices and adaptation to individual situations;

- (11) structured learning workshops in disciplines such as grazing land management, nutrition, breeding management, marketing, and succession planning;
- (12) project evaluation designed & conducted by Roberts Evaluation, Jeff Coutts & DPI&F complete with materials for DPI&F staff to conduct activities to measure the projects' impact on:
 - (i) empowerment of individuals within each team;
 - (ii) the growth in the capacity of team and individual family enterprises to be self-directed learners;
 - (iii) the quality of life as a surrogate for individual enterprise family resilience; and
 - (iv) the cost-effectiveness of the extension model that achieves improvement in the sustainability (environmental, financial, and social) of management practices and the capacity of those involved;
- (13) measurement of indicators for capacity including those for critical thinking, independent learning, problem solving ability, planning, communication, facilitation, community networks, leadership, the benefit and usefulness of being part of a team and the project in general, and worthiness of time commitment. The project aimed for producers to become self-sufficient in identification of issues, exploration of issues, development of solutions, development of projects, implementation of projects, and assessment and evaluation of the success of projects. The key evaluation questions for the evaluation of R2R were as follows.
 - (i) How well was the project managed and implemented?
 - (ii) What are the outputs, impacts and benefits resulting from the project?
 - (iii) What was the benefit/cost of the project?
 - (iv) How effectively does this extension model accelerate the adoption of sustainable beef practices compared to other current models?
 - (v) How can the R2R model be improved to better achieve practice change within groups and broader industry?
 - (vi) What are the implications (learnings) for future extension programs?
- (14) multi-disciplinary team of staff and consultants to support the producers to make improvements to their business. The R2R team included specialists in extension, land management, nutrition, animal breeding and economists;
- (15) tools were designed by the R2R team to integrate practices (land management, nutrition, breeding, marketing, economics, capacity and family goals) and develop management options for implementation. The R2R team made significant advances to the structure and content of a beef focusing framework (Table 1) originally created by Clark *et al.* (1996). The framework was used to show producers the logic pathways within the grazing system, and to clearly demonstrate the inter-dependence between land condition, animal nutrition, and beef business productivity; and
- (16) the beef focusing framework is a tool that allowed beef producers to recognise the importance of land condition to beef production. The R2R team referred to this tool throughout the property planning process and it assisted in the analysis and integration of development options. The

Table 1. Representative sample of the Research to Reality Project beef focusing framework

Critical success factor	Key component			Examples of practices	
Growth rate	Nutrition	Land and cattle management	Land condition	Pasture	High perennial grass density, wet season spelling, pasture monitoring sites, infiltration, soil fauna, reclaim scalds
				Soil	Infiltration, soil fauna
				Woodland	Regrowth
			Evenness of grazing	Infrastructure	Fences, waters, lick points, grazing system
				Fire	Where, when
				Diet quality	Supplements
		Animal body condition	Sown pastures		Buffel, stylos, rye
				Forage crops	Oats, grain stubble, sorghum
				Intensive systems	Production feeding, feedlots, high input molasses
			Mating management		Timing of joining, joining period, heifer management
				Weaning management	Feeding weaners to achieve good growth rates, segregate on weight/nutritional requirements
				Culling management	ID of non performers, foetal ageing (pregnancy testing) for out of season calves, speying
	Genetics	Animal behaviour		Bullying around feed points, patch grazing, temperament	
			Growth promotants	HGP, rumen modifiers	
			X breeding	Genetic selection and monitoring	
		Health	Bull selection	High growth EBV	
			Chronic diseases	3 day sickness, botulism, Pestivirus	
			Parasites	Internal, external	

R2R beef focusing framework was also used to determine key performance indicators worthy of measurement for monitoring and reporting impact, and was used to educate others outside the beef R, D&E discipline on the complexities of managing a beef business.

Results

Producer knowledge and skills

Project evaluation showed that, although most producers are still in the early stages of achieving enterprise change, there have been significant gains in producer knowledge, confidence and skills associated with enterprise profitability and sustainability. All producers cited at least three practice changes that they are undertaking as a result of the project (Storey and Roberts 2008). The majority of participants named pasture management and rotational grazing changes (incorporation of regular wet season rest), including setting up the fencing and water points to support this, and planning for this, as the changes they had made. Other practice changes were record keeping, strategic breeder supplementation, succession planning, monitoring of land condition and diet quality, use of computer mapping programs, and rehabilitation of scalded country.

Some of the most significant changes occurred in the assessment of land condition and understanding about the practice changes that are necessary for improvement (Storey and Roberts 2008). The quantification of the economic performance of each enterprise has also been a powerful learning enabling

producers to question the economic viability of several long-held practices.

Extension methodology

This project has provided significant insight into the use of a range of extension methods to achieve real capacity and enterprise change. It provided the opportunity for staff to trial a whole-of-business integrated extension approach within a committed and supportive team environment. For the beef industry this project provides an important example of an effective transfer of information model (Storey and Roberts 2008) and importantly provides valuable insights on a new approach for group extension.

What worked?

Design of process

The success of R2R began with its design. A system map (Fig. 5) was created that embedded the CI&I concepts into a project framework. Table 1 provides a representative sample of the beef focusing framework. The framework has three critical success factors; growth rate, reproduction rate, and death rate. Growth rate only is shown in the table for simplicity. Profit drivers for growth rate include: meat productivity, weaned weight and meat production; for reproduction they include: branding rate, reproduction index and mating ratio; and for death rates they include the death rate ratio. Key components for each of the three critical success factors are: nutrition, genetics and health and these are directly influenced by land and cattle management

(comprising of land condition, evenness of grazing, diet quality and animal body condition). Examples of on-farm practices for enhancing growth rate in relation to land condition may include high perennial grass density and wet season spelling, and for evenness of grazing may include new fences and watering points. Similarly, there are practices for enhancing, diet quality and animal body condition.

CI&I ensured decision-making was focused, objective and measured and allowed an adaptive management approach through regular checking and review. It also provided a foundation for project staff and producers to design a range of extension activities to fit the outcomes sought at each major step. These activities included on-property meetings, teleconferences, field days and information sessions. This diversity helped cater for learning styles and maintained producer interest and energy for project activities throughout the life of the project.

Keeping the three producer groups progressing at roughly the same pace helped to strengthen the rigour with which the engagement processes were being applied. Feedback from one group activity could be used to improve the activity for the other groups. This shared experience also helped producers to compare their experiences and what they learnt within and between groups.

Focus on enterprise level

One of the elements of the project that appealed strongly to both the beef producers and project staff was the ability to focus on the beef enterprise in its entirety. This meant that profitability and long-term viability of an enterprise could be considered alongside animal production issues, natural resource issues, and the family and social capacity needs of those involved. The beef focusing framework (Table 1) assisted producers in planning by visually illustrating the relationship between key issues such as land condition and its wider impact on animal nutrition, live weight growth, reproduction rates and overall enterprise profitability.

‘The facilitators weren’t there to tell us what to do – they were there to support us.’ (R2R Producer)

Economic benchmarking

For many producers the economic benchmarking process using ProfitProbe and DPI&F’s Breedcow and Dynama programs revealed new information on how their enterprise was performing. For some producers, this approach was the first time they had looked at their enterprises financial performance from more than a purely taxation perspective. These insights coupled with land condition and production information enabled producers to identify priority areas for further action and investigation. Project evaluations indicate a marked change in the capacity of producer participants to assess the value of new approaches based on sound financial analysis (Storey and Roberts 2008).

Meeting processes

A key step in extending the insights drawn from this analysis was the initiation of a combined meeting of the three producer groups from across the Burdekin region. This involved all producer participants coming together to share and compare information about their enterprise. Through this process

producers questioned each other over their results and developed greater understanding of the impact of different management practices on profitability and resource condition. This process also helped to create a collegial environment and a healthy level of peer pressure and competition.

‘I have a friend who wasn’t in the group . . . they say they wouldn’t bare their souls so much – but its not like that, you become relaxed and comfortable with the people in the group, i.e. with Profit Probe figures – you see that some people are in debt but that doesn’t matter. I enjoyed the group because you are neighbours with people but you don’t really know them – you do something like this and you get to know them on a different level.’ (R2R Producer)

All family members were encouraged to be part of the R2R process as this added to the valuable social and community dimension of the project. This also created a shared understanding within the family unit of the enterprises performance, the key issues that needed focus and, most importantly, the way forward. Many of the producers commented on a change in relationships within the business and family, brought about by a shared understanding of the enterprise and capacity to make shared decisions (Storey and Roberts 2008).

‘Our family looks forward to things a bit more, because we all have a plan we are working on, there is no discussion about what we are going to do, the discussion is the planning part – how we are going to do it, what the benefits are going to be.’ (R2R Producer)

Networks

Increasing producer and project team networks and forming partnerships between organisations or with fellow producers was also an important aspect to the project. The involvement of several internal and external specialists not only ensured access to the most relevant information but also assisted in building better partnerships between beef producers, the government and private sector research, development and extension programs.

Funding

Access to significant funding and resources gave the project the flexibility to source advice across many disciplines. This created a high level of professionalism and project credibility because most of the issues raised by the producer groups could be resolved within the resources and timeframe of the project.

Access to experts

Project evaluation showed that the access to external experts provided a fresh perspective to producers and the team as well as contributing significantly to new skills and understanding (Storey and Roberts 2008).

‘Because we are geographically isolated, it is easy to be mentally isolated. The project is important in bringing people together.’ (R2R Producer)

Producers were able to use the advice of experts to identify, develop and implement their own on property projects. These projects were presented as case studies with information tailored

to suit practical understanding and local application. A series of final project meetings was held for producers to share what they learnt about their on-property projects which other producers who may be tackling similar challenges.

'We feel much more confident with our business now that we feel we know it better. To be able to make more solid decisions without as much guess work.' (R2R Producer)

Formal evaluation

The formal evaluation process was a critical element of the R2R project. Outsourcing the project evaluation design and interpretation ensured evaluation wasn't an 'add on' activity but rather an integral part of the process that staff and producers could contribute to and learn from. Producers commented that the evaluation process complemented the learning process by providing a further opportunity to reflect on what they learnt from each activity.

Discussion

What could we have done differently?

Using a relatively new extension process, across multiple, geographically isolated groups posed challenges for both staff and producer participants. With hindsight, there are several key points learnt that can be used for future extension projects.

Unrealistic timeframes

Unrealistic timeframes can be a significant issue with many participatory extension projects and this was the case here. The team underestimated the time involved to form groups and get them working effectively. This, combined with juggling seasonal conditions and the work schedules of 19 different enterprises, meant the project team and participants were constantly pushed to meet project timeframes. Future projects should invest heavily in group processes in the early stages, accelerating the group forming process and dedicating more time to project development and implementation phases. One way may be to encourage producers to play more of a lead role in coordinating and facilitating project activities. This could be a role whereby a producer is remunerated for administering and organising local group activities. This role could also assist in building group cohesiveness and increasing group ownership of the process.

Formation and development of groups

Several key points learnt about the formation and development of new groups have been identified. The three producer groups in R2R were formed by selecting one or two producers from each of the three sub-catchments who were enthusiastic about the project and asking him/her/them to invite trusted friends to join a group. We thought this process would allow the producers to function as a group more quickly, as they had already established relationships. In practice, this was the case for two groups; however, one group brought unexpected relationship dynamics which were difficult to resolve. Perhaps a wider, more inclusive process, that invites producers to register an interest in forming a group rather than the self-selection process, would ensure positive motivation in joining the project.

Number and range of issues

The number and range of issues revealed through the enterprise analysis process raised some challenges. These included succession planning, establishing improved forage plants, wild-dog or other predator control, heifer management, breeder nutrition, property planning and wet season spelling systems. The challenge for some producers was to identify not only the issues of most interest but also issues that would have the biggest impact on their enterprise. Some producers assisted this process by playing a 'devils advocate/brains trust' role in encouraging colleagues to focus in on the key issues. The level of producer comfort to challenge their colleagues stems from personal relationships and impacts on the functionality of the group. This could have worked more effectively if project staff had additional time to spend on group formation and developing skills to function as an effective group.

Extension processes

Establishing the right mix of group extension and one-on-one process was also a challenge. Once the producer groups had identified their projects, producers required specific assistance to determine how to apply relevant research and development information to their own enterprise. As the producer issues had been pooled and prioritised as a group (based on producer motivation to take action), the project team decided to facilitate a series of field days to access specific research and development information. These field days helped convince people to take the next step; however, they did not eliminate the need for further one-on-one specialist assistance to help design on-property projects. In fact, most participant's 'project design' started with seeking specialist assistance. The challenge for future projects is to provide the social and learning value of the group extension processes while, at the same time, catering for action and application at an individual enterprise level.

Social aspects

Finding the balance between enabling producer groups to build confidence and engaging with media and broader industry was a challenge. Social stories without hard facts and figures have historically been difficult to sell to regional and state-wide media. A more strategic approach to media (particularly local media) could have been taken by engaging with them earlier and involving them in the journey. The question remains of how the broader industry gets the benefits of the project without actually being part of the groups. A series of case studies for distribution to the industries have been produced. Encouraging producer groups to engage with neighbours and local industry about project results is one strategy.

Conclusions

Research to Reality provided three producer groups with the opportunity to tackle practical solutions to animal production and grazing land management challenges. These solutions were developed after in-depth enterprise analysis of the enterprises performance to identify areas for further action and investigation.

For producer participants, this project has been successful in achieving new knowledge, confidence and skills. Project evaluation shows that this has been reflected in management

decisions and actions being taken by producers as well as plans for future implementation of improved grazing practices (Storey and Roberts 2008).

For the project team, R2R provided the opportunity to trial new extension approaches within a committed and supportive environment. Project successes and reflections have provided invaluable learnings for staff to carry over into their broader extension roles. The impact of CI&I and the way it has been applied provides evidence of the process's value to extension practice. It provides a new approach to group extension and is an important example of an effective transfer of information model (Storey and Roberts 2008).

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