FUTUREDAIRY

Multidisciplinary research for innovation
(*lessons from FutureDairy's experience*)
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WORKING IN MULTIDISCIPLINARY TEAMS

FutureDairy's core team brought together a diverse range of disciplines encompassing natural and social sciences. It comprised dairy scientists, extension and social researchers, communication specialists, farmers and farm advisors. Knowledge was integrated from studies in specialist areas of dairy science, animal nutrition, crop and pasture agronomy, extension development studies, and farming systems research.

FutureDairy was the first time most members of the management team had been involved in a project that consciously operated as a multidisciplinary research team.

This Tech Note summarises the key findings from the social research report "*Multidisciplinary Research for Innovation: the Future Dairy Management Group*" (Kaboré 2007). The report highlights the benefits, challenges and lessons learnt by the FutureDairy team, which may be of benefit to current and future projects. The full report is available to interested industry people by request to FutureDairy.

BENEFITS

FutureDairy's multidisciplinary approach delivered benefits to both the industry and the project management team. Benefits to the industry included:

- Development of more relevant and robust management guidelines and practices (eg *Management Guidelines for Complementary Forage Rotation of maize, forage rape and Persian clover*).

- Speeding up the innovation process by including farmers, advisors, extension and social research at the technical research stage of the 'traditional' RD&E process.

- a better understanding of farmer decision-making around technology adoption and adaptation.

- Fostering a sense of ownership in the research by farmers and advisors by providing more meaningful and interesting results about technology outcomes on farms in different dairying regions.

- Informing project planners and investors about the way forward for future dairy RD&E by piloting and reporting on a novel project design.

Benefits to project team included:

- Fine-tuning technical research and identifying potential extension activities as a result of feedback from Partner Farms.

- More relevant research as a result of each discipline providing a unique contribution to the partnership between researchers, farmers and advisors which generated new research questions and ideas for the project to examine.

- Broadening each team member's perspective and insight into dairy farming systems.

Broader Perspective

In conventional research projects researchers tend to have similar interpretations of the research problem and are driven by common objectives and world views. Also, research is usually completed prior to the extension phase.

FutureDairy's research phase involved dairy science, extension and social research and research partnerships with farmers and advisors from the beginning. This enabled the project management team to consider different interpretations of 'success' and 'failure' and helped them understand why farming and advisory professions and research disciplines themselves respond to the same issues in different ways, according to their 'worldview'.

WORKING WITH FARMERS

FutureDairy's multidisciplinary approach involved research partnerships with commercial '**Partner Farmers**' who either implemented a complementary forage rotation (CFR) on their farm (Forage Partner

Farms) or aimed to increase milk production per hectare by 30-50% (Feeding Partner Farms).

Our social researchers tracked the experiences of four Partner Farmers. The results and feedback became a catalyst for further discussion, debate and response by the FutureDairy team.

Some of the general issues to emerge from working with Partner Farmers include:

- The influence of inter-generational differences on level of engagement by farmers with the project.
- The differences in risk perception among farmers, advisors and technical researchers and how risk perception influences farmers' decisions.
- The role of tools such as technical monitoring and seasonal calendars to facilitate effective dialogue between farmers and researchers.

Forage Partner Farms

Examples of issues raised included by the Forage Partner Farmers included:

- The impact of reallocating farm labour to manage the new CFR.
- The farmer's need to move beyond our original question "Can I grow 40 tonnes?", to "How does this fit into my whole farm system?"
- The flexibility required around the timing and methods of sowing and harvesting.
- The likely impact of limited resources on the potential for adoption of CFR. For example, farm labour, lack of machinery, inadequate local contracting services and the need and availability of one-on-one technical support.

Feeding Partner Farms

Feedback from the Feeding Partner Farms highlighted to the project some of the issues that affected farmers' decisions around productivity and interpretation of farm performance.

For example in both cases, family-oriented motivations were driving farm business goals and planning. A mismatch was revealed between the way researchers measured farm performance compared to the way farmers assessed performance.

While Return on Assets was an important indicator of farm performance for advisors and researchers, the farmers' regarded this economic measure as relatively

meaningless because it was not a key motivation in their decision making.

FutureDairy's extension and technical research analyses of farm performance highlighted pasture utilisation as a major driver of operating profit on the Partner Farms. Social research highlighted concern felt by one farming family about altering grazing management to address pasture utilisation, and the underlying reasons.

A misalignment between farmer expectations compared with the project's emerged through the combined analyses of extension and social research. The key lesson for the project was that clarifying expectations with farmers from day one is paramount!

Automatic milking

FutureDairy's approach to labour studies in automatic milking systems (AMS) is an example of how mixed research methods can work effectively. In the case of AMS, technical and social research overlapped to provide valuable insight without increasing the complexity of the project.

The labour audit studies were carried out at the AMS farm at EMAI and at Warren's commercial AMS farm at Winnidoo, Victoria.

Quantitative studies carried out by the technical researchers included weeklong periods of labour auditing.

This research was complemented by qualitative studies by social research, which asked questions about the changes in the nature of the work tasks and the benefits for the 'work life balance' for staff in an AMS compared to a conventional dairy system.

CHALLENGES

The multidisciplinary approach created challenges for the FutureDairy team, right from the very outset of the project.

Achieving a successful multidisciplinary research proposal required significantly more negotiation, effort and time than a proposal involving a single discipline.

For the Partner Farms, there was a natural overlap between the technical research and extension roles, and between social research and extension areas of study.

This made setting research boundaries tricky. Some of the initial decisions about boundaries and roles did not make the best use of the multidisciplinary resources of the project team.

Negotiation and clarification of aims for the respective studies is required to clearly define the roles and boundaries for each discipline.

In the FutureDairy management team, different disciplines interpreted research issues in different ways. This made finding consensus on key issues difficult.

Managing researchers from very different disciplines was demanding on the project leader. Major decisions about the direction of multidisciplinary research took a lot of time and effort to accomplish.

A facilitated, formal process for negotiating major research decisions was an area that required further attention. Communication and data management by the team also stood out as areas for improvement.

LESSONS FOR THE FUTURE

FutureDairy's experience suggests that the benefits from a multidisciplinary approach will increase with a more informed approach to project planning, team culture and project management.

Project planning

The multidisciplinary approach should be integrated into the project planning process, from the outset.

Program objectives and research questions must be of sufficient scale and significance to engage each of the disciplines.

Research priorities must respond to these objectives and questions in a way that is valued by the other disciplines.

From the outset, there needs to be agreement on the boundaries of specific activities – are they primarily related to just one discipline or multidisciplinary? However, flexibility is needed to negotiate roles and boundaries on an on-going basis.

Team culture

The project team needs to operate with a culture of respect for each other's expertise, and interest in learning about, the different 'world views' of each discipline.

The ability of individuals as 'team players' should be a key consideration in selecting project team members at the outset.

The team also needs to be open to building a common language while accommodating some specific disciplinary terminology (jargon). To achieve this, results must be accessible to other disciplines. The key tool for

this is a common records management system for multidisciplinary data.

The team needs to agree on formal protocols for data collection, communication and conflict resolution.

Investment in formal team training early in the project encourages the emergence of value, trust and respect among team members.

Project management

A multidisciplinary project relies on robust project management. But this doesn't imply more structure and formality. What is required is greater flexibility to allow different disciplines to negotiate expectations, rather than have them imposed.

Management protocols must be able to accommodate disciplines both working on their own and collaboratively to develop integrated knowledge outcomes.

A multidisciplinary approach requires additional time for, and willingness to learn about other disciplines, their world views, theories and jargon.

There is a need to explore and negotiate boundaries and roles, and to be updated on team members' results and progress. This additional time requirement should be built into the project's schedule.

Leaders of multidisciplinary projects are required to manage the expectations of very diverse investors. Clarifying expectations about project goals, timelines and deliverables is a particularly crucial step in any multidisciplinary project. This requires consultation with, and participation by, all levels of stakeholder.

It is suggested that to facilitate this, a formal process needs to be implemented early in the project which consults with all stakeholders such as the project Steering Group (which represents the major investors) the research team and the potential collaborators and partners in the target research, farming and advisory communities. Developing a participatory program logic would be a useful approach.

For more information

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About FutureDairy

FutureDairy aims to help Australia's dairy farmers manage the challenges they are likely to face during the next 20 years. The challenges are expected to be related to the availability and cost of land, water and labour; and the associated lifestyle issues.

Our activities are structured around three priority areas – **Forages, Feeding and Innovations**. These are where there are opportunities to address the challenges related to water, land and labour resources.

FutureDairy's approach is unique in that our work considers Science, Systems and People issues. In addition to conducting trials on research farms (Science), we explore how our findings work under commercial conditions on Partner Farms (Systems). We also use social research to help understand the social issues (eg labour, lifestyle and practical implications) involved in taking on new practices and technologies (People).

Our **Forages** work is all about producing more home-grown feed from the same area of land. We are investigating the potential to concentrate resources (water, fertiliser and management) on the better ground. Our target is to produce more than 40t DM/ha/yr in a sustainable way. To achieve this we are trialling a 'complementary forage rotation' based on growing three crops a year:

- a bulk crop (eg maize);
- a legume for nitrogen fixation (eg clover); and
- a forage to provide a pest/disease break and to improve soil aeration (eg a brassica).

Our **Feeding** work is researching if it is more profitable to use extra bought-in feed to feed more cows (ie increase stock numbers) or to increase production per cow.

FutureDairy is investigating a number of **Innovations** that could improve farm efficiency, labour management and lifestyle. We have a major study on automatic milking systems (AMS), the obvious labour saving innovation. We are adapting automatic systems to be profitable and suitable for Australia's pasture-based, large herd situation.

We are also studying innovations that allow precision farming without increasing labour needs. Some examples include remote sensing of animal function and pasture status, and the use of video cameras to monitor paddock activities (eg calving) remotely via a computer.

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