Farmer-Led On-Farm Trials – Problem or Solution?

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Abstract

Over the last 10 years, farming systems research in Australia has become increasingly participatory, with grower groups obtaining funding to run trials on local issues. This study reviews the processes, learnings and impacts of farmer-led participatory on farm trials (POFT) in the grains, wine-grape and sugar industries, using evaluative inquiry and action learning methodologies. A review of "grey" literature against a framework has raised questions about the rigour of trial design and reporting processes in both the grains and wine-grape industries. The sugar industry is less developed along the pathway of farmer-led research. Farmer-led on-farm trials cover a range of activities, and have no one set way of implementation. The important starting point to participatory on farm research is defining and developing a shared mental model. The capacity building in communities associated with on farm trials is important to the success of the on farm research.

Media Heading

Farmer-led participatory on farm trials are a recent phenomenon in rural Australia. The scientific and extension processes sometimes lack rigour, but the community capacity building needs to be recognised and valued.

Keywords

Participatory, on farm trials, grains, wine, sugar, capacity building, rigour, relevance.

Introduction

In 2003, the joint venture for Cooperative Venture for Capacity Building and Innovation in Rural Industries funded a project studying 'Participative evaluation of learning and impacts from "Farmer Driven RDE". The objectives of the project are to work with pro-active farmer groups to enhance the design, implementation and evaluation of farmer driven research, development and extension (RDE) by:

- Reviewing activities and developing recommendations to improve processes, learning and impacts;
- Validating the recommendations by working with researchers and farmer groups who have adopted these recommendations.

Petheram and Clark (1998) reviewed farming systems research in Australia and observed that there was little uniformity in approach between groups undertaking systems RDE and little evidence of reference to past learnings and experiences in systems research. They provided strong argument for participatory research approaches as the appropriate methodology for such research efforts. Similarly, 33 case examples of tools used in participatory RDE in Australia were collated by Petheram (2000) and suggested that little information on participatory tools and farmer learning processes had formally been reported in Australia.

The research undertaken in the current study originated from papers presented at the 10th Australian Agronomy Conference focused on farming systems research and participatory RDE processes being undertaken in Australia in the Australian grains industry (www.regional.org.au/au/asa/2001/). Of particular importance are Carberry's (2001) critique of participatory RDE in the grains industry and McClelland and

Eyres (2001) description of the farmer-driven RDE activities of the Birchip Cropping Group. The research project includes case studies from the grains industry, high value intensive horticulture (the wine-grape industry), and the sugar industry. Each of the participating industries has developed, or is in the process of developing, a participatory on farm trials (POFT) process. Evaluation of the co-learnings and cross fertilization between the farmer groups and the industries who participate in this process and those that don't will enable identification of elements crucial to the success of the on-farm trial process, and to the viability of the appropriate industry.

Four different groups of farmers from three industries (grain, sugar and wine-grape) are participating in the project. The groups cover geographically disparate regions of Australia. The HCL Harvesting group, representing the sugar industry is located in the Burdekin in North Queensland); the Birchip Cropping Group is based in the Wimmera-Mallee area in Victoria. The grains based Conservation Farmers Inc is situated in northern NSW and the wine-grape industries' On Farm Trials group is in Sunraysia.

Methods

This inquiry concerning farmers undertaking or sponsoring research assumes two realities. The first is that the farmers' research perspective is (properly) radically different to that of scientists. Farmers are primarily concerned with economic survival, and seek practical answers to local issues. Scientists with secure incomes who are free to pursue knowledge for knowledge's sake don't always consider the farmers' frame of reference when developing solutions to a problem. The second reality is that we have observed that farmer research, which is effective from their perspective, is put at risk by failure to adhere to basic practical 'rules' that strongly influence veracity of outputs (and farmers realise this)(Carberry, 2001). This second reality assumes a need for a research process that results in findings that are both practically meaningful and scientifically sound – as well as being affordable. To address both these realities requires an approach that draws on and balances two social paradigms – an interpretive paradigm centred on a farmer's perspective of the activity of 'research' and a functionalist paradigm centred on techniques aimed at avoiding errors and which capitalises on the stock of research experience and principles that exist in the research community.

The primary method of the project is evaluative inquiry (Preskill and Torres, 1998). A 'menu' for such interaction has been provided by the results of an initial survey using a formal questionnaire of farmers' research experiences and their expectations of research. In successive meetings, through dialogue, reflection, and questioning, the values, beliefs, assumptions, and knowledge about field research and its relation to good farming have been and will continue to be identified and clarified. By this method relevant plans for joint action will be formulated.

The launching of new joint tests of innovations on appropriate research methods has brought into play a second methodology, action research. Action research can be defined as "production of knowledge that guides practice, with the modification of a given reality occurring as part of the research process" (Oquist, 1978, Carberry 2001). This approach acknowledges that science can not research the management of agricultural systems without meaningful participation of systems managers.

Each of the farmer groups participating in the research project is working with a facilitator, who is either employed by the group or provided to the group through industry funding. We have established a "Co-Learning" group of these people. The objectives of the Co-Learning group are to compare and contrast the processes used for identifying research questions, designing trials, reporting on results and adoption of trial recommendations within the communities serviced by each of the different grower groups. Members of the Co-Learning group will trial the recommendations that we establish through the process. Co-learning will result in a shared mental model about on farm research processes between the participants. Developing a shared mental model will enable us, the researchers, to advance our understanding of how farmer groups make effective decisions about on farm research in dynamic, complex and often ambiguous situations (Cannon-Bowers et al, 1993; Klimoski et al, 1994; Mathieu et al, 2000)

Two workshops have been held with the co-learning team, and each case study group has been visited at least once by the researchers. The workshops have involved a process of information sharing about group and research evolution, answering the following questions:

- What has been done in your industry or group in terms of farmer-driven RDE?
- What does success look like to your industry?
- What has worked?
- What hasn't?
- What concerns do you have about the process (e.g. the science, the rate of adoption)?

Results

The three case study industries represent a continuum: from the "young" Wine-grape industry, with many new entrants, knowledge hungry and passionate about their product, just facing up to the realities of over-supply and price decline; to the "middle-aged" Grains industry in which growers know that their survival depends on maintaining global competitiveness and sound natural resource management; and to the "over-mature" sugar industry that is changing from being a secure and affluent industry to one that is undergoing a massive restructure in the face of declining global competitiveness, and under increasing pressure to demonstrate sound natural resource management.

The first co-learning workshop (September, 2003) established that there are two "models" for on farm research "bottom up", exemplified by the Birchip Cropping Group, and "top down" embodied in the Wine-grape Industries' Viticare On Farm Trial Project. POFT in the sugar industry is less developed than the other two industries.

The BCG began in 1992 from local frustration with the failure of traditional government agencies to meet grower research requirements (Gartmann, 2003). The group has successfully attracted research dollars from Grains Research and Development Corporation, and other sources. There has been strong emphasis on community capacity building and the development of infrastructure, as well as on research. It has become a model for other grains based communities.

As part of the research process, we are seeking answers to the following questions: are the cropping groups' mimicking traditional government research structures? What are the advantages to the grower in the new science being undertaken by a grower group (– e.g. subsoil constraints) over a traditional research institution doing the work? What changes in agricultural practice have been seen in the district that can be attributed to the research undertaken in the group programs? What is the job satisfaction for the scientists / facilitators and how does staff retention compare to staff retention in the public sector?

The CRCV Viticare On Farm Trials began in 2000 with the premise of teaching farmers to be scientists. This national program has concentrated on providing farmers with the tools to validate existing research. The national facilitator in association with scientists and statisticians has developed "Recipe Trials" – well designed trials on specific topics. Growers identify a research issue from the trial manual that is relevant to them, and undertake the research in association with the local facilitator. New research questions are referred to institutionally based scientists. To date, there has been little emphasis on capacity building, although it has been an important and undocumented part of the process (Natalie Laukart, pers. comm.). Questions that have arisen from our reviews of this work include: does the recipe approach mean that new ideas are discarded at inception? How do the viticulturists view the "recipe" approach to science?

A review of on farm trials has been undertaken for each of the participating industries. A framework was adopted against which the available trial results were evaluated. The framework examined:

Identification of the research question	▪ What is the rationale for the trial? ▪ What do we already know (review of literature)?
Design	▪ How to deal with variation between sites and seasons? ▪ What role for replication and randomization?

	▪ How will the trial be analysed?
Implementation	▪ What is data collection protocol? ▪ Analysis and Interpretation ▪ Can the design deal with unexpected results? ▪ Will the influence of site and season be accounted for? ▪ What role statistics? ▪ Will results depend on speculation? ▪ Does data support conclusions? ▪ What check on rigour (e.g. peer review)?
Extension	▪ What is the main message?

Several publications of grains-sponsored on-farm research (e.g. the GRIST manual – an annual summary of research conducted by grower groups) and wine-grape research have been evaluated against these criteria. While improvement in rigour was noted in the recent grains publications, some issues remain, for example:

- reported trials where conclusions were not supported by trial results;
- trials addressing similar issues concluding opposing recommendations;
- lack of experimental error quantified;
- lack of base measurement of site characteristics.

The wine-grape industry has reported their research in the web-based Viticare News. Reporting has been anecdotal, focusing on trials that have been undertaken by different groups, rather than discussing the science, the results or the conclusions.

Capacity Building through Research Activity

The process of interactive inquiry has identified that this project will build capacity with both facilitators, scientists employed by groups and group employees – both facilitators and scientists. Qualitative evaluation of the workshop process has shown that the facilitators and scientists working with or for grower groups have benefited greatly from sharing their experience with colleagues. It has provided an environment in which experiences of working with groups can shared and reflected upon in a supportive environment. Anxieties about “am I doing this job the best way possible” have been aired, and different ways of working with their groups proposed.

There is a need for the capacity building aspect of participatory on farm trials to be recognized, rewarded and formalized by funding bodies sponsoring participatory on farm research.

Conclusion

The participants at the two workshops associated with the project have reached the following conclusions:

Participatory on-farm trials cover a range of activities, and have no one set way of implementation. There is no recipe, rather, it is a work in progress and the nature of the trial depends on the context in which it is set. On Farm Research may be either formal or informal. While the latter is not necessarily wrong, the former may be and requires critique. It is important to be discerning in a review process. The important starting point to participatory on farm research is defining and developing a shared mental model between participants.

The next part of the project will see development of a typology for on farm research that embraces context, and outlines the processes and approaches that need to be taken to ensure that research is both rigorous and relevant. The definitions of what on-farm research should be will be improved. This process will include identification of how much of the on-farm research in the study groups is validation of existing

knowledge or generation of new knowledge; and understanding what balance between research rigour and commercial significance is required for on farm research to be useful for farmers in the case-study groups.

References

Cannon-Bowers, J. E., Salas, E., and Converse, S. Shared Mental Models in Expert Team Decision-Making. in Individual and Group Decision-Making: Current Issues, J. Castellan, (ed.), Lawrence Erlbaum Associates, Hillsdale, NJ, 1993.

Carberry, P.S., 2001. Are science rigour and industry relevance both achievable in participatory action research? Agricultural Science, 14:22-28

Gartmann, A. (2003) The Birchip Cropping Group – collaborating for sustainable systems. Proceedings of the 1ST Australian Farming Systems Conference, Toowoomba, Qld.

Klimoski, R. J., and Mohamed, S. .Team Mental Model: Construct or Methaphor. Jnl of Management (20), 1994.

Mathieu, J., Goodwin, G. F., Heffner, T. S., Salas, E., and Cannon-Bowers, J. A. .The Influence of Shared Mental Models on Team Process and Performance. Journal of Applied Psychology (85:2), 2000, pp. 273-283.

McClelland, I. And Eyres, A., 2001. Farmers determining their own destiny. Proceedings of the 10th Australian Agronomy Conference (Australian Society of Agronomy: Hobart, Tas.)?

Oquist, P. (1978). The Epistemology of Action Research. Acta Sociologica 21, 43-163.

Petheram, J.R. (ed.) 2000. Tools for participatory R and D in dryland cropping areas. RIRDC Project No. UM38A.

Petheram J.R. and Clark R.A. (1998) Farming systems research: relevance to Australia. Aust. J. Exp. Agric., 38, 101-115.

Preskill, H. and Torres, R. (1998) Evaluative Inquiry for Learning in Organizations. Sage: Thousand Oaks, CA.