# Participatory research for agronomy: the New Zealand experience

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## Abstract

In New Zealand the need to develop research partnerships between scientists and farmers is reinforced by the need to incorporate evidence of partnerships in bids for most research funding. An on-going project funded on this basis 'Science for Community Change' involves the authors working with six different production systems to assist the adoption of more sustainable land management practices. A recent component of this work involved detailed analysis of collaborative efforts and detailed field surveys of 29 scientists and growers in two case studies: (1) wheat production in Canterbury and (2) organic kumara (sweet potato) production on the East Cape. The aim was to identify how best such partnerships might be facilitated to promote knowledge sharing. Many issues that emerge were common to both research projects, including the need for mutual commitment; the need to incorporate local forms of knowledge; and the need to engage with existing farmer groups. Importantly, the work highlights the challenges faced by the scientists themselves, including the time and skills requirements involved and the constraints on their career development till their all science institutions properly incorporate these features into their reward systems.

## Key Words

Sustainable landuse, farmers' groups, role of science.

## Introduction

For a long time agricultural knowledge was disseminated by variations of the transfer of technology model, whereby experts created knowledge, considered universally applicable, and disseminated it largely verbatim to what were assumed to be grateful farmers. Over the past 30 years dissatisfaction with this model has increased (e.g. Vanclay and Lawrence 1995), catalysed in part by critiques of positivist science (Latour and Woolgar 1979) and by new ideas around who research should serve (Fals Borda 2001). This has encouraged the development of many alternative models of research, with a majority of these promoting greater collaboration between researchers and their intended beneficiaries. Broadly encompassed by the term 'participatory research approaches' more collaborative research has received considerable attention in the agricultural sciences, and the use of participatory methods is increasingly seen as 'best practice' especially in complex, uncertain research environments, such as for sustainable agriculture. New Zealand's governmental science funding body, the Foundation for Research, Science and Technology (FRST) increasingly requires evidence of end-user participation in all phases of research. Science for Community Change, funded through FRST, involves six different case studies designed to assist in the adoption of more sustainable land management practices. Science for Community Change is a collaboration between social scientists from the University of Auckland and scientists from Crop and Food Research (CFR), a government-owned commercial science provider.

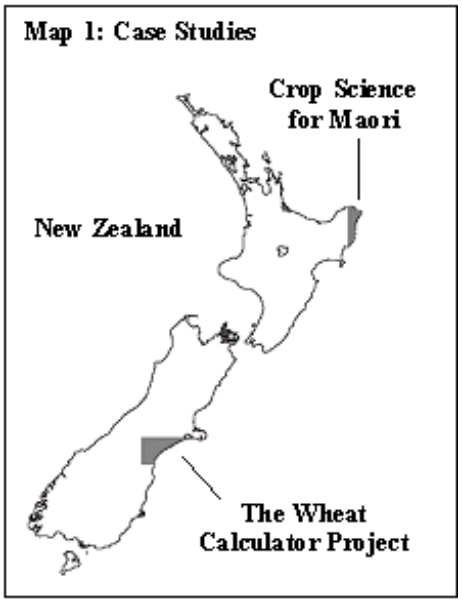
### *Case Studies*

Science for Community Change examines research collaborations between scientists and farmers around New Zealand. This paper the describes the results of a detailed analysis of two of these systems, wheat production in South Canterbury and organic kumara (sweet potato) production on the East Cape (see map 1). The paper is informed by 29 semi-structured interviews with farmers and scientists carried out

during August and September, 2005 and is further supported by an extensive review of the literature pertaining to agronomy and knowledge transfer. While both these cases studies involve participatory research approaches aimed to increase the sustainability of cropping operations, they embrace very different social and economic contexts.

*The Wheat Calculator*

The first case study concerns wheat farming on the Canterbury Plains, where many large, highly mechanised wheat farms produce a large proportion of the national wheat crop. While this area is amenable to wheat production with high soil fertility and a favourable climate, it is also susceptible to nitrate leaching. As Canterbury's aquifers provide drinking water to a large population, including the city of Christchurch, their preservation is a priority especially as landuse on the Plains intensifies through increased dairying and fertiliser applications. One attempt to decrease nitrate leaching to groundwater involves the development of a decision support system for wheat farmers called the Wheat Calculator. This innovation is not in itself a product of participatory research but a participatory approach has been used to refine the Calculator to better meet farmers' needs. Based on 20 years of research by CFR scientist Pete Jamieson, the calculator aims to optimise the timing of fertiliser and irrigation applications with respect to the physiological demands of various wheat cultivars. The calculator allows identification of the optimum nitrate application required and so should reduce the amount of excess nitrate in the soil available for leaching, and affords significant potential savings to farmers through reduced expenditure on fertilisers. In 2001, a project was established to transform the wheat calculator from a scientific model into a "farmer-friendly" software programme for use on farmers' home computers. The Wheat Calculator project involved a partnership between a team of scientists and software designers from CFR and a compulsory levy-funded arable growers association, the Foundation for Arable Research (FAR). FAR advertised for farmers willing to participate and selected 20 local wheat growers who were given the software, trained in its use and asked to feedback their recommendations regarding how to make the calculator more relevant and accessible to farmers.




*Crop Science for Māori*

The second case study involves an ongoing project in which a science team provides agronomic advice to assist Māori landowners attempting to develop commercial organic vegetable production on the East Cape. Māori land has traditionally been underdeveloped, with many iwi (tribes) historically relegated to remote areas of low agricultural value. Māori are generally more "deprived" than Pakeha (white) New Zealanders on a range of socioeconomic criteria (Crampton *et al.* 2004). Consequently, many

government initiatives focus on improving economic and social outcomes for Māori and development of Maori land is increasingly seen as important toward meeting this goal. Initiated in 2003, ‘Crop Science for Māori’ centres on a partnership between CFR (based in Hastings) and a local growers' organisation, the East Coast Organic Producers Trust (ECOP), which aims to develop the many small-scale cropping operations in the region into a profitable organic industry. To this end, CFR scientists provide agronomic advice to growers through a range of interactive activities, such as hui (formal meetings), workshops, trial plots and field days.

**Discussion**

In conventional terms, at least, it is premature to assess the success of both case studies, and indeed while increased farm income and/or increased area cropped might be assumed as measures of success by most producers both case studies were identified as vehicles for the transfer of improved environmental practices.

In the case of wheat, FAR believes that by 2005, the Wheat Calculator (or the principles on which it is based) had influenced the practice of 60 percent of New Zealand wheat growers and was already saving farmers approximately $6 million (NZ) in fertiliser expenditure and increased productivity. In the case of Maori organic production measures of progress are much less clear-cut. Some increase in area cropped has occurred, but while sales (and income) do appear to have increased somewhat, data are at best patchy and incomplete. What is clear, however, is that in both case studies the participants (farmers and scientists) believe the process has worked and provided the basis for longer-term progress.

In each case study, participatory research approaches have allowed agronomic expertise to be tailored to the economic and social conditions of the local area. Respondents from both cases contend that the flexible, negotiated methodologies applied were wholly necessary in enabling them to achieve positive results. For example, before farmers would commit their time and energy to the Wheat Calculator, they had to feel that it would further their farming goals. This was ensured through long-term negotiation with participating farmers (both directly and through FAR) as to the form and focus of the project. Likewise, in Crop Science for Māori, an extended trust-building period marked by frequent meetings was necessary to overcome the mistrust of researchers amongst the growers. Had a more conventional methodology been followed in either case, it is difficult to envisage how the requisite trust between scientists and farmers to allow for a productive and mutually beneficial research partnership would have been generated.

However, predictably, successful research partnerships require more than methodological flexibility. Several conditions had to be met. The first was that each party was demonstrably committed to the research project. Mutual commitment allowed both parties to invest their time and energy into research without fear of the project stalling due to the other’s disinterest. Evidence from this study suggests that commitment is contingent on each party feeling that the research will contribute to their goals. This requires careful planning and negotiation of projects both before and during research. Farmers must feel that their personal goals are addressed by the research before they are likely to contribute their time to the project. Farmers in both cases studies stressed that they had little desire to participate in research that contributed to an abstract body of scientific knowledge, nor were they interested in research that solely advanced the careers of scientists. However, while recognition of and provision for farmers’ goals is fundamental to the success of participatory approaches, it is also important to recognise the goals and requirements of the scientists undertaking such research. Too often the wider literature on participatory approaches has failed to address this perspective. Interviews with the scientists involved revealed many disincentives to their undertaking a participatory approach. Perhaps most importantly, the nature of such approaches often means that they are less likely to produce novel, publishable results, particularly in a scientist’s own specific disciplinary research field. Consequently, many scientists question whether involvement in such research is a wise career move. Careful consideration and planning for the goals of each party is essential to realise mutual goals and commitment to participatory approaches.

The second condition critical when undertaking participatory research is the incorporation of local forms of knowledge. Agronomic research has been highly beneficial in each of the case studies examined and has added significant value to two different cropping operations in two very different contexts. However,

inherent in participatory research approaches is recognition that "expert knowledge" is not the only relevant form of knowledge. In the Wheat Calculator, farmers' input was essential to integrate wheat physiology into the software programme. Similarly, scientists working with Māori soon realised that there was a wealth of traditional knowledge in the community about vegetable production, and that most Māori growers were determined to build upon this knowledge, rather than simply replace it with technical knowledge.

A third factor that emerged as a key to the development of successful research partnerships is the importance of research scientists engaging with (and working through) farmer groups. In both case studies, farmer groups provided clear research partners for CFR, supplying motivated research participants and helping guide the research agenda. Furthermore, in the case of the Wheat Calculator, FAR were the only respondents to specifically raise the issue of the environmental benefits of the calculator. As FAR noted, wheat farmers are unlikely to view their individual contributions to a chronic, diffuse-source pollution problem as a major concern. Such problems need to be addressed at a collective level, and farmer group such as FAR provides an ideal platform through which environmental concerns can be addressed, while still furthering the goals of individual farmers. As R?ling and Pretty (1998: 10) hold: 'All successful moves to more sustainable agriculture have in common coordinated action by groups or communities at the local level.' Moreover, by lending their credibility and appreciation for farmers' needs to a research project, farmer groups can facilitate the development of a productive research partnership much more quickly than scientists attempting to directly recruit individual farmers.

**Conclusions**

Analysis of these two case studies reveals that flexible, adaptable research projects carried out by dedicated scientists and effective community groups present perhaps the only viable methodology for improving the sustainability of different production systems in complex, uncertain environments. However, while participatory research approaches have gained much purchase within governments, universities and science-funding bodies in recent years, several factors still constrain the potential of such approaches to realise better outcomes for communities and scientists. These are now well documented, and include: frequent overestimation of the ability of participatory approaches to realise immediate change in a given local context (Neef 2003); a lack of evaluative methods recognisable to funding agencies (Murray 2000); and concerns regarding the limits and biases inherent in local forms of knowledge (Cameron and Gibson 2005). However, major barriers to the more widespread application of participatory approaches also include the continued disincentives to scientists to undertake such research. The increased application of the participatory approach, is contingent on the agencies that employ scientists collectively modifying their reward structures to encourage scientists to undertake such approaches. As long as the publication of novel science in specialised journals remains the sole determinant of scientific credibility, many scientists will be reluctant to enter into research which is less likely to yield novel, publishable results. Rather than having their career prospects diminished, scientists who undertake participatory research need to have this research recognised by their peers, employers and ultimately by the global community as a valuable contribution to social development and equally, as a legitimate role for science and scientists in the 21st Century.

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