



## ARGOS RESEARCH NOTE: NUMBER 2, OCTOBER 2004

# Transdisciplinary Research

### A meeting of minds ... and disciplines

The ARGOS research programme must combine economic, social and environmental considerations if it is to pinpoint the effects of different management systems like organic, integrated and conventional farming. Every day farmers have to juggle all aspects of growing food or fibre, their family's needs and their economic returns. So the same goes for the scientists and farm managers in the ARGOS team – they will have to come out of their specialist corners, learn each other's language and methods, and set their minds to work collectively to best help farmers and New Zealand Agriculture. We call this joint approach 'transdisciplinary'. It is going to be hard to achieve, but it is essential and it is an exciting challenge.

So what can we do to achieve better transdisciplinarity? This ARGOS Research Note summarises some of our strategies and how this includes input from farmers.

### Breaking down the 'outside-expert-knows-best' attitude

Traditional science analyses things into separate parts in the belief that studying the detail helps understand how the world works. This has led to separate university academic disciplines and departments. Scientists have considerable influence and specialists who concentrate on learning a lot about a very narrow field are often given the mantle of 'experts' to be called in to solve a particular problem. Detailed research and knowledge sure helps, but unfortunately narrowing of knowledge can sometimes lead to 'the boffin' not seeing the bigger picture. ARGOS can not identify practical solutions for farmers if it just studies small parts of the puzzle to death. An innovation that might assist environmental sustainability will not last long if it sucks the bank

balance dry, or if it doesn't fit the farming family's vision for their land.

A new way of doing science involves all the different stakeholders and brings ideas of ordinary people into the scientific process to jointly identify farming problems and opportunities. This not only avoids controversy, it is also likely to find lasting practical solutions that make sense to the key group – the farmers themselves. Transdisciplinary research defines problems broadly, complex problems are addressed, people are included and there is mutual learning among the specialists and others involved.

The lesson here is that farmer input is an important part of our research by grounding it in reality. Farmers have valuable local knowledge, often based on years of family learning on their own patch. It is important to give attention to how people attach meaning to things they have experienced on their own land. In contrast, the traditional science approach tends to simplify complex problems, ignore local ecology, omit the social component, and give too much importance to the scientist as the best source of a permanent solution.

On the other hand, scientists can bring external perspectives and have had time to study important forces acting beyond the farmers' gates that can affect their livelihoods. For example, the ARGOS team will be enhancing the 'Lincoln Trade and Environment Model', a big computer simulation package that can predict the affect of a change in market policy in Europe might have on a local sheep/beef farm profits or its long-term land use capacity. The mix and team work makes for a productive partnership of scientists, farm advisors, sociologists, ecologists, economists, industry representatives and farmers.

We know that farmers are busy people – so we will try to keep our impositions to a minimum. But we need some sessions to hear their views. For example, how do farmers see the non-productive parts of their farm? Are they still a resource that is managed for other goals, such as biodiversity? How do farmers define sustainability and how best can we help them achieve it?

### **Taking an agroecosystem view**

Another key to transdisciplinary research is awareness that complex problems and their solutions are part of a 'system'. Included in that system are humans with all their thoughts, beliefs, interpretations and models about what is going on. This is not just about studying people as merely a clip-on to the farming system – instead people's perceptions are the reality and definition of farming! This differs from the traditional approach which assumes that there is an objective system independent of the farmers, and that the present state can be changed into an 'ideal state' if it is just managed 'correctly'. The ARGOS team does not seek to prescribe ideal farming approaches, nor make some cut and dried judgement of whether it is sustainable or not. People define sustainability in so many different ways anyway. Farmers differ, so these models need to be debated, the issues addressed, and practice adapted, but never in some final way and always with farmers at the steering wheel.

### **Sustainability: more a journey than a destination**

Transdisciplinary theory tells us that process is more important than goals for people managing complex adaptive systems. The journey involves evolution of ideas, interaction and communication, giving change a go and then monitoring whether it worked out or not – a collective learning effort.

The big question is how to manage the economic, social and environmental dimensions of farming at the same time and in a sustainable way. We will compare conventional, Integrated and organic management systems to learn the relative costs and benefits of different approaches. Also, by studying dairying and kiwifruit (high input - high output farming), sheep/beef production on plains and low rolling hill country (moderate input - moderate output) and High Country sheep/beef (low input - low output) farming we can compare lessons across a broad range of intensification. What works in one sector may not for another. The farm

management expertise from the Agribusiness Group within ARGOS sets up a creative tension between management and research parts of the team. Our study of Maori land use adds another dimension of variation and experimentation to hasten our learning. Comparisons within and between farming systems and sectors, between the management and research cultures, and between Māori and Pākehā experiences all aid learning and encourage working across disciplines.

### **Forming the team**

ARGOS's Academic Research Committee meets about once per month to evaluate results and set directions. Each objective leader contributes from their own discipline but also debates outside their disciplinary area. Twice yearly meetings of 'Sector Oversight' committees bring industry representatives and researchers together to evaluate overall progress and work priorities. The farmers are mainly involved by meeting and guiding researchers coming to their homes.

ARGOS is developing a computer database to hold all the data from the separate parts of the research. That will enable us to find links between different disciplines at the push of a computer button. For example, we can use the database to ask: do farms with a certain rainfall and altitude, high returns, and with integrated management, have more earthworms than those on farms with organic or conventional management?

### **Looking Forwards**

We cannot possibly predict what farming will be like in 50 years or what pressures farmers will then face. But we are dedicated to helping the land, the farmers and their families to remain strong so they can go with the changes and withstand new pressures. We hope that ARGOS can help our farmers to become more 'native to this place' by combining production and environment goals in ways that are socially and economically acceptable. Transdisciplinary research will be essential for reaching this goal.

This Research Note by: **John Fairweather** and **Henrik Moller**

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For further information, please contact:

Martin Emanuelsson, Programme Manager,  
The AgriBusiness Group,  
PO Box 4354, Christchurch.  
Ph: 03 365 6808  
Email: martin@agribusinessgroup.com