

# CONTROLLING THE RESEARCH TRAFFIC

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## **Introduction**

The Land and Water Resources Research & Development Corporation is concerned with improving the long-term productive capacity, sustainable use, management and conservation of Australia's land, water and vegetation resources. This charter is very similar to that of many organisations dealing with agriculture and natural resources, reflecting a generally accepted view about the importance of managing our productive resources in a sustainable way. It also reflects that there is a complex web of many organisations and institutions dealing with common issues and resources, albeit from different perspective, and suggests the need for coordination and cooperation so as not to waste limited resources. Unfortunately, the environment under which all these organisations and institutions operate is constantly changing. While this is a constant source of frustration for researchers and advisory staff, it is an unavoidable consequence of the broader debate about what constitutes private and public benefit in relation to resource management. It will be some time before this debate is through, but in the meantime some important directions are emerging which will impact on the place of agricultural research, including controlled traffic research, and extension in future.

## **Sustainability Context**

Sustainable agriculture is defined by the Standing Committee on Agriculture (Hamblin, 1991) as the use of farming practices which maintain or improve the economic viability of agricultural production, the natural resource base and the environment influenced by agricultural activities. The biophysical, economic and policy environment of Australian agriculture means that neglect of any one aspect of the three dimensions of sustainability (economic, resource base and off-site environment) is done so at one's peril.

In a recent study undertaken by ACIL *et al* (1994), it was found that for many producers preoccupied with financial viability, sustainability is not relevant. The general perception was that anything to do with sustainability inevitably costs money which they do not have. This perception, while missing the point about sustainability, is understandable given the long-term cost/price squeeze and the declining returns from agriculture faced by most producers. Indeed, Australian agriculture and its producers have largely managed to survive through the increased productivity resulting from research and development activities. However, there are many

examples of where neglect of the resource base has ultimately resulted in financial ruin. Fortunately, though, there are many examples of where investment in new technologies and farming systems has increased financial profitability while at the same time maintaining, and even improving, the resource base. I would classify controlled traffic technologies as having potentially the same benefits.

Elsewhere in the Wylie study it was noted that producers have mixed perceptions about landcare and its place in sustainable agriculture. Some producers were said to view landcare as basically a "greenie" movement concerned with little more than revegetation, particularly tree-planting, and resulting in little more than a warm, inner glow. Others, however, are said to be concerned that landcare is being used as a disguised vehicle for traditional extension activities and that sustainability is often only given lip service. My view is that these mixed perceptions arise from the confusion due to the changes in the way that information is now managed and disseminated. Much of this confusion arises from fundamental changes in the focus of publicly-funded extension programs and the role government sees for itself in the future provision of extension services. Moreover, reductions in government budgets have required new and different forms of extension mechanisms to be utilised, and it has taken some time for these new mechanisms to cope with the complex information story that is sustainable agriculture. At the same time, debate on the private versus public benefits of maintaining agriculture's resource base is demanding a rethink on who pays and who plays in the funding, research, development, management and dissemination of information leading to its maintenance.

Issues about sustainable agriculture in Australia, what is meant by it, how it is measured and who is responsible for what, won't disappear overnight. On the contrary, as governments increase their focus on holistic resource management at the catchment and regional scales, and place greater responsibility in the hands of community groups for managing their wider environment, the nature of agricultural systems in the context of alternative land use practices and impact on common goods, such as water systems, will come under greater scrutiny. At the same time, forecasts for food requirements of an exponentially growing world population will place added pressure on food producing nations to increase their output from land already heavily utilised for agriculture.

For these reasons, the role of research, development and extension will continue to be essential to ensure that the push for increased production efficiency doesn't come at the cost of a decline in the long-term productive capacity of the resource base. There is nothing new in any of this, of course, and for the past decade we have all witnessed a change to the way that these activities are funded and carried out. Most notable is the emphasis placed on final outcomes,

interdisciplinary approaches, inter-organisational collaboration and end user involvement. Essentially the management of research has changed and it will continue to change.

### **Managing Research**

Many researchers still have a deep-seated suspicion of people who are interested in managing research (Price, P 1994). These researchers hold the view that research is a creative activity that cannot be managed if it is not to be constrained. However, history shows that because curiosity itself is not free of values, research will always be constrained, or motivated, by a driving force of one desire or another. History also demonstrates that there are very few examples where curiosity-motivated research leads primarily on its own, and through the force of the ideas generated, to practical outcomes and applications. This has particularly been the case in agricultural research where, for example, in the pioneering years of early Australian settlement, producers themselves became the major innovators as they were left alone to cope with the exigencies imposed by the harsh environment. This is not to advocate that researchers should be made redundant and that we go back to the old days of producer as sole innovator, but it does suggest that the trend towards increased involvement of producers in setting the directions for research and development, and indeed aiding in the undertaking of R&D side-by-side with researchers, is an appropriate one. Particularly worthy of applause is where the research is undertaken on-farm rather than on experimental stations, where frequently the conditions are not representative (either in reality, or in the minds of producers) of the wider agricultural resource base.

It is not enough, however, for researchers and producers alone to work together. This is very much becoming recognised by the various R&D corporations, most of which consider R&D funding in the context of an investment in but one part of a complex innovation process. This view is promoted by evidence which suggests that increased investment in R&D is futile if other components of the innovation process, such as marketing, processing, production, etc., are not also present and interact with the research (Price, P 1994). This has important implications for the way in which research should be undertaken and eventually developed and extended. The most obvious implication is that an investment at the research point in the innovation process needs to be preceded by properly identifying the market opportunity and then defining the product or service that the customer or client wants. Failure to address this issue has often been a major problem with government-funded research and extension problems in the past.

From a funding perspective, the investment approach by the R&D corporations has been refocussed towards achieving outcomes and has had a considerable impact on how they

operate. As a result of focusing upon solutions to problems in a context of sustainable agriculture, research funders are looking more holistically at issues and are, therefore, increasingly directing their R&D investments towards multi-disciplinary, multi-organisational efforts aimed at holistic solutions. This has resulted in a greater level of investment by most of the corporations in fewer, but larger, projects and in programs of diverse, but related, R&D activities. While most research organisations are willing to participate in complex, multi-organisational ventures, problems inevitably arise. In some cases, traditional research methods and values become an impediment to sharing knowledge and skills, while in other cases, institutional and managerial barriers arise. Intellectual property rights is a major, and ongoing, concern.

For the researcher, this will mean having to consider their area of expertise as not being the most critical to address certain problems, but rather as one critical skill within a host of critical skills required to resolve these problems. It will become increasingly difficult for researchers to find support for their projects if they do not form partnerships with economists, engineers, other fields of biophysical sciences, producers and other community interests. For many researchers working in areas which have been well supported in the past, their project proposals may be overlooked in future as other components of the innovation process are backed in an endeavour to redress past imbalances. For example, in a number of areas of soil management, questions are being asked about whether the real issues lie with lack of knowledge about the physical processes involved, or whether there is sufficient understanding of these and that the problems lie in the development, dissemination and uptake of existing knowledge. This process of re-examination will become more common in future, and its impact will be greater particularly as organisations become increasingly reliant on external sources of support.

R&D corporations are not alone in going down this track. There is an almost universal trend towards developing appropriate institutional structures to handle multi-disciplinary research, including Cooperative Research Centres and various government and university research institutes.

Controlled traffic research lends itself to this approach and researchers with an interest in this field need to take advantage of it. A perfect example of this is a project jointly funded by the LWRRDC and the Grains R&D Corporation (GRDC), and carried out under the leadership of Drs Radford and Yule in central Queensland. It involves half a dozen organisations and around thirty researchers, including agronomists, soil physicists, plant physiologists, engineers, economists and extension experts. Most importantly, it involves research being undertaken on farms, and involves the producers themselves. While this is not a cheap

venture, it is most unlikely that either LWRRDC or GRDC would have invested in any the individual components of this project.

### **Managing Extension**

As with research, the trend in extension has been towards taking a more systemic approach. This is particularly reflected in some of the initiatives falling under the landcare umbrella, such as the property management planning (PMP) program. While this approach is ideally suited as a vehicle for disseminating information regarding sustainable agriculture, the approach as it stands at present has some inherent problems which act as barriers to achieving actual adoption of research results. For example, the PMP process may be perceived in two ways: the first and narrower view is that of being a government-conceived initiative intended to provide a means of raising producer skills in holistic farm management and perhaps to a lesser extent to provide an avenue for the extension of research results and information on best management practice. As such, the PMP process is made tangible and from the position of a producer becomes just one of many options for obtaining information and receiving training. This view is reinforced by the dominant role of government agricultural and resource management agencies in the implementation and operation of the program. The second view is that PMP is a philosophy intended to change the landholders' paradigm of operation towards holistic farm management. Within this paradigm, the producer rather than the institution, is the director of information flows. Although this is a preferred aspiration, it is not one easily accomplished. It requires not only attitudinal and behavioural change, but also a change to many producers' central values and beliefs.

The former of these views is fraught with the problems faced by many extension initiatives; ie. how can participation rates and, more pertinently, adoption rates be increased? The latter view, on the other hand, is fraught with the problems of ideology and ethics as well as with the problems of managing complex, intangible systems. These problems raise questions about how emerging extension programs should be delivered.

It is becoming recognised (Price, R 1995) that if we are to pursue holistic approaches as a means of marrying important economic and environmental goals in the context of sustainable agriculture, then this will require an effort targeted at more than just the producers themselves. In essence, the target audience for such extension programs should involve all those in the innovation process, including marketing authorities, R&D organisations, agro-political institutions, and rural service and support industries, as well as the landholders themselves.

Addressing the interface between the holistic-based extension programs and the many

information sources in a way that generates demand and subsequently increases adoption is critical. To date these interfaces have been very weak; not only with the difficult areas of economics and marketing for example, but also with the traditional areas of research and development. Some may argue that these linkages are weak primarily because traditional extension programs have been handled by government, but it can also be argued that it is more related to the lack of recognition by the non-government sector as to its potential role in extension, at least until recently.

In this regard, a very significant trend is occurring which is likely to have a profound impact in future extension of research results. This is the increasing move by industries to adopt sector wide benchmarking processes which build quality assurance and best management practice into every tier of industry. An example of this philosophy is for an industry to develop measurable targets for the quality of its export products, use these to define the quality targets for the processing methods, which in turn define the quality targets for the farm product, which define targets for the production practice and ultimately for the resource base condition.

At present, many rural industries are beginning to develop best management practice and self-accreditation programs to help deliver the quality and consistency of their products, and to monitor environmental sustainability; the pig and cotton industries are examples. These programs are commendable, and indeed it is the view of the LWRRDC that such programs should eventually make resource-based organisations such as the LWRRDC redundant. Effectively managed, these programs should ensure that it is not only the producers themselves who are concerned with sustainability, but rather that the entire industry is concerned with this issue. This should result in far more resources being made available across industries to develop and support new technologies which will eventually lead to achieving the dual objectives of profitability and sustainability. It is within this context that those concerned with controlled traffic technology, research, development and extension should direct their attention.

## **Conclusions**

While this paper reflects some visions for the future environment of research, development and extension management, it also embodies within it some truths about the directions that these areas are taking. More and more R&D is being directed by industry needs and driven by industry participation. Most research organisations would have found by now that this has resulted in fewer but larger research programs and has demanded a greater element of on-farm research involving the participation of farmers, graziers and other producers. While this trend is often frustrating for some researchers, it should be considered as a worthwhile and necessary challenge; for indeed as government funding of R&D is further eroded in future, the input by

industry will increase. Chasing the dollar will become a more common and difficult task, but it should be more rewarding to researchers when they see an increased level of adoption of the results of their efforts.

From an extension point of view, the writing is just about on the wall. Already the role of the private sector, and in particular the farm adviser, in extension has been increasing at an exponential rate. It is not inconceivable that this private sector role will also start spreading into the facilitation of group activities such as landcare in a way which it has already with the traditional production oriented producer groups. If, as suggested, industries take up the challenge to develop industry-wide benchmarking processes based on best management practices at every tier, then we will see a whole new paradigm for extension delivery in future.

Those involved in controlled traffic research, development and extension are well-placed to fit in with these new directions, particularly as their field wholeheartedly embraces the objectives of sustainable agriculture.

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