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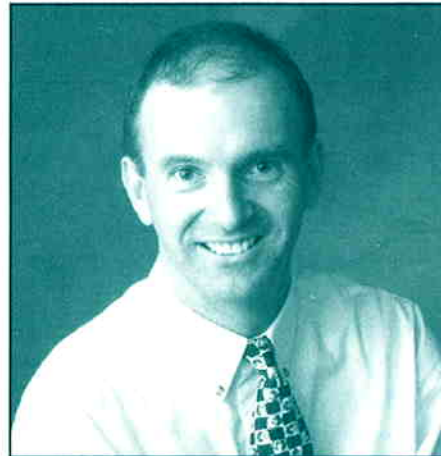
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From the new APEN President - John James

The challenge for us as an organisation of change management and communication specialists is to "walk the talk" ourselves. This was well demonstrated at Toowoomba during our international conference where we used the Open Space process for the first time at an APEN event to drive us towards our goals.

Similarly, when we focus on our network, we need to continue taking calculated risks and venture where we haven't gone before. One of the hot topics of conversation at Toowoomba was for APEN to get out of the "agricultural rut." The Indonesians refer to insular activities as being "like a frog beneath a coconut shell", where you have a limited perception of your universe. We have opportunities to interact with change management and communication specialists from health, transport and other areas. To involve them in our network would bring new understandings and improved perspectives... enriching and challenging us all.

As with most change, there may be some sacrifices involved to achieve the desired outcomes. The non-agricultural participants at our conference challenged us about the "E word" in our name, in that it is meaningless or, worse, confusing to their understanding of what we are on about. As we all know, it is sometimes better to change ourselves than try



to change those around us. For how many years have we been trying to better educate the people we work with about the true meaning of extension? Indeed, how many of us have grappled with our own understanding of what extension is and is not?

I relish the opportunity to lead our network into uncharted waters, using participative and consultative processes along the way. The APEN National Executive (see page 13) had a two day retreat at the beginning of December, where we pushed ourselves to explore beyond the boundaries. Over the coming months we will share with you our vision for the future. As Dr Lin, the conference keynote speaker said, "Choose your preferred future and plan to be there!" I look forward to a rich discussion as we embark on the journey together.

From the Editor

This issue is my last as editor. I have enjoyed my role over the past two years and thank all of you who have contributed articles and provided feedback to improve the standard of our newsletter. Your new editor will be Darren Schmidt who combines a background in journalism with his current role in extension for QDPI. I'm looking forward to reading future issues of ExtensionNet under Darren's editorial guidance.

The approach in this issue differs from my previous newsletters as the focus is on a

group rather than a theme. We have a number of very interesting groups who are dotted around Australia, New Zealand and the Pacific. Our intention is to profile the work that is carried out by teams of workers as a way of promoting the innovation that is occurring in extension. As you will find in these articles, often it is only when several projects come together in an overall program of extension that we grasp the interdependence between disciplines, approaches and people.

Season's Greetings.

Mark Paine

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This article describes the Product Development group's approach by outlining why getting change on farms to improve natural resource management outcomes can be difficult.

What this means is that when a farmer adopts an improved natural resource practice it will often be because of these other benefits, not just for an environmental improvement.

Untangling change

The Product Development Group, Department of Natural Resources and Environment, Tatura, Victoria

Introduction

Irrigated dairy and horticulture are the major users of northern Victoria's harvested water resources. Over the past 20 years the dairy and horticultural industries have made significant improvements in their irrigation practices and thus reduced their impact on the environment. The increasing importance placed on the environment by the general community, government and industry funding bodies however, is raising questions about the rate of change and whether the environmental improvements are satisfactory. With many options available for government and industry to facilitate change, communities and others are asking what are the best tools to accelerate change? The Product Development group within the Department of Natural Resources and Environment (NRE) uses a multidisciplinary approach to understand and demonstrate change in line with NRM objectives. The group uses a mix of disciplines, including technical research, economics, extension and marketing. These disciplines are sourced from within NRE or may be contracted from Universities and the private sector. Key stakeholders are engaged in developing strategies to achieve realistic outcomes for the local/regional context.

This article describes the Product Development group's approach by outlining why getting change on farms to improve natural resource management outcomes can be difficult. The rest of the article describes a range of available adoption mechanisms and discusses the importance of stakeholder involvement. Further articles in this newsletter deal with some of these issues in more depth.

Achieving natural resource outcomes isn't always easy.

Achieving on farm change for natural resource management outcomes is often very different to achieving changes that increase productivity. These differences need to be recognised and addressed.

Balance between public and private good

Improvements in natural resource management practices on farm often benefit the community (public good) more than the farmer (private good). This is because the benefits may be gained over a longer time frame than is relevant for the farm business or may occur at a different location. In order for farmers to change their natural resource management practices an overall private benefit must be evident. This benefit may be productivity increases, but could also include benefits such as labour savings, alignment with personal values or reduced risk.

What this means is that when a farmer adopts an improved natural resource practice it will often be because of these other benefits, not just for an environmental improvement. This has two consequences. The first is that potential environmental outcomes may not be achieved because farmers will be driven to maximise their private benefit (eg labour saving) and in the process compromise some environmental outcomes. Secondly, there is a need to understand the farmer's situation and identify when, how and if an overall private benefit can be achieved for adoption to occur.

Complexity

The changes required to improve natural resource management on any given farm can be complex. Often there is no one solution that will provide desirable outcomes at a catchment scale that will also provide farmers, who might be using unsustainable practices, with sufficient private benefits to act as incentives for change. In addition, investments to improve natural resource management are often complex and impact on a number of areas of the farm business. Simple, cheap, tactical options to substantially increase natural resource management are often not available.

Scale

Improved natural resource outcomes impact beyond the farm gate. Therefore, there needs to be consideration of the

outcomes needed at the farm, sub-catchment, industry and catchment scales. For example, to effectively reduce nutrients entering natural waterways, catchment scale recycling is required for rainfall events in addition to on-farm recycling. The methods of analysis, implementation and evaluation also vary considerably between these different scales. For example in program development, demographic information could be extremely useful at a catchment scale while an understanding of learning styles might be more relevant at the target group scale.

How can change be achieved - mechanisms

There are three broad types of mechanisms available to use in programs to achieve change. They are -

Voluntary – effective where a farmer has already identified that there is an overall benefit for them to change ie. the private benefit is sufficient. Common mechanisms to facilitate this change are incentives, provision of information, extension, research.

Compulsory – effective in creating an environment where adoption becomes preferable to non-adoption. Common mechanisms include audit and accreditation, preferential pricing, regulation.

Mixed – involves both compulsory and voluntary mechanisms. Market mechanisms are sometimes an example of these.

There is a cultural preference in Australia to first use voluntary mechanisms to achieve improved natural resource management before using compulsory or mixed mechanisms. As the balance between public and private good for many natural resource management issues favours public good there is usually a need to use a range of mechanisms that not only achieves positive environmental outcomes but that also minimises negative social impacts.

Multidisciplinary approach

Considering the issues involved in achieving natural resources management improvements, what is the approach of the Product Development Group? Broadly the work fits under four separate areas which when combined, we believe, heads us towards a more holistic approach to natural resource management project design and implementation.

• Stakeholder involvement

The Product Development group runs programs that assist stakeholders to work through NRM issues and develop strategies to achieve change. These issues are addressed at a local level and consider the biophysical, social and political context. Ongoing discussions are also held with funding bodies and other stakeholders on the outcomes that can be achieved given the unique balance between public and private benefit, project progress and the appropriate mix of change mechanisms that are required. This is important for many reasons but particularly because the outcomes achieved are more significant and sustainable over time.

• Organisational change

Natural resource management issues are complex and require broad input to achieve acceptable outcomes for all stakeholders. Such an integrated approach is often in contrast to the organisational culture and structure of public and private bodies. Therefore to achieve the required outcomes, organisational change is also required to support the project team to change much like the way we support farmers to change.

• Understanding the farmer

With the majority of natural resource management programs, achieving the outcomes requires changes in practices by farmers. It is therefore fundamental to the selection and implementation of a mix of change mechanisms to understand what factors will drive farmers to change their practices, what barriers will inhibit change, and what consequences of change will emerge socially, environmentally, economically and politically.

• Understanding change mechanisms

A wide range of mechanisms exist that can increase the rate of change on farm. These may be voluntary, compulsory or a mixture of both. Understanding what mechanisms are appropriate for the targeted group and the needs of stakeholders is important in terms of designing socially, environmentally and economically viable programs.

The following articles cover some of the projects in the Product Development group that are addressing parts of the approach described above. Feedback, comments or contrary views are welcomed and an important part of developing our discipline area and the APEN network!

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Increasing on-farm change: an argument for best practice relationships between researchers and service providers

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Chris Linehan, Katie Bowman & Daniel Armstrong

The issue

Pressure from the community and governments (stakeholders) for improved natural resource management (NRM), including improving water use efficiency (WUE), requires individual farmers to change practices and adopt technology for them to become environmentally accountable (Cocklin *et al.*, 2001). This is altering the focus and type of extension programs, away from programs focusing on direct farmer economic benefit towards programs delivering community benefit. However, the rate of on-farm change with regards to WUE across irrigated industries is lower than desired. Consequently a new approach to complement existing extension programs is being investigated.

There are rational reasons why farmers do not adopt changes addressing NRM issues, including improving WUE. These generally relate to the benefit cost ratio and complexity of the required changes in relation to individuals and their specific farm context. Commonly, addressing these issues with farmers requires a one-on-one or technical expert approach. Augmenting the Department of Natural Resources and Environment (NRE) services by collaborating with other

service providers to irrigated agriculture (specifically to the horticulture and dairy industries) may be needed to achieve the rate of on-farm change desired by stakeholders.

This article briefly outlines the rationale and approach being trialed at NRE Tatura to investigate and engage service providers relevant to water use efficiency in the irrigated dairy and stone and pome fruit industries in the Northern Irrigation Region (NIR) of Victoria.

Who are service providers and why might they increase the rate of change on farms?

Service providers are individuals or businesses who supply goods or services to a farmer, grower or producer. They may also be government funded such as extension staff involved in programs like Fruitcheque or Target 10. More commonly, service providers are thought of as individuals belonging to private organisations. Examples include Fruit Preserving Company / Milk Factory field staff, chemical and fertiliser resellers, feed merchants, seed/plant companies and consultants.

Bloome (1992) comments that farmers see information provided to them through alternative sources, such as service providers, as replacing more formal extension type services. In the Northern Irrigation Region (NIR), the level of dairy farmers utilising the dairy extension program Target 10 is between 10% (Integra, 1998) and 55% (The Virtual Consulting Group). If this trend is repeated in the stone and pome fruit industry, a large percentage of the farming community will not be directly involved in government extension projects.

Recent evaluation of viticulturists found that 74% are using service providers (Dunstone 2001). The same survey found 47% of the viticulturists were using company advisers as sources of viticultural information. The significant number of farmers not accessing government extension services, the wide range of information sources available,

combined with the often complex nature of NRM changes which require individualised advice, suggests that service providers may be in an ideal position to influence NRM change on farm.

How do we engage service providers? An approach.

To increase behavioural change on-farm through service providers, NRE needs to implement a management framework that identifies service providers whose businesses align with NRE's desired outcomes with respect to natural resource management. Such a process needs to:

- * understand the communication and adoption pathways that already exist between NRE research groups and service providers (internal and external to NRE),

- * identify best practice relationships between other organisations and their service providers;

- * use the above information to provide processes and tools that will enable NRE irrigated dairy and stone & pome fruit project groups and researchers to identify service providers relevant to their research objectives

- * engage service providers for a win-win result.

In 1999 Morgan Management Services was contracted to investigate the "*Relationships and information flow between dairy extension providers*" which asked how external service providers wanted to interact with NRE extension staff. Main findings included :

- * Existing relationships were "ad-hoc", with a heavy reliance on pre-existing relationships between individuals.

- * Service providers wanted NRE to develop more formal links with them.

- * Service providers thought that NRE under-utilised them, and did not respect their knowledge, skills and resources.

- * The need for better coordination and distribution of information from NRE research and extension.

Semi-structured interviews are currently being conducted with relevant service providers to obtain a greater insight into their businesses, perceptions of NRE and means by which they wish to interact with NRE.

Getting change within NRE

Morgan Management Services (1999), supported by Linehan (2001) also highlighted

that utilising service providers in an organised, formal and evaluated manner is not the way that some people in NRE "do business". This suggests that many people within NRE consider reducing interaction with non-government service providers is accepted organisational behaviour. Some individuals within the organisation value this behaviour consider it corporate culture (Mezias *et.al.* 2001; Lillrank *et al.* 2001). To change beliefs at an organisational level requires a managed change process as these beliefs are embedded in the actions of the organisation, for example in the routines, practices and skills base of the individuals (Mezias *et al.* 2001).

While we rarely expect farmers to change without some sort of plan and support or incentive, we often ignore such actions when expecting change from people within our organisations.

Various models exist which describe and define how and why organisational change occurs. Most propose a set of requirements that need to be met before change will be successful. Common elements to create change taken from models by Judson (1991) and Hussey (2000) can be summarised as:

- * identifying the need to change,
- * creating a shared vision,
- * ongoing and planned communication,
- * enabling and supporting change in behaviour,
- * implementation, and
- * consolidating or ensuring the change.

It is intended to use awareness of the anticipated benefits of researchers working with service providers to have research groups nominate to participate as a pilot group engaging service providers relevant to their current project. This selection method should reduce barriers to change allowing a more concentrated effort directed towards the change elements identified above.

It is anticipated that a range of tools will be tested using the Australian Business Excellence Framework's ADRI¹ cycle to govern the process that will have researchers engage service providers. It is planned that such an approach will produce a repeatable, documented and improvable process that other groups can utilise into the future. Guidelines such as the International Customer Service Standard (Customer Service Institute of Australia 1999) will provide a

definition and methodology for engaging service providers based on interview findings.

Future work?

It is hoped that future work will centre more comprehensively on understanding organisational culture and its impact on projects relating to natural resource management in Victoria.

1 Approach, Deploy, Results, Improve (Australian Quality Council 2001)

References: Contact APEN Secretariat for a copy.

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It is anticipated that a range of tools will be tested using the Australian Business Excellence Framework's ADRI¹ cycle to govern the process that will have researchers engage service providers.

A farm management economics approach to extension - water use efficiency on irrigated dairy farms in northern Victoria and southern NSW

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Introduction

In northern Victoria and southern New South Wales (NSW), efficient use of irrigation water is important to the future of the dairy industry. Limitations on the availability of irrigation water and environmental issues have resulted in increased pressure to improve water use efficiency (WUE). Water use efficiency is defined as the amount of milk produced from pasture per ML of water applied by irrigation plus effective rainfall.

While improving farming practices may be necessary to maintain the regions natural resources, farmers need to balance this industry and community imperative with their individual objectives. Ensuring that adoption of information on sustainability issues makes individual farmers better off is an important aspect of being a responsible provider of information.

A large random survey of irrigated dairy farms in northern Victoria and southern NSW (Armstrong *et al.* 1998, 2000) found a four-fold range in WUE, indicating potential for many farms to substantially improve WUE. Effective irrigation, pasture, grazing and feeding management were the key factors associated with high WUE. Extension activities based on the survey information were effective in creating awareness, but did not result in widespread change (Bowman 2000). Industry benchmarking surveys can be effective in indicating potential for improvement in areas of the farm business (Queensland DPI 1983), but are unlikely to result in widespread changes in practices and may not be an appropriate tool for making farm management decisions (Malcolm and Ferris 1999). Farm management decision-making is about deciding on the most effective use of resources on a farm to achieve the objectives of the business in the future and needs to consider the complex combination of human, production, environmental, economic, and financial components of the business (Makeham and Malcolm 1993). To understand the complexity of decision making processes, in-depth ex-

amination of a small number of businesses is generally more beneficial than surveying a large random sample (Sterns *et al.* 1998).

This article describes an approach using farm management economics to investigate options for increasing WUE on a case study farm. The purpose was to examine if this extension approach could result in increased WUE, increased profitability, and be compatible with a farmer's objectives. Economic and human/social issues are considered, as well as the environmental and production issues, to gain an improved understanding of the decision-making process and motivation for change.

Methods

Farm selection

The case study farm was selected because changes had been implemented in recent seasons that had affected WUE and profitability, and possible further changes were being considered. This enabled investigation of links between WUE and profitability, and provided opportunities to obtain insights into other motivations for improving WUE.

Data collection and analysis

Production, economic and financial data were collected by personal interview for the 1995/96, 1996/97, 1997/98 and 1998/99 seasons. The factors that may have contributed to changes in WUE and profit over the four seasons were discussed. The medium to longer-term plans and options for the farm, and the main constraints, were scoped through a semi-structured discussion.

The production efficiency calculations used have been documented by Armstrong *et al.* (1998, 2000). Farm management economics budgets were developed according to Makeham and Malcolm (1993).

Evaluation of development options

Four initial development options were evaluated, based on the comprehensive information collected, by estimating the whole farm operat-

ing profit, in the steady state, after implementation. After considering the operating profit and practicalities of four options, two options were discarded. Ten-year discounted net cash flow partial budgets (here in after referred to as development budgets) were completed for the remaining options, which were used to investigate the return from investing in these options and the feasibility of financing the development. These development budgets were the appropriate method to examine how the existing farm could be developed to improve WUE and profitability in the future (Malcolm and Ferris 1999). The 10-year period allowed the returns from the investment to be expressed and was consistent with the planning period of the farmer. Details of the assumptions used in constructing the development budgets can be found in Armstrong (2001). An analysis of the sensitivity of the different options to fluctuations in key parameters, such as, milk price, was also conducted.

Results

Background to the case study farm

The current owner operators (a father and son full time plus some assistance from the mother) purchased the farm approximately 15 years ago. They plan gradual development into the future. The father wants to hand over the management of the farm to the son over the next 5-10 years.

The milk harvesting facilities are the main constraint to increasing herd size, and hence milk production. By building a new dairy, the owners anticipate a large enough reduction in milking time to allow them to milk an extra 70 cows without any extra labour. The owners considered replacing, or renovating, the dairy to be a necessary component of any expansion option.

The relatively low irrigation water right per hectare of this property means there will be an irrigation water shortfall in most seasons, if the current area is fully irrigated. While reliance on temporary irrigation water makes the farm vulnerable to price fluctuations between seasons, the owners seem comfortable with this vulnerability. Purchasing permanent water right would increase the total liability of the farm and make financing development options more difficult, as the equity of the farm business is currently relatively low (approximately 55 %).

There is about 20 hectares of non-irrigated



Group looking at pasture from field day

land that could be developed for irrigation. Opportunities to purchase adjoining pieces of land may arise, but most land in the immediate vicinity of this farm also has a low water right per hectare.

There was not a simple, direct relationship between WUE and operating profit on this farm. However, the season with the lowest WUE also had the lowest operating profit (1997/98), and the increase in WUE in 1998/99 coincided with an increase in operating profit. While WUE is not always the major factor impacting on operating profit, increases in WUE can be profitable.

Potential areas for increasing WUE and profitability

Increases in WUE can probably be achieved through continued improvements in grazing management, which may lead to increased income and/or reduced feed costs. Observations of post grazing mass by the farmer, and others, indicated considerable scope to utilise more of the pasture grown. This suggests that reducing supplementary feeding, or increasing stocking rate, is likely to lead to higher pasture consumption and higher WUE.

There appears to be potential to increase profitability by investing in infrastructure that increases labour efficiency. For example, a new dairy would allow milk production and income to be increased with similar labour requirements.

The irrigation water use does not indicate significant potential to increase WUE through improved irrigation application efficiency. Alternatives to flood irrigation, such as sprinklers, are unlikely to reduce water use on this farm as the soil type is a heavy clay (Wood and Martin

2000) and the irrigation layout appears efficient.

Some initial options were proposed that met the objectives of the farm owners, and provided opportunities to capitalise on potential for improvement in profitability and/or WUE. However, the practicality and economic feasibility of these options needed to be considered thoroughly.

Evaluation of the development options

The process we used to deal with the complex farm management decisions associated with the development options was developed and refined through discussions with a farm consultant (Ian Gibb, Farmanco) and other advisers, and is summarised in Table 1.

The projected whole farm operating profit of each of the four options, in the steady state after implementation, was higher than any of the previous four seasons (Armstrong 2001). After considering the operating profit and practicalities of implementing the four options, two options were discarded. However, the discarded options may be quite appropriate in a different situation on another farm. The remaining two options were (i) develop land for irrigation, or (ii) intensify on the existing land. Both options involved constructing a new dairy. While the whole farm profitability of the two