

Principles and processes for effecting change in environmental management

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Abstract

In New Zealand environmental management is essentially the responsibility of land managers. Management decisions affect both production/productivity and the environment. However, responsibility for ensuring positive environmental outcomes falls on both local (Regional) and Central Government, and both they and international agencies such as the OECD would wish to monitor and report on changes. In terms of policy, strong links have been established via Central and Regional Government to land managers. Consumers in the market place are also, increasingly, requiring responsibility for positive environmental outcomes of those who purchase and process primary products. Strong links for responsibility have been established between our international markets and processing businesses and there is a noticeable strengthening of the links from the processors to the land manager/producer.

In New Zealand a range of initiatives has been developed and implemented over recent times, whereby land managers are taking increasing responsibility for accounting for the environmental outcomes of their production activities. The range covers the spectrum from voluntary to compulsory (e.g. in order to meet market requirements) and from those initiated by customers to processor and/or producer initiatives. A selection of these initiatives will be described. Principles and processes associated with these initiatives will be discussed.

Keywords: agricultural extension, environmental policy, change management indicators

Introduction

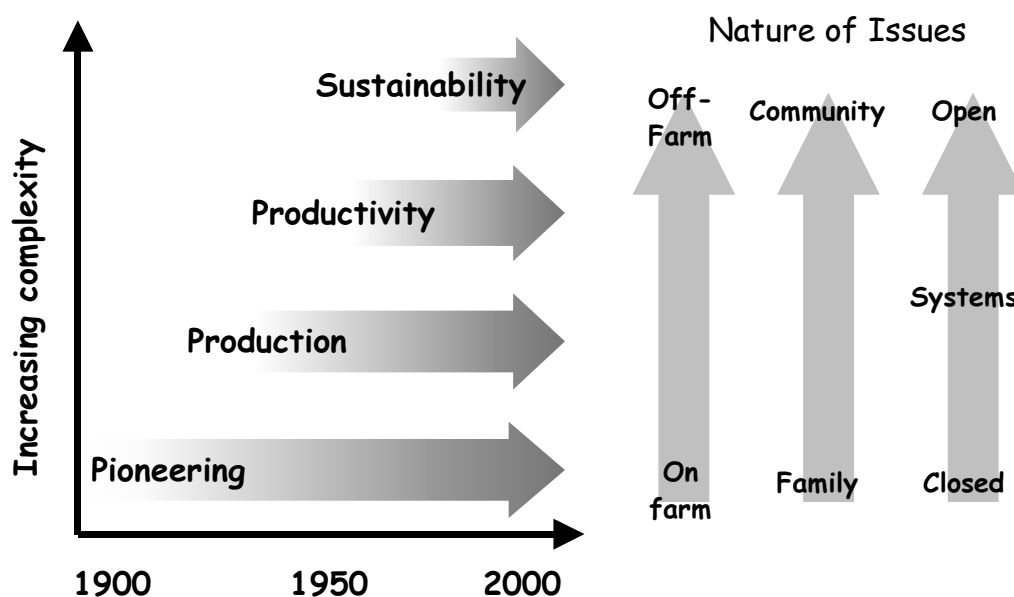
Land managers are constantly reviewing their decisions about the management of natural resources. As the bulk of these land managers are involved in some sort of agricultural activity it is in this sector that most of the study of change processes has occurred. The drivers for these changes have been social and economic but the potential for change has been limited by the scientific knowledge of our natural resources. Only recently has the drive from society been to improve the management of our environment. In this paper we will summarise the developments that have occurred in agricultural extension processes, how these processes have been incorporated into environmental management, and the motivation strategies for effecting change in New Zealand.

Development of the extension process

In the past 50 years, New Zealand's agricultural research and extension, and their associated institutional structures evolved through a number of phases. Having struggled through a Pioneer phase characterised by critical shortages of labour and capital and isolation from markets, New Zealand emerged in the 1950s into a world recovering from World War II (figure 1). Access to European markets for agricultural products fostered the development and uptake of new technologies and a shift in focus to agricultural production. The emphasis

was no longer land clearance and development but on using the results of science to improve our farming systems. During this phase research funding and research institutions were directed towards technological innovation. The principal research thrust came from the Department of Scientific and Industrial Research (DSIR) and this information was disseminated by the then Ministry of Agriculture and Fisheries extension service, both government funded institutions. The extension process adopted followed a linear transfer of technology (TOT) model and assumed a diffusion process amongst farmers. Good communication was seen as the best means to facilitate this diffusion process.

Figure 1. Successive eras of land management as they relate to New Zealand agriculture and the changing focus of agricultural issues (Adapted from Bawden 1987).



As resource constraints and declining terms of trade became apparent, the emphasis moved on from production to the efficiency of production – productivity. Farmers concentrated on maximising resource use efficiency and both research and management of the farm focused on optimising. Farmers were actively encouraged to take advantage of production technology through Government incentives and subsidies. During the productivity phase, institutional changes were small. By 1986 most farm supports were removed, including Government funding of agricultural extension services. Change was driven by a continual questioning of the effectiveness of extension and the acceptance of the need to adopt different approaches to assist with learning among the farm community. Extension agents were there to help farmers and recognised that they had personal goals in addition to production targets. The removal of a central government funded extension service meant consultants took a more client-centred approach.

Concern for the environment, both here and internationally, finds New Zealand moving towards a ‘sustainability’ phase (MAF Policy, 1996). The declining terms of trade and the response in increased productivity had intensified resource use and increased resource degradation. By gathering statistical data on productivity drew attention to the decline in the quality of the very resources used in agricultural production and raised concern about the sustainability of our farming systems. This phase saw a jump in complexity as

issues moved beyond the farm to landscape and catchment impacts and involved the wider community (Figure 1). Research scientists and extension services began to measure the extent that farming systems were increasingly 'open'. The undesirable outputs or externalities of agriculture increased as inputs to maintain the higher productivity increased. The impact of agriculture on the environment entered the public domain and involved national and global institutions. The Government took a hands-off approach and delegated environmental management to regional governments who, in turn, passed much of the responsibility on to the land managers. Parallel to this, Crown Research Institutes (CRIs) were created out of the government research institutions and put on a commercial footing. They could seek funding from the Government public good research fund (PGSF) and other funding sources. Public good research funding became contestable (Journeaux, and Stevens, 1997).

The four phases of agricultural development subsumed rather than replaced each other, as did the extension philosophies that emerged with each phase. The linear TOT is still appropriate when there is a clearly identifiable problem with a land-manager who acknowledges ownership of both the issue and solution and is able to incorporate the solution into their management system. In these cases, the findings and products developed from scientific research are readily adopted by end-users, especially when the result can clearly be seen to 'make a difference' to environmental management. The adult education model is still appropriate with the development of complex farming systems and on-farm environmental issues. However once problems have impacts on the wider environment and involve the wider community the multi-use, multi-value nature of these problems require a more participatory process (Kilvington and Allen, 2002).

Environmental Extension

Environmental extension has not had a clear institutional home in New Zealand. Several Government Ministries have a policy and an advocacy role (Department of Conservation, Ministry for the Environment, Ministry of Agriculture and Forestry - Policy), and the CRIs have developed research and extension programmes from public contestable funding, the Regional Government entities have an environmental education mandate, and there are several NGOs, using public money, that are very active in promoting sustainable management practices (e.g. Landcare Trust, Fish & Game, Forest & Bird).

The complexity of environmental issues and the need for more participatory extension processes has encouraged the use of groups of land managers and wider community groups. The advantages of groups includes the pooled wisdom of the participants, the encouragement and motivation of peers, and acceptance of problem ownership. In Australia, where Landcare groups have been strongly promoted, they have been accredited with facilitating incremental change rather than systemic change (Campbell, 1995) and are more successfully promoting changes to farm practice rather than achieving off site benefits (e.g. biodiversity conservation) (Curtis, 1997).

The emerging environmental extension approach emphasises a more active, participatory approach to gathering information and decision-making and a more collaborative link between researchers, extension agents and users of the information. Increased user involvement helps keep research and information transfer relevant while providing a collaborative learning environment. Greer, J and Greer, G, (1996) proposed an interdependency approach to environmental extension where the extension process, with elements of TOT and adult learning, were matched with a viable information system where the users of the information are involved in its development, interpreting its meaning and debating its value.

Sustainable Agricultural Practice

Motivation for effecting change in agricultural practice often hangs on the perceived balance of Private

Good/Public Good to the land manager. Where the benefits are tangible, the steps of Awareness, Information Seeking, Evaluation, Implementation and Monitoring characterise and possibly constrain the rate of adoption. In contrast, environmental benefits are often remote in both time and space and the costs of environmental management practices cannot be offset against economic benefits. An attempt to reconcile these costs and benefits is the SUBS (Soil Underpinning Business Success, (Mackay, et al.,1999)) programme where farmers (in groups) develop their own “land management” units based on the soil resource with the aim of using this information for farm business planning. It has been particularly successful in situations where there are strong environmental and soil differences within a property as it allows improved productivity on robust land that can be used to offset reduced intensity of use of fragile land.

Sustainable agricultural practice extends into the catchment, landscape and community and represents an increase in complexity. Awareness of environmental degradation is not immediately apparent on-farm and even more obtuse off-farm. Changes in soil, vegetation and water quality occur over decades and through seasonal noise. A number of tools have been introduced in New Zealand to monitor changes in environmental quality in soils (Visual Soil Appraisal, (Shepherd, 2000)), water (Stream Health Monitoring and Assessment Kits (SHMAK),) and bush remnants (Bush Vitality Assessment Kit, (Janssen, 2004)). These monitoring tools also have educational value by making causal links between land management practice and environmental quality.

One attempt to offer farmers prompt feedback on environmental impacts that are distant and diffuse is the modelling package ‘Overseer’ (Ledgard et al., 1999). With inputs on fertiliser use, stocking rates, feed supplements and harvested produce, it generates a nutrient balance that gives an estimation of soil nutrient status and potential losses caused by leaching.

Environmental Policy

Regulatory instruments are not popular, as the means of achieving the desired outcome is often perceived as unfair and even inappropriate. However, these instruments are usually accepted as an underlying set of regulations to support other policy strategies to control the recalcitrant few. They can also be used as a precautionary step when an undesirable outcome is suspected without clear evidence. Regulations are best seen as a safety net to prevent environmental damage and guarantee essential ecosystem processes are maintained. In New Zealand, a more regulatory approach has been adopted for point source pollution and other direct causes of environmental degradation. It is used particularly when feedback on the environmental outcome of management action is remote or delayed. The regulatory approach, with penalties, implies a normative view and a linear technology transfer model which doesn’t sit well with the New Zealand land manager’s worldview. Regulations also are a blunt instrument and frequently ill-suited to the situation.

Voluntary and economic incentives to effect behaviour change are seen as more democratic and consistent with the adult learning model of land managers’ behaviour. Economic incentives are commonly justified as a cost sharing arrangement to compensate farm managers for using farming systems which provide off-site benefits. They are also seen as effective circuit breakers to encourage environmentally sustainable practice that, once accepted by the community, will provide an enduring change even when the financial support is removed. Direct financial incentives are used in New Zealand to assist protection of valued habitats, vulnerable landscapes and riparian margins. In addition, some regional councils will encourage investors in farm forestry, for example, allow the option to retire vulnerable steep country with shared risk.

A new form of self-regulation is becoming common in New Zealand – that imposed by industry. It has its origins in the Quality Assurance (QA) demands made by food distributors. The best known example is the organic food movement with its several accreditation schemes. New Zealand’s vegetable and fruit industry is

accredited with the EUREPGAP scheme, which links users (including many of the major supermarket chains in Europe) with producers in a QA scheme. A number of New Zealand industries (dairy, deer, pork) have set up voluntary QA schemes as a marketing strategy (Morris, et al., 1998). The major emphasis of these QA schemes is on food safety and they only have minor and indirect environmental objectives. For example they often have strict pesticide usage schedules and monitoring that indirectly will reduce environment pesticide loading. The EUREPGAP control point and compliance criteria ranks a conservation management plan as 'minor' and a sustainable commercial agricultural production plan that minimises environmental impact as 'recommended'.

Some industries in New Zealand have set up more overt Environment Management Systems (EMS). 'Market Focus' set up by the New Zealand Dairy Board (now managed by Dexel, the research and extension arm of New Zealand's dairy industry) requires its suppliers to maintain a database of potential environmental threats (fertilizers, medicines, rates of effluent disposal) and encourages the development of a farm environmental plan. It is currently voluntary but may become a condition of supply in the future. The "Clean Streams Accord" between government agencies and Fonterra, New Zealand's principle dairy dairy company, deals more directly with water quality issues and has some specific time-frame objectives.

The North Otago Sustainable Land Management Programme (NOSLaM) was the only scheme that directly addressed issues of importance to sustainable resource management. However Project Green¹ developed for sustainable meat production systems, has as its objective: "To achieve a standard of food safety, animal welfare and sustainable resource management that is defensible in all parts of the world" (Morris, et al., 1998).

Property-right incentives, where rights and responsibilities are shared between the land manager and some other agency, are seen as cost effective and un-intrusive. Property-right agreements negotiate what can and can't be done and lock this into a covenant. Environment BOP (Bay of Plenty regional Council) offer a comprehensive farm plan that is effectively a partnership between the landowner and the regional council to protect indigenous biodiversity or address soil and water conservation issues. Many regional and district councils cooperate with the National Trust to create Open Space Covenants (QE II covenants) to protect an area of special interest. Under QEII Trusts² Open Space Covenants, landowners can "protect their land and continue to own it while ensuring it remains for future generations to enjoy". Covenants are registered against the land title and are binding, not only on the present landowner or leaseholder, but all subsequent landowners or leaseholders. Many regional authorities offer land tax relief for this voluntary protection of significant resources.

Young et al., (1996) called for a diverse use of policy instruments as each had their strengths and weaknesses but none is sufficiently flexible to successfully address the ecological, social, economic and institutional contexts of environmental management. Environmental policy is generally aimed at negotiated approaches because, away from the simple cause-and-effect scenarios, it is hard to identify the ideal outcomes and identify the main beneficiaries.

Towards a collaborative regional approach

Solving problems associated with sustainable development is *not* just about changing the behaviour of individual landowners, but about seeking new ways of thinking about systems, neighbours and whole-farm

¹ <http://www.projectgreen.co.nz>

² <http://www.nationaltrust.org.nz/covenants/index.html>

planning. Consequently, sustainable development extension/practice is about engaging stakeholders (including landowners) in the process of learning and adaptive management and about negotiating how to move forward in a complex world, where we do not have all the information we would like. This is important for issues such as pest management where the problem needs to be addressed both on farm, and across the region.

Key elements in such a regional approach to land management, which covers a mosaic of enterprises, are processes for involving all stakeholders, and adaptive management. The Ministry for the Environment encourages self-regulation. Farm plans are an example of this approach to addressing environmental issues. In New Zealand farm plans have been used since the 1940s to address soil conservation issues and current plans are still tied strongly to this pedigree ((Blaschke et al., 2003). However most Regional Councils support the concept even though it stretches resources, but some are more dedicated to the practice than others.

Farm Management Indicators - learning our way to sustainable agriculture

Successful environmental change requires us to do more than just undertake one-off projects on farms. It is dependent on the coordinated actions of many stakeholder groups, communities and agencies, who in turn must act within the confines of a wider policy framework imposed by the community at large. Within this broader and integrated view of environmental management, management needs to be practised simultaneously at different levels of decision-making.

Aggregating farm management indicators within and across countries is a hierarchical problem in that it assumes that performance at some higher level has a direct cause-and-effect relationship with some activity at a lower level. The assumption is that some farm management strategy(ies) will improve some environmental indicator at the catchment level (e.g. water quality, biodiversity etc.). For example, an ISO 14000 approach would call for some quality assurance scheme to be in place i.e. the number of farms that are operating under a farm plan or the number of farm managers who are members of a Landcare group. This implies that there is some EMS process in place but does not measure environmental impact.

It is important, therefore, that appropriate indicators be chosen. When actions are simple, we may be able to measure compliance. As actions become more collaborative and co-ordinated then we have to also look to indicators of task and process. Process looks at the supporting mechanisms that are in place to support eventual actions e.g. good governance mechanisms that include different stakeholders.

There are also signs that community values towards the environment have changed. The number of institutions that encourage EMS has grown in recent years – NOSLaM 1995, Landcare Trust 1997, Forestry Stewardship council, 1997, are examples. The number of environmental awards has grown and become a feature in the farming community. The Ballance Farm Environment Awards are gradually spreading through the country³. Their objectives are to “encourage sustainable land management and to display to farmers that profitability need not compromise and, in the best examples, can restore and enhance environmental values.” The associated Trust has put together a significant set of pamphlets to assist land managers in their pursuit of sustainable land management practices. MAF has established the Sustainable Farming Fund⁴, to which “communities of interest” make applications for financial assistance with projects. MfE has established the Sustainable Management Fund⁵ to support community, business, iwi (Maori tribal groups) and local

³ <http://www.ballance.co.nz/fea.html>

⁴ <http://www.maf.govt.nz/sff/>

⁵ <http://www.mfe.govt.nz/withyou/funding/>

government to carry out practical projects that will produce environmental benefits.

Conclusions

Agricultural environmental extension has developed with the changing New Zealand context. The linear TOT is still an efficient process of information transfer when there is a clearly identifiable problem with an end-user who acknowledges ownership of both the issue and solution and is able to incorporate the solution into their management system. Many of the industry imposed EMSs would fall into this category. Recognition of the farm as a human activity system, where the individuals involved aspire to some goal, calls for much involvement with stakeholders before the information is incorporated into the management system. Farm plans and EMSs are outputs from such enquiry systems. Finally the appreciation that many environmental issues are both biophysically and socially complex, involving the wider landscape and community, calls for a more collaborative approach to the extension process.

National environmental indicators need to signal that these processes are in place and working. The existence of farm plans, EMSs, Landcare and Catchment groups is a start and indicate an improved attitude towards the environment.

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