

CHAPTER

7

# Moving forward



**A**lthough changes are already underway to address the environmental impacts of farming, there is little evidence that existing efforts will be sufficiently profound or widespread enough to maintain and enhance New Zealand's natural capital. The trends in the health of the environment continue downward. The trends in use of more material and energy inputs into farming systems continue to increase. Questions remain:

- will the types of innovations highlighted in Chapter 6 be sufficient to turn around the decline in environmental health and natural capital?
- or will they simply soften the curve and slow the decline?
- if they are only slowing the decline, are New Zealanders prepared to accept declining environmental quality?

## 7.1 The need for more fundamental changes

The evidence gathered in this report shows that more fundamental redesign of farming systems is required to address the depth of the problems identified. Farming systems need to be developed which deliver environmental sustainability *and* economic wealth, *not* short-term economic wealth at the expense of environmental sustainability. Moving forward will require drawing on and nurturing current activities *and* designing and implementing new approaches. All of the tools and approaches discussed in Chapter 6 have something to offer. It is not so much about finding a 'silver bullet' as using a variety of tools that in combination will contribute to improved outcomes.

It will not be enough to focus on change at the on-farm/local level only. Many powerful drivers originate from beyond the farm and will need to be addressed. A broad systemic approach is required – one that defines goals, removes barriers and develops strategies to support a transition to more sustainable agriculture within local and global environmental, economic, political and market contexts. This will include improving access to appropriate information, resources and technologies; the development of new skills and technologies; the provision of a range of institutional supports; the development of strategies for

sustainability and empowering people and organisations to take the necessary action.<sup>1</sup>

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## 7.2 Redesign for sustainable farming

*Most of the changes we must make are in our economic life. The systems of taxes, subsidies, regulations and policies through which governments motivate the behaviour of individuals and corporations continues to 'incent' unsustainable behaviours.<sup>2</sup>*

In order to achieve sustainable environmental outcomes, redesign needs to occur more extensively at multiple levels of the whole farming/food system:

- *on the farm*, through the development of sustainable farming systems
- *regionally*, via approaches that integrate the activities of many farms, such as integrated catchment management
- *nationally*, through the development of central government policies, farming sector policies and codes of practice, new institutions and structures, market instruments and other measures which alter some of the drivers to ensure that environmental impacts are appropriately costed and valued and that changes made on the farm and regionally are supported
- *internationally*, through ensuring that international trade negotiations and rules support environmentally sustainable outcomes.

So what is needed to encourage these changes? Making changes will necessitate:

- widespread understanding and acceptance of the *strategic risks* involved in current farming systems
- understanding of the drivers that are shaping current farming systems and agreement on *adapting, changing and modifying some of the drivers* to ensure support for new farming systems
- understanding of the *farming systems research* needed to empower major redesign, and investment in the necessary research capabilities
- understanding of the *ecosystems research* and environmental monitoring at a catchment scale needed to maintain and enhance natural capital over long enough time scales, and investment in the necessary research capabilities
- provision of *strategic leadership and vision for environmentally sustainable farming* from within the farming/food sector
- implementing redesign for *environmentally sustainable farming* through integrated catchment management programmes
- widespread *participation and commitment* to developing new farming systems.

... redesign needs to occur more extensively at multiple levels of the whole farming/food system

### 7.2.1 Strategic leadership and vision

In the first instance, the most pressing requirement is for the farming sector to engage in an extensive dialogue on the issues raised in this report. The strategic risks identified during the course of this investigation (see Chapter 5) do not appear to be either widely understood *or* accepted within the farming sector. As Chapter 4 highlights, leadership in the sector, as indicated by some government policies and industry strategies, is strongly focused on production and productivity gains. Progress of a sufficient scale to address the cumulative damage to natural capital and loss of resilience in farming will not occur without widespread commitment from all parts of the farming sector. This includes farmers, rural communities, consumers, processors, exporters, service industries, financial institutions and government.

In terms of structures, this investigation identified a gap in the farming sector: a forum or place for a dialogue/discussion and synthesis of ideas and knowledge about the strategic opportunities, risks and directions for New Zealand's farming, food, and fibre businesses. People interviewed for this investigation also identified this gap. They want the opportunity to share in the on-going development of strategic ideas and innovations for farming *across* the various sectors not just within each one.

In short, there is a need for an organisation that can:

- stimulate a constructive dialogue around the future of New Zealand's farming sector and broader food systems
- facilitate wide engagement in that dialogue
- create a vision and direction for New Zealand farming which is more environmentally, economically, and socially sustainable
- facilitate research to support the dialogue and promote strategies to address changing needs.

In terms of organisational structure, one approach might be along the lines of a foundation or trust, collectively owned by many partners (i.e. the whole farming sector), and outside of Government (local and central) but partnered with it.

To be effective, a new vision and strategy for the future would need to be developed from within and owned by the farming sector. It would also need to recognise the interests of the general public and other industries (e.g. tourism) in maintaining the health of natural capital in New Zealand. Hence the need for an organisation that is capable of openly and freely engaging the diverse variety of individuals, groups and sectors involved in farming, with a view to developing collective strategic thinking.

This report is a contribution to the dialogue and discussion necessary to develop this understanding, but much more will be required. Widespread participation of the farming sector will be critical to fully understanding the risks *and* essential in getting commitment to change.

**Proposal for Action:**

In summary:

- the farming sector would benefit from the development of a strategic vision for the future which addresses the risks, challenges and opportunities raised in this report
- a new pan-sector institution may need to be developed to support this dialogue. At the present time no such structure exists.

The PCE will organise a workshop to promote this dialogue in the first half of 2005.

**7.2.2 Sustainable farming systems**

The shape and form of sustainable farming systems will depend on the nature of the vision for the future of the farming sector. Given the valuable work that is already occurring, it will be a matter of building on it while developing an understanding of the *farming systems research* needed to empower major redesign and investment in the necessary research capabilities.

More effort needs to go into research and development of tools and systems that contribute to sustainable farming systems. The characteristics of farming systems redesigned for sustainability have been discussed in Chapters 2 and 6. The focus needs to be moved along the redesign spectrum from tools for remedy and mitigation to approaches that adapt the whole farm system.

The on-going development of sustainable management systems in the farming sector shows considerable promise.<sup>3</sup> However, two key issues need to be addressed. The primary focus of a number of these schemes is food safety, which, while critical, does not automatically lead to improved outcomes for the environment. Such schemes need to place more emphasis on environmental outcomes. The other issue is the need for independent certification and verification and systems to track products from farm to consumer. As noted in Chapter 4, the Government has a key role to play in verification and auditing regimes and facilitating the establishment of such schemes.

**Proposal for Action:**

In summary:

- enhance the investment in farming systems research to empower major redesign
- continue the development of sustainable management systems, with a particular emphasis on independent verification and auditing regimes.

It is *recommended* that:

- a) the Minister of Research, Science and Technology pay particular attention to farming systems research requirements during the development of the Foundation for Research, Science and Technology's investment strategy for 2004/05 to 2010/11.<sup>4</sup>
- b) the farming sector, assisted by the Ministry of Agriculture and Forestry, increase investment in developing and implementing sustainable management systems with a



particular emphasis on independent verification and auditing regimes.

### 7.2.3 Integrated catchment management

ICM provides a catchment wide organising framework for integrating redesign efforts on individual farms with activity beyond the farm. Much of the adverse environmental impacts we see are the end result of the cumulative impacts. An integrated framework is required in order to understand the relationships between all the activities and the environment,

and to ensure that individual redesign efforts cumulatively lead to the maintenance of natural capital. The capacity to integrate land use planning with water and soil planning is vital for providing the capacity to match activity to the environment and recognising that some activities may not be appropriate for the sensitivity of the surrounding environment.

Some of the necessary conditions to promote ICM are already in place through the provisions of the RMA and non-statutory project based efforts of the type discussed in Chapter 6. However, understanding what needs to happen at a catchment scale to maintain and enhance natural capital over long term time scales will require greater investment in ecosystem research, regular monitoring, and the necessary associated research capabilities.

In order to take ICM to the next level, consideration should be given to forming some type of Cooperative Research Centre (CRC) for ICM in New Zealand.<sup>5</sup> The CRC approach involves partnerships between central and regional government, research providers, industry and the community. This ensures the specifically appropriate research outcomes to particular geographic areas (where the research is conducted) will have national transferability and relevance. It also ensures that regionally applied research funding is leveraged by contributions from central government for the national good.<sup>6</sup>

What is also required is a way of taking best practice management models and using them to inform a strategic approach to ICM. The process needs to be led and funded by central government.<sup>7</sup> In particular, these best practice models have the potential to:

- clearly define ICM for a New Zealand context
- identify frameworks for environmental issue identification and prioritisation
- inform multi-stakeholder catchment management planning
- identify the causes of environmental pressures and evaluate the effectiveness of environmental responses

- evaluate the implementation of sustainable land practices including environmental and socio-economic costs and benefits
- evaluate the suitability of land use activities (farming) in relation to the natural and physical resources available
- raise public and stakeholder awareness of integrated catchment management
- establish trust between government, industry, science and the community.

Funding is a critical barrier to developing ICM more extensively in New Zealand.<sup>8</sup> Much of the funding for either research or implementation is limited and/or short-term and the benefits of ICM will not show over the short-term. A key to the development of whole farm systems is greater investment in long-term research trials (taking the Whatawhata sustainable land management project<sup>9</sup> as an example).

#### **Proposal for Action:**

It is *recommended* that:

- a) the Minister of Research, Science and Technology pay particular attention to ICM research requirements during development of the Foundation for Research, Science and Technology's investment strategy for 2004/05 to 2010/11.<sup>10</sup>
- b) local government pays particular attention to supporting and resourcing ICM initiatives when developing plans under the RMA, and annual plans and long-term council community plans under the LGA.

#### **7.2.4 Transforming drivers**

*Creating commodity systems that serve a broader range of goals will require incorporating those other goals into the structure of the rules and incentives that shape the behaviour of commodity systems. Sustainable commodity systems will need to be much richer in information, full of the details that have been so intentionally stripped away in the process of commodification.<sup>11</sup>*

For the reasons outlined in Chapter 4, commodity markets do not tend to account for damage to natural capital and community decline that can occur as a result of intensified farming production. The dialogue proposed in Section 7.2.1 will need to incorporate a discussion on how commodity markets can be adapted to address these issues and seek agreement on transforming drivers. Given the strength and complexity of the drivers, collective action will offer the greatest likelihood of success.<sup>12</sup>

A variety of policy instruments already exist that can be used to adapt drivers (see Chapter 6). New Zealand has tended to rely on non-market based instruments. The 'stick' has not been very big and neither has the 'carrot'. There is a need to broaden the range of instruments used. More comprehensive packages need to be trialled to develop understanding of the most useful combinations for New Zealand conditions. The Lake

Taupo initiative is a potentially successful example of a package using combinations of regulation, economic instruments, education and partnerships.

**Proposal for Action:**

The PCE will monitor the impact of the Sustainable Development Programme of Action, which may be expected to address some of these issues.

The PCE may also carry out an investigation into the use of economic instruments.<sup>13</sup>

### 7.3 Other research needs

This investigation has been broad-based and focused at a high level. A number of potentially important issues could not be addressed adequately (see Chapter 1 for what the investigation does not cover). In this context a number of matters have been identified which may merit further research either to understand drivers more fully or to understand the nature of the redesign required to move toward more sustainable farming.

Soil is one area where there are a number of issues which require better understanding if soils are to continue to have the capacity to support farming. These include:

- intensification and soil functioning – the ability of soils to provide ecosystem services while under pressure from intensive farming
- managing land use change – the capacity to predict the performance of new farming systems on soils not traditionally used for that type of farming
- valuing the natural capital of soils and methodologies for assessing such value
- soil functioning and soil ecosystem behaviours.<sup>14</sup>

As this report goes to print, a research proposal to address some of these issues, from four CRIs and funded by FRST, is being finalised. This is welcome recognition of the importance of soil and land use research to our ecological and economic futures.

Other issues include:

- understanding what type of farming system is appropriate (i.e. will not compromise natural capital) to a particular catchment and recognising when the receiving environment in a catchment is too sensitive for farming to occur
- the effect of rising farming asset values on how the overall farming system functions
- the effect of the rising dominance in the food system of supermarkets.

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### 7.4 Areas for focus

While there is clearly need for dialogue in the farming sector before further actions are identified and agreed to, some matters require immediate progress. The likelihood of major degradation to natural capital is too high to postpone action. Three of these are discussed briefly in the sections below.

### 7.4.1 Non-point source pollution

This investigation has clearly identified non-point source pollution from farming systems as a significant risk to New Zealand's environment and to the future of farming itself.

Remediating, mitigating and ultimately avoiding non-point source pollution must be a priority for the farming sector and a key focus for farm system redesign in order to maintain and enhance natural capital, specifically fresh water and soils.

#### Nutrient management

Nutrient management stands out as the area requiring *significant, immediate* focus, particularly in respect of nitrogen fertiliser use.

In the short-term, New Zealand needs to move rapidly to a situation where all farmers are using nutrient management plans and tools which balance nutrient inputs with plant uptake and minimise nutrient outputs which cause environmental damage. A suite of tools, management practises and policy instruments are available (some of which have been discussed in Chapter 6). Given the declining trends in the quality of the environment, particularly fresh water, it would appear the voluntary approaches used to date are not sufficient. Regulation will probably be required. The exact type of approach would be best developed with the characteristics of individual catchments in mind.

In the medium and long-term, research needs to focus on developing highly productive farming systems which do not require high levels of synthetic fertilisers in order to achieve that productivity. Expansion of soil research will be a critical part of this farm systems research.

#### Faecal contamination from animals

The other key risk to the quality of the environment and to the health of people is contamination arising from animal faecal matter. A variety of tools discussed in Chapter 6 help reduce the discharge of these contaminants into waterways. However, it is unclear whether these approaches will be sufficient. Further research is required.

#### Proposal for action:

Further work is required to advance the management of non-point source pollution, ranging from changes on-farm, to new planning provisions, to new research. A number of institutions can be expected to take a lead:

- farming industry organisations
- regional councils
- research institutions
- research funding agencies such as FRST
- MAF through the Sustainable Farming Fund.

### 7.4.2 Fresh water

Many New Zealanders highly value clean fresh water but there is strong evidence that fresh water quality is declining in farming areas (see Chapter 5). If left unchecked, over time New Zealanders will lose access to clean fresh water in the wider environment.

Farming clearly contributes to declining fresh water quality, although many other land use activities do as well. Managing fresh water requires an integrated approach across rural and urban areas and at national, regional and local levels.

Major fresh water issues that must be addressed include:

- water quality and water pollution
- abstraction and allocation
- valuing and pricing
- efficiency of water use, particularly irrigation
- poor stakeholder awareness of issues
- indicators for fresh water quality and quantity.

#### **Proposal for action:**

The current Government's Water Programme of Action is a vital policy programme that is addressing some of these issues. The PCE will monitor and report on the impact of this programme over the next few years.

### 7.4.3 Indicators for sustainable agriculture and the state of the environment

An area for immediate focus is the selection and implementation of indicators that will provide information on the sustainability of farming systems and the state of our natural capital (see Appendix 2 for a summary of sustainable agriculture indicators). As noted in Chapter 3, New Zealand does not currently have a well-developed national set of environmental and social indicators for farming. The farming sector generally has a variety of established economic and production indicators and good data ranging over long time sequences for those indicators. The dairy sector, for example, carries out detailed monitoring related to milk production while the sheep and beef sector monitors lambing rates and carcass weights. The farming sector needs similar information about the state of its natural capital which farmers can then use to adapt farming systems accordingly.

Benefits would include:

- early identification of trends in the health of the environment and potential threats to natural capital
- reliable data which informs and demonstrates the need for change to farming systems
- the capacity to clearly identify environmental quality and sustainability and demonstrate it to consumers, internationally and nationally.

This is an area of focus in which it would be appropriate for the Government to take the lead. A national framework will need to be developed and implemented. Indicators for sustainable farming will also need to be integrated with the indicators programme for the state of the environment (SOE).<sup>15</sup> SOE information is vital for placing farming within the broader environmental context. Both of these areas of focus will of course need to be integrated into the Government's work on monitoring progress toward sustainable development.<sup>16</sup>

#### **Proposal for action:**

It is *recommended* that:

- a) the Minister of Agriculture and Forestry take the lead on the development and implementation of a programme of indicators for sustainable farming
- b) the Minister for the Environment ensure that the SOE indicators programme is completed and implemented as soon as possible with a focus on a limited suite of key indicators.

### **7.5 Further PCE involvement**

The usual practice of the PCE is to back-up the release of a report by carrying out workshops and speaking engagements that provide opportunities for people to engage in the findings of the investigation. In the case of this report, this phase will be particularly vital because of the need for dialogue in the farming sector about the risks, challenges and opportunities identified in this report. In the first instance, the PCE will organise workshops in the four regions originally visited: Southland, Canterbury, Hawke's Bay and the Waikato. Other opportunities will be taken-up as and when they arise.

Some issues have been identified as matters that the PCE may investigate further. These include:

- the system of science funding and provision and how it contributes to the maintenance and enhancement of the natural capital of farming
- the Government's Water Programme of Action and other fresh water related issues
- aspects of the implementation of the RMA particularly in relation to the environmental outcomes arising from farming.<sup>17</sup>

A number of the themes raised in this report with respect to the need for research and environmental policy making have also been canvassed in a recent PCE report *Missing links: Connecting science with environmental policy*.<sup>18</sup> *Missing links* focuses on the complex issues that face environmental policy makers, and analyses ways in which science, research and technology can be used more effectively to address such issues. In doing so, it examines how the links between science, policy-making and the public interest can be strengthened to engender confidence in the way policies are developed and what they will achieve. It highlights some approaches to improving science-policy-stakeholder links, relationships and communication. Approaches such as adaptive management, integrating scientific perspectives, participatory and learning systems in the policy cycle, and the role

of 'boundary organisations' are explored. *Missing links* concludes with suggestions for forging better links and developing better processes to deal with complex environmental policy issues. Recommendations for further action are directed towards environmental policy makers in general, and the Minister for the Environment and the Minister of Research, Science and Technology in particular.