LEGISLATIVE ASSEMBLY

Standing Committee on Natural Resources Management

BETTER ON-FARM APPROACHES TO SALINITY AND DROUGHT MANAGEMENT

(Terms of Reference C and D)

Sustainable and Profitable Farming

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TERMS OF REFERENCE

(a) current disincentives that exist for ecologically sustainable land and water use in New South Wales;

(b) options for the removal of such disincentives and any consequences in doing so;

(c) approaches to land use management on farms which both reduce salinity and mitigate the effects of drought; (this report)

(d) ways of increasing the up-take of such land use management practices; (this report)

(e) the effectiveness of management systems for ensuring that sustainability measures for the management of natural resources in New South Wales are achieved;

(f) the impact of water management arrangements on the management of salinity in NSW. (tabled October 2004)

CHAIRMAN'S FOREWORD

Over the past 20 years or so, it has become apparent that the Australian landscape cannot continue to support those agricultural practices brought here by European settlers. Farming with introduced, shallow-rooted crops and intensively grazed hard-hoofed stock has worn thin the already fragile soil. We are paying the price with severely degraded soil and water resources and damage to valuable ecosystems.

In recent years, the NSW Government has developed vegetation and water reforms in an attempt to turn around the impact of unsustainable land use practices. While these reforms have met with some success at the regional level, it is time now to focus on the on-farm level.

I suspect that many landholders feel confused by the messages promoting 'productivity and the economy' on the one hand, and 'environmental protection' on the other. The good news is they can have it both ways.

Throughout this inquiry, the Committee has heard from many landholders who are both environmentally conscious and profitable. We have also heard from the government departments that support them. They tell us that protecting soils and using water more efficiently makes money.

This report looks at ways landholders can operate more sustainably at the farm level and how to encourage this change of behaviour. This includes good property planning that incorporates best science, provides for an adaptive approach, and tests and evaluates ideas. Farmers who develop property plans could be provided with financial incentives to conserve or rehabilitate native vegetation or ecological areas if required. The Committee feels that such property plans have the potential to deliver catchment targets at the farm level.

The community can't expect farmers to foot the bill for what are essentially "public good services". At the same time, farmers must recognise that today's regulatory approaches are intended to deal with sustainability in the longer term, and that without a better managed landscape productivity will decrease.

Many farmers have taken up the challenge successfully. The community's own challenge is to encourage the rest to also take up the challenge. The most crucial and most difficult part will be to sell this message: sustainability is profitable.

Hon Pam Allan MP
Chairman

EXECUTIVE SUMMARY

Background

Salinity has always been part of the natural landscape in Australia. However, since European settlement, it has exploded to be a major national problem, affecting the economy, communities and the environment.

While drought can have significant economic and social impacts, unlike salinity, it is essentially a consequence of the natural cycle (global warming factors aside). There is now, though, a realisation that the country cannot be "drought proofed". We have to accommodate "drought risk" as a normal part of life on a dry continent.

Without the acquired local knowledge of thousands of years of experience and observation, European style farming practices were simply imposed upon this "strange" land by white settlers.

Post-settlement governments encouraged the clearing of vast areas of land for wheat and to raise sheep. Areas dominated by indigenous *Eucalyptus* species and perennial, summer-growing tussock grasses, disappeared. Agricultural and technological developments were stimulated by the gold rush and rail network. By 1900, beef and dairy cattle, grain, fruit and vegetable crops added to the sector's diversity, which became further supported by irrigation water diverted to dry inland areas. Water consuming crops such as rice and cotton were introduced.

All these activities were essentially alien to the natural systems that had evolved here. Not surprisingly there have been major reactions within these natural systems. The most significant has been the emergence of debilitating salinity.

Regulatory Framework

Governments and the community have relatively recently countered this problem by developing a range of natural resource management responses. From the Federal Government through the states to local communities, a complex web of organisations and programs have evolved.

In New South Wales, since 2000, action on a range of natural resource management reforms have been taken to develop healthy ecosystems through sustainable approaches and water uses while maintaining productive land.

At the state level a number of organisations have natural resource responsibilities. These are the Department of Natural Resources, the Department of Primary Industries, the Department of Environment and Conservation, the Natural Resources Commission and Catchment Management Authorities.

Over the past decade, regional planning approaches to vegetation, water and catchment management have been increasingly refined and there is significant focus on improving outcomes for salinity through catchment planning. Community based Catchment Management Authorities have been established to lead natural resource management.

Under the most recent reforms, the Natural Resources Commission sets state wide standards and targets. These are adopted by CMAs in their catchment action plans but refined to suit their catchment and sub catchment circumstances.

Given that clearing native vegetation is linked to soil degradation and salinity, the NSW Government has implemented land-clearing controls. Property Vegetation Plans, voluntary but legal instruments proposed under the Native Vegetation Conservation Act 2003, are designed to encourage the preservation of native vegetation. They have the potential to contribute to the management of salinity and drought.

Drought management has not been an implicit part of this natural resource process. However, there is though the potential to address drought preparedness through the Catchment Action Plans as part of catchment and sub-catchment planning.

On-farm approaches to salinity and drought

Soil degradation is an indicator of inappropriate farming techniques. There is considerable evidence that, in order to address salinity, agricultural systems need to be redesigned to better acknowledge and fit to the local natural systems.

Compelling evidence of on-farm approaches (that is, redesigned agricultural systems) that are tackling salinity and can mitigate the effects of drought was provided to the Committee. These redesigned agricultural approaches are not theory but proving themselves on the ground.

They can be divided into three categories.

1. *Soil Health*

Maintaining and improving the health of soil, on which all agriculture depends, is essential. A number of systems aim to achieve this.

Conservation Farming

The main aim of "conservation farming" is to protect soil structure and health and conserve water *in situ*. On-farm approaches include maintaining from 70-100 per cent groundcover, in particular perennial native grassland pastures through better grazing and stock management, limited or zero tillage, using water more efficiently and planned de-stocking and cell (or pulse) grazing.

Landcare

Another approach aimed at redesigning agricultural systems with similar principles and objectives as conservation farming is Landcare. While its approach has sometimes been called "sustainable agriculture" Landcare Australia Limited (LAL) prefers landcare farming. An interesting feature of LAL is that it sources money from both the government and corporate sectors. As well as offering farmers the incentive of profitable landcare farming by adopting the types of approaches outlined here, it is able to assist in implementing the necessary changes. It is, therefore, acting as a organisation for change by providing "transitional" funding.

2. *Water Use Efficiency*

Water from rainfall ends up as either run-off, deep drainage, transpiration or evaporation. This has implications for water use efficiency and salinity outcomes.

Traditional farm systems are not very efficient at converting rainfall into production. From an effective natural resource management perspective, it is essential to capture rainfall where it falls because rainfall that does not end up in "production" contributes to poorer water quality, erosion, salinity or other environmental problems. Therefore, it makes sense for farmers to be able to efficiently use what rain does fall in situ and minimise the need to apply water at other times when evaporative loss would occur. A number of techniques and tools can achieve this.

3. *Using Appropriate Pastures*

One of the key causes of dryland salinity is over-watering of introduced crops. The use of more suitable and appropriate pastures is critical. This means looking more closely at more indigenous types of pastures. The use of deep rooted perennial pastures (such as lucerne) and salt tolerant crops and pastures and judicious use of trees are all methods that can assist in more effective use of water while maintaining ground cover.

Conserving vegetation at the paddock, property and regional level provides protection from drought and salinity. Implicit, therefore, in these approaches is the recognition of the importance of maintaining native vegetation. In the context of this report, native vegetation is not considered in terms of the merits or not of its removal but in terms of its role in the success of contemporary farming practices. The case studies included in the report show how, in very practical terms, these approaches are working.

No one single approach will provide the answer to salinity (or drought preparedness), however. These approaches should be seen as a suite of options (that will continue to evolve) selected to suit the particular circumstances as part of an holistic on-farm planning approach.

Encouraging Change

Salinity occurs extensively on privately owned land but its impacts are felt by the whole of the community. The whole community, therefore, has an interest in remedying the problem.

It was put to the Committee that some 40 per cent of landholders had adopted or were utilising some form of these techniques. While this figure is heartening, it also means that the complete uptake of these sustainable agricultural practices will be achieved through continued encouragement of the remaining 60 per cent of landholders. Of these, the Committee heard that two-thirds will readily take up the challenge, while one-third will respond less enthusiastically.

However, it was argued that this current rate of the adoption of redesigned agriculture techniques is not enough to deal with current problems so there is an added need for the up-take of such approaches to increase considerably.
There is clearly then a need for concerted action to further "spread the word".

The 40 per cent of landholders already changing their on-farm practices represent the "low hanging fruit" – those more readily willing to become involved in change. Winning over the remaining 60 per cent will become harder and harder.

The adoption of these farming practices will need to become simpler, relatively effortless and driven by incentives. In order to attract their support, landholders will need to be shown the benefits of changing farming approaches,.

In fact this is the key. The appropriate agricultural practices, though evolving still, are readily identifiable. The problem is finding the right mix of policies to bring the remaining landholders on board. This is the priority for the government and community to actively sell the advantages of adopting these approaches. Waiting for the landholders to act will not work. They need to take the message out to the landholders. For landholders, adopting these approaches will need to be as simple and seamless as possible and be supported by incentives and tools.

But such change should not require major investment. Rather it will require a "shift in thinking". Certainly encouragement and incentives need to predominate with compulsion as a last resort. Policies should reward good outcomes and discourage unwanted approaches.

Ways to increase the up take

The Committee has identified three elements to encourage this change of direction. The first is the need for a **property management planning** at the property level; the second is **community support** mechanisms for landholders; and the third is **reward** for taking appropriate actions.

Property Management Planning (whole of farm planning)

One of the aims of Catchment Action Planning is to promote "sustainable agriculture" through conservation farming approaches, better water use efficiency, property management and vegetation planning and using good science and good extension programs.

PVPs have been established under the recent natural resource management reforms to encourage maintaining native vegetation on individual farm properties. However, these Property Vegetation Plans fall short of being comprehensive farm management planning tools.

There does seem to be discontinuity between the catchment planning level (with its targets and objectives) and the application of natural resource management objectives at the farm level. There is no single, uniform, dedicated mechanism to deliver these broad outcomes in an integrated way at the farm level within the natural resource management framework.

Property management planning is such a tool. It is a dynamic business management tool that integrates economic, social and environmental farm management issues to suit the goals of each individual farm, including ecological, financial and succession planning.

While the Department of Primary Industries currently encourages and supports property management planning it is not a core decision-making policy tool at farm level. Its use is somewhat ad hoc with the cost of utilising this service seen as a disincentive.

When properly utilised, whole of farm planning has successfully increased the capacity of farmers to place their decision-making in a catchment or locality framework, thus increasing the adoption of sustainable land management practices. For example, better grazing and cropping practices, protection of remnant native vegetation, and water use efficiency are best implemented through the use of whole-farm or system planning. They are then able to drive the adoption of redesigned agricultural systems.

Indeed PMP has the potential to deliver catchment action plan standards at the farm level through utilising tools such as PVPs and conservation agreements.

There is, in the Committee's view, a significant policy tool gap between the catchment planning and delivery of objectives at the on-farm level. Property Management Planning has the potential to fill this gap. This needs to be adopted as a matter of principle and ways (incentives) found to ensure as wide an adoption as possible. It should be incentive driven.

Every property should develop one and it should become as much a part of the farm operation as checking the rain gauge.

Drought planning can also be addressed within whole of property planning. Recognising drought as part of the natural environment in which farmers operate and encouraging landowners to plan for droughts has become accepted policy. The drought tool currently under development needs to be finalised as a matter of urgency.

Community Support

The community has accepted the need to address salinity problems and has come to expect a concerted effort from those best placed to bring about change – the landholder. This expectation must, however, come with support. In the long term, the measure of the community's commitment to address the problems of salinity will be its support for change. Both landholders and the community should share responsibility for land-use management.

Support can be in a number of forms including knowledge, financial and government service.

Knowledge

Knowledge is an indispensable tool in managing and decision-making in the contemporary world. Farm operations are no exception. Farmers cannot make and implement decisions on the best ways to manage their operations without relevant and up-to-date knowledge, skills and information.

Education and Training
A number of agencies and organisations provide extension services and training programs for landholders. The range and benefits of such courses need to be clearly articulated to landholders. These need to be backed by appropriate incentives to encourage landholders to take part.

Science and Research
Understanding how to best manage salinity is a key concern for effective remediation.

The redesigned agricultural systems identified in the report, while clearly effective, are still evolving. This evolution is an adaptive learning process in which science will play an important role.

Governments, landholders, industry and research groups need to keep working together to develop better outcomes for salinity.

Funding
Funding for the remediation of salinity and for aspects of drought relief come from both federal and state sources as well as some corporate areas (through Landcare).

Funding is available for a range of projects and initiatives at the on-farm level. There has been a concerted effort to deliver funding over recent years. There is a need to ensure that it is used efficiently and effectively and properly co-ordinated and targeted.

Networks (Landholder Support)
A crucial element in "spreading the word" to bring about behavioural change is to have the message transmitted by people who have credibility and cache. Farmers are more likely to learn from other farmers. Certainly farmers by nature are not inclined to easily take advice from bureaucrats. In this regard an important tool is to have farmers advising and teaching other farmers about the advantages and benefits of new on-farm approaches. Extension services provided by government agencies should adopt this principle where ever possible.

Government Service Delivery
State agencies in the natural resource management area have undergone a range of reforms in the last few years. Thirteen new Catchment Management Authorities have been set up along with the Natural Resources Commission. These work alongside the three state agencies and local governments. In addition community organisations such as Landcare Australia and Conservation Farming groups are involved in delivering services.

This diversity and complexity of agencies, programs and services must present a confusing and complex array of options for any landholder who might be setting off to seek advice on how to improve his or her on-farm operations. Indeed the Memorandum of Understanding developing between natural resource management agencies is and indication that there is potentially a problem with coordination.

The Committee has no doubt that all the agencies are well intentioned but the Committee cannot help but wonder if current arrangements would not be extremely confusing to landholders toying with the idea of seeking help in changing to more sustainable practices. The Committee is concerned that at the most important level – the on-farm level - optimum outcomes might not be achieved because of confusion these arrangements might be creating.

It was put to the Committee that agencies needed to improve their ability to work together to facilitate better land use approaches, although it has to be acknowledged this was not a consistent message.

Given that persuading and convincing the remaining 60 per cent of landholders to adopt more suitable agricultural practices will not be a simple task, it is essential to ensure there are no unnecessary obstacles placed in the way. Should the landholder speak to DPI, the local council, their local CMA or Landcare? Such choices could and would be confusing.

Access to government support, in the form of extension services, incentives, programs and advice needs to be simple and easy. There needs, therefore, to be a single point of contact, a one-stop-shop, for all natural resource information.

This would not require a new bureaucracy but coordination and cooperation on the part of the existing agencies. The Committee is not proposing a reorganisation but simply co-operation to ensure that information on all government services are readily, easily and simply available to those who are prepared to take the first step. This might be simply a 1800 phone number. The existing agency memorandum of understanding could be developed to achieve this cooperation.

Information Kit

To assist in this process of unravelling the maze of agency information (including programs, funding, incentives and government extension services) there needs to be developed a comprehensive Information Kit or Service Directory. This will provide a summary of all the tools and services available and where they can be accessed.

Outreach

As pointed out above, it will continue to become harder and harder to get landholders to adopt these innovative practices.

The most important element in the strategy to encourage the take-up of these approaches will be to take the message out to landholders. To move to the next level will require getting out and talking to landholders, to sell these ideas. This will mean knocking on doors or developing other strategies to "intercept" those who need to be encouraged to adopt more suitable agricultural practices. A well structured "outreach" program will be essential.

Reward

Rewarding farmers for adopting sustainable practices will be the most effective way to drive change. The nature of the reward depends on a complex set of factors. The community should contribute where there is a demonstrated benefit to the whole

community. Where the landholder ultimately benefits from the change, the landholder should pay. However, initial transition costs might discourage the best action and it might therefore be in the community's interest to contribute in this situation with some "transition" assistance. Rewards then could be financial such as payments, grants, low-interest loans, services (advice, training) or public recognition.

Profitability

The most significant reward to change to these redesigned farming systems is their proven profitability. Numerous case studies and submissions demonstrated the economic benefits. This might be called an "inbuilt initiative".

However, while such approaches might offer better financial outcomes down the track, there might well still be a disincentive to change approaches if the short-term "transition" costs are deemed by the landholder to be prohibitive. The community needs to consider the merits of supporting the landholder with some short-term financial support.

Environmental services payments

Environmental services are those goods and services to the community that are provided by the environment. Environmental service payments are financial rewards to landholders for maintaining environmental services on land that in their own right might have been uneconomic to the landholder.

Otherwise known as public-good conservation, this approach is based on the notion that the wider public should bear the costs of actions to promote public-good environmental services, for example, biodiversity, threatened species preservation and greenhouse gas abatement. The government, on behalf of the community, purchases "public good conservation" from farmers that the farmer individually might find uneconomic. In the case of salinity this provides landholders a positive incentive to, say, retain and manage native vegetation which then becomes an asset rather than a liability.

This also encourages preventative action rather than taking action after the event.

Farm Rating

As part of a policy framework to reward the adoption of on-farm practices that reduce salinity and prepare for drought, there needs to be a way of encouraging landholders to initiate action and then rewarding them for progress made. A rating tool or index of property sustainability should be developed to use as an incentive for property improvement. Landholders can be rewarded, financially (through access to further funding) or other means for attaining agreed rating levels. A rating system such as this could also be used to develop consumer support for sustainable agricultural practices.

Model Farms

The number of case studies provided to the inquiry highlights just how many farm operations exist that show these on-farm approaches do indeed work. There is a need to maximise the benefit of these operations. Farmers who have implemented sustainable farming practices should be encouraged to set up a network of farms to

provide support and encouragement to each other and to promote sustainable agriculture to other local farmers to assist adoption of good stewardship practices.

These network farms would need to achieve a specified rating and thus be eligible to receive some form of payment for their activity or involvement.

Acknowledgement

Not only should good practice be financially rewarded, it should also be recognised as widely as possible throughout the community. This can be achieved through awards, the media, and access to further levels of funding. Wherever possible these acknowledgements reach all areas, including urban areas. The SEDA energy awards might provide a model. Acknowledgement should be at a high level, perhaps via a Premier's Award.

LIST OF RECOMMENDATIONS

Property Planning

1. Property Management Planning (or whole farm planning) form the institutional basis for land use management at the property level, to complete the chain from state targets to on-farm implementation. Property management plans will include sustainable agricultural objectives. They will not be mandated but encouraged and facilitated.

2. Catchment Management Authorities will become the approval authority for property management plans to ensure they align with catchment action plans and objectives. The CMAs will work closely with the Department of Primary Industries to develop this policy.

3. Catchment Management Authorities will dedicate a fixed proporton of their funding to the uptake of property management planning.

4. Incentives and assistance options are to be developed and to be available to encourage landholders to prepare and implement property management plans.

5. Community Service Officers, trained in whole farm planning, will prepare the plans with landholders.

6. In circumstances where development applications are required, property management plan be one of the consent requirements.

7. Natural Resource Commission to audit and report annually on the rate of take up of property management plan in each Catchment Management Authority.

8. That Property Management Plans not be approved by the CMAs, unless they address clear outcomes that provide for sustainable agricultural techniques

Support

9. That the Natural Resource Commission to oversee the development of coordinated government approach, based on the existing Memorandum of Understanding, to actively encourage and facilitate landholders to adopt conservation landcare approaches by the establishment of an “on-farm advisory service” in each catchment (CMA) area. This “on-farm advisory service” will be the point for all inquiries from landholders and the public for information on state agency programs and services relating to on-farm land use.

10. That the Natural Resources Commission prepare an "information kit" for landholders relating to sustainable agricultural techniques. The kit will be a comprehensive directory of all government and community services, extension programs, incentives and funding available for landholders as they relate to on-farm salinity and drought approaches.

11. The "on-farm advisory service" be tasked with making direct contact with all landholders to explain benefits and advantages of, and services available to assist in, adopting more salinity and drought friendly practices. This contact program should:

    a. Focus on encouraging property management planning
    b. Utilise trained property management planners, particularly those with a background in farming
    c. The "on-farm advisory service" be notified by councils of transfer of rural properties so that contact can be immediately made with the purchaser.

12. Catchment Management Authorities to develop a "tool box" of on-farm approaches aligned to their catchment and sub-catchments targets and objectives to address salinity and prepare farms for drought.

13. The Natural Resources Commission develop a joint program with the conservation farmers groups to identify research priorities as needed

Rewards

14. That the Government develop a policy to remunerate landholders for the environmental services provided by their farming sustainable operations that meet agreed outcomes. Programs to be audited from time to time by the NRC.

15. That an objective rating of the sustainable salinity performance (including salinity and drought preparedness elements) of individual properties be developed. The rating system can be used to:

    a. Reward landholders through further access to services;
    b. A tool for consumer support of for sustainable farming.

16. That funding be available to landholders who wish to adopt sustainable agricultural approaches to assist with transitional costs. This could include low interest loans.

17. That a network of accredited model "open farms" be established to provide working examples for interested landholders, as well as support and encouragement for each other. Owners of accredited "open farms" should receive community payment for their educational activities.

18. That individual and group on-farm innovations and initiatives in natural resource management should be acknowledged at regional events and an annual metropolitan event (say a Premiers Award).

Chapter One - Introduction

1.1 This is a report into the Committee's terms of reference C and D.

1.2 Salinity and drought are two major problems facing contemporary farmers and indeed the whole Australian community.

SALINITY

1.3 Salinity has always been part of the natural landscape in Australia. However, the land use changes of the past 200 is the primary reason for rising salinity in Australia.

1.4 Agricultural, industrial and urban development have caused salinity to rise as natural ecosystems and changed hydrology have accelerated the movement of salts into rivers and onto land.[1]

1.5 Research conducted by the CSIRO highlights that existing agricultural practice results in consistent and widespread leakage throughout the Murray Darling Basin. The flat, salty Australian landscape tends to grow trees and grass. Introduced crops have a much greater capacity for contributing to salinisation through leakage than native species.

1.6 According to research by Walker et al[2] current agricultural systems leak between two and five times more than the native vegetation it replaces. The report concluded that extending dryland salinity is fundamentally caused by the limited capacity for groundwater systems to accept the amount of leakage below existing farming systems.

1.7 This has led to the paradoxical situation that, while low soil productivity and lack of water and nutrients have constrained development in Australia, over-watering and increased nutrient loads are the cause of existing landscape issues such as salinity.

1.8 Therefore, agriculture and farming systems need to be redesigned to ensure suitable water flows, nutrient and carbon cycling.

1.9 In recent years, in recognition of these problems, considerable effort has gone into developing a better understanding of the landscape, so that farmers can continue to support themselves and the wider community with goods and services on which the nation has come to depend.

1.10 Similarly, the past two decades has seen both recognition that existing clearing practices are causing considerable degradation of the natural resource base, which ultimately impacts upon economic and social values and changes in attitudes at both the community and the government level.

[1] Walker G, Gilfedder, M and Williams, J. Effectiveness of current dryland systems in the control of dryland salinity, (date) http://www.clw.csiro.au/publications/Dryland.pdf).
[2] Ibid

DROUGHT

1.11 Drought has a number of impacts on farmers, their families and the wider community. For example, farm incomes are reduced, produce for markets shrink, prices rise and fragile landscapes become even more fragile and at risk of damage.

1.12 The issue of drought has significant political implications. The NSW Farmers Association recently held a drought summit in Parkes to highlight the plight of the rural communities as a consequence of the drought.

1.13 But attitudes are changing here too.

1.14 Drought is being recognised as simply a part of the natural cycle in Australia and farmers, and the community, need to recognise and accept this, adjusting behaviour accordingly.

1.15 Rather than trying to "drought proof" the land, landholders are developing techniques and approaches that enable them to manage and survive extended periods of dry in reasonsable physical and financial positions.

Comment

1.16 Salinity and drought on farms have wide ranging impacts upon the whole community and the landscape. It is vital that practices that reduce and turn around these impacts are adopted. It is the Committee's aim in this report to look at such practices and make recommendations accordingly.

1.17 This report identifies a number of practices and approaches at the farm level that are proving successful in reducing and turning around salinity and mitigating the effects of drought. It then goes on to identify approaches that will encourage the take up of such practices.

1.18 The report is structured in the following way:

- **Chapter Two** sketches out the "traditional farming practices" introduced and expanded from the time of European settlement.
- **Chapters Three and Four** provide background, respectively, on the institutional frameworks and regional planning processes and state targets that overlay salinity action and, to a lesser extent, responses to drought.
- **Chapter Five** describes a range of on-farm approaches that have been put to the Committee as methods to address salinity and mitigate drought effects.
- **Chapters Six, Seven, Eight and Nine** discuss ways to better encourage the uptake of these practices.

Chapter Two - Brief history of agriculture in New South Wales

> *There was no land policy, no selection of men who understood farming ... Such things did not matter, so long as the 'infamous assemblage' was removed from England.*
>
> Roberts on the First Fleet[3]

2.1 In discussing ways to address salinity and drought, particularly at the farm level, it is useful to bear in mind the history of Australian agriculture. The approaches and methods adopted in the past are coming back to haunt us in the present.

ARRIVAL

2.2 Australia's first white inhabitants travelled 12,000 kilometres to live in a land about which they had no knowledge. The imposition of the agricultural management practices they brought with them — developed to suit the wet, fertile landscapes of England — were to have a devastating effect on large parts of the Australian landscape. The history of farming in Australia is littered with stories of exploitative farming followed frequently by the degradation of the land and the impoverishment of the farmers".[4]

2.3 Foremost among King George III's instructions to Governor Arthur Phillip were to "proceed to cultivation of the land ... and with all convenient speed transmit a report of the actual state and quality of the soil ... and the most effectual means of improving and cultivating the same".[5]

2.4 At the time of the first European settlement the indigenous tree cover of the continent consisted predominantly of more than 500 species of evergreen Eucalyptus. The most common indigenous species of grass was the perennial, summer-growing tussock grass, *Themeda australis*, commonly known as kangaroo grass, which is closely related to the *Themeda triandra* that is prevalent in the grazing lands of South Africa.

> "To the first arrivals from Europe [the indigenous vegetation] offered few products that were considered useful except wood for timber and fuel, and food for livestock".[6]

2.5 The King's exhortation to "improve" the land proved to be problematic. Australia's soils are commonly deficient in phosphorous and nitrogen. In many parts there are deficiencies of trace elements (particularly copper, cobalt, zinc, and molybdenum). Such deficiencies were not recognised until long after the land was cultivated.[7]

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[3] Sir Stephen Roberts,. *History of Australian Settlement 1788-1820*, 1968, p 3
[4] www.austehc.unimelb.edu/au/tia/001.html
[5] A.G.L Shaw, "Colonial Settlement 1788-1945" in Williams, D.B. (ed.). *Agriculture in the Australian Economy*, 1990, p1
[6] www.austehc.unimelb.edu.au/tia.001.html
[7] ibid

2.6 Even the First Fleet, landing in the relatively benign environment of Botany Bay, found that members of Captain Cook's expedition had oversold the quality of the soils.

2.7 Having moved on to Port Jackson, they found that soils in the vicinity were not suitable for the cultivation of cereal crops.

2.8 In addition the settlers were ill prepared for the challenge. The First Fleet carried 12 ploughs but no animals to draw them. Nor was there any one on board with any idea of how to tackle the land. Despite the King's wish that the land be cultivated, these ships did not carry a single farmer. The new inhabitants had to contend not just with poor soils, but poor tools, expensive supplies and unskilled labour.[8]

2.9 In those early days of colonisation, the Governor had sole authority on instruction from London to make land grants. Initially, in 1787, such grants were made only to liberated prisoners. The grant was capped at 30 acres for single men and 50 for married men, with an additional 10 acres per dependant child. Two years later, grants were extended to free migrants and serving marines (to a maximum of 100 acres). Land was commonly granted on the proviso that a certain proportion of the land would be cultivated.[9]

2.10 The British inevitably saw Australia's landscape (which initially meant New South Wales) through European eyes. But these new settlers, who had left home during the early throes of the industrial revolution, were not dealing with a country with a centuries-long history of development. Instead they were confronted with a land that had barely been disturbed at all except by indigenous peoples who for tens of thousands of years had 'cultivated' the land in a way that had left it, in the eyes of many commentators, changed but virtually unscathed:

> "When Europeans came to Australia, the soil had mulch of thousands of years. The surface was so loose you could rake it through the fingers. No wheel had marked it, no leather heel, no cloven hoof. Digging sticks had prodded it, but no steel shovel ever turned a full sod. Our big animals did not make trails … Every grass-eating mammal had two sets of sharp teeth to take a clean bite. No other land had been treated so gently".[10]

2.11 It was in this context that the British government sought to add their newest colony to the list of outposts which were established not only to extend the Empire's influence but also its wealth. Clearly, the British expected a return on their investment in Australia:

> "A most significant European vision of the Australian continent was that of terra nullius … Europeans found an Australian landscape … that bore no direct evidence that it was used, made productive or converted from its primeval state. By contrast, there was an Anglo-Celtic view of the achievement of perfectibility in the rural landscapes of Britain with their blend of natural and human design".[11]

[8] Shaw in Williams (ed.), p.1.
[9] Year Book Australia – Agriculture – Gross value of agricultural commodities produced
[10] Roberts, op. cit., p22
[11] Frawley, K. "Evolving Visions" in Dovers, S. *Australian Environmental History*. 1994, pp. 60-61(

2.12 Clearly, though, there has been an economic pay off from these developments.

EARLY SETTLEMENT

2.13 In the decades following European settlement, farms sprang up around the new settlements, mainly growing wheat crops and raising sheep introduced from Europe. Throughout the 1880s new tracts of land were opened up through Government initiatives. Farmers and squatters gradually moved inland and occupied huge areas of pasture. The introduction of railways in the 1850s meant farmers in remote areas had vastly quicker and better transport for their produce back to the cities and major ports. Massive areas of forest and scrub were cleared for pasture along Australia's coast and inland.[12]

2.14 It soon became apparent that, in the face of infertile soils and a dry climate, the production of high quality wool was a more appealing business prospect than cultivation. The wool industry soon dominated Australian agriculture.

2.15 But it was not without its problems. The grasses which the new settlers found were mostly deep-rooted perennials which were well adapted to the poor topsoil. Stock management methods hastened the destruction of native grasses, with cloven hooves, hitherto unseen in Australia, cutting up the ground which was then hardened by rain.

2.16 The resulting degradation came swiftly:

> "Settlers first took their stock to the lovely Hunter River in 1821. By 1826 they had eaten the country bare. In 1859 botanists inspected it for the NSW Government. On farm after farm they found no Australian plants. All that grew were imported weeds."[13]

2.17 In the 1840s, John Robertson described his newly acquired property at Wando Vale:

> "… the grasses were about four inches high, of that lovely dark green; the sheep had no trouble to fill their bellies; all was edible; nothing had troubled the grass before them."

2.18 He also described their deterioration over a period of a few years:

> "Many of our herbaceous plants began to disappear from the pasture land; the silk grass [presumably one of the *Vulpia* species; these are non-native annual grasses of no grazing value] began to show itself in the edge of the bush track, and in patches here and there on the hill. The patches have grown larger every year; herbaceous plants and grasses gave way for the silk-grass and the little annuals, beneath which are annual peas and die [sic] in our deep soils with a few hot days in spring, and nothing returns to supply their place until later in the winter following."

2.19 This deterioration of grazing quality over the first 20 years of settlement appears consistent over much of inland Australia. The decline was hardly noticed from generation to generation. Yet today quality native grasslands are

[12] www.cultureandrecreation.gov.au
[13] Rolls, E. "More a new planet than a new continent" in Dovers (ed.), *op cit.*, p. 26

very rare, most being reduced to the hardier, less palatable species and containing a significant proportion of non-native annual plants".[14]

2.20 With the benefit of hindsight, it is easy criticise the early settlers for their naïve treatment of the land, but that temptation should be resisted. The mistakes they made are understandable, given that we still struggle to find a balance between productive agriculture and healthy ecosystems. Eric Rolls has suggested that if one were to send a group of modern scientists in a time machine back to Australia the 18th century, they would likely make as many errors as the settlers:

> "What manner of men caused this destruction? They were not greedy or ignorant, many of them had a background of hundreds of years of good farming. They could usually estimate pasture, its stocking rate and recovery time, but it was beyond human achievement to assess this land correctly. It was more a new planet than a new continent".[15]

EXPANSION

2.21 The gold rush of the mid-nineteenth century, which attracted thousands of people hoping to strike it rich, was a massive fillip for the economy. The boom included a significant expansion of the agricultural sector.. By 1857 in Victoria there were 8,000 farmers, more than double the number only a few years earlier. In the decade between 1850 and 1860, the land under crop in South Australia increased sevenfold.[16]

2.22 Technological developments also had a marked effect on the amount of land under cultivation. The advent of rail combined with significant new tools such as the mechanisation of the wheat industry, refrigerated transport, mechanical shearing, and plant breeding allowed farmers to cultivate less fertile lands further inland, where rain was less plentiful than nearer the coast.[17]

2.23 The continent's area under cultivation increased from 1.2 million acres in 1860-61, to 9.5 million in 1906-07, about half of which was given over to wheat.[18]

2.24 At the same time, stock numbers were soaring. From 1860 to 1894, the sheep population jumped from 20 million to 100 million and cattle from 4 million to 12 million.[19] Severe drought over the next decade led to sheep numbers falling dramatically, to 40 million, a sharp pointer to the folly of exceeding resource and environmental limits.[20] Indeed, the introduction of non-native animals had a profound effect on the landscape:

> "The plants had never had to push their roots through hard ground, had never had their leaves bruised by cloven hooves, they had never whole bunches of leaves torn off between a set of bottom teeth and top jaw pad. They died."[21]

[14] Extract from Farming without farming by Darryl Cluff in Sub 84:Stipa Native Grasses Association Inc
[15] Rolls in Dovers (ed.), op. cit., p27
[16] Shaw in Willams (ed.), op cit., p5
[17] Fry, K. "Kiola" in Dovers (ed), op cit; Shaw in Williams (ed.), op cit.
[18] Year Book Australia, op. cit.
[19] Shaw in Williams, op cit
[20] Dumsday et al, in Williams, p172
[21] Rolls in Dovers (ed.), op. cit., pp 25-26

2.25 The importation of game animals for sport to be enjoyed by the more prosperous settlers had a disastrous effect on the landscape. Rabbits in particular ran riot and continued to plague farmers until the introduction of myxomatosis in the 1950s.

2.26 Bad laws also played in their part in the deterioration of the landscape, particularly from the 1830s to the 1850s.

> "Graziers could not spell any parts of their runs. If a commissioner or land inspector found an area without stock, he immediately declared it unoccupied and allotted it to someone else."[22]

TWENTIETH CENTURY

2.27 While wool and wheat still dominated agriculture in 1900, beef and dairy cattle and grain, fruit and vegetable crops were adding to sector's diversity. At this time 14 per cent of Australia's total population (not including the indigenous population, who were not included in the Census) was working in the pastoral and agricultural industries.

2.28 Today, only three per cent of the country's population is now employed in farming, a reflection of the sector's dwindling importance to the national economy.[23] Of course, the figures are much higher in regional areas.

2.29 The Australian Government used bounties to encourage production while placing tariffs on some goods to discourage imports. By the early 20th century, agricultural output had grown to the point where Australia had become a major exporter of food.

2.30 While the agricultural sector's importance to the growth of Australia's economy in its formative years cannot be denied, it came at a cost.

2.31 Land clearing continued almost unabated, with diminishing returns:

> "Land opening with little prior economic or environmental analysis continued into the 1960s. Similarly, the forests were cut to a level beyond sustainability into the 1970s … Water management projects (especially dam building and river regulation) were one of the most visible examples of 'wise use' of scarce resources. They were also potent symbols of national development—but they were constructed largely in ignorance of environmental effects and, in the case of irrigation, little analysis of the capacity of agriculture to pay capital and running costs."[24]

2.32 The past 50 years has seen as much land cleared (Australia-wide) as in the 150 years before 1945. An estimated 500,000 ha of native vegetation (including regrowth) has been cleared for agriculture in 1990.[25] Prior to European settlement in New South Wales, 52 million ha was covered by forest or woodland. Currently, only 21 million ha remain.

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[22] ibid., p 26
[23] www.cultureandrecreation.gov.au
[24] Frawley in Dovers (ed), op. cit. pp. 66-67
[25] Smith, Stewart. *Native Vegetation: Recent Developments*. A Briefing Paper to NSW Parliament. 2003.

2.33 In the interwar years, Australia introduced soldier settlement schemes for both British and Australian soldiers to encourage young people to farm land. These schemes were considered a repayment of the debt owed by the nation to its soldiers, but equally were driven by governments' desire to foster intensive land usage. The settlement schemes were the responsibility of the various states, who later paid a high price for these schemes; much of the land set aside for them was marginal farming land on which it was not possible to establish a business which would last generations:

> While preference was given to men with some experience of agriculture, in most cases this was a farm labourer or employee on a large property. Few had the experience of managing and running a farm enterprise. …It has generally been acknowledged by contemporaries and later historians that the soldier settlement experiment of the interwar period was a dismal failure.[26]

2.34 A crucial factor in the failure of the scheme that while demand for produce was declining while supply was increasing. Before World War I, the industrialisation of Western European economies, in particular especially Britain, Germany and France, and the resulting growth in urban areas, fuelled huge demand for farm output. But trading relations had changed dramatically after the war "with a fundamental shift in the terms of trade:

> Essentially market forces of demand and supply for primary products were moving in opposite directions … settlers were being encouraged to produce more in a market that was already over supplied.[27]

Irrigation

2.35 Given that Australia's climate is one of the driest on earth, and that this is exacerbated at fairly regular intervals by protracted droughts, it is not surprising that Australian authorities embraced irrigation schemes with enthusiasm. Irrigation meant that water could be diverted from higher rainfall areas near the coast to drier areas inland, encouraging more people to settle away from major coastal cities. The establishment in 1887 of irrigation settlements in Renmark, South Australia and Mildura, Victoria are examples of early moves in this direction. The trend continued into the early 20th century. The Murrumbidgee Irrigation Area (MIA) in New South Wales, on which work began in 1906, is one of the largest. The Burrinjuck Reservoir was built in 1927 to supply water to the MIA, the first major reservoir built for this purpose.

2.36 The Murray Darling Basin is the Goliath of Australian irrigation, accounting for 71.1 per cent of the total area of irrigated crops and pastures in Australia. There are almost 15,000 farms with irrigated crop and/or pastures, more than a quarter of the total number of farms in the Basin, and nearly half of all Australian farms with irrigation. Some 70 per cent of all water used in Australia is used by irrigation in the MDB.

[26] Monica Keneley, "Land of Hope: Soldier settlement in the Western District of Victoria 1918-30", School of Economics, Deakin University at www.jcu.edu.au/aff/history/articles/keneley2.htm
[27] www.jcu.edu/au/aff/history/articles/keneley2.htm

2.37 In the MIA, estimates are that up to 80 per cent of the MIA is affected by shallow water tables, with up to 5 per cent of the area having gone out of production because of waterlogging and salinity.

2.38 According to the Murray Darling Basin Commission:

> Australia has long had a low rate of return on its investment in irrigation, largely due to the fact that the bulk of the irrigation water used in the southern Basin supports mixed farming and low-value commodities.[28]

Cotton, rice and grazing

2.39 The role of Australia's cotton and rice farming and its grazing is currently the subject of much debate. Farmers argue that they are among the most efficient in the world, while conservationists question the wisdom of these industries in a continent as dry as this one.

2.40 The Australian rice industry began when Isaburo (Jo) Takasuka, having arrived from Japan with his family, was allocated 200 acres of flood prone land on the Murray River near Swan Hill, Victoria. By 1914, Takasuka had produced a commercial crop of 'Japonica' variety rice. In 1923, seeds were offered to settlers and an initial harvest reaped 222 tonnes. By the mid 1920s, Australian rice was being exported and the industry grew with the development of a co-op mill and the establishment of a rice marketing board.

2.41 Large-scale rice farming, particularly in the central and south of the bioregion, and the technology used to produce rice, are largely driven by the Japanese export market. On average, farmers require 2,000 litres of water to produce a kilogram of rice. The Rice Growers' Association maintains that growers have improved their water efficiency by 60 per cent in the past 10 years, and that the industry is the first Australian agricultural industry to initiate a regional biodiversity plan and a greenhouse reduction strategy.[29]

2.42 Cotton was introduced by the First Fleet, and production grew quickly enough to fill the gap left by US sources during the American Civil War. A hundred years later, the industry was virtually non-existent, and in 1963 a bounty was introduced to encourage growers (later withdrawn).

2.43 More than 90 per cent of Australian cotton is grown under irrigation. Since 70 per cent of the nation's cotton is grown in NSW, that is a significant issue in this State. Cotton is almost exclusively an export commodity; more than 90 per cent of Australia's cotton is sold overseas. In 1999-2000, Australia produced a record harvest of 3.2 million bales.[30]

2.44 Cotton Australia says growers have improved their water efficiency by 11 per cent since 1999; even so, as the MDBC has noted, it is not the most efficient crop, though it is better than rice or grazing:

> In terms of returns per ML of water used, "fruit, vegetables and dairying are among the most efficient (commodities), rice and grazing are the most inefficient, with cotton in between (though closer to the efficient group)."

[28] http:/www.mdbc.gov.au/education/encyclopedia/irrigation/irrigation.htm
[29] www.rga.org.au
[30] www.cottonaustralia.com.au

2.45 The MDBC says "there is little doubt that irrigated grazing needs very careful examination if its large scale continuation is to be justified".[31]

SALINITY

2.46 One of the most serious outcomes of European farming practices in Australia has been salinity, which has affected vast tracts of farming land as well as rural towns as large as Wagga Wagga.

2.47 Large parts of the Australian landscape are naturally saline, with salts derived from weathered rocks and salt transported by the wind from the coastal zone being stored below the root zone of native vegetation. Floodwaters periodically flushed accumulated salts from within the soil and into the rivers, which would then transport salts downstream, to be deposited on low-lying floodplains, or into the sea.

2.48 A lack of understanding of the workings of the natural cycle in Australia at the time of European settlement meant that the environmental consequences of the introduction of Northern European farming practices went unremarked. It was not until Australia's population expanded that the cumulative adverse effects of these practices on the land's fragile natural resources (with its nutrient poor soils and considerable environmental variability of "drought and flooding rains") made themselves apparent.

2.49 One example of the changes to the landscape that these practices have brought about is clearing. Clearing native vegetation to plant introduced crops and pastures with different water use patterns, regulating the naturally-evolved flow of rivers to provide a constant water source for extraction and irrigation, and the use of inappropriate drainage and water systems has seen the nation's waterways and associated floodplain areas increasingly salt affected.

IMPACTS OF SALINITY

2.50 Salinity is a problem for a number of reasons. Increasing salinity is predicted to threaten agricultural production, water supplies and ecosystems and there is grave concern that if left unchecked, the natural resource base on which agriculture depends will continue to degrade. [32],[33]

2.51 At the 2004 National Landcare Awards, Mr Brian Scarsbrick, CEO of Landcare Australia, said that "salinity isn't called the white death for nothing. It can kill everything in its path – including communities".[34]

2.52 Salinity is an economic 'externality' caused by current land use practices, which has unanticipated side effects on both the environment and other water users. The lack of information and knowledge in this area has meant it is difficult to factor in the potential impacts of salinity as part of the economic equation.

[31] www.mdbc.gov.au/education/encyclopedia/irrigation/irrigation.htm
[32] NSW Salinity Strategy, op cit.
[33] Wentworth Group of Concerned Scientists, *Blueprint for a National Water Plan*, 2003.
[34] www.landcareaustralia.com.au/MediaDisplay.asp?ArticleID=92

2.53 In NSW, most salinity impacts occur in Australia's largest and most extensive river drainage system and most productive agricultural area, the Murray-Darling Basin, which drains the southern part of Queensland, New South Wales (including the Australian Capital Territory) and Victoria and is composed of two main channels:

- the Darling River - which drains into the Menindee Lake System; and,
- the River Murray - which drains to the Great Australian Bight.

2.54 The Murray-Darling Basin provides over 41 per cent of the gross value of national agricultural production.[35] However it is also the most regulated river system in Australia, with nearly all of the water from the Basin being diverted and used for agricultural purposes.[36]

2.55 While salinity currently affects less than 1 per cent of agricultural land in Australia, where it does occur, the yield losses are large.[37]

2.56 Just as critically, if mitigation practices are not implemented, salt loads are predicted to increase for many catchments, with a predicted risk of increased area impacted by salinisation, ranging from approximately 152,000 hectares to 1.3 million hectares by 2050.[38]

2.57 By 1987, 96,000 hectares of the Basin's irrigated land were estimated to be salt affected, with 560,000 hectares of land demonstrating water tables rising to within two metres of the land's surface.[39] In 2000, 89,000 hectares of land in NSW were affected by production yields limited by salinity (predicted to rise to 286,000 hectares by 2020) and 180,000 hectares of land in NSW demonstrated shallow water tables or were affected by dryland salinity.[40,41]

2.58 In NSW, more than 90 per cent of the salinity impacts occur in the Murray, Murrumbidgee, Lachlan, Macquarie and Hunter river catchments. The Hunter and Hawkesbury-Nepean river catchments have the most extensive areas of existing dryland salinity or shallow groundwater of NSW coastal catchments.[42]

2.59 It is also predicted that rising water tables will continue to occur in large areas of the Murrumbidgee and Murray catchments and considerable areas of the Lachlan, Castlereagh and Macintyre catchments. The most significant increase is expected in the Lachlan, Murrumbidgee and Namoi rivers, with salinity in the Bogan, Macquarie and Namoi catchments expected to reach levels above

[35] Murray-Darling Basin Ministerial Council, Draft Integrated Catchment Management in the Murray-Darling Basin 2001-1021: Delivering a Sustainable Future [September, 2000], page 1. In, Farrier, D. *Integrated Natural Resources Management in the Murray-Darling Basin, Australia*: The Dryland Salinity Lever, Centre for Natural Resources, Law and Policy, University of Wollongong.
[36] Murray Darling Basin Ministerial Council, *The Salinity Audit*, December 1999, page 2.
[37] National Land and Water Resources Audit, *Australians and Natural Resource Management 2002*, March 2002, page 89.
[38] Ibid.
[39] Ibid.
[40] Ibid.
[41] Ibid, page 91.
[42] National Land and Water Resources Audit, *Australian Dryland Salinity Assessment 2000*, January 2001, page 16.

the World Health Organisation's recommended limit for potable drinking water [800 μ/cm].[43]

2.60 Therefore, as salinisation impacts on both environmental and agricultural values, it is increasingly seen as both a natural resources and an economic issue. While salinity is having a negative impact on the nation's land and water resources, the nation's infrastructure in some areas is also being adversely affected. It is predicted there is a risk that public costs arising from the effects of salinity could be as much as $500 million per year over the next 20 years.[44]

2.61 Managing the impacts of salinity has thus become a priority for both the Commonwealth and State Governments.

SALINITY ON FARMS

2.62 The Australian Bureau of Statistics 2002 study of Australian farms collected information from farmers on the extent of land showing signs of salinity, as well as the strategies used by farmers to manage and prevent salinity.

2.63 The main findings of the report were:

- Almost 20,000 farms and 2 million hectares of agricultural land were reported by farmers as showing signs of salinity;
- Nearly 30,000 farms have implemented salinity management practices;
- Of the agricultural land showing signs of salinity, 800,000 hectares is unable to be used for agricultural production;
- Non-irrigated farms accounted for 1.8 million hectares or 93 per cent of the agricultural land showing signs of salinity;
- Farms primarily involved with the production of beef cattle, sheep and grains accounted for 16,000 or 82 per cent of the farms showing signs of salinity and 1.9 million hectares or 97 per cent of the agricultural land showing signs of salinity.

2.64 In the next chapter, the committee outlines the regulatory framework across the three levels of government which determines the context in which natural resources are managed.

IMPACT OF DROUGHT

2.65 Drought is a natural phenomenon although there is evidence building that global warming (a consequence of human industrialised activity) could contribute to the occurrence of drought.

2.66 The localised impact of drought can be exacerbated by certain on-farm practices. Consequently of course, the impacts can also be mitigated by better practices.

2.67 Expert analysis of the drought in 2002/03 illustrates the effects of drought on the agricultural sector and, indeed the national economy. The 2002/03

[43] Ibid, page 19.

[44] National Land and Water Resource Audit, op cit, page 28.

drought affected about 90% of NSW, 65% of Queensland and 48% of Victoria's 59 municipalities. More than half of Australia was seriously or severely rainfall deficient for the 11 months from March 2002 to January 2003.

2.68 Farm gross domestic product fell by 24.3 per cent through the year to the June quarter 2003, rural exports fell be 26.6 per cent, and agricultural income fell by 46.2 per cent. The ABS has estimated the drought to have directly reduced agricultural employment by about 100,000.

2.69 While the farm sector accounts for only 3.5 per cent of the economy and around 4.5 per cent of aggregate employment, the drought took almost 1 per cent from Australia's GDP growth in 2002/03.

2.70 The effects of the current drought in eastern Australia are likely to have similar implications for landholders and their employees, as well as the national economy.[45]

2.71 In the next chapter the Committee outlines the regulatory framework across the three levels of government that determines the context in which natural resource management is carried out.

[45] The Department of the Treasury, Impact of the 2002-03 drought on the economy and agricultural employment, www.treasury.gov.au

Chapter Three - Regulatory framework

3.1 The potentially disastrous impacts of salinity on the Australian landscape have generated a major and complex layering of responses from governments and the community. The most relevant are summarised in the pages that follow.

3.2 The management of drought is much more reactive and hence the regulatory framework more limited.

COMMONWEALTH AND JOINT COMMONWEALTH/STATES INITIATIVES

3.3 Given its importance to the economy, a major focus of activity has been the Murray-Darling Basin.

Murray-Darling Basin Initiatives

3.4 The Murray-Darling Basin Agreement was signed by the governments of the Commonwealth, NSW, Victoria, and South Australia in 1987, following the establishment of the Murray-Darling Basin Ministerial Council in 1985. The purpose of the agreement is "to promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin".

3.5 The Murray-Darling Basin Initiative is the partnership between the governments and the community established to give effect to the 1992 agreement. It is the largest integrated catchment management program in the world, covering the watersheds of the Murray and Darling rivers, an area of more than 1 million square kilometres.[46]

3.6 The Murray Darling Commission is the executive arm of the Murray-Darling Basin Ministerial Council and is responsible for managing the River Murray and the Menindee Lakes system of the lower Darling River, and advising the Ministerial Council on matters related to the use of the water, land and other environmental resources of the Murray-Darling Basin.

The Salinity and Drainage Strategy, 1988

3.7 The Salinity and Drainage Strategy (a schedule to the Murray-Darling Basin Agreement) commenced in January 1988. It provided a framework for NSW, Victoria, South Australia and the Commonwealth to manage water logging and salinisation in the shared rivers of the Murray-Darling Basin.

The Murray-Darling Basin Salinity Audit, 1999

3.8 The MDBC's Salinity Audit of the Murray-Darling Basin was released in late 1999.

3.9 The audit reported that salinity would do enormous damage to the natural environment unless governments and the community significantly increased their efforts.

[46] www.mdbc.gov.au

Basin Salinity Management Strategy 2001 – 2015.

3.10 The Strategy extends the life of the target set under the Salinity and Drainage Strategy for the Murray River until 2015. It also extends the accountability arrangement to South Australia and Queensland and introduces the use of end-of-valley salinity targets in each state to help maintain the target at Morgan.

Living Murray Initiative

3.11 In mid-2002, the Murray-Darling Basin Ministerial Council established the Living Murray Initiative in response to substantial evidence that the health of the River Murray system was in decline. The Council's concern was that the decline would threaten the Basin's industries, communities, and natural and cultural values.

3.12 In November 2003, the Council decided on a 'First Step' for The Living Murray, with a focus on achieving environmental benefits for six significant ecological assets.

3.13 The Chief Executive of the Commission summarised the activities for the Committee:

> **Ms CRAIK (Murray Darling Basin Commission):** Governments agreed to put in $500 million over a five-year period to recover some 500 gigalitres of water to be applied at six specific sites to achieve very specific objectives at those specific sites. In addition, a previously approved $150 million environmental works and measures program, which is all about putting in regulators and infrastructure to improve tidal flows, has also been tied to the Living Murray. The native fish strategy where it deals with the Murray, of course, is part of that and obviously is an important part of the Living Murray.[47]

National Dryland Salinity Program

3.14 The National Dryland Salinity Program (NDSP) was established in 1993 in two five-year phases to provide baseline data, new technologies and practical solutions for dryland salinity.

3.15 The program was managed and supported by a consortium of organisations from around the country, including all the state governments. Each of these organisations contributed financially and/or through the provision of research or other in-kind services to the NDSP.

3.16 The first phase, completed in 1998, focused on improving understanding of the causes of dryland salinity and on establishing a collaborative national focus on the research and development effort. The larger, second five-year phase, valued at $15 million, focused on developing practical, profitable and sustainable solutions and establishing wider networks and was completed in 2004.

3.17 Land and Water Australia, a federal statutory research and development corporation within the Australian Government's Agriculture Fisheries and Forestry portfolio, has provided support for the NDSP.

[47] Transcript of Evidence 8 June 2005 p1

3.18 With the completion of phase two of the NDSP, much of this work is now being continued by the Cooperative Research Centre for Plant-based Management of Dryland Salinity and a Land and Water sub-program called Sustainable Grazing on Saline Lands (SGSL).[48]

3.19 The Landcare group told the Committee it had applied for NHT funding (1999-2000 and 2000-01) to undertake a *Farming for the Future* course and draw up a plan to deal with biodiversity and soil conservation. The funding assisted them to obtain and use aerial photographs and actual farm plans to map the property topography and soil types, as well as evaluate water use efficiency and determine better management approaches.

The National Heritage Trust (NHT)

3.20 The Natural Heritage Trust of Australia Reserve was established by the Commonwealth Government under the *Natural Heritage Trust of Australia Act 1997* to:

- provide a framework for strategic capital investment to stimulate additional investment in the natural environment;
- achieve complementary environment protection, natural resource management and sustainable agriculture outcomes consistent with agreed national strategies; and
- provide a framework for cooperative partnerships between communities, industry and all levels of government.

3.21 In March 2001, the Federal Minister for Agriculture released the Natural Heritage Trust (NHT) report, *Australian Dryland Salinity Assessment 2000*, as part of the National Land & Water Resources Audit. The report warned that nearly six million hectares nationwide were at risk from dryland salinity, which could triple in 50 years to 17 million hectares.

3.22 At public hearings, Mr Klem told the Committee that the National Heritage Trust's Envirofund was intended to assist communities undertake local projects aimed at conserving biodiversity and promoting sustainable resource uses that were not identified as part of catchment management investment strategies.

3.23 Mr Klem said that Envirofund was a "grassroots" program where individual Landcare groups and Council can do for example do coastal work such as working on bitou bush and dune care.[49]

National Action Plan on Salinity and Water Quality (NAP)

3.24 On 10 October 2000, the Prime Minister launched the National Action Plan on Salinity and Water Quality (NAP), a blueprint for salinity policy development. The Council of Australian Governments endorsed the proposal a month later.

[48] LWA Implementation of National Research Projects, Progress Report, 25 June 2004; http://www.ndsp.gov.au/about.asp?section=13

[49] Transcript of Evidence 7 April 2005 p10

3.25 The NAP recognised that salinity and deteriorating water quality were seriously affecting the sustainability of Australia's agricultural production, the conservation of biological diversity and the viability of the nation's infrastructure and regional communities. At least five per cent of cultivated land is now affected by dryland salinity - this could rise to as high as 22 per cent. One third of Australian rivers are in extremely poor condition, and land and water degradation, excluding weeds and pests, currently costs approximately $3.5 billion per year.

3.26 The plan represents a commitment of $1.4 billion over seven years for applying regional solutions to salinity and water quality problems, and involves all levels of government, community groups, individual land managers and local businesses working together.

3.27 The Plan aims to tackle salinity and water quality problems in key catchments and regions by:

- establishing targets and standards for natural resource management;
- assisting communities to develop integrated catchment/regional management plans;
- providing an improved governance framework to secure the Commonwealth-State/Territory investments and community action in the long terml;
- providing a coherent framework to deliver and monitor implementation of the NAP that clearly articulates roles for all stakeholders; and,
- promoting understanding of and community support for the plan through a public communication program.

3.28 The plan will evaluate salinity mitigation schemes and market based - instruments that manage water impacts by using market forces.[50]

Monitoring and evaluating the NAP

3.29 A Joint Australian and NSW Government Steering Committee[51] was established to oversee the delivery of the NAP and the National Heritage Trust in NSW.

Australian Government Natural Resource Management Team

3.30 The Australian Government Natural Resource Management Team (AGNRM Team) is a joint venture between the Australian Government Departments of

[50] A number of recommendations made regarding funding allocations from the NAP and National Heritage Trust, delivery arrangements and monitoring and evaluation of the program made in the final report of the Select Committee into Salinity 2002 appear to have been addressed.

[51] Comprised of two representatives from the Australian Government – the General Manager, Natural Resources Management Team (Department of Agriculture, Fisheries and Forestry) [Cwth], and the Assistant Secretary, Natural Resources Management Team (Department of Environment and Heritage) [Cwth]; two NSW Government representatives – the Deputy Director General for the Office of Coastal, Rural and Regional NSW (Department of Infrastructure, Planning and Natural Resources) and the Director, Biodiversity and Conservation (Department of Environment and Conservation); and, two chairpersons from the Catchment Management Authorities.

the Environment and Heritage and Agriculture Fisheries and Forests and is composed of staff from both Departments.

3.31 It has been set up to run the National Heritage Trust and the NAP.

3.32 The AGNRM Team has responsibility for program delivery, liaison with State and Territory agencies and regional bodies and administration of funding for the NHT and the NAP.[52]

THE SHIFT TO INTEGRATED NATURAL RESOURCE MANAGEMENT

3.33 The approach to natural resource management is an evolving one. In the past, it was done on a licence-by-licence or consent-by-consent basis, without an overall management framework. Land, soil, water and vegetation were considered separately, rather than as part of a natural system. Cumulative impacts became significant, without any framework for addressing them.

3.34 In the two decades prior to 2000 there has been a growing recognition that management of natural resources required a strategic, systematic integrated response that addresses cumulative impacts. During this period NSW governments commenced a more integrated approach to natural resource management through a range of reforms.

3.35 Crucial to the move to integrated natural resource management has been the adoption of integrated catchment management approaches, such as the Murray Darling Basin Initiative.

3.36 The principles of catchment management stress an integrated approach to the four environmental standards of water quality, salinity, soil conservation and biodiversity conservation, and involves landowners having an express responsibility to manage their land in a sustainable manner.

NATURAL RESOURCE MANAGEMENT IN NEW SOUTH WALES

3.37 Since 2000, there has been an increasing recognition that concerted and urgent action is required to develop sustainable approaches to live in harmony with the landscape while at the same time providing society with the goods that it needs.

3.38 Administratively, total or whole of "catchment management" has been evolving since the 1980s, when Catchment Management Committees[53] were first established to assist with directing Commonwealth and State funds into "local catchment projects". This was followed by the establishment of Catchment Management Boards. These boards developed Catchment Blueprints that aimed to set and achieve natural resource "targets", identified by community representatives.

[52] //www.nrm.gov.au/national/agnrm.html
[53] Established under the *Catchment Management Act 1989*

Salinity Summit

3.39 In March 2000, the NSW Government held a Salinity Summit in Dubbo. The Summit drew together more than 200 delegates from the various stakeholder groups.

3.40 The Summit agreed that salinity should be addressed as part of overall natural resource management, as well as consideration of social and economic drivers.

3.41 Major recommendations included:

- The NSW Government develop an integrated Salinity Strategy that would deliver continuing agricultural productivity while conserving bio-diversity and protecting the built environment.
- An Expert Group of leading financiers and economists be established to advise the Government on market-based solutions to salinity.
- Innovative commercial solutions to salinity be facilitated.
- The NSW Government should examine ways to provide better coordinated natural resource management.
- Catchment plans and other environmental planning instruments should incorporate salt targets.

The NSW Salinity Strategy

3.42 In line with the recommendations of the Salinity Summit, the *NSW Salinity Strategy* was released in August 2000.

3.43 The Strategy's vision for NSW was for a state that has healthy ecosystems, sustainable and productive land and water uses, and secure and sustainable communities.

3.44 The strategy identified a number of key policy directions, including:

- planning systems at the appropriate geographical scale to achieve change;
- market based incentives for land holders to manage their properties so that specific environmental outcomes are achieved;
- creation of business opportunities for salt affected land;
- enhanced capacity of frontline staff to provide salinity advice to landholders.

3.45 As part of the *NSW Salinity Strategy* the NSW Government has allocated $52 million of new expenditure to salinity management action over four years, $5 million of which goes to the new Environmental Services Investment Fund annually to finance strategic on-ground actions.

Water Management Act 2000

3.46 In 2000*, the Water Management Act 2000* came into effect. It consolidated many of the Acts and amendments that had been introduced over many years by various governments, a situation that was cumbersome and created unnecessary complexity. In line with contemporary natural resource management principles, one of the Act's primary objectives is to protect and enhance water sources and the ecosystems that depend on them.

3.47 In 2004 the Act was further amended.

Blueprint for a Living Planet

3.48 In November 2002, the Wentworth Group of Concerned Scientists released *A Blueprint for a Living Planet*. A particular concern raised by this report was broadscale land clearing, which the Group recommended ending by:

- developing new farming systems based on perennial plants;
- reassigning land based on its capability (thus some land would have enhanced productivity while other land would be retired from production);
- paying farmers for environmental services beyond a duty of care, such as less intensive production, retiring areas of land, planting trees and establishing river setbacks.

3.49 The Wentworth Group argued that its model simplified environmental standards, water catchment strategies and regional structures, and the delivery of public funds to farmers. In particular, the model expected farmers to retain 34 per cent native vegetation cover on their properties as a 'duty of care' and in their own economic interest. Farmers with greater cover would be paid, while those with less would be assisted to come up to the standard over five years.[54]

A new model for Landscape Conservation in NSW – Wentworth Group Report

3.50 In 2002, the NSW Government commissioned its own report from the Wentworth Group. This report, *A New Model for Landscape Conservation in NSW*, was released in February 2003.

3.51 The report observed that farmers wanted "to restore our damaged rivers and landscapes and create a new model of sustainability that would become the envy of other nations".

3.52 It proposed "a radically new way of managing native vegetation in New South Wales", arguing that:

> The real debate about land clearing is not about trees, it's about better management of native vegetation so that farmers can protect our rivers which produce fresh water and manage our land so that they can continue to produce the food we eat and the clothes we wear.[55]

[54] Wentworth Group of Concerned Scientists, A Blueprint for a Living Planet November 2002
[55] A New Model for Landscape Conservation in NSW, WgofCS, February 2003, p3

3.53 According to the Group, "the [new] model is underpinned by tougher laws on land clearing, but is focused on providing farmers with investment security and the funding support they need".

3.54 The proposed model was made up of five interdependent components:

- strengthening and simplifying native vegetation regulations, ending the broadscale clearing of remnant vegetation and protected regrowth;
- setting environmental standards and clarifying responsibilities for native vegetation management to facilitate the creation of healthy rivers and catchments;
- using property management plans to provide investment security, management flexibility and financial support for farmers;
- providing significant levels of public funding to farmers to help meet new environmental standards and support on-ground conservation; and
- restoring institutions by improving scientific input into policy setting, improving information systems and regionalising administration.

The Native Vegetation Reform Implementation Group

3.55 The Government accepted the Wentworth Group's model as the basis for the reform of natural resource management, particularly native vegetation management policy. In March 2003, the then Premier announced the establishment of the *Native Vegetation Reform Implementation Group* to be chaired by the Hon Ian Sinclair.[56]

3.56 In announcing the reforms, the then Premier acknowledged that "over the past 200 years broadscale land clearing has impacted heavily on soil, water quality and salinity" and "has depleted habitat and biodiversity". The reforms, therefore, were designed to "end broadscale land clearing and also protect the financial viability of farming families", as well as:

- provide provision of $120 million over four years to help farmer protect and replant native vegetation;
- cut red tape by allowing farmers to prepare a voluntary 10 year Property Management Plan;
- fast track vegetation mapping to help farmers develop property management plans;
- provide clear definitions of native vegetation; and
- reduce the number of committees and agencies responsible for land and water conservation.

[56] Premier's Press Release 15 March 2003, "Premier Carr announces $120 million plan to help farmers protect native vegetation"

3.57 The Group delivered its final report to the then Premier in October 2003, stating that

> New South Wales needs a sound approach to the management of our native vegetation that:
>
> - is built on a shared commitment to develop the world's leading agricultural production systems that utilise maximum water efficiency and sustainable farming practices;
> - is capable of sustaining regional development with secure access to natural resources;
> - protects the environment by restoring and maintaining the quality of our water, soil, biodiversity; and
> - is based on mutual trust between farmers, environmentalists, governments, and the wider community.

3.58 The native vegetation reforms are intended to facilitate community input into natural resource management and aim to deliver improvements in vegetation, soil and salinity management and will support delivery of the NAP.[57]

3.59 Based on the recommendations of the Group, the Government introduced into Parliament in November 2003 three linked pieces of legislation to deliver the reforms. These were:

- The Catchment Authorities Management Act,
- The Native Vegetation Act, and
- The Natural Resources Commission Act

Catchment Management Authorities Act 2003

3.60 The Wentworth Group proposed that the NSW Government set the environmental standards for the state and that these standards be converted into practical conservation priorities by "water catchment authorities". Landholders would then be provided with scientific and financial support to implement these standards on their properties.

3.61 The Native Vegetation Reform Implementation Group had then recommended that 13 Catchment Management Authorities (CMAs) be set up to be responsible for local natural resource management and services.

3.62 The *Catchment Management Authorities Act* 2003 established 13 independent, statutory authorities replacing 72 catchment boards and vegetation and water management committees.

3.63 These Catchment Management Authorities were to be the leaders of natural resource management in NSW, providing a regional focus for natural resource management in NSW. The CMAs were to work with the local community, State Government agencies, community committees, local government and other service providers on behalf of the State Government "to deliver real natural resource improvements". CMAs will be the primary vehicle for the delivery of

[57] NVRIG Report, Oct 2003, p9

incentives for sustainable land management funded by the State and Commonwealth Government (ie, the National Heritage Trust and NAP). They are to build on existing work including on the recommendations and actions contained within existing Catchment Blueprints, Investment Strategies and Regional Vegetation Management Plans (RVMPs).

3.64 Membership of a CMA was to be based on knowledge and skills in a wide range of areas relevant to the operation of each catchment area, including an understanding of natural resource management and land use systems. Consideration was also given to geographical representation.[58]

3.65 Chairs of a number of CMAs told the committee that they saw their roles as including:

- developing catchment action plans (CAPs) which set key priority areas for investment under the NAP and National Heritage Trust II;
- reviewing Water Sharing Plans;
- establishing Environmental Water Trusts to sell and buy water for seasonal flows for floodplains; and
- approving Property Vegetation Plans under the Native Vegetation Act 2004.

3.66 The then Department of Infrastructure, Planning Natural Resources (DIPNR) had responsibility for the CMAs jointly with other land management agencies, such as the Department of Environment and Conservation (DEC) and the Department of Primary Industries (DPI).[59]

3.67 According to DIPNR, the CMAs would:

> allow for local communities to have a more direct say in key decisions about how their natural resources are managed... [and] facilitate on-ground delivery of a number of strategic actions across salt and drought affected catchments.[60], [61]

3.68 More specifically:

> **Mr VERHOEVEN (DIPNR):** To ensure that the best possible on-ground resource condition outcomes are obtained, the New South Wales Government has invested responsibility for NRM investment with these community-based catchment management authorities. The CMAs are autonomous from DIPNR and other New South Wales agencies and report directly to the Minister for Planning and Infrastructure and for Natural Resources. This ensures that local communities in each of these catchments have real power to direct the action on ground and on-farm, where it is most needed, in this case looking at salinity and drought management.
>
> As I have indicated, the CMAs are developing their integrated catchment action plans. DIPNR is resourcing or working with the CMAs to enhance their ability to respond by the allocation of $430 million over four years to implement their CAPs; funding of over $100 million over three years for staff and resources for the 13 CMAs; the transfer of over 245 technical staff from DIPNR to the CMAs.[62]

[58] Min Knowles Hansard LA 12 November 2003 p98
[59] Ibid.
[60] Ibid.
[61] Evidence to the Committee, op cit.
[62] Transcript of Evidence 27 October 2004 p3

3.69 Regional Vegetation Management Plans (RVMPs) had been a key tool under the previous Native Vegetation Conservation Act in providing a comprehensive strategy for managing native vegetation, based on regional needs. They were effectively replaced by Catchment Action Plans, to be developed by CMAs. One of the tasks of the CMAs was to identify those elements of the draft and final RVMPs for incorporation in the CAP (along with catchment blueprints and investment strategies).[63]

Catchment Blueprints

3.70 Catchment Management Boards, the predecessors of the CMAs, had developed Catchment Blueprints in response to joint State and Commonwealth directions around investment prioritisation. The Committee was told that these Catchment Blueprints (accredited by both State and Commonwealth governments) would continue to have a significant role in the catchment planning process.[64]

3.71 Natural Resources Commission (NRC) officials explained that the Catchment Blueprints represented a lot of good work that needed to be carried forward:

> **Mr McMILLAN (NRC):** ... all of the previous catchment management boards had in place blueprints, they are accredited for up to ten years by both the joint steering committee of the Commonwealth and State governments.[65]

3.72 Other witnesses supported this position:

> **Mr CROFT (Border Rivers–Gwydir CMA):** The significance of the blueprints was that they were built on a lot of previous work, in fact going back in my experience almost to 1998. The genesis of the blueprints and the public consultation began as far back as then, largely with NHT funding, and that formed the basis of the blueprints for the catchment management boards. The position now is that they will also inform and begin the process of the catchment action plans that we have to do.[66]

> **Mr FERRARO (Central West CMA):** ... The blueprints went through a pretty extensive accreditation process at the Commonwealth level as well, so I think that everybody is keen to make sure that the blueprints are used essentially as the template for the catchment action plan, but they will be revised and updated where necessary. I do not think there is any intention from anyone to throw all the work out and the guidelines for the catchment action plan actually pick up a lot of things almost directly from the blueprint.[67]

3.73 The Natural Resources Commission noted, however, that its work would involve "filling some perceived gaps regarding catchment blueprints", especially given that there may be some complexity around the translation of Catchment Blueprints to CAPs:

> **Mr McMILLAN (NRC):** There were, as you would all be aware, a large number of blueprints and they were accredited in around 2002. A lot of the catchment management authorities are in the process of deciding how to take those forward

[63] DIPNR, A New Approach to Natural Resource Management, October 2003, HO/16/03
[64] Transcript of Evidence 17 November 2004 p16
[65] Transcript of Evidence 17 November 2004 p19
[66] Transcript of Evidence 10 November 2004 p2
[67] Transcript of Evidence 10 November 2004 p2

> into catchment action plans. In some catchments that is a one to one translation, like Western where there is one catchment blueprint being translated into one catchment action plan. In others, such as Northern Rivers, you have three catchment blueprints being translated into one catchment action plan, so sometimes that is an easier task; sometimes it is a more complex task involving bringing together different sets of communities who have been part of developing the catchment blueprint and taking it into a catchment plan.[68]

Native Vegetation Act 2003

3.74 The Wentworth Group's 2003 report to the Premier had identified a number of concerns with the Native Vegetation Conservation Act 1997. The Act had repealed clearing provisions in the Soil Conservation Act 1938; Western Lands Act 1901; Crown Lands (Continued Tenures) Act 1989; the Forestry Act 1916 (Appendix 2), as well as *State Environmental Planning Policy No 46 - Protection and Management of Native Vegetation* in order to bring the clearing of native vegetation in NSW under the one regime. The report found that the Act:

- had not been effective in stopping broadscale land clearing because it was undermined by exemptions and contained perverse incentives to clear regrowth; and
- was complex for farmers to comply with.

3.75 The Government agreed with these criticisms, stating that the 1997 Act "was overly complicated and couldn't deliver on agricultural and conservation outcomes". Building on the framework developed by the Native Vegetation Reform Implementation Group, the Government replaced it with the Native Vegetation Act 2003.[69]

3.76 In the words of the then Minister for Natural Resources, the aim of the legislation was "to end broadscale clearing and maintain productive landscapes". The legislation would "create a new system based on statewide targets, regional plans to achieve those targets and new rules for the management of native vegetation".[70]

3.77 In evidence to the Committee, DIPNR stated that the reforms:

> signal a fundamental shift in the way that land is to be managed, with a move away from punitive measures to incentives to help farmers and other land managers, and are intended to protect native vegetation and other natural resources while making it easier for farmers to carry on with their work.[71]

3.78 The new CMAs are to play a key role in the approval of clearing proposals and provision of incentives through the property vegetation plans. CMAs will also be 'on the ground' to assist landholders through the process.

[68] Transcript of Evidence 17 November 2004 pp16-17
[69] DIPNR pamphlet: Native Vegetation Management in NSW, The Native Vegetation Act 2003, December 2003, DIPNR 03_920
[70] Minister Knowles Hansard 12/11/03 p4890
[71] Evidence before the Committee, 27 October 2004.

3.79 In addition to ending broadscale clearing, the Act aimed to reward farmers for good land management as they could apply for financial incentives by preparing a property vegetation plan with their local Catchment Management Authority.[72]

Property Vegetation Plans

3.80 The Act established a new consent process for native vegetation management based on property vegetation plans [PVP].[73]

3.81 The Property Vegetation Plan is a voluntary but legally binding agreement between the landholder and the local CMA which sets out what can be done with native vegetation on a property. Its 15-year tenure was designed to give certainty and stability to the development process. The aim of the PVP is to provide landholders with the opportunity to develop a strategy to manage native vegetation on their property.[74]

3.82 The Plans can come with a financial incentive for, where they align with CAPs, "funding may be available to support landholders".[75]

3.83 Landholders are of course still free to seek a development application from DIPNR as an alternative to a PVP.

3.84 The primary benefits of the new system include giving farmers the opportunity and flexibility to take the initiative to develop a plan for the whole property; the opportunity to link plans at the property level to the CAPs developed by regional communities; and new development consent rules that end broadscale clearing but allow flexibility for farmers to continue routine agricultural management practices.[76]

3.85 A computer-based assessment tool called the PVP Developer has been produced to assess applications. This is a fast, simple proposal and requires no fees or application forms. The Developer assesses the proposed activities against four elements – water quality, soils, salinity and biodiversity (including threatened species).

3.86 The Native Vegetation Act 2003 replaced many of the advisory bodies to government with the one body, a "high-level stakeholder group", the Natural Resources Advisory Council, to articulate "clearly the positions of key stakeholders to the Government". The Council, with a maximum number of 20 representatives plus an independent chairperson, was not only to provide advice to government but "broker agreements between the representative stakeholder groups on contentious natural resource management issues".[77]

[72] www.dipnr.nsw.gov.au/nativeveg/fact_sheet_02.shtml
[73] Minister Knowles Hansard LA 12 November 2003 p 94
[74] www.dipnr.nsw.gov.au/nativeveg/fact_sheet_05.shtml
[75] DIPNR, Native Vegetation Management in NSW Fact Sheet DIPNR 03_920 December 2003
[76] Knowles, Hansard 12/11/03 2nd reading speech p 94

[77] Knowles, Hansard LA 12/11/03 2nd reading speech p 96

Natural Resources Commission (NRC)

3.87 The third plank in the Government's natural resource management's reforms was the establishment of the Natural Resources Commission (NRC).

3.88 The Commission's fundamental focus is to provide independent advice to Government on natural resource issues, set State-wide standards and targets, audit the implementation of those plans as to whether they achieve the established State-wide standards and targets and recommend their approval by CMAs.[78]

3.89 The Commission is also involved with New South Wales water management reforms, as well as native vegetation reforms under the Native Vegetation Act 2004 and threatened species conservation legislation. In evidence before the Committee, Commission officials stated that the reforms "have refocused those pieces of legislation in the context of these broader inter-governmental agreements and the view on where natural resources should go".[79]

3.90 It will make recommendations on State level natural resource management standards and targets and audit the performance of CMAs.

3.91 Standards and targets of the NRC will include:

- guiding real improvements in environment condition and landscape productivity;
- focusing on getting value from limited money available;
- being realistic and achievable; and,
- utilising short and long term perspectives.

3.92 The Commission explained to the Committee how its role in state wide targets had evolved out of concerns about the lack of focus with national funding:

> **Mr McMILLAN (Natural Resources Commission):** There are a couple of very important bilateral agreements. There are bilateral agreements for implementation of both the NHT and the NAP. They make commitments at a government level to implement, among other things, standards and targets for natural resource management which, as those members who have been involved in this area for a while would realise, arise out of concerns that perhaps the initial funding through NHT did not have enough focus around the delivery of the particular outcomes it was trying to achieve and those two frameworks, particularly the national framework for standards and targets, are I guess really the genesis for a lot of the work that we are doing now in terms of developing State-wide targets for natural resource management and doing work on State-wide standards for natural resource management.[80]

3.93 The NRC told the committee that it was committed to providing independent advice to the NSW Government and drawing on both the practical experience of those who manage our natural resources and the best available science.

3.94 It identified some of its goals.

[78] Transcript of Evidence 17 November 2004 p17
[79] Transcript of Evidence 17 November 2004 p17
[80] Transcript of Evidence 17 November 2004 p16

3.95 Short-term goals include:

- the development of catchment blueprints;
- finalisation of interim standards and targets needed to support/guide short term investments; and,
- to initially focus on native vegetation, as vegetation clearing is considered a major cause of land degradation in NSW.

3.96 As an ongoing goal, the NRC will:

- audit the catchment and water sharing frameworks;
- integrate environmental, social and economic impacts;
- develop an appropriate level for aspirational targets; and,
- expand focus from vegetation to include water and coastal issues.[81]

State Agencies

3.97 At the time of the reforms outlined above, the two main New South Wales government agencies responsible for natural resource management were the Department of Infrastructure Planning and Natural Resources (DIPNR) and the Department of Primary Industries. Following the election of the new Premier in 2005, DIPNR was significantly restructured. A separate Department of Natural Resources has been established under the same Minister as the Department of Primary Industries.

Department of Natural Resources

3.98 The Department of Natural Resources (DNR) aims to share NSW's "natural resources fairly between rural communities, industry and the environment". The Minister for Natural Resources now has responsibility for some of the main players and issues touched on in this report, including the Natural Resources Commission, Catchment Management Authorities, salinity, native vegetation and rural water management.

Department of Primary Industries (DPI)

3.99 In July 2004, NSW Agriculture was merged with NSW Fisheries, State Forests of NSW and the NSW Department of Mineral Resources to form the NSW Department of Primary Industries (DPI).

3.100 DPI provides advisory and education services and practical farm production solutions for profitable agriculture. It supports the strong economic performance of primary industries, and facilitates appropriate access to and wise management of natural resources.

3.101 DPI assists CMAs to tailor a property management planning program to meet their catchment planning goals. Property management planning is a process that integrates economic, social and environmental farm management issues to suit the goals of the individual farm.

[81] Transcript of Evidence 17 November 20

3.102 The property management plan also provides the context for an EMS evaluation, to see whether it is relevant to a particular agricultural industry.

3.103 DPI has approximately 300 extension officers. Extensions taken include all the ways by which information relevant to agricultural industries is provided to farmers. This ranges from formal education activities with farmers to the indirect provision of information to them by providing training and technical support to the private sector, other agencies and CMA staff.

3.104 One of DPI's most important program is FarmBis, which provides assistance to farmers, by way of grants, to encourage them to participate in training and education activities that will enhance their farm business management skills. Property management planning and quality assurance are examples of approved courses that link business and environmental outcomes.

Department of Environment and Conservation

3.105 The Department of Environment and Conservation (DEC) is the agency with prime responsibility for the health of the environment in NSW. The Department manages the State's natural and cultural heritage, promoting sustainable consumption, resource use and waste management. DEC regulates myriad activities designed to meet its goal of ensuring a healthy environment. Among its responsibilities are air and water quality, biodiversity and threatened species.

Memorandum of Understanding

3.106 A Memorandum of Understanding, The Natural Resource Partnership Agreement, was agreed between the Minister for Natural Resources, on behalf of the NSW Catchment Management Authorities, the Director General for Infrastructure Planning and Natural Resources, and the Presidents and Secretary General of the Local Government Association and Shires Association of NSW.

3.107 The MOU states among its general principles that:

> Effective natural resource management and land use planning can only occur through co-ordinated and cooperative action of local and state government, particularly through the joint actions of local government and Catchment Management Authorities (CMAs).
>
> The integrated approach will be built on a continuing commitment to regional Natural Resource Management Plans (NRM) plans, including Catchment Action Plans (based on the Catchment Blueprints), Vegetation and Water Sharing Plans and Environment Planning Instruments.

3.108 The MOU also deals with mechanisms for achieving the partnerships between CMAs and local government, and between those bodies and the State Government, and the implementation of the Agreement.

LOCAL GOVERNMENT ROLE IN NSW

Statutory Powers

3.109 Councils have a role in resource management and considerable powers to implement a broad range of environmental measures.

3.110 Councils are not specifically required to implement measures to address salinity but there is nothing in the relevant legislation that prevents them from doing so.

3.111 The Local Government Act 1993 (LGA) and the Environmental Planning and Assessment Act 1979 (EPAA) define the environment broadly. Under the LGA, as amended by the Local Government Amendment (Ecologically Sustainable Development) Act 1997, each council's charter includes the responsibility to:

> … properly manage, protect, restore, enhance and conserve the environment of the area for which it is responsible in a manner which is consistent with and promotes the principles of ecologically sustainable development.[82]

3.112 Councils are encouraged to adopt a pro-active, holistic and systematic approach to managing the environment.

3.113 The LGA requires councils to have regard to the principles of ecologically sustainable development in carrying out their responsibilities, as stated in the *Protection of the Environment Administration Act.*

3.114 The principles include the precautionary principle:

> namely that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. (Farrier et al, op cit, 6:1999).

3.115 Councils have the following powers that they could use to manage salinity:

- planning instruments under the *Environment Planning and Assessment Act 1979 (NSW)* that control land use. This was discussed at public hearings;
- delivery of services under the *Local Government Act 1993*, including water supply, sewerage and stormwater that affect recharge to groundwater in the way they are managed and water is priced.

COMMUNITY INITIATIVES

Landcare - Philosophy and Practice

3.116 The landcare movement has its genesis in Victoria, through an initiative of Joan Kirner, the then Minister for Conservation, Forests and Land, and Heather Mitchell, president of the Victoria Farmers' Federation. The first group formed in Winjallok on 25 November 1986. It marked the beginning of a nationwide movement for sustainable rural development.

3.117 In July 1989, following a joint submission between the National Farmers' Federation (NFF) and the Australian Conservation Foundation (ACF), the then

[82] Farrier, Lyster and Pearson, Environmental Law Handbook 22:1999

Prime Minister Bob Hawke announced the Decade of Landcare, with an initial commitment of $340 million over 10 years.

3.118 In the early 1990s the NFF and ACF worked with the Federal Government to spread landcare across Australia.[83]

3.119 Today, there are some 4,000 Landcare groups in Australia, counting about 40 per cent of practising farmers among their membership. There are at least four organisations involved with the landcare concept.

3.120 **Landcare Australia Limited (LAL)** is a not-for-profit organisation set up to assist the government with the many commercial aspects of landcare.

3.121 In its submission to this inquiry it advised that State agency promotion and coordination, with funding made available through the NHT, National Landcare Program and the NAP, had encouraged these farmers to join.[84] Urban group members are on the rise, accounting for the decline in percentage terms of farmers among the membership.[85]

3.122 At public hearings LAL officials explained their role in more detail:

> **Mr SCARSBRICK (Landcare Australia Ltd):** We created that brand; we promote it and then we go to the corporate sector to seek additional funding to that which is being put in by the Federal and State Governments. That is our role. We are in contact with the groups nationally. We provide capacity building educational material to them, but we are not the lead agency for landcare. Quite often we are mistaken for that. We assist the movement in achieving their objectives. I guess we advocate the advantages of landcare as a method of delivery and that is, I guess, what we want to do here today…
>
> **Ms QUEALY (Landcare Australia Ltd):** Landcare Australia's role is really to raise the resources and raise awareness that Landcare is there and it is something that we would like everybody to participate in, whether you are corporate or an individual or a farmer. That is our role. Each of the States' and Territories' role is to encourage more participation but actually have the infrastructure which supports I guess at a more useful level in some ways, but setting State policies and helping to get State funding to the relevant people.
>
> **HON. PAM ALLAN (Chair):** There is a formal relationship between the two?
>
> **Mr SCARSBRICK:** Yes[86].

3.123 The Committee asked how Landcare Australia Ltd was funded:

> **Mr SCARSBRICK:** We have a three-year contract with the Department of Agriculture, Forestry and Fisheries (DAFF) to produce on a fee-for-service basis. Our contract is up for renewal this year, for instance, and we provide evidence about the sorts of things that we deliver. We get, I guess, about 50 per cent of the money from that source and assistance from some states where we have got offices. State governments also make a contribution. The other 50 per cent is very much corporate dollars. We charge for the use of the logo, and the Landcare logo for our, we call them exclusive sponsors because within a competitive category we only take one. For example, Westpac is our only bank

[83] *Landcare in Australia*, Landcare Foundation Victoria, 2nd ed,2000
[84] Submission No 103 p5
[85] Transcript of Evidence 6 April 2005 p8
[86] Transcript of Evidence 6 April 2005 pp10-11

> sponsor. The use of the logo. They provide a licence to do that and we use that for promotion of the logo and some overhead costs.[87]

3.124 Administration costs are funded through the National Landcare Program.

3.125 LAL has more than 50 corporate sponsors who often look for specific projects to fund. LAL points out that that funding goes to a limited number of projects in comparison to government funding such as NHT.

3.126 When assessing projects for funding, it therefore targets high priority projects which match sponsors' requests. LAL also looks at projects assessed for NHT funding but which have fallen below the funding cut-off line. Projects submitted "as opportunities arise" have a limited chance of succeeding.[88]

3.127 **The Australian Landcare Council** is the Australian Government's key advisory body on Landcare and natural resource management matters.

3.128 Mr John Klem, the Chairman of the Hawkesbury Nepean CMA, is also the NSW representative on the Australian Landcare Council. Mr Klem told the Committee the Council provides advice to Federal Ministers on strategic directions from a State perspective, in particular on tax incentives and catchment management.

3.129 **The National Landcare Program** is administered by the federal Department of Agriculture, Fisheries and Forestry Australia (DAFFA). It (and Landcare Australia Limited) was established during the initial growth phase of the 1990s.

3.130 It was established to fund on-ground action to ensure integrated and sustainable natural resource management at the farm, catchment and regional levels. The Federal Government has agreed to provide funding of $159.5 million (until 2007-08) for the National Landcare Program.

3.131 In May 2003 the National Landcare Program was reviewed by the Department of Agriculture, Forestry and Fisheries Australia to assess the program's effectiveness.

3.132 At public hearings, the committee sought information on the results of that review and in particular what shortcomings may have been found:

> **Mr KLEM (Australian Landcare Council):** I sat on that review and I was part of that process. They found that Landcare was successful that is why they renewed the budget. There were a few criticisms. There were a few criticisms of LAL, in the fact they thought LAL was urban and not enough rural. There was some criticism for that process, but when you look at the structure of LAL and where the money is coming from you would understand the process.[89]

3.133 **The National Landcare Facilitator Project**, involves the triennial appointment of a rural affairs and extension officer who reports to government on all landcare matters, especially community organisation and support.

3.134 The project "is supported by" the federal DAFFA and the National Landcare Program.

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[87] Transcript of Evidence 6 April 2005 p8
[88] http://www.landcareaustralia.com.au
[89] Transcript of Evidence 7 April 2005 p13

3.135 Its objectives are to "support and provide leadership to the landcare movement", liaise between government, community and industry on natural resource management issues and "lead and support a national network of coordinators" to effectively engage communities on NRM matters. [90]

3.136 Currently, the Federal Government's National Heritage Trust Program, Envirofund, provides financial support for 'care' projects that aim to rehabilitate and conserve a number of elements of the natural environment. This includes Bushcare, Coastcare and Wetlandcare that have all evolved out of the Landcare movement.

3.137 Over the past 20 years, Landcare representatives in NSW have been involved in Catchment Management Committees, Catchment Management Boards and now with CMAs.

DROUGHT REGULATION

The National Drought Policy

3.138 Australia's current drought policy was originally developed and agreed to by all States and Territories in 1992. It was an attempt to move away from the former subsidy-based approach to drought management, which was primarily reactive and crisis-driven. The new policy focused instead on the development of risk management strategies that would allow farmers and regional professionals to anticipate and manage frequent droughts as a normal part of the Australian landscape.

3.139 The concept of Drought Exceptional Circumstances (DEC) was developed in 1995 in recognition that certain extreme drought conditions warranted direct government intervention. DEC was defined as 'rare' (a-one-in-20 year event) and 'severe' (lasting either more than 12 months or three consecutive failed seasons, depending on the production system under consideration).

3.140 In 1997, the concept of DEC was broadened to Exceptional Circumstances (EC) to allow for government intervention in a range of 'rare' and 'severe' events, including pests, disease, frosts and water logging. 'Rare' events were re-defined as those occurring, on average, once every 20 to 25 years. 'Severe' events were newly required to affect a significant proportion of farm businesses in a region. Rainfall was no longer used as the key indicator of the problem and an emphasis was placed on a severe downturn in farm income over a prolonged period. The event must also not be predictable or part of a process of structural adjustment. The new criteria were agreed on by the Commonwealth and the States in 1999.

3.141 The Commonwealth offers a range of financial assistance programs for drought affected households.

[90] www.landcarefacilitator.com.au

NSW Drought Policy

3.142 The Department of Primary Industries has carriage of drought management in NSW. It provides a range of advice on planning for and managing drought, as well as financial assistance for drought affected households.

3.139 The Committee sought to clarify how the various States defined a drought:

> **Mr GERARD MARTIN MP:** We have heard from the Rural Lands Protection Boards that their drought declarations have been more frequent than the one in ten year events adopted by New South Wales Agriculture. Does this mean that there is a discrepancy in the definition of what a drought is between the various agencies?
>
> **Dr SHELDRAKE [DPI]:** The way the drought is described, and this is currently an issue that is being discussed at the Primary Industries Standing Committee and Primary Industries Ministerial Council, that is a way of more objectively assessing when a region is in drought, so drought on the north coast is going to be the result of a different rainfall pattern than a drought at Bourke or Brewarrina, so the task has been set to try to identify some objective criteria that can assist in that and that will then overcome the discrepancy of the EC descriptor for drought and the criteria as opposed to Rural Lands Protection Boards, and that is the boards themselves advising State Council and then determining when an area is in drought. There are always going to be those discrepancies until you come up with something that is a bit more standardised
>
> **The Hon. RICHARD AMERY MP:** Isn't the issue about drought declarations a product of the unique New South Wales situation that we have Rural Lands Protection Boards? Is it right that some other States do not declare droughts, for example, or they work off exceptional circumstances classifications? I mean there is a difference in it.
>
> **Dr SHELDRAKE:** Yes.
>
> **The Hon. RICHARD AMERY MP:** At some stage they say "I declare it is a drought".
>
> **Dr SHELDRAKE:** That is correct.
>
> **The Hon. RICHARD AMERY MP:** Some States do not do that.
>
> **Dr SHELDRAKE:** That is correct. All the States are participating in the Primary Industries Ministerial Council process in looking for a mechanism which will enable a drought to be better described, and that is for exceptional circumstances purposes, but in New South Wales and in Queensland, those States - and in New South Wales the Rural Lands Protection Boards - will then be able to use that same objective mechanism if it gets adopted[91].

3.143 Farmers have the choice of claiming either a tax rebate or reduction for soil and water conservation works carried out on their property. The tax deduction is a function of the Income Tax Assessment Act of 1997, which allows primary producers to write off, over three years, capital expenditure on facilities for conserving and conveying water on their tax returns. The rebate is provided by an $80 million contribution from the Natural Heritage Trust for a Landcare tax rebate of 34 cents in the dollar, for up to $5000 yearly expenditure on

[91] Transcript of Evidence 23 March 2005 p5

preventing and treating land degradation, and up to $5,000 on facilities for conserving and conveying water.

3.144 An additional federal Drought Investment Allowance is available to primary producers for capital expenditure on water storages and water supply equipment. It allows for a deduction of 10 per cent on the costs of acquiring or constructing new items of drought mitigation property such as fodder storage facilities, livestock drinking water storage facilities, water transport equipment facilities and minium tillage equipment.

3.145 Farmers may also be eligible for road transport rebates for moving stock, fodder and water in drought affected areas of New South Wales under a state program managed by DPI.

3.146 The Department of State and Regional Development also accepts applications to a Business Drought Assistance Program to assist regional businesses that are reliant on farmers for their income and are therefore severely affected by drought. Assistance to small and medium sized businesses that meet the criteria of business decline comes in the form of a payroll tax relief. Direct grants are also available for small businesses for up to $3,000 to help them maintain their operations both during and beyond the drought.

3.147 The Rural Assistance Authority administers a range of State and Federal assistance programs.

3.148 The next chapter looks more closely at the natural resource management at the regional/catchment level in New South Wales, focusing on the roles of the Natural Resource Commission and catchment management authorities. It discusses state targets including salinity targets.

Chapter Four - Regional Planning Approaches

4.1 Over the past decade, regional planning approaches to vegetation, water and catchment management have been increasingly refined. In particular, both scientific and community concerns about the current condition of the State's natural resource base has resulted in a heightened awareness of the importance of regional, local and property planning to maintain landscape values.

4.2 The NSW and Australian Government are jointly investing $436 million in natural resource management through the Catchment Management Authorities.[92]

STATE STANDARDS AND TARGETS

4.3 At public hearings, NRC officials told the Committee that generic targets were already agreed at a national level, reflecting the inter-governmental intention to have "consistent quality of natural resource management".

4.4 The Commission anticipates that catchment management planning will improve "on cross CMA issues". For example, dealing with regional biodiversity issues consistently and ensuring that inter-valley salinity targets for the Murray Darling Basin Commission and salinity targets in different catchment areas are integrated.

> **Mr McMILLAN (NRC):** The fundamental role we think of State targets is to help with co-ordination of thirteen separate CMAs to deliver on issues that exist at an above catchment scale, so bio-regional focus in terms of biodiversity, end of basin salinity targets, obviously that's covered by MDBC issues in some catchments but where there are gaps where issues that are at a bio-physical or geographical scale above catchments, that's the key area for the state wide target.[93]
>
> **Dr PARRY (NRC):** Perhaps an important point to emphasise is that our task on the targets and standards side is State-wide and we recognize, as do other players, that one size does not fit all. State-wide targets will need to be translated by CMAs into relevant targets for their catchments and their sub-catchments and targets will have associated with them indicators of outcomes which will be most relevant to natural resource management outcomes.
>
> The standard side, we are completely agreed, this is not a form box ticking exercise. There will be some guidance which we believe will be useful to the CMAs but it's not designed to be a red tape exercise. In fact no doubt Alex will explain, we have only really effectively been doing this for less than six months. We have been working with several of the CMAs through the pilot process to actually work out state wide standards and targets that actually can be implemented and effective at the CMA and sub-catchment level, so we are absolutely mindful of avoiding red tape for effective outcomes.
>
> **Mr McMILLAN (NRC):** And probably it is important to explain the scale in which these things will operate. These won't operate at the paddock scale, the sub-catchment scale or in the catchment, they will operate at the catchment

[92] www.nrc.gov.au/standardsmenu.asp
[93] Transcript of Evidence 17 November 2004 p18

> management authority's regional scale and it will operate at the scale of their major programs under the CAP, not a project level. To people on the ground a lot of the standard stuff, they won't see it at all. It's more governance type stuff with the CMA, if that makes sense.[94]

4.5 The NRC is responsible for drafting the standards. These standards will integrate a range of issues and aim to maximize a broad range of socio-economic and environmental benefits, rather than focus on just salinity, water quality or biodiversity.[95]

4.6 In May 2005, the NRC recommended to the Government a *Standard for Quality Natural Resource Management* and state-wide targets for natural resource management. In September 2005, the NRC reported again on the standards and targets, including monitoring and evaluation arrangements. These reports are now with the Government and are expected to be released soon.[96]

CATCHMENT PLANS TO MEET STANDARDS AND TARGETS

4.7 Each of the CMAs will formulate their own catchment plans through a consistent process, but each CAP will focus on catchment specific issues. CMAs will develop and adopt catchment action utilising existing Catchment Blueprints[97], based on state-wide standards and targets. The CAPs will be reviewed and approved by the NRC, to ensure that the catchment targets are "measurable, time-bound and deliverable, to be achieved by a certain date".[98]

4.8 Murrumbidgee CMA officials told the Committee the process had been genuinely consultative:

> **Mr O'BRIEN (Murrumbidgee CMA):** It hasn't been a top-down process. The NRC has been engaging with the CMAs in the development of standards and targets and have got a number of pilot CMAs - Murrumbidgee is one of the pilot CMAs - and we have a very good working relationship with the operatives from the Natural Resources Commission and the Natural Resources Commissioner and Assistant Commissioners. Originally I was a bit worried, I thought it was going to be a top-down shout, but it is not that at all, it is very much a partnership approach, which I am pleased to find.[99]

4.9 This view was supported by Western CMA witnesses:

> **Mr TREWEEKE (Western CMA):** We have worked with the NRC as one of their trial areas and we have nothing but admiration and the highest praise for them, yes, for their cooperation and for their understanding of the individual issues that emerge within each CMA. We have had a very positive relationship with them.[100]

[94] Transcript of Evidence 17 November 2004 pp 19-20
[95] Transcript of Evidence 17 November 2004 p18
[96] http://www.nrc.nsw.gov.au/standardsmenu.asp
[97] Transcript of Evidence 10 November 2004 p16
[98] Transcript of Evidence 17 November 2004 p19
[99] Transcript of Evidence 10 November 2004 p16
[100] Transcript of Evidence 23 March 2005 p17

4.10 Officials nevertheless expressed their concerns that the delay finalising the targets could affect the way in which some actions were implemented. As one CMA explained to the Committee:

> **Mr KING (Lower Murray Darling CMA):** the investment strategy … is sitting in Canberra now to be ticked off or played with or whatever they want to do with it, but when that is done, that will be our investment for the next three years, so therefore the standards and targets that are set, if they are outside some of those things, we will need to re-alter it or we will need more money, if some of those standards and targets are not the same as what we have done.
>
> As Mr Ferraro referred to before, it is this timing, how it has come along the track, the previous group, but, we can live with that. It is just that some of our priorities that we have put down and some of our actions, hopefully we have tried to fit them in there.[101]

4.11 A point agreed by Western CMA:

> **Mr GREEN (Western CMA)** … we cannot finalise our catchment action plan until they are completed. So there is a little bit of out-of-phasing in what we are doing at the moment and hopefully in a couple of years' time - after December I guess - we will be able to catch those up and re-phase them. That is a little bit of a problem at the moment. I think the other problem that we have run across is that, being first starting with the standards and targets, there is a bit of a danger that we are going to be second-guessed all the way along and the CMAs in developing their investment strategies and their catchment action plan could potentially become tied up in bureaucracy and red tape in the process side of things rather than the implementation side of things. That is certainly one thing that I am concerned about as general manager because we have been demanded by the New South Wales Government and Australian Government to get works on the ground and get things going whereas we are being asked to do all this process stuff as well with what are fairly limited resources in the CMAs.[102]

4.12 Namoi CMA witnesses said that while their organisation's involvement with the NRC had been largely positive, the timing had caused some problems for developing and implementing investment strategies:

> **Mr TRUMAN (Namoi CMA):** I would like to add that the Namoi investment plan I think has been signed off recently and, just to lead on from that, although we are still waiting for these targets to come from the Natural Resources Commission.[103]

TARGETS FOR SALINITY AND DROUGHT

4.13 According to the submission from DIPNR, dryland salinity management was one of the issues targeted by the original Catchment Blueprints and through catchment action planning, CMAs will deliver a number of on-ground and strategic actions across salt and drought affected catchments.[104]

[101] Transcript of Evidence 10 November 2004 p16
[102] Transcript of Evidence 23 March 2005 p12
[103] Transcript of Evidence 23 March 2005 p12
[104] Transcript of Evidence, 27 October 2004

4.14 There is little consideration of drought issues in the catchment management process.

Salinity targets

4.15 Lower-Murray Darling CMA advised the Committee it was reviewing Blueprint targets, in particular its salinity and vegetation targets. The CMA said that the salinity target needed to be recalculated from a Monthly Time Step model to a Daily Time Step mode.[105] CMA officials noted there were only sufficient funds to implement 50 per cent of the estimated required incentives to achieve the vegetation target.

4.16 Murrumbidgee CMA officials said their Catchment Blueprint listed improved soil health as a target. They had a number of inter-linked projects to better manage salinity by increasing the adoption of best management practices to achieve 80 per cent water use efficiency within their catchment.[106]

4.17 Namoi CMA officials pointed out that even at the regional level there would need to be variations in applying targets:

> **The Hon. RICHARD AMERY MP:** You talk about standards and targets which you understand a few catchments are a bit concerned about. I think your appropriate comment was that salinity in one part of the State is a different management issue than in other parts of the State. I am just asking the question: Is there a looming dispute or conflict between what might be State-wide standards and targets with the way your catchments, or anybody's catchments, may be managing those issues?
>
> **Mr TRUMAN (Namoi CMA):** Yes, I see that. I guess it is really to highlight that, although the CMAs on-ground works are really associated with native vegetation, in our northern region, which has very high economic outputs from productivity, and because of that climatic condition we have the ability to quite effectively manage salinity through our cropping practices and I guess it is really to highlight that, and they will try to identify those.[107]

4.18 This issue has already been acknowledged by the NRC, which pointed out to the Committee that CMAs would be expected to develop their catchment action plans to meet statewide targets but according to their local conditions and circumstances.

Drought targets

4.19 At public hearings, Central West CMA representatives advised the Committee that drought strategies have not been addressed by most of the blueprints:

> **Mr SUTHERLAND (Central West CMA):** I would just like to make one comment regarding drought strategies and things like that. They are a little bit outside the charter of the CMAs. One thing the Committee needs to be aware of as we start to manage the land better, there is actually going to be less water running into the river systems and that needs to be factored into the water management plans and things like that. In Perth there has been a 30 per cent decline in rainfall since the mid-seventies, and a similar thing was experienced in New South

[105] Questions on Notice 4 November 2004 p1
[106] Questions on Notice 22 December 2004
[107] Transcript of Evidence 23 March 2005 pp15-16

> Wales, whether it is global warming or just an aberration in climatic pattern, that is going to have serious impacts I guess on the amount of water that is physically going to be available for irrigators for towns.[108]

4.20 Given the lack of drought targets in the catchment blueprints, the Committee was interested in understanding how DIPNR would assist farmers to anticipate and manage drought:

> **Mr VERHOEVEN (DIPNR):** Good management of drought at the national, State and at the farm, level, including cities and urban areas, comes from taking a holistic approach to resource management, which … is underpinned by sound knowledge of the resource base and the CMAs having realistic goals and expectations about access to resources.[109]

4.21 The NRC stressed to the Committee that the whole process was a long term adaptive management program. Implicit in such a program is the requirement for auditing, monitoring and evaluation:

> **Mr McMILLAN (NRC):** Necessarily the initial audits, whatever they might be, it will have to be some period down the track, will need to focus on the actual management actions undertaken, so the re-vegetation here or the actions that have actually been done, that have actually been implemented. Over time the monitoring and evaluation of whether resource condition has actually improved That needs to be the focus of the audit and this should be seen in the context of a ten to twenty year program of adaptive management with a series of management actions, see what sort of impact there is on resource conditions, feedback and decide whether those in fact might need to be adjusted, those management actions can adjust them, again monitor on the resource condition and all of that in context of changing climatic conditions need to be adjusted also. This needs to be done, as I said, as quite a long-term time frame.[110]

Salinity and Drought Management

4.22 The relevance of the regional planning to this inquiry relates to whether it was feasible the new CAPs would be effective in facilitating better on-farm approaches to managing salinity and impacts of drought.

4.23 The CMAs advised that, given the targeted approach and investment commitment, there was strong potential for improved outcomes for salinity and drought management. Key programs that were expected to be beneficial to on-farm activities were:

- promoting conservation farming approaches within cropping areas
- water use efficiency programs
- improving salinity and water quality and other catchment works
- using good science to facilitate better outcomes.

[108] Transcript of Evidence 10 November 2004 p3
[109] Transcript of Evidence 27 October 2004 p3
[110] Transcript of Evidence 17 November 2004 p19

4.24 Mr Glennon provided a snap shot of how the regional planning would filter down to the farm level, at least in the Lachlan CMA:

> **Mr GLENNON (Lachlan CMA):** We had 700 applications from landholders across the Lachlan. We have currently assessed all those applications and are looking to go into some contractual arrangement with landholders in early January to take up those works. So, we are going pretty well from that perspective and I think Tim has outlined pretty well the process for the continuation of investment strategy in the next couple of years, the process we have to go through to do that.....I know in the Central West and also in the Lachlan, and I assume in the Gwydir-Border Rivers as well, as well as targeting the catchments and targeting the actions within those catchments, most CMAs by now have worked up .....we call the environmental services ratio - which is more or less a process of once you have decided what actions you want a landholder to do, it is almost a multi criteria sort of ranking which allows you to then determine the public/private cost of those works. So once you have worked out what you want to do and where you want to do it, you can then negotiate with the landholder for various contributions from the CMA to that landholder to provide some type of update.[111]

4.25 Similarly, the General Manager of Lachlan CMA described a local project to deliver on salinity and drought:

> **Mr GLENNON (Lachlan CMA):** I think they obviously will because of that targeting of effort and finance. In terms of predictable outcomes, relating back to the salinity and the drought issues, there are particularly investments in water use efficiency, from our perspective a local project, Lake Brewster, which is designed for very much improving salinity and water quality outcomes and a number of other catchment works. Obviously there is not evidence yet to quantify those improvements, but based on best science and everything we have got, I think everything would lead you to consider that they will mean major improvements.[112]

4.26 Murrumbidgee CMA advised that catchment action planning would address land use management issues by protecting catchment assets (productive land, water and vegetation) from threats such as salinity and lack of water. Murrumbidgee CMA stated that:

> CAPs will draw together all NRM planning frameworks including those relating to salinity and drought. The Murrumbidgee CMA NAPSWQ budget has been allocated programs and projects that address specific salinity and water quality targets. These programs may also facilitate better drought management by enhancing Landholders NRM skills and knowledge.[113]

4.27 Border Rivers-Gwydir CMA officials told the Committee that they had similar priorities and were working with Central West CMA on a pilot property management planning project with a view to developing an 'environmental benefits index', as well as collecting information on salinity and vegetation within the catchment:

> **Mr CROFT (Border Rivers-Gwydir CMA):** Others were data gathering and just finding out where we were and getting some base line information because without that,

[111] Transcript of Evidence 10 November 2004 p5
[112] Transcript of Evidence 10 November 2004 p3
[113] Questions on Notice 22 December 2004 p2

> particularly in natural resource management, you cannot manage anything because you don't know the trends, so you have got to have that base information. We have got other programs like discovering where the salinity is in the catchment. There has not been very much work done on that. That is another project that is happening as well, and another one targeting specific vegetation in a targeted part of the catchment.[114]

4.28 Namoi CMA advised that salinity had been occurring within that catchment for a number of years and that catchment planning was essential to managing it:

> Catchment planning has identified issues and actions planning, which have facilitated on-ground works as well as economic, environmental and social aspects. [115]

4.29 Namoi CMA representatives told the Committee they would be focusing on recharge management to maximise benefits by using Groundwater Flow Systems data, incorporated into Land Management Units (LMUs)[116], which will be a basis for Best Management Practices (BMPs) and planning. They would also focus on property management and vegetation planning to assist land managers refine their goals in line with best practice, and provide incentives to implement best practice and adopt sustainable land-use mixes:

> This integrated approach using LMUs, and adaptive management with progressive improvement towards BMP, is integral to all programs within the Investment Strategy.[117]

4.30 Witnesses advised that the Namoi catchment area had a summer dominant rainfall. Agronomy based solutions to the salinity management in the region were effective and trees were not always an appropriate solution. They could carry out response cropping, which was more favourable for the development of agronomic systems which maximise water use and reduce the potential for salt mobilisation:

> **Mr TRUMAN (Namoi CMA):** This means that the retention and enhancement of native vegetation is generally not the most appropriate environmental or economic response for the management of dryland salinity in the Namoi catchment. In addition, the impact of increased tree cover on water yields from the upper catchment could lead to further losses in economic returns and regional viability. The Namoi CMA has identified this and, although a large percentage of our funds need to be allocated towards the management of native vegetation, it is recognised that the management of salinity can be achieved through our farming systems. It is envisaged that funding will be allocated to assist in the increased adoption and uptake of opportunity cropping systems and alternatives to native vegetation where appropriate.[118]

[114] Transcript of Evidence 10 November 2004 pp 6-7
[115] Questions on Notice 30 March 2005 Question 2).
[116] LMUs to be developed for entire catchment and will divide it into areas of "like physical characteristics" and land capability which require similar management practices and land use mixes.

[117] Namoi CMA, Correspondence to Committee, (question no 2) 30 March 2005
[118] Transcript of Evidence 23 March 2005 p11

Drought

4.31 Lower Murray Darling CMA representatives told the Committee they were developing a draft drought policy (due to be completed in December 2004), based on the general principle of encouraging landholders to be better prepared for drought and manage drought conditions. The policy promotes retention of 40 per cent groundcover within the catchment through better management practices, supported by initiatives and incentives:[119]

> **The Hon. RICHARD AMERY MP:** That 40 per cent, you are talking about 40 per cent of the whole catchment, is it sort of like a target or a goal that you have?
>
> **Mr KING (Lower Murray Darling CMA):** Yes, and they have to be specific, it just cannot be any groundcover, it has to be specific, which is coming out in the policy. Just leading on from that a little bit, we have only got 5 per cent of our veg that has been cleared, we have still got 95 per cent point something of native veg, so native veg is not a high issue as in the loss of it.[120]

4.32 The Committee wanted to know whether there would be potential impacts for a 40 per cent catchment target, whether each person in the catchment was required to make a contribution, and how people were involved in the process:

> **Mr KING (Lower Murray Darling CMA):** Mainly through information flow, education. I mean, most farmers, when we first put out some of our targets to do with vegetation, there was a big uproar but then we explained to them, hang on, we've got 95 per cent of our native veg still in tact and all of a sudden the penny drops, it's not a great issue and it is the same as with this 40 per cent. If you can educate and show that by leaving 40 per cent after the drought your restocking rates pick up that much quicker and you are not flogging your land, people seem to come on board. It is that communication/education type.[121]

LOCAL GOVERNMENTS AND NRM PLANNING

4.33 In his submission, the Minister for Primary Industries suggested that links between land use policies established under the *Environmental Planning and Assessment Act* and natural resource management developed by CMAs need to be considered.[122]

4.34 In its submission to this inquiry, Bland Shire Council highlighted its leadership role in the protection of the natural environment and said local government had an important role in facilitating and activating natural resource management in partnership with other State and Federal Government agencies and local groups. It assisted community (ie Landcare) groups to achieve their objectives and the broader objectives of the council and the community.[123]

[119] Transcript of Evidence 10 November 2004 p10
[120] Transcript of Evidence 10 November 2004 p9
[121] Transcript of Evidence 10 November 2004 p10
[122] Submission No 90
[123] Transcript of Evidence 7 April 2005 p1

4.35 Berrigan Shire Council representatives advised that while they worked with landholders and soil conservation practitioners to develop sustainable practices, limited financial resources meant that their role with regard to natural resource management was fairly weak:

> **Mr PERKINS (Berrigan Shire Council):** We are more of an advocate, if you like, in terms of natural resource management. We, I guess, are blessed in our area in that we have had these land and water management plans and now the CMAs. We have not really needed to have the strongest role. The farmers in our area have mainly looked after those issues themselves. I am not sure if it is for all local governments, but if we were to have a stronger role we need the ability to effectively manage that, which we do not moment.[124]

4.36 In its submission, Wagga Wagga Council said that such planning instruments, especially Development Control Plans, are useful in developing a more sustainable approach to rural living**.** The Committee heard in evidence that CMAs are a good way of moving forward:

> **Dr NEAVE (Wagga Wagga City Council):** .... generally speaking, we would say that our council really works in the urban and peri-urban areas. Our influence in rural areas is less. That is not to say there should not be a bigger role in that and I think that is part of what this Committee is exploring. Our council particularly has an issue with salinity, urban salinity in particular, and while that is affected by what happens in urban areas, it is also affected by those rural and semi-rural areas as well. We do have a couple of policies and programs that do work in the rural area, like we have a tree management policy which covers the whole LGA. I flew up from Wagga this morning and looked out the plane and what did I see? Simplified landscapes, very substantial smoke haze, degraded riparian areas and a number of other problems you would say are serious from a natural resource management point of view and clearly more work needs to be done.[125]

4.37 The Committee questioned Wagga Wagga Council witnesses about the impact of managing salinity by pumping saline water out of the urban areas. Witnesses explained to the Committee that the bore field program had been useful in managing water levels within the urban area and had not created any extra problems:

> **The Hon. RICHARD AMERY MP:** Did you reduce the water table, and has there been an improvement in the salinity effects on the urban parts of the city?
>
> **Dr NEAVE (Wagga Wagga City Council):** We continue with that bore field pumping program that you referred to, but there is also a number of other programs in the city. We are trying to reduce water getting into the ground water system and removing rubble pits and so on. We have a network of 80 or 90 piezometers around the city which measure ground water levels. Last year's State of the Environment report, even though we have been in about four years of drought, there were more rises in ground water than falls, so we are getting these regional aquifers continuing to move, and that impacts on the city.[126]

[124] Transcript of Evidence 7 April 2005 p2
[125] Transcript of Evidence 7 April 2005 p2
[126] Transcript of Evidence 7 April 2005 p3

4.38 The program was useful in keeping ground water down below the surface and therefore minimising impacts on infrastructure, roads, houses, and sewer infrastructure.[127]

Comment

4.39 The last two chapters have described the framework, or set the scene, for the following discussion of on-farm salinity and drought preparedness.

4.40 The NRC sets the big picture but overall natural resource management has been devolved to the regional catchment level through the new catchment management authorities. It is up to the CMAs to set their own priorities and develop programs to deliver on the natural resource management outcomes in their catchments. This ultimately includes the complex issue of achieving better natural resource management at the farm level, on privately owned land.

4.41 This will be a challenge for the CMAs and indeed the broader community.

4.42 At this level problems such as drought and salinity require practical solutions. Experts are saying that we need to identify and adopt agricultural techniques better suited to our circumstances.

4.43 The next chapter identifies a range of redesigned agricultural practices that have been developed to do just that.

[127] Transcript of Evidence 7 April 2005 p2

Chapter Five - On-farm Approaches

5.1 The previous chapter considered how salinity, and to a lesser extent, drought is managed at the catchment level.

5.2 This chapter looks at specific on-farm practices that are proving themselves capable of reducing salinity and preparing for drought.

5.3 In many ways these practices have been developed in response to the "realisation that land degradation is a sign of inappropriate farming practices" and represent the redesigned agricultural and farming systems needed to ensure suitable water flows, nutrient and carbon cycling.

5.4 The committee discusses these approaches in three broad categories, as follows:

1. Soil health
2. Water use efficiency
3. Use of appropriate pastures

5.5 It should be noted that these approaches are not independent of each other. They are in fact interwoven and overlap. They have been divided in this way to in order to facilitate the presentation of the information.

SOIL HEALTH

5.6 The link between soil health and a nation's wealth is well accepted.[128] It is therefore in the nation's interest to halt soil degradation and implement soil health improvements.

Conservation Farming

5.7 Conservation Farming is a key method in maintaining and improving soil health.

5.8 Mr Seis, of Stipa, told the Committee there is growing evidence, both anecdotal and scientific, to show that these conservation farming approaches lead to improvement in soil health, better water use efficiency and general improvement in ecosystem function.[129]

5.9 In evidence before the Committee, Primary Industry officials defined conservation farming as "a term that is applied to a suite of management practices that reduce soil disturbance, increase soil organic matter and retain vegetation, including stubble":

> **DR SHELDRAKE (DPI):** The objective is to improve soil health, conserve water and reduce soil erosion. Native pasture species are often favoured by conservation farming approaches. Traditional soil cultivation and burning of stubble assists in control of weeds and plant diseases. In conservation farming other approaches are required. Conservation farming has enabled the development of specialised planning equipment, more disease resistant crop varieties and

[128] Professor Mildred Alali Amakiri, Dean of the Post Graduate School, Rivers State University of Science and Technology, Nigeria.

[129] Transcript of Evidence 17 November 2004

herbicides for wheat control. The Department of Agriculture has been involved in researching all of these areas since the late 1960s.[130]

5.10 The Central West Conservation Farming Association and Stipa Native Grasses Association are two key farmer-run organisations that promote farm management practices that improve soil health. They have formed an alliance that encourages both groups to broaden their outlooks by looking at vastly different strategies to achieve similar goals in a way that is both profitable and good for the environment:

> **Hon PAM ALLAN MP (CHAIRMAN):** ...can you explain to the Committee what being a conservation farmer actually means to the members of your association? How do you think the association has benefited from its association with Stipa?
>
> **Mr KNOWLES (Central West Conservation Farming Association):** Well, it is improving a natural resource to make it profitable and beneficial for the farm, for the community and for the environment. It sounds a bit glib, but that basically sums it up. They are all winners.
>
> **Mr MARTIN:** So it is a win-win situation?
>
> **Mr KNOWLES:** Pretty much, yes.[131]

Maintaining Ground Cover

5.11 Both organisations believe that 100 per cent living ground cover/100 per cent of the time will promote healthy soils by reducing dryland salinity and mitigate the effects of drought by providing a living ground cover. The aim of this technique is to prevent water from penetrating the soil beyond the root system of plants. This helps drought preserve soil, perennial grasses and subsequently, domestic stock.[132]

5.12 Appropriate and healthy vegetation cover protects soil processes and, subsequently, domestic stock during drought periods, by conserving the water within the root zone. Water that is prevented from leaking past plant roots minimises salinity impacts.[133]

5.13 In its submission to this inquiry, the Rural Block noted:

> Managing salinity, drought, soil erosion, water quality, weeds etc is about maintaining groundcover. Maintenance of groundcover at greater than 70 per cent at all times, with a high degree of level of permanent perenniality in the system, is the most effective way to manage land degradation issues... Most of these require a shift in thinking rather than high levels of expenditure.[134]

5.14 The Minister for Agriculture noted in his submission:

> There are opportunities to develop farming systems that are both more profitable and have reduced environmental impacts. For example conservation farming and modern planting techniques.[135]

[130] Transcript of Evidence 23 March 2005 p2
[131] Transcript of Evidence 17 November 2004 p3
[132] Submission No 84
[133] Submission No 84
[134] Submission No:4,
[135] Submission No 44

5.15 The General Manager of Central West CMA told the Committee that drought impacts appeared less severe in areas where conservation farming techniques (such as improved grazing and groundcover management) were being encouraged:

> **Mr FERRARO (Central West CMA):** Driving around the catchment through the drought, those areas that had practised conservation farming, the landholders would say it was like their crop had received two or three more inches of rain through the drought than, say, the person next door who had not been practising conservation farming. That is a pretty good example of win-wins all around where you get benefits for the property in terms of production and environment and broader environmental benefits with long-term mitigation of salinity.[136]

5.16 Conservation farming practices had the potential to conserve natural resources during drought according to the chairman of the Murray CMA. He observed to the committee that during the recent droughts conservation farming techniques meant that:

> **Mr BAXTER (Murray CMA) ...** we did not experience the dust storms that our forefathers talked about in previous droughts and I just need to acknowledge that farming practices have changed.[137]

Grazing and Stocking

5.17 Several submissions recommended better grazing management and cropping approaches that retain and promote perennial native grassland pastures which are more drought tolerant than introduced pasture.[138] Other paddock level approaches which assist with managing salinity and drought impacts include:

- reducing stock number pressures;
- using saltbush with strategies to match stocking rates to (land capability) carrying capacity;
- applying rigour to carrying capacity determinations and enforcing them;[139]
- farm level decision support systems that assist producers to determine appropriate grazing strategies to achieve a balance between environmental, market and economic goals.[140]

5.18 The Central West Conservation Farming Association's submission to the inquiry recommended planned grazing strategies with perennial grasses and saltbush combined with matching stocking rates to carrying capacity.[141]

[136] Transcript of Evidence 10 November 2004 p3
[137] Transcript of Evidence 10 November 2004 p11
[138] Submission No 87
[139] Submission No 18
[140] Submission No 44
[141] Submission No 87

5.19 The Association explained that good grazing management can improve diversity and perenniality of native grassland pasture which is more drought tolerant than introduced pasture. Conservation farming landholder Colin Seis has developed "pulse" grazing. The property is divided into numerous paddocks, and sheep mobs only spend between two and four days before being moved. Each paddock receives about three months of rest before being grazed again, allowing the native grasses to recover.

5.20 Graze periods and rest periods are planned and monitored for maximum performance of both pastures and sheep. Average graze periods are 4-6 months with rest periods of 70-90 days.[142]

5.21 Other organisations also promote "cell" (or pulse) grazing as a better land use practice for groundcover management. The Upper Timbumberi Landcare Group located within the Namoi Catchment Management Area, outlined on this at public hearings:

> **Mr BOTFIELD (Upper Timbumberi Landcare Group):** ...I have an ability on my property now to move stock from any paddock to any other paddock, so that we if you have low-producing paddocks they do not have to be stressed or grazed anywhere near as much as your higher producing paddocks...
>
> Just an idea of the actual area we are working under, it is the majority of old cultivation that has been cultivated probably for the last hundred years. There is a big variation in soil types, from black to clay to grey clay and red clay. Therefore, the cell grazing in my situation helps because you can isolate some of those bad areas and give them more time to rejuvenate but I think that really in itself is a big asset, to be able to do that...[143]

5.22 The Upper Timbumberi Landcare Group also argued that destocking assisted with maintaining 70 per cent of groundcover, which is the key to dealing with soil conservation and salinity:

> **Mr GARDNER (Upper Timbumberi Landcare Group):** There has been some physical on-ground works in terms of putting flumes into gully heads to stop erosion and improve water quality, but basically all the salinity outcomes, most of the erosion outcomes, most of the water quality outcomes can be achieved by maintaining high levels of ground cover and one of the long term targets for the group is to maintain minimum 70 per cent, so as part of a monitoring process that they are in now, they actually monitor ground cover as stock leave the paddock, so we are always measuring minimum ground cover to ensure that it does not get below 70 per cent.[144]

5.23 There is general agreement for the need to promote de-stocking in response to seasonal conditions. Drought mitigation in the pastoral zone means achieving a balance between grazing stresses on native vegetation and the retention of core breeding livestock.

[142] Submission No 25
[143] Transcript of Evidence 17 November 2004 p3
[144] Transcript of Evidence 17 November 2004 p5

Cropping approaches

5.24 As the Committee has already noted, a number of leading agriculturalists and scientists have stated that consideration of more appropriate cropping approaches is vital in dealing with salinity and drought impacts. Introduced crops contribute more to salinisation than native species and limiting tillage (even to zero) is needed to improve soil structure.

5.25 The Central West Conservation Farming Association recommend the following cropping approaches, which are working in the central west:

- pasture cropping (growing harvestable annual crops in native perennial pastures);
- cover cropping (minimal soil disturbance, ground always covered with something growing);
- no till cropping (minimal soil disturbance and retention of stubble);
- advance sowing into native pastures (increasing diversity by sowing annual crops into pastures).

5.26 In its submission to this inquiry, the Association said that the main benefits of these approaches include:

- effective water, mineral and energy cycles;
- the soil is always covered, eliminating bare fallows (improving water holding capacity and reducing leakage);
- rainfall is captured where it falls reducing run-off therefore erosion;
- 100 per cent soil cover 100 per cent of the time;
- rising levels of organic carbon in the soil improve water holding capacity;
- less leaching of nutrients and water to the water table;
- continual conversion of solar energy to biomass – either edible or harvestable;
- sustainable profits and improving resource base.[145]

[145] Submission No 22

CASE STUDY - WINONA

Mr Colin Seis is a member of the Stipa who owns and manages "Winona", a mixed farming (sheep and cereal crops) enterprise in Gulgong, NSW. The Seis family has been in the area for 150 years and in that time has been prepared to implement innovative methods. During the 1970s, the Seis family recognised that traditional farming methods were not sustainable and was having problems with dryland salinity, soil acidity and annual weeds.

Mr Seis found that the original tableland landscape was grasslands with scattered trees and realised that native grasslands had a role to play in controlling groundwater and limiting the impacts of salinity. Plant communities in the region were dominated by perennial native grasses, predominantly *Poeceae* family which would be interspersed with a highly diverse suite of herbaceous non-woody wildflowers (forbs). While vast areas of these grasslands would contain trees, significant areas were recorded by the early European explorers as "treeless plains".[146]

The use of superphosphate was ceased and a combined grazing and cropping was implemented. Mr Seis developed and implemented "pulse" grazing and working with neighbour Mr Daryl Cluff. Mr Seis then started to sow winter cereal crops directly into summer growing-winter dormant native perennial pastures.

This pasture was grazed up to the sowing season, with stock being put back onto the pasture after harvest to graze stubble and green perennial grasses. The approach aims to have 100 per cent groundcover, 100 per cent of the time (including under crops) and believes this approach is both profitable and solves environmental problems.[147]

The original concept of sowing crops into a dormant stand of summer growing (C4) native grass, like red grass (*Bothriochloa macra*) was thought to be a very inexpensive method of sowing oats for stock feed. This certainly turned out to be true, we quickly learnt that there were many side benefits and that we were only touching the surface of a land management technique that is proving to be revolutionary.[148]

5.27 The Conservation Farmers' Association cautioned that as there is considerable diversity across regions and farm operators in New South Wales, localised and regional specific solutions are required.

> **Mr GOULD (CWFA);** no one best practice is going to cover that diversity of operations.....our membership goes from the tableland right out to Nyngan, to the plains, so again, now we've got a diversity in rainfall and topography and soil types and everything else, so what suits one farmer doesn't certainly suit another... what we try and get across as our association is that there are fundamental rules and the things ...in terms of soil cover and water use and soil health... that have brought us together as an association, to drive our

[146] Submission No 84, Appendix 2
[147] Pasture cropping brings up profit by an incredible 25 per cent. Landcare Farming Case Study. Landcare Australia http://www.landcareaustralia.com.au/FarmingCaseStudies.asp
[148] Transcript Of Evidence 17 November 2004; Pasture Cropping: A land management technique. C. Seis

> fundamental thinking and the individual farmers go away and do that their own way and we as an association bring information and peer support to that process.....we collectively are building a better practice across a diversity of operations and locations.[149]

5.28 Some submissions included 'response' or opportunity cropping (sowing a crop when there is enough moisture to do so)[150], rotational cropping and increasing organic matter in the soil and correcting PH levels[151] and farm forestry.[152]

5.29 Namoi CMA witnesses advised the Committee that the nature of salinity in the north of the State differed from the south because the north has a summer dominant rainfall, resulting in short events that can vary between the extremes of drought and floods.

5.30 Mr Truman stated in evidence that response cropping provides the ability to maximise water use opportunistically, thus reducing the potential for mobilisation of salts:[153]

> **Mr TRUMAN**: As rainfall never exceeds evaporation for any given month of the year, plants have the ability to use most of the rainfall. This rainfall pattern is more favourable for the development of agronomic systems, so we actually have the capacity to implement appropriate solutions through our farming systems. Largely we have the ability to maximise our water use through opportunity or response cropping thus reducing the potential for mobilisation of salts.[154]

[149] Transcript of Evidence 17 November 2004 p11
[150] Submission No 19
[151] Submission No 36
[152] Submission No 38
[153] Transcript of Evidence 23 March 2005 p11
[154] Transcript of Evidence 23 March 2005 p11

CASE STUDY - CONSERVATION FARMING AT BARAGONUMBEL

Stipa gave evidence to the Committee that a property located in the Saxa-Gollan district, approximately 45km from Wellington, was a good example of where the "better conservation farming approaches" were assisting in reducing salinity impacts. "Baragonumbel" is owned and managed by Matthew and Kylie Barton, who have been practising pasture cropping for more than three years and in 2003 planted nearly 2000 ha. Species incorporated into their approach include retaining natural populations of summer (C4) native pastures for summer and autumn grazing, followed by no-tilling wheats or oats after the first frosts in autumn. Recent developments have also seen summer legumes (such as cowpea) being sown into winter (C3 dominant) based native pastures.

The Bartons have also attended the Grazing for Profit management courses run by Resource Consulting Services. Mr Barton also decided he would "work with nature" and achieve profitability in the process:

> **Ms RAHILLY (Stipa):** On the bus trip Greg and Pam and Tony visited a farmer who is carrying out pasture cropping, so that is no-till into native grasses, and he has salinity patches on his place that are basically shrinking. Over the road is another property where an awful lot of money has gone in, and Tony commented to me afterwards about this, a lot of trees have been planted and a lot of government money, and the salinity is actually getting worse on their place, so it is possible with the techniques that we are developing and working on the whole time to actually reduce salinity.[155]

Landcare Farming

5.31 The Landcare philosophy was described in an earlier chapter. While the movement evolved out of the tree planting movement in the 1980s it has progressed to adopt similar aims and practices as those described above.

5.32 The chief executive of LAL told the Committee that landcare farming comprises a whole range of techniques, such as more efficient water use, reduced tillage and minimising the use of chemicals.[156] and that:

> **Mr SCARSBRICK (Landcare Australia Ltd):** … we at Landcare Australia have been developing case studies of farming operatives, hardcore farmers who have moved to more sustainable agricultural positioning on their whole property, and clearly increasing productivity is one of the main benefits of it… [157]

5.33 Ms Quealy identified the key areas for LAL projects as being "sustainable agriculture, biodiversity, water quality, coastal soils and erosion, native vegetation and capacity building for the community".[158]

5.34 Mr Scarsbrick observed, however, that sustainable agriculture" can be a hard concept to sell, as opposed to "landcare farming".[159]

[155] Transcript of Evidence 17 November 2004 p10
[156] Transcript of Evidence 6 April 2005 pp7-8
[157] Transcript of Evidence 6 April 2005 p7
[158] Transcript of Evidence 6 April 2005 p9
[159] Transcript of Evidence 6 April 2005 pp7-8

WATER-USE EFFICIENCY

5.35 It goes without saying that in Australia it is vital to make the most of the available water. But it must be used in such a way as to recognises and heeds the operation of our natural systems.

5.36 As noted in chapter one, current agricultural systems leak between two and five times more than the native vegetation they have replaced.

Optimising rainfall – using rain where it falls

5.37 The Upper Timbumberi Landcare Group informed the Committee that many traditional farm systems were not very efficient at converting rainfall into production. Indeed, evaporative loss costs farmers money and probably contribute to salinity.

5.38 Rainfall that does not end up in production contributes to poorer water quality, erosion, salinity or other environmental problems. Therefore, it makes sense for farmers to be able to efficiently use what rain does fall *in situ* and minimise the need to apply water at other times when evaporative loss would occur.[160]

5.39 The key then to both efficient water management and minimising salinity impacts, was "using rainfall where it falls".[161]

5.40 Mr Gardiner, a member of the Rural Block who has been working with Upper Timbumberi, explained this argument in detail to the Committee:

> **Mr GARDINER (Upper Timbumburi Landcare Inc):** I think the important thing about it too is that most environmental degradation problems on agricultural land are associated with not using rainfall where it falls. If you want to encourage salinity then you let a lot of deep drainage happen or a lot of evaporation happen. If you want to encourage erosion you let a lot of run-off happen. Some preliminary work that we did in the area suggested that about 21 percent of all the rain that fell across the Timbumburi area actually ended up as production, and that is grain, livestock production or litter on the ground, so I was always rather concerned about where the other 79 percent was going, it either de-drains, runs off or evaporates and neither of those three outcomes is very good for long-term environmental management. The other thing that happens is that if you are only using 21 percent of your rainfall, which around Duri is probably about 140 millimetres, then the best year that you are having is a drought because that is not using anywhere near the potential amount of rainfall, so what happens under those situations is that farms go into drought earlier because they are not utilising water for grass production and they come out later.[162]

5.41 Groundcover and native tree management were two important approaches in dealing with water use efficiency, which in turn can be beneficial for both salinity management and drought impacts.

5.42 Because leakage rates far exceed catchment leakage targets, a better approach would be to aim for leakage values comparable to those under native vegetation.

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[160] Transcript of Evidence 17 November 2004 Tabled document Rainfall Use Efficiency pp1-2
[161] Submission No 92
[162] Transcript of Evidence 17 November 2004 pp4-5

5.43 The fact that water from rainfall ends up as either run-off, deep drainage, transpiration or evaporation, has implications, for water use efficiency, salinity outcomes and the appropriateness of farming practices.

5.44 Thus the amount of groundcover has implications for water use efficiency, salinity and soil health – which can be affected by particular farming practices.

5.45 The amount of run-off is determined by the slope, groundcover, soil structure and the depth to impermeable layers in the soil profile.

5.46 For example, water runs off more easily in steeply sloped areas while low groundcover does not slow that flow. Paddocks with poor structure will have low water infiltration rates. Shallow soils fill with water and the balance runs off. The majority of rainfall events are less than 15mm and unimpeded soil drainage of 60cm will allow water from such events to infiltrate the soil without run-off.

5.47 Deep drainage is a function of soil texture and agronomy, as water is held in the soil by surface tension, capillary pressure and electro-magnetic attraction. When the amount of water held in the soil exceeds field capacity (the maximum amount of water that can be held) the surplus drains through the soil.

5.48 Soils with coarse texture will have less water retention capacity and water will drain through more easily. Additionally, agronomic systems that rely on stored soil water also encourage deep drainage. *(*Freebairn *reference for this?).* During the production process, water is transpired and becomes either grain, grazing or litter.

5.49 The following table indicates that when rainfall ends up as run-off, it means that from 4 to 15 per cent of the total amount is lost overland from the paddock or farm. More commonly, this amount is 10 per cent. Between 2 and 8 per cent of the rainfall drains deeply to the groundwater table (the upper limit being 6-8 per cent). Rainfall can also end up as transpiration and be converted into litter, (detached plant material on the soil surface), grass for grazing and crops. The most inefficient conversion of rainfall is evaporation. From 15 to 60 per cent of rainfall can be lost from bare earth, ineffective transpiration or due to low soil nutrient status.

Component	Description	Range
Runoff	Overland loss from the paddock or farm	low 4%, common 10%, high 15%+
Deep Drainage	Losses to the groundwater table	probably 2-4% (high 6-8%)
Transpiration		
Litter	Detached plant material on the soil surface	commonly ½ to 1 handful per 30cm square (high = 4 handfuls).
Grazing	Amount of rainfall actually required to grow grass fed to animals	Figure is calculated
Grain	Amount of rainfall actually required to grow crop grain	Figure is calculated
Evaporation (or Inefficiency)	Loss from bare earth, ineffective transpiration or losses due to soil nutrient status	Low 15%, High 60%+

Conservation Farming and Water Use Efficiency

5.50 From the above it is clear that soil structure and water efficiency go hand in hand. Conservation farming, and similar approaches, deliver the type of soil structure that makes better use of water.

5.51 Conservation farming methods effectively capture rainfall where it falls, improving infiltration and reducing run-off and therefore erosion. In some cases, water use efficiency has required the revegetation of some degraded landscapes.

5.52 The Central West Conservation Farming Association explained that good soil structure (combined with litter and humus) had the potential to slow water down. Native grasslands hold water in their plant roots. This combination (good soil structure and native grasses utilising water *in situ*) acted to mitigate dryland salinity:

> **Mr SEIS (Stipa):** We have looked at controlling salinity in recent years by using trees like pumps but in reality I don't think our grasslands function that way. It looks as though what they actually did was slow the water down, almost like a sponge, and that was related to plant roots and humus and everything associated with it, and litter, so maybe we've looked at the salinity model in the wrong way. I do not think it ever functioned that way. I do not think it functions as pumps, I think it functioned like a sponge.[163]

5.53 Mr Peter Knowles, Chairman of the Central West Conservation Farming Association, advised that a DIPNR assessment of a 'conservation farming area' and a 'traditionally farmed area' was demonstrating that healthy soils will absorb and hold water more efficiently, storing it and making it more accessible during droughts.[164]

5.54 Mr Seis, told the Committee:

> **Mr SEIS (Stipa):** Because of the farming and grazing methods that are being implemented and adopted reasonably widely now, and I am talking about the pasture cropping methods that we have been working on .. and grazing management... that type of management can enhance especially our native grasslands so greatly and increase organic matter, litter and all the associated things with it, we can enhance all of that with farming methods, there is no doubt.
>
> **Mr APLIN:** What are the improvements that you have actually noticed since the introduction of the new methods, which include perennial native grasses and crop rotation? What actual benefits have accrued?
>
> **Mr SEIS:** Because we have the very well documented transects, especially on my place where the research work is being done, we have increased native perenniality from 10 percent to 80 percent in a five-year period; we have increased the numbers of species, that is diversity, of native perennial plants by an increase of nine actual species, so we are looking at 20 species in these paddocks now. It is very easy to do, once you start combining this sort of

[163] Transcript of Evidence 17 November 2004 p13
[164] Transcript of Evidence 17 November 2004 p13

> grazing management and cropping management, you can do that very easily; it is not a problem.[165]

5.55 It is important to prevent the loss of the "balance of accountable" rainfall to evaporation or inefficiency. Factors that affect evaporation (water lost directly from a bare soil surface) are litter and wind run. Litter reduces evaporation by insulating the soil surface and maintaining a soil surface micro-climate that is less conducive to evaporation. Lower soil temperatures in stubble retained farming systems have implications for germination, root development and early growth of crops.

5.56 Temperature gradient is the most important mechanism in determining evaporation. Evaporation accounts for a part of rainfall use inefficiency. The importance of evaporation can be encapsulated in Water Use Efficiency (WUE) calculations in cropping systems where fallow efficiency (the amount of water retained in the soil relative to the amount of rain that falls during the fallow) is generally considered to be 20 to 25 per cent. With loss to deep drainage being 10 per cent, the remaining 65 to 70 per cent is lost to evaporation. In long fallows, this equates to about one years rainfall.

5.57 The Cental West Conservation Association has found that not only do better farming practices improve soil health in the State's Central West but that adopting conservation farming techniques can provide for "an additional six Sydney Harbours worth of water that is currently leaking out of the landscape and causing salinity."[166]

5.58 This encouraging result is due to the use of plants using the available water thus preventing salinity.

5.59 A salinity study conducted by the Bureau of Rural Science found that the above result indicates that the region could create an extra $100 million worth of produce using this extra water. Furthermore, as organic matter increases in the soil profile, there is the potential to sequester an additional 100 million tonnes of carbon to help reduce greenhouse gas emissions.[167]

5.60 By implementing conservation farming methods, groundcover is maintained (eliminating bare fallows) and the water holding capacity of the soil improved thus reducing the potential for leakage. In addition, the levels of soil organic carbon rises and there is improved biological status of soil and improved cycling of nutrients.

5.61 Utilising water where it lands also reduces the need to apply water from outside sources. Therefore, techniques that reduce the need for additional water on properties, allowing the farm to operate more in harmony with the natural cycles, are vital.

[165] Transcript of Evidence 17 November 2004 p10
[166] Lawrie, P and Packer, I, "Soil health and a water balance model for the Central West", *Looking Over the Fence*, Vol 1,Issue 1, Aug 2004. Appended to Submission 84
[167] Submission No: 87 Central West Conservation Farming Association, Vol. 1, Issue 1, September 2004, pages 19-23

5.62 According to the CSIRO's Dr John Williams, over-watering of introduced crops is a key cause of dryland salinity and agricultural systems need to be redesigned to ensure water flows, suit the flat, salty landscape, to which trees and grass are adapted.[168]

Water Efficiency Tools

5.63 Some groups are developing practical tools to assist in delivering better water management at the on-farm level.

5.64 For example, the Rural Block's Rainfall Use Efficiency (RUE) program is designed to determine whether poor farm profitability is more likely to be the result of a poor product or poor management of natural resources.

5.65 RUE allows farmers to calculate their own water budgets by measuring how efficiently they use rainfall in the production of crops, livestock and soil surface litter. Changes in management can be assessed against their capacity to utilise water on existing productive areas.

5.66 At public hearings, the Committee's attention was drawn to the disparity in rainfall use efficiency on individual farms:

> **Mr GARDINER (Upper Timbumburi Landcare Group):** There is about three times as much variation in rainfall use efficiency across paddocks on individual farms as there is across the average of farms in the whole district. One of the areas that we've been trying to get these guys interested in is actually own farm data collection and benchmarking themselves against their own best practice rather than benchmarking against best practice for the whole district.[169]

5.67 According to the Rural Block's submission, there is considerable scope for productivity growth on existing cleared land in northern NSW. The optimal level of production is not necessarily dependent on what is physically possible using all available rainfall. If using more resources does not increase profit, there is little sense in farmers overtaxing their most valuable asset:

> On any farm it is permissible to *not* use all productive land for production if this is the most profitable outcome. *Not* using potentially productive land for a while provides an opportunity to put a few deposits in the natural resource bank.[170]

5.68 The Rural Block sees measuring RUE in conjunction with Property Management Planning (PMP) (see chapter seven) as key aspects of the farm business monitoring process.

USING APPROPRIATE PASTURES

5.69 One approach to dealing with on-farm water management raised in submissions was planting deep-rooted perennial pastures and the utilisation of saline lands to grow salt tolerant pastures.

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[168] Walker G, Gilfedder, M and Williams, J. Effectiveness of current dryland systems in the control of dryland salinity, (date) http://www.clw.csiro.au/publications/Dryland.pdf)
[169] Transcript of Evidence 17 November 2004 p5
[170] Rural Block, Tabled Document, 17 November 2004

5.70 Removal of deep rooted, perennial native vegetation, and its replacement with shallow-rooted, annual crops has altered the hydrological balance away from groundwater equilibrium to significant recharge. Additionally, forests contribute to salinity management through transpiration, therefore returning trees to the landscape may be part of the solution to dryland salinity.

Trees or Pasture?

5.71 The need for regional or local solutions has already been noted in this report. CSIRO research supports this, having found that, in order to significantly reduce leakage, landscape (ie bioregional) aspects need to be considered. For example, high rainfall areas require a high proportion of trees to be incorporated into the landscape whereas, where average rainfall falls, grazing and cropping systems may have the potential to slow salinisation.

5.72 Dr Williams argues that to reduce salinity, pasture plants may need to be supplemented with trees and shrubs situated to intercept excess water, with the shade and shelter benefits of trees and shrubs also mitigating the effects of drought.[171]

5.73 Witnesses from the Upper Timbumburi Landcare Group told the Committee relation to managing salinity and mitigating the impacts of drought, planting native trees is an important approach in their region:

> **Mr BOTFIELD Upper Timbumburi Landcare Inc):** The tree planting I think has been the most significant. There has been some fencing off of remnant vegetation areas. On my place I have put in three ponds, a ponding system to slow the water down, to allow the water to settle and have less effect on the salinity. I do have a saline patch on my property which has been there, as it appears, for some time, well before my time, and we have also got test bores down around that area to eventually gauge what effect we are having in that area through deep drainage, so there are five of those test bores I think dotted around just slightly above that salt area and one below that salt area, just to give us an indication of what is happening over time.[172]

5.74 Tree planting provides other benefits as well:

> **Mr BOTFIELD (Upper Timbumberi Landcare Inc):** It is a combination of all those things and it has got to be strategically done in accordance with your plan…
>
> **Mr GARDINER (Upper Timbumberi Landcare Inc):** With salinity there is probably, if you took one hundred different scientists and gave them a hundred different cases of salinity, they'd come up with a hundred different causes of it but basically salinity, as I said before, salinity, erosion, water quality, they are all water management issues and if you are actually transpiring more water than you're evaporating, then you won't have a salinity problem.
>
> **The Hon. RICHARD AMERY:** As Peter said earlier on, it is probably too early to make an assessment of the impact of that tree planting.
>
> **Mr GARDINER:** And again, the salinity on Peter's place that you're looking at probably took 150 years to show up. It will probably take something of that order of magnitude to disappear again. One of the problems with salinity is something to do with the ability of soil to transport around, hydraulic

[171] Walker G, Gilfedder, M and Williams, J. op cit
[172] Transcript of Evidence 17 November 2004 p4

conductivity and those clay soils around Duri have very low hydraulic conductivity, water moves very slowly through them.

Mr LEE (Upper Timbumberi Landcare Inc): The trees we planted, twenty odd farmers met on my place - I'm a sheep farmer so I was running maximum number we thought but the teacher said, you should be running an extra three to five sheep. The whole lot of us looked stunned but in the finished they proved that we were losing probably a little bit more than twenty per cent through wind flow, so hence in the last two years our group has planted 8,000 trees but we won't see the benefit of that for probably five to seven years. Ground cover and the trees, all down the track, there will be improvement. Through all the monitoring with our group, benchmarking, in five years time we'll see results.

Mr BOTFIELD: The trees also break down the wind velocity, which helps the pasture and of course that won't take effect for a little while yet. It soaks up some deep drainage as well and the other thing is that it gives you a benefit with biodiversity, the birds and wildlife and that sort of thing. We have planned our tree planting to furrow into some of the natural veg that's already there and I think that's much better for the environment as well. Every farmer likes to hear the birds and see the wildlife as well.

Mr GARDINER: I think the interesting thing about the whole process was that right throughout the whole workshop series we did not mention the word "biodiversity" once, but we showed these guys how they could make more money by being biodiverse.[173]

5.75 In chapter four the view of Namoi CMA on the management of dryland salinity in its catchment were noted. In particular Mr Truman observed that the particular characteristics of this catchment meant that the "retention and enhancement of native vegetation is generally not the most appropriate environmental or economic response" Furthermore, "the impact of increased tree cover on water yields from the upper catchment could lead to further losses in economic returns and regional viability."

5.76 Accordingly, the Namoi CMA has "recognised that the management of salinity can be achieved through our farming systems" and that, although a significant proportion of its funding needed to be "allocated towards the management of native vegetation… will be allocated to assist in the increased adoption and uptake of opportunity cropping systems and alternatives to native vegetation where appropriate".[174]

5.77 This highlights the need to have regionally and even localised solutions to natural resource problems.

[173] Transcript of Evidence 17 November 2004 pp7-8
[174] Transcript of Evidence 23 March 2005 p11

Deep rooted perennial pastures to improve salinity

5.78 In its submission, the Department of Primary Industry detailed how it is researching and promoting the use of perennial species in the agricultural landscape:

> There are examples of farmers on the western slopes of the Great Dividing Range with perennial pastures who had demonstrably more feed available for livestock during the summer-autumn [drought] period of 2003[175]

5.79 The Nature Conservation Council of NSW supported this, pointing out that planting "locally appropriate deep-rooted perennials" helped reduce salinity through providing groundcover and lowering water tables, and work to mitigate the impacts of drought by retaining soil moisture, shading to reduce temperatures and evaporation, and groundcover which can recover more quickly after rain than over-grazed pastures.[176]

5.80 Phase rotation experiments conducted in Western Australia have confirmed that lucerne can dry the soil profile to a greater depth that annual crops and pastures, creating a buffer against leakage beyond the root zone.[177] This research also indicates there are productive and economic opportunities to integrate lucerne and potentially other "alternative" perennials into crop rotations across southern Australia.

5.81 The Department of Primary Industry advised that collaborative research on the benefits of deep-rooted perennials demonstrated the importance of including lucerne within a 'phased farming system', which can reduce leakage. Examples include integrating perennial pastures into annual cropping programs to help decrease water drainage below the root zone.

5.82 The Committee also heard that DPI had used NSW Salinity Strategy funding to conduct socio-economic analysis of farm management options at the sub-catchment scale. Results indicate that perennial pastures may be as effective as trees in reducing deep drainage at the test sites, the effect of which should be observed within 10 years.

5.83 The Department's research has also indicated that the location of perennial plantings is important, providing balance between water volume and water quality. Improved pastures and soil conservation works minimise soil erosion which can contribute to instream salinity.[178]

5.84 Furthermore, it was argued that there was a drought "advantage" to this approach. In his submission, Mr Rod Young, a dryland mixed farmer and grazier in north west NSW wrote:

> Deep rooted perennial pasture besides lowering the water table are much more drought tolerant than annual species. Lucerne and consul lovegrass have provided green feed after every fall or rain on my property during the current

[175] Submission No 44
[176] Submission No 38
[177] Ward, et al, High water-use farming systems that integrate crops with perennial pastures.
[178] Questions on Notice June 29 2005

> drought. Annual species take substantial rainfall to become established, let alone before they produce much bulk of feed.[179]

5.85 Stipa, on the other hand did raise some concerns with the use of lucerne:

> and those deep roots suck all the moisture out of the surrounding soil. So nothing grows between the sparse lucerne plants. This leads to bare compacted ground, which leads to erosion. Good scientists communicate with innovative farmers and work out ways in which their systems can be taken up by more farmers.[180]

Salt tolerant pasture

5.86 The Minister for Agriculture advised the Committee that research is underway on salt tolerant pastures and crops and management techniques to get the most sustainable use of saline land. The Economic Services Unit of NSW Agriculture is also conducting a socio-economic analysis of farm management options aimed at identifying profitable farm practices that may contribute to a reduction in salinity while achieving the greatest public benefit.

5.87 The Minister for Agriculture and Fisheries says:

> There is potential on saline lands to grow salt tolerant pasture species for both livestock production and to reduce the impact and off-site effects of water movement from those saline lands.[181]

5.88 Mr Don Matthews, a retired weed consultant and a member of the Implementation Committee of the North East (Vic) CMA where he specialises in weed and salinity activities, argues that salinity provides its own opportunity. He says that the use of salt tolerant pasture plants makes saline land productive. Salinity affected land can be an asset because there is a constant source of water:

> It should amaze us all that we consider an excess of water an environmental problem in Australia. The fact that the water is salty is surely only a challenge to develop through genetic engineering, plants that will tolerate this saline water. Because the land is so cheap and all of the mitigating activities are so expensive, it is unlikely that asking farmers to plant more trees, so diminishing their productive area, is ever going to succeed as a strategy… I propose that a major portion of the funding available through the National Action Plan on Salinity should in fact be expended on developing salt tolerating varieties of Lucerne and if possible, the perennial grasses Cocksfoot and Phalaris. If these plants were available to farmers, saline waters would become an asset that they can use to produce income. We know the salt tolerant gene, so let's use it and stop wasting money on salaries for extension personnel and the unproven planting of trees in recharge areas.[182]

5.89 While the use of suitable species in saline areas has some merit, some caution should be exercised in taking advantage of a symptom of a problem that actually needs to be remedied.

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[179] Submission No: 17,
[180] Question On Notice 17 November 2004 Q13
[181] Submission No: 44,
[182] Submission No 2

Native salt tolerant species

5.90 It has been argued that the use of salt tolerant natives can have a number of benefits ranging from erosion management to biodiversity protection. The use of native tolerant species is being evaluated by DIPNR.

5.91 In a paper given at a recent Dryland Salinity Conference the Department highlighted that there was a wide variety of salt tolerant native species. However, apart from chenopods, these have been ignored, yet some native grasses (eg, *Sporobolus, Paspalum* and *Panicum*) have shown potential on severely scalded sites in NSW.[183]

Saltbush

5.92 The benefits of using saltbush were raised at public hearings by both DPI and DIPNR. Departmental representatives raised the potential for saltbush to be used to remediate salinised sites as well as to provide alternative fodder during dry times when feed may be low.

> **Mr FISHER (DPI):** We see two roles for salt bush. One is for salinity there is a real problem at the moment where salt bush can help to pull down the water table because it is tolerant to those conditions and, as it uses up the water, pull the water table down and let other pastures re-establish there. The other role for it though is the more pro-active one of integrating salt bush into a farming system. There is an interesting trial going on out at Condobolin with alley farming of salt bush and using the salt bush to fill in the gap in the feed year in Autumn. It improves farm productivity but because it has got a deep root system it is keeping the water tables down low. So that is a win/win for sustainability and profitability.
>
> **Mr PETER DRAPER MP:** There is a commercial organisation at the moment growing it near Quirindi.
>
> **Mr FISHER (DPI):** Yes, but just how you manage it in the farming system is fairly critical. A lot of people are letting it get up too high. If it is used as part of the annual feed year, it should have more positive outcomes.[184]

5.93 DIPNR advised the Committee:

> **Mr VERHOEVEN (DIPNR):** There are probably at least two examples where remediation of saline sites can deliver a win-win that I might quote. The first is successful marketing of saltbush lamb as a gourmet product by restaurants, and that is occurring in and around Parkes and Cowra, for example. The second is Horizon Salt's marketing of salt recovered from evaporation ponds. This is occurring in the south-west of the State.[185]

Other salt tolerant pastures

5.94 The "Water, soil and salt movement from sustainable salt-tolerant pastures in NSW" sub-project (involving DIPNR, DPI and interstate agencies, ie, CSIRO, SARDI) began in March 2003 and has been primarily assessing the impacts of

[183] Semple, B. Exotic vs. native salt-tolerant species: our choice now but a potential burden for future generations
[184] Transcript of Evidence 23 March 2005 p8
[185] Transcript of Evidence 27 October 2004 p13

a salt-tolerant, perennial grass-based pasture (tall wheat grass dominant), compared to a volunteer/naturalised pasture, on pasture and animal production, and water, soil and salt movement off site at two saline discharge sites near Young and Molong.[186]

5.95 The project coordinators state that results from this project should:

> "boost the confidence of many more landholders to better incorporate saline land into their whole-farm management plans for triple bottom line outcomes".[187]

Drought Tolerant Species

Winter Green pastures

5.96 In its submission LAL identified "winter green" native perennial grasses as being "generally more drought tolerant". These were discussed in greater detail at public hearings:

> **Mr SCARSBRICK (Landcare Australia Ltd):** There has been a lot of research going into utilisation of native species, particularly perennial winter green pastoral plants. There has been an earlier emphasis on the phalaris and fescues, they have done a great job. We have some native species that are great as well, and particularly drought tolerant, and do not quite require the phosphate inputs, and that sort of thing. Landcare Australia, for instance, has been involved with John Deere working with a group that is developing a harvester front to harvest the very fickle harvesting of our native species. *Danthonia*[188] is very hard to get off. It shatters and all of that sort of thing. We see that planting back with some native species that are winter green should not be forgotten.
>
> We are not against exotic species in the pasture situation we see a lot more can be utilised, particularly if it is in the pasture already and can be managed effectively. I guess once you put phosphate on to native pastures, and you do not put too much on, and you do not have the huge explosion of clover, and you bring it up slowly, you will get the native species that are winter green, coming through and dominating, like danthonia and microlina, and those sorts of pastures. We see that as an important way of going forward to improve productivity, but also help with drought tolerance. There is no doubt, coming out the drought, the exotic improved pastures have a difficulty, particularly rye grass and that sort of thing.[189]

Maintaining Native Vegetation

5.97 One of the focal points of the Wentworth Group and the subsequent natural resource management reform process in New South Wales has been native vegetation.

5.98 Clearing of native vegetation is linked to a number of problems including soil degradation, salinity, declines in water quality, aquatic ecosystem health and climate change.

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[186] Marcar, "Profitable and sustainable grazing systems for livestock producers with saline land in Southern Australia", p4
[187] ibid, p4
[188] Kangaroo Grass
[189] Transcript of Evidence 6 April 2005 pp10-11

5.99 Implicit in many of the sustainable agricultural approaches identified above, is the aim of accommodating native vegetation.

5.100 Material presented to this inquiry stressed the importance of maintaining native vegetation as a part of an holistic approach to sustainable agriculture and thus, consequently, reducing salinity and preparing for drought. The Namoi CMA evidence, however, does not totally support this with regard to salinity.

5.101 Mr Brian Binning, landholder and landcare farming, discussed at some length his approaches to managing his property, approaches that included native vegetation management:

> **Mr BINNING (Weeroona):** Our farm covers 1000 acres, and is a fully developed Southern Tablelands property. Since its purchase in 1988, the property has had 15 years effort put into intensive revegetation and pasture improvement. This has included establishing conservation areas and green corridors to enhance biodiversity and shelter, along with other measures which mitigate dryland salinity. These results have been achieved by using a mix of owner resources, National Heritage Trust Grants for revegetation, and assistance from the Green Corps.[190]

5.102 Dr Sheldrake in outlining the role of DPI to the Committee identified the relationship between "promotion of sustainable agriculture... and native vegetation management".[191] Later he observed that native vegetation was a "really big sustainability issue".[192]

5.103 The submission from Upper Timbumberi Landcare Group stressed that clearing poor quality land is not profitable.

[190] Submission No 83
[191] Transcript of Evidence 23 March 2005 p2
[192] Transcript of Evidence 23 March 2005 p7

CASE STUDY

Witnesses from the Upper Timbumberi told the Committee that planting native trees is important to managing salinity in their region. Mr Botfield said that his property included a ponding system to slow water down which has less impact on salinity.[193]

Mr Lee told the Committee that attending a Super Solutions meeting at Quirindi was the catalyst for designing their project. The group subsequently made a submission for the project, which was broken up into three stages, with separate lots of funding obtained for each stage.

> **Mr PETER DRAPER MP:** Over the three year period how much has come to the group through this funding?
>
> **Mr BOTFIELD Upper Timbumburi Landcare Inc):** It is pretty hard to say. We do not have total funding, but we do have total trees.
>
> **Mr LEE:** There were about 8,000 trees, 80 kilometres of fencing and probably, off the top of my head, $250,000 worth of works in total, roughly.[194]

The group took a catchment approach to create a corridor of remnant vegetation and planted 100,000 trees and built 100 kilometres of fencing. The group maintains groundcover at above 70 per cent, which facilitates better water-use efficiency.[195]

> **Mr BOTFIELD Upper Timbumburi Landcare Inc):** We have planned our tree planting to furrow into some of the natural veg that's already there and I think that's much better for the environment as well. Every farmer likes to hear the birds and see the wildlife as well.[196]

Witnesses told the Committee that their Landcare group had doubled in size as a result of the project and that 43 farms and the local school had been involved.[197]

Eleven of the group are now monitoring their work on a salinity problem in Boiling Down Creek, with pleasing results. While drought conditions have made them concerned about the health of the trees they had planted, losses were smaller than expected. Mr Lee advised that he was "tickled pink" that of the 8,000 trees he had planted, only 520 needed to be replaced.

Comment

5.104 These examples of practical working farms that are successfully addressing the problems of salinity and drought preparedness, through redesigned, sustainable agricultural practices, show what can be done with commitment, determination and a fresh attitude.

5.105 They prove that such sustainable practices can provide positive environmental outcomes, such as reducing salinity and mitigating drought, and, as will be shown in a later chapter, they are also profitable.

[193] Transcript of Evidence 17 November 2004 p4
[194] Transcript of Evidence 17 November 2004 p4
[195] Case Study: Upper Timbumberi Landcare Wildlife Corridor Gully Erosion Salinity and Water Control. Natural Resources Management; Australian Government, June 2004. http://www.nrm.gov.au/state/nsw/publications/case-studies/timbumberi.html
[196] Transcript of Evidence 17 November 2004 p8
[197] Transcript of Evidence 17 November 2004 p4

5.106 It is vital that these types of approaches and the principles behind these methods spread more broadly through the farming community.

5.107 With regard to maintaining native vegetation, the background and mechanisms for the regulation of native vegetation, through Property Vegetation Plans, were set out in chapter three. This is an issue that has been controversial in rural communities, as much it seems from the regulatory nature of the approach as from the objectives of the policy.

5.108 In this inquiry the committee has been tasked with identifying on-farm practices and does not propose to adjudicate in any way on this issue.

5.109 What the Committee does note, however, is that the evidence relating to practical sustainable agricultural approaches indicates that there is merit in blending native vegetation with on on-farm agricultural activities and ways to further this blending need to continue to be developed.

5.110 The committee is hopeful that some of its recommendations will assist in achieving this.

5.111 Changing direction to adopt these redesigned agricultural systems will not require major investment but will need a "shift in thinking".

5.112 The shift in thinking needs to come from both the farming community and the broader community by committing to appropriate support mechanisms such as funding, knowledge and farm planning. The rewards are profitability, sustainability and ultimately a sense of achievement and satisfaction.

5.113 In the next chapter the committee looks at ways to encourage change to these approaches.

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Chapter Six - Encouraging Change

6.1 The previous chapter described various on-farm strategies that can reduce salinity as well as mitigate the effects of drought.

6.2 Not surprisingly, these approaches were enthusiastically championed by their advocates. The material, particularly the case studies, provides strong evidence of the success of these redesigned agriculture systems.

6.3 However, there is also acknowledgement of the merits of these approaches and support for them at the institutional level.

6.4 Murrumbidgee CMA advised that its Catchment Blueprint listed groundcover maintenance, perennial pasture systems, and increased water use efficiency of crops and pastures.[198] However, the Chairman of the Murrumbidgee CMA stated that groundcover targets would vary in different areas for different times of the year to accommodate farming needs:

> **Mr O'BRIEN (Murrumbidgee CMA):** For instance, in a mixed farming zone you cannot have 100 per cent groundcover for the year because, even with conservation farming practices, you still need to put the crop in, so there is a tillage operation there or at least a drilling operation to put seed in the ground. So there will be periods of time but the whole idea of that is to minimize the time that the ground is actually exposed to the elements. So you retain the stubble for the maximum period of time. If farmers have the equipment and the stubble is not too heavy, then they can actually drill into the stubble, but that will vary from place to place and condition to condition.[199]

6.5 At public hearings, Murray CMA representatives advised the Committee that:

> **Mr COUROUPIS (Murray CMA):** Profitable sustainable agricultural production was at or about the top of our lists of activities and priorities from each of our community workshops.[200]

6.6 Central West CMA witnesses advised that protecting soil and better managing water would have better outcomes for both salinity and drought:

> **Mr FERRARO (Central West CMA):** Yes, we would agree certainly that we are aiming to be able to make some significant difference in those areas. One example that we have is a program that we launched about two weeks ago, which is our conservation farming program, and what that essentially aims to do is increase the uptake of conservation farming in the cropping areas obviously around the catchment. About 10 percent of the catchment is cropped in any given year and, simplistically, what we are aiming to do with conservation farming is increase the amount of organic matter in soil which will mean that the soil firstly holds water and, secondly, it is utilised more efficiently by the plans, which means that there is less recharge and therefore salinity benefits, plus there are benefits to the crops in terms of production value, so we see that there are win-wins all around.[201]

[198] Question On Notice 22 December 2004 p5 Q8
[199] Transcript of Evidence 10 November 2004 p10
[200] Transcript of Evidence 10 November 2004 p13
[201] Transcript of Evidence 10 November 2004 p3

6.7 There can be little doubt that in order to better manage salinity, "redesigned" farming systems need to be embraced.

6.8 In its submission, DIPNR advised that in setting salinity targets, CMAs will provide support for landowners to establish perennial pastures and strategically manage vegetation, improve water use efficiency, practice conservation farming, response cropping and grazing and better soil management, and rehabilitate saline discharge sites with saltbush and other salt tolerant species.[202]

6.9 Landcare Australia Limited's report *Landcare Farming: Securing the future for Australian Agriculture* highlights that given the erodable and salty nature of Australian soils, the need for landcare farming remains and while there has been significant progress in developing landcare farming systems, more needs to be done.

6.10 Landcare told the Committee that some 40 per cent of farmers are involved in Landcare activities, implementing some form of sustainable agricultural practices.

6.11 Mr Baxter, Chairman of the Murray CMA asserted that some 30 to 40 per cent of farmers did not see the relevance of catchment blueprints and that considerable work still had to be carried out in order to have 80 per cent of farmer engagement "on ground". [203]

6.12 Mr Baxter told the Committee it is fairly easy to engage the "greener farmers" and those that are committed anyway, but there is still a need to raise interest levels in the general farming community:

> **Mr BAXTER (Murray CMA):** …probably you have got to get that mid section, who are out there just farming away for a dollar and you have got to arouse their awareness of natural resource management with them.[204]

6.13 According to Mr Baxter, it is important to understand that it may be difficult to achieve 80 per cent in priority areas 'on the ground' within an opportune timeframe, because money needs to be spent to engage that very important sector of productive farmers. He conceded that:

> **Mr BAXTER (Murray CMA):** We will never get probably the bottom 20 per cent We will get them when their farms change hands. It is hard to teach the old dog new tricks they say. When this next generation comes, that is when you will capture a lot of those and you need to have progress so that you are there capturing that at the time of land manager change.[205]

CAPACITY TO ADAPT

6.14 In his submission, Mr Binning painted a picture of how changes were taking place in his area:

> At the farm level, the current picture is one of a diversity of quite scattered interventions. In our region, the range from those of the altruistic conservationist

[202] Submission No 94
[203] Transcript of Evidence 10 November 2004 p17
[204] Transcript of Evidence 10 November 2004 p17
[205] Transcript of Evidence 10 November 2004 p17

> who works through the Landcare Group, to some of Australia's best examples of holistically planned, managed, and monitored on-farm programmes.....on-farm inspections will highlight the characteristics of different approaches and the variability of the methods being used to achieve change.[206]

6.15 The capacity for the remaining landholders to adapt to more sustainable practices is a vital issue and, in order for landscape condition to improve, Governments need to better understand why farmers do not adopt such practices

6.16 The Minister for Primary Industries acknowledged that governments need to understand both the interaction between land holding patterns and the capacity of landholders to adopt more sustainable practices.[207] He drew the Committee's attention to a report (which confirmed that there differences among landholders in motivation and capacity to access and adopt information on best practices.[208]

6.17 Another paper[209] found that adoption of innovations by landholders is a dynamic learning process that depends on personal, social, cultural and economic factors, as well as on characteristics of the innovation itself. Not surprisingly, landholders need to perceive that the innovation will enhance a range of goals, particularly economic goals. The non-adoption or low adoption takes place when an innovation fails to provide a relative advantage, particularly in economic terms.

6.18 In its submission, the Murray Catchment Management Board said that providing incentives may trigger continued implementation by farmers. It said that social research undertaken in the Murray Catchment in 2000 showed that the values and objectives of farmers were important considerations in the adoption of better land management practices.[210]

6.19 According to this submission, landholders with strong economic objectives will need incentives and if the right mix of technical advice and incentives is available to trigger sustainable practices, the chances are that farmers will apply them to other enterprises over time.

Comment

6.20 That 40 per cent of farmers might have adopted redesigned agricultural systems is, on one level, heartening. On another, however, it means that 60 per cent of farmers still need more encouragement to change or amend their practices, if significant inroads into the problem are to be made.

6.21 Fully engaging this remaining 60 per cent of landholders is the key. The 40 per cent of farmers who have adopted, or are actively adopting, more sustainable on-farm practices represent an enthusiastic vanguard that is by

[206] Submission No 83
[207] Submission No 44
[208] Cary, J.W., Webb, T.J. and Barr, N.F, "Understanding landholders' capacity for change", Bureau of Rural Sciences, Canberra, 2002.
[209] Pannell, D. J., Marshall, G. J., Barr, N, Curtis, A., Vanclay, F. and Wilkinson. 'Understanding and promoting adoption of conservation technologies by rural landholders'
[210] Submission No 27

definition more easily engaged. It will become more difficult to bring about the total uptake of these sustainable on-farm practices across the state, due to the increasing difficulty in engaging all of this 60 per cent of farmers. While a considerable portion of this 60 per cent can, with the right strategies and plans, be persuaded to take up the challenge, a significant group will resist change.

6.22 But the community must develop a successful strategy to bring about this change.

6.23 As the Rural Block pointed out earlier in the report, the key to this is not major investment but "a shift in thinking".

6.24 The problem for the Committee, then, has not been one of identifying innovative on-farm approaches. Indeed, it is exciting to see such a range of successful approaches on the ground. The critical issue is finding ways to bring about the "shift in thinking" required to overcome what will be the increasingly difficult task of increasing the take-up of these approaches.

6.25 Approaches to increase the take-up of practices to deliver these outcomes will, therefore, be varied. They should generally focus on reward and encouragement with compulsion as a last resort, although this option is a valid one when broad community interests are at stake.

6.26 Crucially, the experience of landholders who are adopting new, more sustainable systems, is that they are also maintaining or even improving financial returns.

6.27 In setting out the methods to encourage the uptake of these practices, the Committee has divided them into three categories. These are:

- Property Planning
- Support
- Rewards

Chapter Seven - Property Planning

PROPERTY MANAGEMENT PLANNING (OR WHOLE FARM PLANNING)

7.1 Property Management Planning (PMP) was put forward during the inquiry as a valuable tool or technique for implementing sustainable agriculture at the on-farm level.

What is a property management plan?

7.2 Property management planning is a system of property design and management "based on ecological and economic factors". It is a tool that helps farmers design more sustainable systems by helping analyse the farm operation from a biophysical, ecological, economic and social perspective. These perspectives allow a redesign of the farm layout and management to ensure sustainable production and profitability.

7.3 The process considers all the farm physical assets (for example, to better determine where trees and perennials are best located and how to protect water quality and biodiversity) and integrates them with farm budgeting and marketing strategies to accord with the goals and aspirations of the farming household.[211]

7.4 Property Management Planning accommodates a broad range of farm elements. According to the Rural Lands Protection Board, property management planning approaches should include ecological, financial and succession planning.[212]

7.5 A point agreed by the Deputy Director-General of the Department of Primary Industry when he told the committee, "property management plans are much more than just plans for the utilisation of the farm's physical resources; they consider all of the farm family's needs, including succession planning".[213]

PMPs and on-farm approaches

7.6 The advantages and benefits of property management planning, particularly in integrating better agricultural practices into operations were put to the committee.

7.7 NSW Agriculture put the relationship between the on-farm operation and sustainability most succinctly in its submission, stating that:

> The promotion of property management planning is the lynchpin to integrating farm production and environmental management.[214]

[211] Acotanc-95, Farming the Future: Sustainability and Whole Farm Planning, Sept 1995 www.newscrops.uq.edu.au/acotanc/papers/proust.htm
[212] Submission No 18
[213] Transcript of Evidence 23 March 2005 p2
[214] Submission No 44

7.8 The Namoi CMA supported this proposition, stating "that property management and vegetation plans aid landholders to identify what native vegetation resources are on the property, how to make future plans for that vegetation, to build the resource knowledge they require to manage their land, and if required, propose offsets".[215]

7.9 Murrumbidgee CMA told the Committee that a suite of soil conservation approaches are best considered within a 'whole of farm approach':

> **Mr O'BRIEN (Murrumbidgee CMA): ...** It is really a whole suite of programs. Drought risk management is a part of that, but it is a part of the whole approach to farming. You cannot just walk into a farm and say we are going to deal with the farm from a drought perspective, you have to deal with it from a whole farm management approach and drought risk management is one of those issues.[216]

7.10 The Central West Conservation Farming Association also agreed that property planning enables better decision making for conservation farmers:

> **Mr MAURICE (Central West Conservation Farming Association):** ... one of the really positive things because rather than making a decision on a bottom line figure, profit or production, how much crop you can grow or whatever, you are making it towards an outcome for your whole soil, biodiversity, water quality, and if there are any of those things missing it is not satisfactory. That to me is really the thing that has come out in the last few years, and then measuring the results.[217]

7.11 Landcare Aust identified property planning as one of the features of the successful Landcare farmers:

> ...They are younger, have farm plans, understand land degradation issues on their property, have made expenditure eligible to be claimed as a tax deduction. They also have larger farms which are less intensively cropped, but hold more livestock than non Landcare farmers.[218]

7.12 The submission from Upper Timbumberi stressed the need to understand "where money is made" as part of decision-making in the whole farm planning context.

7.13 Murray CMA told the Committee that planning what landholders want for their property provides the opportunity to take into account economic and environmental issues. Furthermore, planning and discussing property works with a landholder is beneficial.[219]

7.14 According to Mr Binning whole-farming systems result in better utilisation of a farm's pasture resources as they provide for grazing rotations to allow seasonally variable use of native or improved pastures.

7.15 Mr Binning gave an example of how whole farm planning might operate. He described how his program has aimed to restore the farm as a sustainable production system based on an ongoing reinvestment of 10 per cent of annual gross farm income, which is now 30 per cent complete. The property is undergoing a slow recovery from the effects of two years of drought, with stock

[215] Correspondence Namoi CMA 6 April 2005
[216] Transcript of Evidence 10 November 2004 p9
[217] Transcript of Evidence 17 November 2004 p11
[218] Submission No 103 p6
[219] Transcript of Evidence 12 May 2004 p14

numbers well below normal carrying capacity. During the recent drought period substantial injections of externally sourced capital has been required to enable the family to survive.[220]

7.16 Mr Binning, in his submission, provided an example from the wool industry of the advantages that can accrue when related whole-farming systems are utilised in the decision-making:

> In the wool-growing sector, changing fencing patterns are proving beneficial. Fencing layouts which allow more efficient grazing rotations, and which allow seasonally variable use of native or improved (ie exotic) pasture species have resulted in more robust and even utilisation of a farm's pasture resources. This has been invaluable in helping minimise the extent of tenderness in wool.[221]

7.17 The Upper Timbumberi Landcare Group argued that an holistic approach to farm management had to occur. For example, trying to deal with sustainability, profitability and production as separate or discrete notions was a mistake. On the other hand, farmers tend to use "profit, income, production" interchangeably when they were different:

> **Mr GARDINER (UTL):** They'll be talking production and meaning profit, talking profit, meaning income and so the idea that three things all happen at the one point in time is quite importantly wrong. If you are again looking for drought resilience in agriculture then what we need to be doing is identifying what the actual optimum level of production for each farm is and it may be a heck of a lot less than what they're trying to produce right now.
>
> **Mr BOTFIELD (UTL):** And of course there is a variation in enterprises too on each of those properties, a big variation.[222]

7.18 The witnesses cited another example of the benefits of this approach. The Committee was told about a landholder in Wongwibinda (eastern side of the northern tablelands) who completed the property planning program and was able to reduce his stock numbers by 60 per cent. This in turn meant he was able to reduce his need for feed supply.[223]

7.19 At public hearings, the Central West Conservation Farming Association further detailed the effectiveness of property planning:

> **Mr BOTFIELD (Central West Conservation Farming Association):** The group's main activity was generated through what was called the Super Solutions Program and, of course, once we made a submission to that it was found necessary to do some critical planning of our properties to make sure that what we were about to do as far as land care was concerned was compatible with the land and also economically viable for the property owners.
>
> My own particular property required a subdivision of some 30 paddocks where it originally only had seven paddocks. Once this was done it was obviously indicated that a watering system had to be installed as well… he benefits became clear very soon during this recent drought. The rotational grazing has assisted in the better use of the property and rested areas of the property that were not necessarily rested before. It allowed those areas to rejuvenate and also

[220] Submission No 83
[221] Submission No 83
[222] Transcript of Evidence 17 November 2004 p6
[223] Transcript of Evidence 17 November 2004 p7

> allowed proper evaluation of the capacity of those paddocks and therefore resisted overgrazing. The benefits, of course, were that during the drought period, in my particular case, I did not feed out any hay or subsidise grazing through hand feeding. I was able to eliminate that. Also the triggers were there to indicate to me as to when I should reduce the herd in order to stop stressing the land. That also improved my financial position on the property because there was less need to purchase feed. The reduced stress on the land allowed that to happen.[224]

PMP and catchment planning

7.20 The Minister's submission raised another vital point within this discussion. He observed that programs supporting whole farm planning (such as Prograze etc) "increase the capacity of farmers to place their decision-making in a catchment or locality framework, thus increasing the adoption of sustainable land management practices".[225] Dr Sheldrake (Deputy DG Department of Primary Industry) observed at hearings that New South Wales DPI has been assisting CMAs to tailor a property management planning program to meet their catchment planning goals.[226]

7.21 The link to catchment planning also enables the process to be linked to incentives.

7.22 Mr Baxter (Murray CMA) said that in the irrigation areas, property planning "is a pre-requisite for funding for recycling of irrigation water and involves a formal survey". He said "the land and water management plans have property planning as pre-requisite to the other incentives that are available".[227]

7.23 Other submissions also recommended linking regional natural resource plans with incentive payments to property management plans and education programs in sustainable land management and water use. The NSW Irrigators' Council recommended that property management plans should be the mechanisms that trigger incentive payments for farmers.[228]

Status of PMPs

7.24 PMP featured significantly in the natural resource management reform process in New South Wales.

7.25 In 2000, the Salinity Strategy had recommended included "planning systems at the appropriate geographical scale to achieve change". In 2003, one of the key components in the Wentworth Group report was the use of "property management plans to provide investment security, management flexibility and financial support for farmers". In the same year, the Sinclair Group had recommended to the New South Wales government that red tape be cut "by allowing farmers to prepare a voluntary 10 year Property Management Plan".

[224] Transcript of Evidence 17 November 2004 pp2-3
[225] Submission No 44 p11
[226] Transcript of Evidence 23 March 2005 p2
[227] Transcript of Evidence 10 November 2004 p14
[228] Submission No 20

7.26 The Native Vegetation Act 2003 had delivered Property Vegetation Plans and the PVP Developer as means to manage native vegetation although, Mr Verhoeven (DIPNR) told the Committee the PVP:

> is part of their integrated approach to delivering in the catchment. The PVP process will provide a range of outcomes in biodiversity, soils, salinity and water quality, while addressing vegetation management from property through to sub-catchment scale.[229]

7.27 The PVP is the regulatory instrument for native vegetation management and although it has a range of outcomes, it is clear that it is not a property management plan as it does not fit the criteria provided above.

7.28 PMPs do not have the same regulatory standing as PVPs.

7.29 According to the Rural Block, holistic planning is, at the moment, absent at the farm level. It said in its submission:

> The main thing lacking in most farm businesses is a management system that allows farmers to accurately assess the outcomes of a series of otherwise ad hoc operational activities. Most farmers do not regularly assess groundcover or water quality as measures of the sustainability of their farm. In NSW, neglect and negligence clear more land than bulldozers.[230]

7.30 In its submission, Rural Block asserted that:

> Farmers in New South Wales do not have the management systems in place to know whether they are managing their resources sustainably or maximising the returns from their farm business. Without this knowledge, the natural resource base of the farm will continue to be eroded to feed the family because increasing production is seen as the only way to make more money.[231]

7.31 The Department of Primary Industry is a supporter of Property Management Planning. In fact, the Minister told the Committee "it is a core responsibility …[of the department] under the NSW Salinity Strategy".

7.32 The Minister also advised that through whole-farm property management planning, landscape assessment potential and decision support tools, the Department works with landholders to develop farming systems that are more profitable and have reduced environmental impacts. Farm level decision support systems such as Prograze and Landscan, can assist producers determine appropriate grazing strategies in achieving balanced environmental, market and economic goals. He said that such programs can assist to increase a landholder's capacity to make decisions within a catchment or locality framework.[232]

7.33 The Committee understands, however, that the Prograze course costs $1,500.

7.34 The Deputy Director General outlined the Department of Primary Industry's role in property planning in New South Wales:

> **Dr SHELDRAKE:** New South Wales Agriculture co-ordinated delivery of property management planning courses under the former Farming for the Future program.

[229] Transcript of Evidence 27 October 2004 p4
[230] Submission No 4
[231] Submission No 4
[232] Submission No 44

An accredited course based on this experience is available through Tocal Agricultural College.[233]

7.35 CMAs are engaged in PMPs to varying degrees.

7.36 Border-Rivers/Gwydir and Central West are involved in a property management planning pilot program, which includes "holistic training ... with two delivery modes" and the development of a process to link PMPs to "environmental service ratios and incentive funding".[234]

7.37 Namoi CMA advised the Committee that it will encourage landholders "into property management planning and vegetation planning will be part of the PMP process". Namoi CMA went on to say that it saw the PMP "as a delivery mechanism for BMP and PVP".[235]

7.38 Mr Baxter from the Murray CMA told the Committee that, "the property management plans in the formal context as you may know them are probably not necessarily the way that our CMA is going, but in every discussion about works on property a plan is part of the discussion."[236]

7.39 The Northern Rivers CMA sees PMP as "a useful tool to facilitate solutions to a range of issues" while for the Lower Murray/Darling CMA "property planning is largely driven by CMA partners".[237]

7.40 As part of the devolution of regulating activities to the regional community level, DPI has been assisting CMAs to tailor a property management planning program to meet their catchment planning goals.[238]

7.41 It is clear from the comments above that many, if not all, CMAs are supporters of the property management planning and the committee also understands that property management planning is an approach that CMAs are giving consideration to implementing to varying degrees, depending very much on their priorities.

PMP Tools

7.42 A number of tools exist to assist in the decision-making involved in property management planning.

The Property Vegetation Plan (PVP)

7.43 Mention has already been made of the PVP as an agreement, voluntary but legally binding, between a landholder and the local CMA. It determines what is done with native vegetation on individual properties. Advocates for PVPs argue that they provide:

- certainty for the landholder (the agreement could last up to 15 years);

[233] Transcript of Evidence 23 March 2005 p2
[234] "New email newsletter on Property Management Planning in NSW", www.deh.gov.au/discussion-groups/ nrmdiscussion/msg00013.html
[235] Questions on Notice, 30 March 2005, Q5; Transcript of Evidence 12 May 2004 p14
[236] Transcript of Evidence 10 November 2004 p14
[237] "New email newsletter on Property Management Planning" op. cit.
[238] Transcript of Evidence 23 March 2005 p2

- an alternative to a development application to clear native vegetation or protected regrowth;
- the basis for providing funding support for farmers to improve native vegetation on their properties.

7.44 Supporters say PVPs are an important tool in fighting salinity because they encourage the maintenance of native vegetation.

PVP Developer

7.45 The PVP developer is a computer-based tool, using accumulated local natural resource information to assess the proposed PVP. The Developer assesses the impact of the proposal on four elements – water quality, soils, salinity and biodiversity.[239]

7.46 The Committee heard in evidence that the PVP Developer was based on the world's best science and would be used in native vegetation clearing proposals and the delivery of incentives for native vegetation management.[240]

7.47 Namoi CMA representatives advised they would not use the PVP Developer until it had been trialled to a level that satisfied the CMA and delivered valid results for the region.

Land Use Option Simulator

7.48 The Land Use Option Simulator (LUOS) is a property scale planning tool designed to support better land management decisions to ensure long term sustainable production and land use. It helps rank competing land use change options and estimates "the impacts of land use and management changes on salinity and carbon sequestration, and the costs/benefits to a landholder of changing their current land use and management practice".

7.49 LUOS can report on the impacts of land use change on salinity and carbon sequestration as separate indices or combine them into one index – the Environmental Benefits Index (EBI).[241]

Salinity Benefits Index

7.50 As part of the Environmental Services Scheme (see below), the NSW Government developed a Salinity Benefits Index that calculates the change in stream salinity that can be expected from a specific change in land use or management. DNR literature says "it provides an objective means of comparing options for changes in land use within and between catchments to help prioritise actions to manage salinity".[242]

[239] DIPNR Fact Sheet No5– NSW Government's Property Vegetation Plans, November 2004 DIPNR 04_214_1e
[240] Transcript of Evidence 27 October 2004 p4
[241] DIPNR The Land Use Options Simulator (LUOS), Fact Sheet, December 2003, DIPNR 03_916
[242] Caring for our Natural Resources, the Salinity Benefits Index, www.dlwc.nsw.gov.au/care/synopsis_sbi.htm

7.51 While this suggests that it is more a catchment rather than property management tool, the Committee heard that it could be applied to any property, and linked to a costing model to help formulate budgets and make projections about returns.[243]

Industry Best Practice and EMS

7.52 The Cotton Best Management Practice (BMP) is a voluntary program that encourages cotton growers to assess risks on-farm and implement plans to overcome environmental and other issues. It uses a 'plan-do-check-review' management cycle and contains an external audit component. It has been selected as a project under the National Environmental Management Systems (EMS) pilot program which will assess its effectiveness in an EMS form.

7.53 In its submission, the NSW Irrigators' Council advised that 60 per cent of the 2002 cotton crop was produced under BMP. It argued that voluntary industry best management practice systems could be built on to become environmental management systems.[244]

7.54 Similarly, Cotton Australia advocates industry self-regulation and argues that this fosters greater participation than government initiated programs. It is opposed to the development of EMS by Government and their use as a regulatory tool. It would like Government support of industry best management practice programs.[245]

7.55 The Rice Industry Environmental Champions Program launched in 2001 has also been selected as part of the National EMS pilot program. The NSW Irrigators' Council advised that the program contains five levels of action that are undertaken to gain a credit under a program designed to link on-farm action with catchment improvement.[246]

7.56 One submission recommended the use of EMS as a way of rewarding farmers for sustainable food and fibre production. Their products could be labelled to indicate their environmental credentials, allowing consumers to make an informed choice.[247] Another submission suggested farmers receive guaranteed market access and possibly higher prices by retailers in exchange for implementing agreed environmental practices.

Planning for drought

7.57 While the aim of property management planning is to take an holistic view of the farm business and its environment, it is able to incorporate specific objectives such as drought preparedness.

7.58 There is a growing acknowledgement that drought has to be recognised and managed as part of the natural environment in which farmers operate and encouraging landowners to plan for droughts has become accepted policy.

[243] Transcript of Evidence, 12 May 2004, pp 7-8
[244] Submission No 20
[245] Submission No 31
[246] Submission No 20
[247] Submission No 38

7.59 In 1992 all States and Territories agreed to Australia's National Drought Policy, which was based on the principle that farmers should manage the risk of drought as part of their business. The concept which underpins the principle is that farmers need to adapt their management practices in response to the climate conditions they face.

7.60 The Chief Executive Officer of the Rural Lands Protection Board, which is responsible for making regional drought declarations, said that better long term farm planning needs to take into account climactic trends. He stated in his submission:

> Producers must accept that droughts are a normal event and therefore prepare for it to occur on a regular basis rather than assume that government assistance will be available.[248]

7.61 Dr Sheldrake highlighted that the Department of Primary Industries is striving for property plans to include the business risk of drought, which would mean there would be less of a need for Government to assist.[249]

7.62 Dr Sheldrake also said that the current trend is for better drought preparedness and that he thought farmers went into this drought much better prepared. In particular, the way that farmers responded to the most recent drought meant very few had animals that suffered and had to be destroyed.[250]

Drought Planning Tools

7.63 However, DPI officials told the Committee that the way drought is described is currently an issue that is being discussed at the Primary Industries Standing Committee and Primary Industries Ministerial Council. Dr Sheldrake said they are seeking a more objective regional assessment of when an area is drought affected:

> **Dr SHELDRAKE (DPI):** ....so drought on the north coast is going to be the result of a different rainfall pattern than a drought at Bourke or Brewarrina, so the task has been set to try to identify some objective criteria that can assist in that and that will then overcome the discrepancy of the EC descriptor for drought and the criteria as opposed to Rural Lands Protection Boards, and that is the boards themselves advising State Council and then determining when an area is in drought. There are always going to be those discrepancies until you come up with something that is a bit more standardised.[251]

7.64 Dr Sheldrake agreed that some other States do not declare droughts as such. He told the Committee if a mechanism to better enable a drought to be described is adopted (including for Exceptional Circumstances purposes) New South Wales, Queensland and the Rural Lands Protection Boards will be able to use the same objective mechanism.[252]

[248] Submission No 18
[249] Transcript of Evidence 23 March 2005 p5
[250] Transcript of Evidence 23 March 2005 p5
[251] Transcript of Evidence 23 March 2005 p5
[252] Transcript of Evidence 23 March 2005 p5

Comment

7.65 The potential for Property Management Planning as an on-farm business management tool has been widely acknowledged in recent years. PMP was identified at a high level during the reform process including the Salinity Strategy. It is promoted by the DPI.

7.66 Approaches to dealing with salinity and drought then need to form part of a whole farm planning process to ensure comprehensive decision making at the farm level occurs. There was a consistent view put to the committee that property management planning is vital to implementing sustainable agricultural procedures.

7.67 Currently, the main institutional mechanism at the farm level is the Property Vegetation Plan, a useful and important tool but designed for the management of native vegetation. It is not a comprehensive, dynamic business planning tool. However, there were instances where PVPs were confused with property management planning.

7.68 The Committee agrees with the Minister's comment about the potential of whole farm planning to deliver on-farm natural resource management outcomes. Most if not all CMAs also recognise and acknowledge this and plan to utilise and/or support them in the future.

7.69 For all this, the use of PMPs remains ad hoc or not a top priority and there are disincentives to their use, such as the cost imposed for the necessary training.

7.70 The government has developed a framework to deliver state wide and then catchment level outcomes but there is at the moment no instrument to ensure the community's objectives are delivered right down to the farm level.

7.71 Property management planning can be this final link as it can deliver catchment levels standards (as set out in catchment action plans) at the property level. In this way PMP can deliver community outcomes on the farm, by utilising various tools such as conservation agreements and PVPs.

7.72 The evidence suggests strongly that PMP needs to be brought to the centre of the planning process at that level. It has to be as common to use as the rain gauge.

7.73 This will allow CMAs to focus on community capacity building for longer-term natural resource outcomes at the property level.

7.74 PMP will facilitate and drive the uptake of the redesigned agricultural systems identified in this report.

7.75 These outcomes will not occur overnight. This approach needs to be seen as a medium to long-term plan which requires commitment and support across the community, including government, rural organisations and even banks.

7.76 Property Management Planning should be encouraged through incentives, educational programs and direct approaches. In order to encourage the uptake of this approach the Committee recommends a range of incentives. However, it would seem reasonable to make property management planning mandatory as a condition of any appropriate development application.

7.77 Just as importantly, property management planning needs to fit within broader regional planning objectives. This will ensure that the objectives inherent in adopting more sustainable agricultural techniques at the property level are in accord with broader natural resource management objectives. To achieve this, on-farm practices have to be linked to and accord with Catchment Action Plans.

7.78 Responsibility for the implementation of property management planning at the farm level should rest with the CMAs, given their mandated role of delivering natural resource management outcomes at the regional level. However, they will need to work closely with the Department of Primary Industries.

7.79 The approval process must be simple and streamlined. Critically, delivering redesigned agricultural approaches through *whole-of-farm* planning is essential. The introduction of more profitable and sustainable farming operations, such as better grazing and cropping practices, protection of remnant native vegetation, and water use efficiency – all of the practices identified in the previous chapter- will be best implemented through the use of property management planning.

RECOMMENDATION 1: That property Management Planning (or whole farm planning) form the institutional basis for land use management at the property level, to complete the chain from state targets to on-farm implementation. Property management plans will include sustainable agricultural objectives. They will not be mandated but encouraged and facilitated.

RECOMMENDATION 2: That Catchment Management Authorities become the approval authority for property management plans to ensure they align with catchment action plans and objectives. The CMAs will work with the Department of Primary Industries to develop this policy.

RECOMMENDATION 3: That Catchment Management Authorities dedicate a fixed proportion of their funding to the uptake of property management planning.

RECOMMENDATION 4: That incentives and assistance options be developed and to be available to encourage landholders to prepare and implement property management plans.

RECOMMENDATION 5: That Community Service Officers, trained in whole farm planning, prepare the plans with landholders.

RECOMMENDATION 6: That, in circumstances where development applications are required, property management plan be one of the consent requirements.

RECOMMENDATION 7: That the Natural Resources Commission to audit and report annually on the rate of take up of property management planning in each Catchment Management Authority areas.

RECOMMENDATION 8: That Property Vegetation Plans not be approved by the CMAs, unless they address clear outcomes that provide for sustainable agricultural techniques (eg, maintaining at least 70 per cent groundcover, off-sets that include salt-bush).

Chapter Eight - Community Support

8.1 The community has recognised the need to address salinity problems and expects change on the ground to take place. Given these expectations, it is not unreasonable for the community to provide support for these changes.

8.2 Community support and involvement is, therefore, the second element in facilitating the change to sustainable agricultural practice.

8.3 While a considerable part of the change in land use practices has to come from landholders, as both users and stewards of a significant proportion of the land, the role of the broader community is significant, a role acknowledged in hearings, firstly by Berrigan Shire Council:

> **Mr PERKINS (Berrigan Shire Council):** The other thing that we would say is that environmental management is not something just for the land owners, it is for the broader community to participate in and be responsible for.[253]

8.4 This was supported by Central West CMA:

> **Mr FERRARO (Central West CMA):** In the Central West we certainly have a long way to go in terms of our community awareness and how we engage with the community. We have been very focused on getting the organisation up and running and really the next stage is to actually more actively engage with the community. Our board has a very, very strong view that we cannot get anything done in the catchment without bringing the community along with us and its vision is all about communities and healthy catchments, so I guess the board has a very strong view that we have to engage the community first and only through that can we get the change that we really need.[254]

8.5 And Border Rivers-Gwydir CMA:

> **Mr CROFT (Border Rivers-Gwydir CMA):** We now feel also that we need to start working with the community in that sense, …and I have had positive feedback with the engagement I have had so far.[255]

8.6 The Natural Resources Commission acknowledged the importance of the interaction between CMAs and communities in natural resource management, as Dr Parry explained:

> **Dr PARRY (NRC):** We are certainly interested in terms of the standards for good practice of CMAs to ensure that CMAs are engaged with their communities and indeed in some of our visits we have met similar groups - different areas of interest, but similar groups. If there is some evidence that raises concerns about systemic failure or shortcomings in CMAs in terms of their engagement with communities we would clearly have some concerns about that. That would ultimately, and perhaps a bit too late in terms of good outcome, arise through the audit process. We would much rather, as any good auditor would do, be involved quite early and correct the problem before it does become a problem. So we are interested in hearing from groups as our formal engagement is with CMAs, but if that sort of information comes to hand it is something we would be interested in and we would pursue in discussions with CMAs.[256].

[253] Transcript of Evidence 7 April 2005 p2
[254] Transcript of Evidence 10 November 2004 p7
[255] Transcript of Evidence 10 November 2004 p8
[256] Transcript of Evidence 17 November 2004 p22

8.7 According to the Commission, a key performance standard it expects would be how the CMAs interact with their communities to conduct natural resource management activities:

> **Mr McMILLAN (NRC):** … we are conscious of not trying to teach them [CMAs] how to suck eggs but state wide standards around best practice natural resource management need to learn from everybody and share best practice across all the CMAs, so within that context we will be working with CMAs and others to work up state wide standards around the issues of community consultation engagement.[257]

8.8 Community involvement and responsibility manifests itself through support for landholders and other stakeholders in bringing about the changes to on-farm practices that the community expects or desires to happen.

8.9 A number of versions of community support were identified or became evident during the inquiry. They have been broken down into four categories:

- knowledge (education/training; science and research)
- funding
- networking
- government support.

KNOWLEDGE

8.10 Knowledge is an indispensable tool in decision-making and management in the contemporary world. Farm operations are no exception. Farmers cannot make decisions on the best ways to go about their businesses and protecting resources without relevant and up-to-date skills, knowledge and information.

Education and Training

8.11 Not surprisingly, a large number of submissions stated that providing information, training and advice to farmers and agricultural advisers was imperative to increasing the take up of more sustainable agricultural land-use practices.

8.12 Extension support for farmers has traditionally been a role of government agencies both federal and state.

8.13 In addition to the formal education institutions (TAFE, Agricultural Colleges), there are a range of training and education services to landholders provided by a range of organisations. In fact, the array of courses and extension services seems baffling.

8.14 In New South Wales the Department of Primary Industries plays a leading role in this area. In his submission, the Minister for Primary Industries explained that "the uptake of sustainable land management practices relies upon well designed, resourced and integrated extension and training programs which are

[257] Transcript of Evidence 17 November 2004 p17

underwritten by 'incentives' to participate". He cited the *WaterWise on the Farm* program as a model.[258]

8.15 DPI employs approximately 300 extension officers who provide formal education activities to farmers, including property planning, as well as direct provision of information, training and technical support to the private sector, other agencies and CMA staff.[259]

8.16 A key component of the training provided is to highlight the complexity of farm management and determine optimum approaches for the local environment, business capability and market goals through courses such as Prograze and Landscan:

> **Dr SHELDRAKE (DPI):** Rather than presenting a one size fits all recipe, New South Wales DPI aims to promote a deep understanding so that farmers can determine the best option in their own situation. Examples of this approach are courses such as Prograze and Landscan. New South Wales DPI is also a member of the Council for Environmental Education and contributes to the delivery of the New South Wales environmental education plan Living for Sustainability.[260]

8.17 Mr Botfield (Upper Timbumberi Landcare) told the Committee that generally DPI workshops provided a new and clear vision of the necessity to plant and monitor, which in practice has achieved a number of outcomes, in particular re-organising his property into cells to enable better management. He told the Committee:

> **Mr BOTFIELD (Upper Timbumberi Landcare):** so you can closely monitor what's happening as far as the pasture levels are concerned and as far as the water use efficiency is concerned with keeping the ground cover up to the level that we hope to.
>
> Mr Gardiner told the Committee that identifying the most limiting factor on each property, was important
>
> **Mr GARDINER (Upper Timbumberi Landcare): ...**because it varies from paddock to paddock and it varies from property to property, and so what happens is that a lot of farmers spent a lot of money working on the issue that isn't necessarily the one on their farm that is most limiting on the financial outcomes they are getting.[261]

8.18 The Federal Department of Agriculture and Fisheries operates the FarmBis program which is a part of the Australian Government's Agriculture Advancing Australia (AAA) package, jointly funded by the Australian Government, participating States and the Northern Territory.

8.19 The program provides financial assistance to primary producers and rural land managers to undertake business and natural resource management education and training activities.

8.20 Over 150,000 primary producers and rural land managers around Australia have attended FarmBis supported learning activities since the program commenced in 1998.

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[258] Submission No. 44 p11
[259] Transcript of Evidence 23 March 2005 p3
[260] Transcript of Evidence 23 March 2005 p3
[261] Transcript of Evidence 17 November 2004 p6

8.21 Murrumbidgee CMA told the Committee that these were both good programs that may be under-utilised and needed to be implemented more strongly from the natural resource management perspective:

> **Mr O'BRIEN (Murrumbidgee CMA):** What I found is in the FarmBis program, it was very well utilized by some pretty smart consultants and accountants and lawyers to develop succession plans and a whole bunch of things that they charged out to the FarmBis program at $4,000 and then charged the landholder whatever they got paid back....I think the FarmBis program, for what it has done in the past, is a very valuable tool.[262]

8.22 There is also a role for the new Catchment Management Authorities, in particular to facilitate education networks between farmers.

8.23 Murrumbidgee CMA witnesses said they were working on developing educational partnerships with DPI and the CSIRO:

> **Mr O'BRIEN (Murrumbidgee CMA):** Teaching the farmers how to grow better and more vigorous crops, how to manage their pastures better and then have their livestock enterprises lined up and maximize the profits from that. That is a partnership arrangement which we are developing through an organization called Farmlink which is a farm producer group or series of groups, they are spread all across the Murrumbidgee and spill out into other catchments as well, but also DPI and CSIRO are inputting into that and CMA of course. That is very important.[263]

8.24 Mr O'Brien also highlighted the sister program called Profitable Animal Production from Perennials, which is targeted for the grazing only parts of the catchment (above 600 mm rainfall zones) and at increased producer profitability as the driver for land use management change:

> **Mr O'BRIEN (Murrumbidgee CMA):** Rather than having a begging bowl mentality looking for another government hand out. Driving landholders to think of their farming business and how they can be more profitable by adopting a different land management practice, which by the way, has natural resource management benefits.[264]

8.25 Some CMAs are providing knowledge and training directly to farmers. In so doing it is important that education and training highlight the limits of action:

> **Mr BAXTER (Murray CMA)** Working towards the mentality where it may be the more megalitres used on the farm the better farm business it was for a long time, that is changed to return from megalitre and making wise decisions about your water use. That is something through the irrigation training course that we have been able to do, to train farmers to think about the decision of water use. It is a very important area, moving towards increasing water use efficiency by a whole range of methods....The long range plans are certainly delivering those and out of all adversity there comes some good and the low water allocations have forced a lot of farmers to have a really hard think about their farming systems and which way forward and the land water management plan process has been crucial in helping to facilitate the change in water use efficiency.[265]

[262] Transcript of Evidence 10 November 2004 p18
[263] Transcript of Evidence 10 November 2004 p17
[264] Transcript of Evidence 10 November 2004 pp18-19
[265] Transcript of Evidence 10 November 2004 p11

8.26 Financial incentives for farmers to learn new ways of doing this may ensure an increased rate of participation. As previously discussed, the Upper Timbumberi Landcare Group representatives told the Committee their activity was generated through having access to the NHT Super Solutions Program which assisted them with planning and on-farm works.

8.27 The Chairman of the Murray CMA raised a vital point in this context when he told the Committee that while there were good intentions to ensure that 80 per cent of funding would be used for on-ground projects and minimizing administration costs, a considerable proportion of the local landholders did not see the relevance of the [Murray] blueprint. Therefore, funding for education programs was needed to further increase engagement:

> **Mr BAXTER (Murray CMA):** I think in the rounds of community consultation we have had so far, there is a strong message that we still need to do quite a bit in bringing farmers along with the process through education, awareness and that really before you can get, in our catchment, 80 per cent on round, you need to attract the attention through a whole lot of programs, whether it is field days, which I still put in as education awareness programs.[266]

Science and Research

8.28 At both a national and global level, scientists and policy makers recognise the need to halt soil degradation to address the complexities of soil, vegetation and water conservation in a socio-economic context, and to deal with the actual cause of the problem rather than just managing the symptoms.

8.29 The redesigned agricultural systems identified in chapter five, while clearly effective, are still evolving. This evolution is an adaptive learning process in which science will play an important role. Understanding how to best manage salinity is a key concern for effective remediation.

8.30 Encouraging farmers to work with scientists was suggested as an important way of increasing the up-take of such land use management practices. Two submissions suggested that farmers and scientists needed more collaboration to evaluate the issues, determine the solution and ensure that better practices are adopted at a more significant rate.

8.31 In evidence to the Committee, Mr Seis, representing the Central West Conservation Farming Association, highlighted the importance of scientists and farmers working together to conduct research. He said that the CSIRO had been working on pasture cropping for two years and getting some very positive results:

> **Mr SEIS (Stipa):** It's really enjoyable working with these scientists one to one and we learn a lot from each other really, it's been very good.[267]

8.32 Landcare has also recommended that governments, landholders, industry and research groups urgently work together to further develop landcare farming systems, that have been shown to have good outcomes for salinity.

[266] Transcript of Evidence 10 November 2004 p17
[267] Transcript of Evidence 17 November 2004 p13

8.33 The Committee supports this conclusion with regard to all the sustainable land use systems it has identified in this report.

8.34 Both Stipa and the Central West Conservation Farming Association stated that:

> If scientists are to be relevant to the farming community, they must be informed by the farming community. Scientists have the propensity to lock themselves away in "ivory towers", expecting farmers to believe what they say. A classic example is the work done on lucerne. Scientists claim that it is an excellent perennial being deep rooted and high in protein. The only problem is that stock don't like it.[268]

8.35 According to Stipa, a cooperative approach to science and research had the potential to bring on board those farmers less committed and engaged. In other words, the missing 60 per cent:

> **MR GERARD MARTIN MP (Deputy Chair):** Can you tell the Committee how you feel this work is being conducted in a way that is meaningful and useful to farmers?
>
> **Ms RAHILLY (Stipa):** I think again it is a question of getting scientists who talk to farmers to ask what the farmers want to know about our systems. It is what I was saying before: Too often they decide what we want to know, do the science and then tell us. Now we hope to work with scientists so that the less innovative, the ones who are not going to push forward, will take up systems that science has proven work in ways that they understand and we feel that if they talk more to us, like the CSIRO people are talking to Col, then the science will be more meaningful.[269]

8.36 In its submission, Stipa quoted Dr John Williams (a former CEO of the CSIRO and now a member of the Wentworth Group of Scientists), as saying that "innovative land managers are ten years ahead of scientists." At public hearings, Stipa said:

> **Ms RAHILLY (Stipa):** We are hearing that over and over from scientists.... We feel that good scientists will listen to landholders who are out there actually making changes, so innovative farmers, and there are many of them in our membership, who are actually addressing natural resource management problems and for a long time scientists have sat in laboratories saying what we need is, what the farmers need is, but the good scientists are out there communicating with farmers, seeing what they're doing and then listening to what the less innovative farmers want.[270].

8.37 An example of this was provided by the CWCFA. It provided the committee with an outline of the CSIRO project. The general aim of the research was to firstly, determine the impact pasture cropping has on soil water and soil nitrogen compared with more traditional cropping and grazing systems and secondly, compare pasture cropping with a high zero tilled crop and summer dominant native perennial pasture.

8.38 Dr Williams said that the interaction between science and economics is fundamentally important "and will have traction with our communities".

[268] Questions on Notice 17 November 2004 Q13
[269] Transcript of Evidence 10 November 2004 p4
[270] Transcript of Evidence 17 November 2004 p14

CASE STUDY - SALINITY MANAGEMENT AT "TALAHENI"

Located at Murrumbateman, 40 km north of Canberra, "Talaheni" is a 250 ha, mixed grazing property (primarily superfine wool production and a small herd of Angus). It is owned and managed by John Ive and his family, with a view of understanding their landscape and the vegetation influenced water flow and use.

Severe dryland salinity was evident when the Ive family bought the property in 1980, the result being poor pasture vigour, bare patches prone to erosion – with one gully being 1.2 km long and up to 6m deep. Productivity was low, carrying only 2 dry sheep/ha and the area affected by dryland salinity.

Mr Ive is a senior research officer in CSIRO's Sustainable Ecosystems Division in Canberra. He combines his professional scientific experience at CSIRO with a love of the land and has demonstrated the links between vegetation placement and their effects on water table levels. His approach has won him a National Landcare Award.

A network of piezometers was installed to measure water table levels, which over the past 12 years, has provided "the longest known sequence of weekly piezometer readings anywhere in Australia".[271] Other measures applied to the property include:

- constructing a large dam to intercept overland flow;
- sub-dividing and re-fencing the property based on soil and land capability to better manage grazing and pasture;
- reducing the impact of soil acidity with sewage ash and surface seeding with legumes and tall wheat grass, which is salt tolerant;
- planting areas identified as high recharge and low production with Eucalyptus;
- grazing management to encourage natural regeneration of trees on cleared hilltops where poor, shallow soils preclude the growth of deep-rooted perennial pastures;
- fencing out native remnants and linking them with mixed-species corridor plantings;
- fertilising and managing native and sown perennial pasture to increase pasture bulk and vigour and to use more of the rainfall where it falls;
- replace annual pastures with exotic perennial pasture.

DPI has been monitoring groundwater and has confirmed the collective benefits of trees and perennial pastures in combating dryland salinity when established on appropriate parts of the landscape and suitable soils.[272]

8.39 As with the education and training issue, there appears to be the potential for the science and research to be organised and administered in a complex way.

[271] The National Landcare Awards, www.landcare.com.au

[272] A whole of farm integrated approach to regaining productive use of acidic, saline tableland landscapes, www.agric.nsw.gov/reader.salinity-research-pubs, September 2004

8.40 By way of example, the Western CMA told the committee:

> **Mr GREEN (Western CMA): ...**I have been involved fairly directly - I guess I have been leading the group - on the invasive scrub issues. The Science and Information Board is actually leading it and doing the responses on it, but I have been coordinating and helping to put together some of the responses. In that I must say the collective approach from DIPNR, DEC, the CMAs and the Science and Information Board has been very good and people have been looking at utilising whatever knowledge was around and not sticking I guess to the perfect scientific knowledge at some stages.[273]

8.41 Ms Rahilly (Stipa) told the Committee she has been involved with Grain and Graze in the Central West and has been working with the Department of Primary Industries. She said there is a component of their work to research pasture cropping, but it has taken 18 months of very hard work to get the DPI scientists to answer their questions.[274]

8.42 The committee understands that all the three agencies, Natural Resources, Primary Industries and Environment and Conservation, employ scientists to deal with research in the areas of their interest.

8.43 The Department of Primary Industries advised the Committee that the Department had been involved in researching areas of importance to agricultural development since the late 1960s. Dr Sheldrake told the Committee the Department has a research budget of approximately $126 million, of which 30 percent is provided by industry and other external stakeholders. It therefore continues to play a role in evaluating the effectiveness of new ideas.

8.44 Dr Sheldrake said the Australian research is characterised by increasing collaboration between research providers. The Department has approximately 900 research staff, including scientists and technical support staff, and is a participant in 18 co-operative research centres, including the CRC for Plant Based Management of Dryland Salinity, the CRC for Cotton and the CRC for Irrigation Futures. He also said that formal alliances have been developed with Charles Sturt University, University of Sydney, Southern Cross University and University of New England.[275]

Comment

8.45 The provision of "knowledge" (ie education and training and science and research) represents the community's indirect support for the farming community.

8.46 However, these resources should be delivered as efficiently and effectively as possible, The Committee agrees with the comment by the Minister for Primary Industries about the need for targeted extension services and training.

[273] Transcript of Evidence 23 March 2005 p16
[274] Transcript of Evidence 17 November 2004 p14
[275] Transcript of Evidence 23 March 2005 p1

8.47 Yet the array of services available in these areas is confusing. Community organisations are delivering training and extension services in landcare and conservation farming at the same time as CMAs are moving into this area. The Department of Primary Industries provides also extension services and other education programs. All major natural resource departments have science and research elements.

8.48 The Committee is not convinced that the whole process is well integrated and fears there is the potential for duplication or gaps.

8.49 The committee also agrees with the Minister that the knowledge made available should be underwritten by incentives. While it is not unreasonable for users of education and other services to make a contribution, particularly if this leads to financial advantage, the community should be prepared to contribute when the outcome is to its broader advantage. Furthermore, if the up-front costs are in themselves a disincentive then careful consideration needs to be given to identifying ways to overcome these disincentives.

8.50 Ultimately those landholders the community needs to reach (the 60 per cent) to change their practices will not take up the project if the resources are not simply and clearly made available and the incentives and the personal obligations involved in their use are not carefully designed and balanced. This group will be easily discouraged unless ease and simplicity are the key elements in any resources that support their efforts to change.

8.51 It is essential that the "knowledge" made available to landholders is focused, coordinated and incentive driven.

8.52 The Committee makes a number of recommendations that address these issues at the end of this chapter.

FUNDING

8.53 There are a range of funding sources for natural resource management and specific salinity projects and programs from federal, state and corporate levels. They are available at both catchment and on-farm level. For example,

- Native Vegetation Management Fund (has operated since 1998 and protected more than 89,000 hectares of native vegetation on more than 910 properties);
- Landcare programs (since the 1980s funds to encourage more sustainable agriculture). While funding grants for specific environmental projects will be available from the National Heritage Trust, the National Landcare Program will now distribute financial incentives for property owners to conserve vegetation through the new catchment management arrangements;
- National Heritage Trust (the Trust's Envirofund is intended to assist communities undertake local projects aimed at conserving biodiversity and promoting sustainable resource uses that are not identified as part of catchment management investment strategies);
- Drought Exceptional Circumstances.
- Healthy Soils for Sustainable Farms – a very recent Australian Government initiative, from Land and Water Australia, to "accelerate the transition by

farmers and resource managers to practices which maintain and restore Australia's soils".[276]

8.54 Again, the key is that the funding reaches its target, on-farm problems. The test of this is that the community should see a decline in salinity.

8.55 The *Landcare Farming: Securing the future for Australian Agriculture*' report concluded there is a continued need to both promote the wider adoption of landcare farming practices and to fund local landcare coordinator positions.

8.56 The Australian Government's National Landcare program will continue to provide funding for on-ground action projects.

8.57 Mr Binning also said that while the funding from the Commonwealth and State Government programs for the National Action Plan for Salinity have filtered down to the sub-catchment level, they have not yet been effective in working from the individual property level to the sub-catchment.[277]

8.58 In New South Wales, however, such funds will now be directed by investment priorities outlined in regional natural resource management plans and investment strategies identified by CMAs.

8.59 LAL agreed. Its approach seeks corporate funding to assist with on ground approaches to environmental management issues being managed by CMAs:

> **Ms ALLAN (CHAIR):** What sort of quantum are you talking about with the corporate funding? That would be significant funding as far as the CMAs are concerned?
>
> **Ms QUEALY (Landcare Australia Ltd):** Growing. There is two areas, the actual funding and the influence that a corporate can also bring, plus some other resources that corporates bring that are not just straight cash?
>
> **Mr SCARSBRICK (Landcare Australia Ltd):** Cash in kind. It is about seven million dollars. I guess it is the strategic way in which we can apply that and add value too. We often do it in association with an NHT project, where they did not quite get enough money, and add value in that way. It is not a huge quantum, but it is very significant in its flexibility and being able to apply it.[278]

8.60 Mr Klem told the Committee that in the majority of cases, the transition process was going well, but in some cases the lack of infrastructure might affect how the funds were delivered. He also said the CMAs would distribute funds through Landcare groups, which ties in with the CAPs and investment will be in the catchment priorities. He also said that the Landcare groups, who were "invaluable", would do the work on the ground.[279]

8.61 However, Mr Klem expressed his concern that, as the CMAs will now be the primary recipients of funding for natural resource projects, the Landcare movement may "feel left out" of the process:

> **Mr KLEM (National Landcare Council):** ..the Federal Government now is giving direct funds to the regional bodies, to the CMAs, and Landcare felt left out because what used to happen prior to that was that Landcare groups would apply

[276] www.lwa.gov.au
[277] Transcript of Evidence 6 April 2005 p1
[278] Transcript of Evidence 6 April 2005 p9
[279] Transcript of Evidence 7 April 2005 p10

> directly to the Federal Government. They would be assessed on a Statewide basis and then they would go to the Federal Government, in that order, and then they would approve funding or not approve funding. What is happening now is that that money is going to the regions and the regions are virtually distributing a lot of that funding……That is the CMAs.[280]

8.64 However, one submission criticised Landcare's "scattergun approach" to tree planting, suggesting that recent studies indicate more research is required into planting needs before planting takes place. Landcare should "direct its efforts into more strategic on-ground works that actually target salinity hotspots".[281]

8.62 At public hearings, CMA chairs said the Catchment Blueprints would set priority areas for investment as the "template for future investment of the National Action Plan for salinity water quality investments and Natural Heritage Trust Mark II investments".[282]

8.63 The Catchment Blueprints, which Lachlan CMA said will deal with the previous *ad hoc* approach to Landcare funding allocations, have given rise to CAPs:

> **Mr GLENNON (Lachlan CMA):** …in my opinion the power… of the blueprints… was that they were the first documents that really focused on trying to prioritise priority catchments and priority issues to address within those catchments for water quality and salinity, and that was the biggest movement away from the previous land care which was generally… more scattered funding. This was a much more targeted approach. The technical rigour behind those I think is pretty solid, so obviously CMAs will pick up on all that type of work ….we are already investing and negotiating with landholders on some of the incentive funds under the National Action Plan and at this point in time the blueprints are the only plan that has been accredited by both State and Australian Government, so even though we are moving on to CAPs.[283]

8.64 Of course, there is never enough funding to go around. Therefore, efficiency and focus is important.

8.65 All CMAs had a similar story regarding funding levels. The Central West does "not have anywhere near the money required to fully implement the blueprint, so the catchment action plans are going to be focused on some of the key areas.[284] However, its catchments were divided into several sub-catchments, so that while vegetation and biodiversity were issues for the entire catchment, salinity issues would be targeted in the critical sub-catchments only. This meant that salinity funds were not spread over the entire catchment.[285]

8.66 According to the Border Rivers-Gwydir funding is scarce. "Traditionally … missed out on a lot of funding" so "we need a robust and good way of saying to Farmer A, okay, you've missed out on the scarce funding" but here is the reason why.[286]

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[280] Transcript of Evidence 7 April 2005 10
[281] Submission No 24
[282] Transcript of Evidence 12 May 2004 p2
[283] Transcript of Evidence 10 November 2004 p2
[284] Transcript of Evidence 10 November 2004 p2
[285] Transcript of Evidence 10 November 2004 pp4-5
[286] Transcript of Evidence 10 November 2005 pp5-6

8.67 Regardless of funding limitations, a number of CMAs declared their intention to use it to focus on aspects of the on-farm approaches identified in the previous chapter.

8.68 The Namoi CMA advised that it's focus will be on technical support and information collation to facilitate best management practice, property management planning, capacity building (through training education and awareness), native vegetation enhancement, promotion of perennial pastures and sustainable farming systems and salinity management through gully rehabilitation.[287]

8.69 The Lower Murray Darling CMA stated its priorities would be the promotion of conservation farming techniques to facilitate better cropping, soils and recharge management, rangeland management, the provision of salinity and drought incentives, such as sustainable grazing and water point management and irrigation best management practice incentives.[288]

8.70 Murrumbidgee CMA planned to prioritise, among others, salinity and soil health.

8.71 Of particular note here was the CMA's intention to move away from on-going dependency on government funding. It indicated to the Committee on-ground incentives to maximise catchment outcomes, develop self-sustaining programs that improve landholder knowledge, skills and motivation will be targeted.[289]

Comment

8.72 The funding programs identified here and in other parts of the report represent a more direct form of community support for resource management by landholders. Again it reflects the communities concern for and interest in these matters.

8.73 The Committee has not attempted to identify every program available to landholder, either directly or indirectly.

8.74 Again, as with the "knowledge" resources discussed above, the Committee is somewhat overwhelmed at the range and complexity of funding resources.

8.75 Accordingly, it is concerned this maze of resources has the potential to confuse those who might consider taking action as well as scattering the focus of the funding, thus diluting its effectiveness.

8.76 It is imperative that the funding available is efficiently and effectively delivered.

Networks (Landholder Support)

8.77 The adoption of practices that reduce salinity and mitigate drought are not only a valid interest for the whole community but will depend on landholders supporting each other.

[287] Question On Notice 30 March 2005 q10
[288] Question On Notice 4 November 2004 q10
[289] Question On Notice 22 December 2004 q10 p6

8.78 The Upper Timbumberi Landcare Group told the Committee that working as a group helped maintain enthusiasm on a project and that catchment planning was a good way to get people involved.[290]

8.79 Landcare groups form strategic networks that facilitate knowledge transfer.[291] Landcare farmer and Australia Landcare Council witness Mr John Klem told the Committee:

> **Mr KLEM (National Landcare Council):** I was down at Harden Murrumburrah a while ago and they have a big salinity problem. Through their local Landcare working group and working with CSIRO they have actually done a lot of work on salinity and cropping and getting good results.[292]

8.80 For example, Mr Klem told the Committee that the results of cropping regimes were obtained immediately and placed on the Internet, as opposed to being a research process where it may be 12 months or more before information is available.

8.81 Landcare Australia Limited has been working with groups for some time.

8.82 It also observed in its submission that an ABARE report[293] found that adoption of landcare farming practices is much higher if the landholder is a Landcare group member . Landcare Australia Limited surveys also show that Landcare farmers are 50 per cent more likely to adopt sustainable agricultural practices than other farmers.[294]

8.83 The Committee discussed with LAL concerns it had raised about the impact of funding for its coordinators.

> **Mr SCARSBRICK (Landcare Australia Ltd):** So at the moment can I just say though that coordinators have been put into place but there is a concern, by Landcare Australia and a number of other people, that the community aspect of supporting the Landcare movement, with helping with capacity building and that sort of thing, has been restricted. They are not so much supporting the movement but concentrating on the planning aspects. I can understand the establishment phase, and that sort of thing, but we do believe that it is important that we keep that community Landcare movement going and that those coordinators provide some support to that.[295]

8.84 Mr Scarsbrick said that their coordinator spent one day a week on community Landcare and four days a week on regional aspects of planning, which is a recent function expected of coordinators.

> **Mr SCARSBRICK (Landcare Australia Ltd):** I hope that we get back to a balance of supporting the Landcare movement with some coordination and that sort of thing. It is a great way of getting information out to the whole community.[296]

[290] Transcript of Evidence 7 April 2005 p13
[291] Submission No 103, p. 6)
[292] Transcript of Evidence 7 April 2005 p12
[293] Alexander et al, 2000
[294] www.landcareaustralia.com.au
[295] Transcript of Evidence 6 April 2005 p7
[296] Transcript of Evidence 6 April 2005 p7

8.85 The Chairman of the Murrumbidgee CMA told the Committee that community engagement would be enhanced by having landholders, members of the community and Landcare group members etc, on selection panels to assist with making decisions about awarding contracts within the organisation:

> **Mr O'BRIEN (Murrumbidgee CMA):** We have also had community members on selection panels for project officers with the CMA staff.
>
> **Mr SEARSON (Murrumbidgee CMA):** In addition to that they have been involved in developing the investment strategy that we have in place now, so we had technical working groups and the Landcare networks and farmer organisations nominated people with expertise to participate in those and they have been very useful in providing a lot of information and in evaluating tenders. Some of these farmers that would have had involvement are really at the leading edge and have been able to have great input into that process.[297]

Farmers learning from farmers

8.86 A key aspect of networking is that people learn from those they feel comfortable with and trust.

8.87 The Department of Primary Industries stated that "farmers learning from farmers is a key principle of successful agricultural extension". An effective, consistent and well respected network of extension staff is required to be successful.

> Working with and training private sector agricultural advisors on the impacts and management of salinity, for example, is essential to improving up-take of sustainable land management practices. NSW Agriculture[298] staff are well underway with the delivery of training workshops for this purpose, under both the NSW Salinity Strategy and the CRC for Plant Based Management of Dryland Salinity.[299]

8.88 The Nature Conservation Council supports this position, stating that farmers who have implemented sustainable practices should be encouraged to set up networks to promote, encourage and support their peers and neighbours to facilitate increased adoption of "good stewardship" practices. These groups could then be used as a focal point to demonstrate the economic benefits of good management practices.[300]

[297] Transcript of Evidence 10 November 2004 p13
[298] Now Department of Primary Industries
[299] Submission No 44 p11
[300] Submission No 38

8.89 The Stipa Native Grasses Association has employed an extension officer for seven years. It has adopted the approach of farmers teaching farmers and has been promoting ecologically sustainable and profitable systems through field days and conferences. Stipa also produce a quarterly newsletter which highlights innovative techniques and encourages networking between farmers.[301]

> **Ms RAHILLY (Stipa):** We have been running field days and seminars and forums where we specifically get farmers who we feel are doing a good job and they present to farmers and that seems to be very successful.
>
> **Mr SEIS (Stipa):** Usually in shearing sheds, it works very well in shearing sheds. We get a hundred people at these things.[302]

8.90 Witnesses from Stipa told the Committee that exit polls indicate that field days which demonstrate conservation farming methods, such as pasture cropping and 100 per cent groundcover, are highly successful. They said:

> **Ms RAHILLY:** They learn best from field days, from our field letters and they don't learn from agency staff.
>
> **Mr SEIS:** Farmers learn from farmers.[303]

8.91 As Wagga Wagga City Council explained in its submission, "programs need to be promoted by people who understand the local farming community and are used to communicating with them. Outside specialists often have difficulty communicating with farmers and many programs fail to get adopted as a result of communication failures".[304]

8.92 Learning from those who have the knowledge and skills to devise better land use approaches to reduce salinity and mitigate the effects of drought is clearly a way forward in increasing the adoption of more sustainable agricultural practices.

Farm Groups

8.93 In his submission to the inquiry, Mr Binning argued there were advantages in linking groups of farms rather than focusing exclusively on individual enterprises. Mr Binning's submission advocates that there should be more trials of "groupings of farms" to provide better opportunity to learn at a both a scientific and an economic level. Mr Binning told the Committee:

> **Mr BINNING:** All of those matters can be learned, but equally there is an important case for knowledge transfer by example and that has taken place in some important examples of individual farms, but by and large outside Victoria where there is a greater attention to groupings of farms. Within New South Wales the innovation has mostly been on an individual farm basis rather than on a groups of farms basis.[305]

[301] Submission No 25
[302] Transcript of Evidence 17 November 2004 p12
[303] of Evidence 17 November 2004 p12
[304] Submission No 95
[305] Transcript of Evidence 6 April 2005 p2

CASE STUDY – FARM NETWORKS (THE SALTSHAKER PROJECT)

The Boorowa Saltshaker Project involved landholders from six Landcare groups who wanted to improve biodiversity on their farms and better manage dryland salinity, especially to prevent salt from getting into the Boorowa River. The local area was highly cleared and has many problems, including bio-diversity loss, increasing dryland salinity, water quality issues.

The project aimed to conserve 1,000 hectares of remnant native vegetation in the catchment to try to reduce the risk of dry land salinity. The Boorowa Regional Catchment Committee banded together with Greening Australia, CSIRO, Sustainable Eco Systems, the local shire council and others. Eighty separate properties were involved.

The Saltshaker project focused on areas where landholder production interests, salt abatement and bio-diversity conservation all overlap. $1.8 million was spent on establishing 900 hectares of vegetation and preserving 300 hectares of remnant vegetation.

Landcare Australia Chief Executive Brian Scarsbrick said

> "What's so impressive about the Saltshaker project is that it is Landcare at its best – it's a collaborative local effort by over 71 landholders focused on protecting remnant vegetation and woodlands to make a difference and help the land....For many of the landholders involved in Saltshaker, it was their first major Landcare project and because Saltshaker has given lots of personal advice, people have loved being part of the project.

Such an approach would assist the community to better determine the impacts and the feasibility of reaching targets and their cost.

> "All of those matters can be learned, but equally there is an important case for knowledge transfer by example and that has taken place in some important examples of individual farms, but by and large outside Victoria where there is a greater attention to groupings of farms. Within New South Wales the innovation has mostly been on an individual farm basis rather than on a groups of farms basis".[306]

Comment

8.94 These local networks can be very effective ways of spreading messages and initiating a change of behaviour due to people's natural tendency to listen to and accept ideas from their own local communities.

8.95 While these types of networks tend to evolve organically, policies and incentives need to identified and developed that can assist in building up such networks.

[306] Transcript of Evidence 6 April 2005 p2

DELIVERY OF GOVERNMENT SERVICES

8.96 A major support mechanism the community does provide is service delivery through state agencies.

Agency Coordination

8.97 Chapters Three and Four outlined the regulatory and regional planning regimes that stood behind the management of natural resource management generally and addressing salinity, in particular, in New south Wales.

8.98 The Rural Block in its submission raised the important issue of the coordination of state agencies in delivering natural resource management services. In the context of this inquiry this is a vital concern. The submission stressed that agencies need to improve their ability to work together to facilitate better land use approaches.

8.99 Certainly the systems described by the committee in chapters three and four are complex and potentially confusing, as can be discerned from the Murrumbidgee CMA's description of some of the bureaucratic relationships.

> **Hon. RICHARD AMERY:** Is it with regional directors or is it with program specific agency people?
>
> **Mr SEARSON (Murrumbidgee CMA):** There is a whole raft of arrangements. At the top level there is the regional coordination management group, which is run through the Premier's Department, which has the regional managers and regional directors. I am involved with that from a CMA perspective. With the Department of Environment and Conservation and with the Department of Primary Industries....it is at the regional manager level, so it is the regional director and senior staff in the region, but also, for instance, with Primary Industries it is Len Banks as an overall State perspective.[307]

8.100 At public hearings it was observed that a number of community organisations felt they had not been fully involved in the reform process at the regional level.

8.101 Stipa expressed concerns it had with the Central West CMA:

> **Ms RAHILLY (Stipa):** We have had problems with the Central West Catchment Management Authority. For instance, talking from Stipa's point of view, our project offer was sort of sucked in to the CMA on 1 July 2003 and we have had to manage on voluntary work ever since. It has been frustrating because we were under the impression that the community groups would be supported and that the CMA would work in with us. I am hoping that they will see the light and realise that we do have a lot to offer, but yes, it has been a very difficult process.
>
> **The Hon. RICHARD AMERY:** Could you expand on that in your written answers?
>
> **Ms RAHILLY:** Yes.
>
> **Mr KNOWLES:** We really believe that we have a system in place which will increase the adoption of this farming system and it will probably be one of the cheapest ways that you will ever get it done. The CMAs are limiting the whole thing.
>
> **Ms RAHILLY:** Yes, disassociating themselves from farmers; that is the real worry.

[307] Transcript of Evidence 10 November 2004 p15

> **DEPUTY CHAIR:** We are quite happy to take on board those criticisms; it is not a sanitising exercise from our point of view.[308]

8.102 Mr Treweeke (Western CMA) acknowledged that some aspects of the landcare process had not been well coordinated.

> **Mr APLIN**: Do you understand that using Wagga has actually evolved from a Landcare forum originally? How closely do your catchment management authorities work with Landcare and in what particular ways?
>
> **Mr TREWEEKE**: Very closely. We have catchment officers, or catchment support officers they are called. They work with the Landcare groups. Speaking from the western area, some of our Landcare groups have actually fallen over during the drought and people have found it difficult to get them going, but I think there is a renewed interest now and we are trying to work as closely as we possibly can with them. We sponsor our own CMA Landcare awards. The CMAs got a bit of out sync with the national Landcare statement, the national Landcare award program. So we will get everything geared around their timing next year and the next year on, because the following Landcare conference from the one that is being held this August is in 2007. They have them every two years.[309]

8.103 Berrigan Shire Council described some coordination issues, relating to cross-border issues and the role of the Landcare under the new CMA regime:

> **Mr PERKINS (Berrigan Council):** The only issue we have with the CMA concept in our area is that it effectively only is managing half a catchment. There is another one on the Victorian side as well. We would see some role for coordinating those perhaps a little bit better and we also feel that the Landcare structure has been left out of this system somehow despite some of the very good work that they have done.[310]

8.104 Generally, however, Berrigan Council was happy with the reforms but raised its concerns regarding the catchment management programs:

> **Mr PERKINS (Berrigan Shire Council):** there has been a range of uncoordinated and often conflicting environmental targets being put in place and we were pretty refreshed when the revamp of the CMAs and the catchment blueprints came along. We saw that as an attempt to address that...[311]

8.105 Other CMAs acknowledged that there was a need for some focusing of state agency activities:

> **Mr O'BRIEN (Murrumbidgee CMA):** I think that is critical. It is really a case of we have to line up the work of all the State government agencies and the CMAs to be all pulling in the same direction ... We should be strategic and .... look beyond the Natural Heritage Trust and the National Action Plan for Salinity Water Quality.[312]

8.106 Other evidence hints at the need for greater cooperation and coordination as can be gleaned from the following comments.

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[308] Transcript of Evidence 17 November 2004 p15
[309] Transcript of Evidence 23 March 2005 p19
[310] Transcript of Evidence 7 April 2005 p2
[311] Transcript of Evidence 7 April 2005 p1
[312] Transcript of Evidence 10 November 2004

8.107 Murrumbidgee CMA advised that it was developing strategies to ensure better coordination with both the DPI and DEC:

> **Mr SEARSON: ...** We have been very lucky, they have helped us right the way through and have committed resources to helping the catchment authority. One thing that I have been very strong about all the time when I worked in the department and now with the CMA was that the departments have to rely on their activities with the CAPs and the blueprints, and they are tending to do that, so that we are all pulling in the one direction or ... so that we get synergies from all our activities, and the same goes with local government.[313]

8.108 Western CMA was taking a similar approach in developing close contact with the DIPNR, DPI and DEC:

> **Mr GREEN (Western CMA):** Effectively, we have got limited resources and those departments have very limited resources in the areas that we work, so if we do not work together we are really shooting ourselves because there is no value in trying to work against each other ... I guess the formal side of it has not been developed yet.[314]

8.109 In evidence before the Committee, Mr Treweeke (Western CMA) stated that the CMAs had a very good meeting with DPI earlier that morning and there would be similar meetings with other agencies:[315]

> **Mr TREWEEKE:** We went right around the table, all 13 CMA chairs enunciated how they had done their deal, if you like, with DPI, and it varied from, in one instance, a particular officer being designated to do a particular job that was of high importance to the CMA, another one where two were half-time, each officer putting half their time into CMA work, and other CMAs have literally chosen to look at a suite of skills, particularly socio-economic work, that they want DPI to contribute. So every CMA fundamentally is tailoring their requirements as to what DPI can deliver.[316]

8.110 As a result of the recent NRM reforms, there is some direct assistance from agencies to CMAs, particularly regarding staff. For example, Murray CMA witnesses told the Committee that they had 17 recurrently funded staff and two other staff members from DEC and DPI. However, under its investment strategy, the CMA may have up to 30 directly employed staff (including implementation officers).[317]

8.111 The Committee was told that the staff support from DEC would be working on biodiversity issues and property vegetation plans:

> **Mr COUROUPIS (Murray CMA):** Threatened species is quite an issue in the Murray catchment, so we are trying to take away a lot of the processes about the threatened species, the threat that the landholders see, and go about allaying their fears and putting in place a much more harmonious and understanding relationship between DEC and landholders using the CMA as some sort of conduit for that process. We haven't got either of those staff yet, the CMAs are

[313] Transcript of Evidence 10 November 2004 pp15-16
[314] Transcript of Evidence 23 March 2005 p12
[315] Transcript of Evidence 23 March 2005 p14
[316] Transcript of Evidence 23 March 2005 p14
[317] Transcript of Evidence 10 November 2004 p14

still negotiating with both DEC and DPI about the terms and conditions of how they would come to us, but it is a significant step forward.[318]

8.112 The Committee asked Upper Timbumberi Landcare witnesses whether their organisation was directly represented on the CMAs:

Mr BOTFIELD (Upper Timbumberi Landcare Inc): No, we have what we call Tamworth Manilla Landcare Association and Timbumburi is incorporated under that. Our CSOs, our officers that are employed by Tamworth Manilla Landcare, they are actually employed under contract via the CMA.[319]

8.113 The Namoi CMA told about a formal arrangement in the catchment:

Mr TRUMAN (Namoi CMA): …because if they are involved from the word go there is greater ownership and greater involvement. This is more of a formal arrangement, because we have been operating with these different agencies in the past but this is more formalised into certain people from all the agencies in set teams within the catchment.

CHAIR: A related question: How are your relationships going with the other departments, the other agencies? This seems a very formal approach that you are taking. Is that to maximise the communication? Is there evidence of lack of co-operation?

Mr TRUMAN: No. I guess it is just to formalise it. We have worked in this way in the past. It is a proposal at the moment that has been put forward. It has not actually been committed to, but it is a way of just trying to involve the different people in a bit more of a formal way, rather than just in general ways, but we have been working that way. We are certainly aware of limited resources right across all the agencies and it is just to avoid duplication there as a way of targeting the funds and resources in the most efficient way we can.[320]

8.114 One "outsider" (ie non-CMA) who provided lengthy criticisms of government service delivery was Mr Binning. According to him:

… without support from aware and well–resourced farm advisors, the current process where knowledge only slowly "trickles down", will persist. My stance is that speeding up this process will be essential if problems are to be addressed at an adequate scale."[321]

8.115 In his submission, Mr Binning argued there was a "yawning gap between the 'top down' policy efforts of government, and on-farm practices". The Committee pursued this issue at public hearings:

CHAIR: You then call for an increase of local State Government advisory services as well as departmental consolidation. Would you like to give us some more details of that because we are most interested in any real or apparent gulf that appears to exist between what is available and what needs to be done?

Mr BINNING: I am happy to respond to that. The gap has really been created by the belief that traditional services that have been delivered under the umbrella of an individual department's responsibilities can be either outsourced or centralised and in some cases absolutely, in absolute terms, diminished. That is associated with privatising. In other words, 20 years ago, or even 10 years ago,

[318] Transcript of Evidence 10 November 2004 p14
[319] Transcript of Evidence 17 November 2004 p5
[320] Transcript of Evidence 23 March 2005 p13
[321] Mr Binning, Correspondence to Committee (question no 1), 5 May 2005

> if you wanted to understand a bit about fertiliser use, you would go to a Department of Agriculture adviser and he would give the advice. Now the expectation is that the Department of Agriculture adviser does not give advice to individual farmers, he only gives advice in meetings or group seminars or whatever else, and the expectation is that the individual farmer will go to the commercial supplier of those services and he will ask what are the services they deliver, make a value judgment about what he wants and then, if there is an over and above cost to the product, he might pay for that as a service directly.[322]

8.116 Mr Binning said that a number of firms run such 'advisory services', but that he believes that the Government needs to increase human resources at "the coalface" and assist with skills development. He expressed concerns that DIPNR is trying to get into the 'agricultural services' by tailoring the way in which Property Vegetation Plan is being made available to farmers (eg through the CMA process) and the conditions under which it should be triggered.[323]

8.117 However, Mr Binning pointed that DIPNR:

> inherently is an extension of the old Land and Water regime. Those services do not tailor what the Department of Agriculture tailors, which is about paddocks and improved pasture, the best management of native species, cell grazing and water run-off. All of those things come through the Department of Agriculture. There is nothing in the Property Vegetation Plan system which requires the coordination or simultaneous delivery of those services, so it is a matter of providing a different way of, if you like, delivering umbrella advice on an holistic approach to farm management measures rather than the specialised departmental advice which was coming through before; and that is very closely associated with the catchment management authorities. DIPNR is sort of tacked on to the catchment management authorities and Agriculture is somewhere out there.[324]

8.118 The relationship between government agencies, local government and community organisations confuses the picture further.

8.119 Landcare and catchment management traditions have involved people gathering as a 'group' to work together to consider how to best manage natural resource issues. Additionally, local governments have had an important role with the traditional Landcare program, in particular, supporting the facilitators who coordinate and supported Landcare groups.

8.120 Traditionally, local government would facilitate Landcare funding and would coordinate community groups as well as providing capacity building, such access to tools and facilities for volunteer groups. Currently, NHT Envirofunds will be available for local environmental projects that would not have access to funds provided under the catchment management arrangements.[325]

8.121 Ms Quealy told the Committee that her organisation's policy was to link with the CMAs or the NRM region so as to understand and interpret what the catchment authorities want the people in their communities to be involved with.

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[322] Transcript of Evidence 6 April 2005 p2
[323] Transcript of Evidence 6 April 2005 p2
[324] Transcript of Evidence 6 April 2005 p2
[325] www.nht.gov.au/envirofund/index.html

> **Ms QUEALY (Landcare Australia Ltd):** Two reasons; one is to make sure that the corporate funding is going to very good, high priority and proper projects, but the other is that we are trying interpret those to the general community through our media relations, and that kind of thing, but also to the corporate community who might be wanting to invest in natural resources management in a particular catchment or across the state or in other states……At the moment we have some of the chairs and general managers coming in to us, seeking meetings with us, and telling us what their priorities are, understanding that they need to work with us as we facilitate the corporate leveraging into the catchment management authority.[326]

8.122 Officials from Bland Shire Council, which is a large agricultural community, said the council works with local farming community and Landcare groups to play a key role natural resource management especially during this period of sustained drought.[327]

8.123 Landcare Australia said in evidence that their business plan states they have to develop relationships with each of the 57 CMAs or natural resource management regions across Australia, including the 13 in New South Wales:

> **Ms QUEALY (Landcare Australia Ltd):** It is very important for us that the projects we are putting corporate funding into are definitely projects that are going to last. The only way we can prove that they are going to last is that they are linked to CMA priority projects and larger landscape projects. We have a list of key areas that, sort of, match, because the CMAs and RM regions are a bit different, but match the basic key areas of sustainable agriculture, biodiversity, water quality, coastal soils and erosion, native vegetation and capacity building for the community. We add to that with some key programs; Landcare farming, Landcare gardening, the urban style, a junior Landcare, for the kids, and other special projects that might be based on a bio region.[328]

8.124 Further evidence of the need for coordination in the government service delivery area is the Memorandum of Understanding which was detailed in chapter three.

8.125 There is, then, a formalised acknowledgment of and avenue for greater cooperation between the levels of government, so necessary for the effective management of natural resources in NSW management.

Face to Face Contact

8.126 A number of organisations described to the committee the merits of a "face to face" approach to service delivery.

8.127 The Committee asked the Namoi CMA how the use of catchment support officers (CSOs) assist with the on-ground approaches to management of salinity:

> **Mr TRUMAN (Namoi CMA)** …. Within the priority catchments which have been identified through our investment strategy landholders have been informed that they lie within these priority areas and the CSOs will help to develop projects which will help to meet the targets. The CSOs are at that farm level. I guess they are able to work closely with the landholders and build up a good

[326] Transcript of Evidence 6 April 2005 p9
[327] Transcript of Evidence 7 April 2005 p1
[328] Transcript of Evidence 6 April 2005 p9

> relationship and they can then seek the input from specialists like myself from salinity to assist where salinity is an issue, or if it is biodiversity, they can approach the key people. They are a familiar face that the landholders can build a relationship with and they also can identify some of the social, economic and environmental impacts that some of the technical sides may not pick up, they are aware of some of those issues as well, so they are out there in the catchment and already engaging the community, which will be a great step for when we start to get the catchment action plan happening.[329]

8.128 During the workshops, community feedback on what the CMAs considered "was missing" within the blueprints was sought and new priority activities for the CMA were highlighted:[330]

> **Mr COUROUPIS (Murray CMA):**It is high on farmers' minds and we are trying to evolve the Murray CMA into an organisation which is seen as adding value to a landholder's farming activities, where we are not just seen as being responsible for delivering incentives to help biodiversity or reduce salt, even though we may not have funding to help, but when one of our officers comes on to your farm it is seen as a source of information to help you better run your farm and increase its sustainable agricultural production. To that end we are in the midst of establishing seven landholder community advisory groups throughout the catchment which will be a form of direct communication between the board and the landholder community directly, where we will have a point to which we can refer and go back and get feedback on our activities, our priorities, and make sure we are still hitting the mark with our major stakeholders.[331]

8.129 Mr Baxter also said sitting down "one on one" with a landholder provides a great opportunity to talk with landholders about natural resource management and assist them to consider what they are actually dealing with:

> **Mr BAXTER (Murray CMA):** ....our implementation officers sit down really at the kitchen table and map the property, go through what are some of the issues with the property and maybe how the CMA can provide incentives to enhance whether it is biodiversity, vegetation, water quality outcomes on that farm... and that is really an extension of your community engagement process as well and it develops, slowly but surely, a commitment from the farmer ... every farmer I talk to, that initial planning process has been the catalyst to bring about the sense of a need for some change on my property. [332]

Comment

8.130 As with the sections on "knowledge" and "funding", the picture emerging here is one of organisational and program complexity. For example, DPI has a role in promoting sustainable agriculture, while CMAs, responsible for achieving NRC targets at the catchment and sub-catchment level, are themselves pushing conservation farming. In between are the Departments of Natural Resources and Environment and Conservation.

8.131 Again it is hard not to conclude that duplication or omissions in service delivery or even "turf wars" could occur.

[329] Transcript of Evidence 23 March 2005 p12
[330] Transcript of Evidence 10 November 2004 p13
[331] Transcript of Evidence 11 November 2004 p13
[332] Transcript of Evidence 10 November 2004 p. 14

8.132 While the principles behind these programs are to be supported, the Committee needs to ask how effective are all these well-intentioned activities. The Committee does not question their merit but wonders if they cannot be better coordinated, targeted and focused.

8.133 Certainly, natural resource management has gone through considerable change in recent years, particular the CMA's with their enhanced central role in natural resource management. In addition, the new Premier made changes to portfolio arrangements that has affected natural resource management bureaucracies.

8.134 It comes as no surprise that those with in the bureaucracies were not critical of these structures. They all are simply getting on with making the process work. However, some outsiders had concerns about the operation of these arrangements and, to the Committee the arrangements do seem complex and unwieldy.

8.135 It is hard not to conclude that there is considerable activity at the top of the tree but not enough filtering down on to the farm level.

8.136 Perhaps in time this will come as the reforms and agency changes bed down. But we do not have much time.

8.137 It is similarly difficult to avoid the conclusion that natural resource management delivery in New South Wales would be a very complex process for those on the ground to understand and access. For those 40 per cent of innovative and enthusiastic landholders, mastering this complexity is not impossible. However, for the (60 per cent) of disengaged landholders who need to become involved in sustainable agricultural practices such complexity would be a significant obstacle to taking that first step to change. And it is the potential behaviour of this group that has to drive this matter.

8.138 In finding ways to address this issue the committee has considered the overarching role of the Natural Resources Commission at one end of the natural resource management in New South Wales and the need to get change on the ground.

8.139 Initially, there needs to be a comprehensive kit or directory of available natural resource management services (government and community) prepared for the ready information of landholders.

8.140 Locally available state government farm advisory services should be optimised with specialist service providers need to be able to deliver holistic advice, backed by an ability to call in more specialists. Landholders can be directed to the appropriate agency or natural resource organisation where necessary but the focus should be on encouraging property management planning.

8.141 On-farm approaches would greatly benefit from a coordinated and focused approach that was built around a face-to-face, one-on-one engagement with landholders. It is important that government agencies get out and sell the message of the benefits to landholders and the community of sustainable farming techniques.

8.142 The intention is not to build a new bureaucracy nor to reform the existing arrangements. However, the government's resource management endeavours at the farm level needs to have a single focus or brand (even if a number of agencies are contributing to the outcome).

8.143 The existing memorandum of understanding is a suitable vehicle to develop these strategies but must be updated to incorporate these recommendations and include all related agencies (DPI, DNR, DEC the CMA's and Local Government).

8.144 The following recommendations have been developed in order to ensure agency coordination and cooperation and get the service on the farm where they can do most good.

RECOMMENDATION 9: That the Natural Resource Commission to oversee the development of coordinated government approach, based on the existing Memorandum of Understanding, to actively encourage and facilitate landholders to adopt conservation landcare approaches by the establishment of an "on-farm advisory service" in each catchment (CMA) area. This "on-farm advisory service" will be the point for all inquiries from landholders and the public for information on state agency programs and services relating to on-farm land use.

RECOMMENDATION 10: That the Natural Resources Commission prepare an "information kit" for landholders relating to sustainable agricultural techniques. The kit will be a comprehensive directory of all government and community services, extension programs, incentives and funding available for landholders as they relate to on-farm sustainable agricultural techniques.

RECOMMENDATION 11: The "on-farm advisory service" be tasked with making direct contact with all landholders to explain benefits and advantages of, and services available to assist in, adopting more salinity and drought friendly practices. This contact program should:

a. Focus on encouraging property management planning
b. Utilise trained property management planners, particularly those with a background in farming
c. The "on-farm advisory service" be notified by councils of transfer of rural properties so that contact can be immediately made with the purchaser.

RECOMMENDATION 12: Catchment Management Authorities to develop a "tool box" of on-farm approaches aligned to their catchment and sub-catchments targets and objectives to address salinity and prepare farms for drought.

RECOMMENDATION 13: The Natural Resources Commission develop a joint program with the conservation farmers groups to identify research priorities as needed.

Chapter Nine - Rewards

SUSTAINABLE FARMING FOR PROFIT

9.1 Human beings instinctively resist change. However, they are much more likely to change through incentive and the perception of some advantage or personal gain than through coercion. Financial advantage is a very significant motive.

9.2 The Rural Block submission summed up the situation:

> Good NRM and farm profitability are inextricably linked. Farms cannot be viable in the long term without good NRM and good natural resource management on farms cannot be achieved without profitability.[333]

9.3 The problem according to the Rural Block is that farmers receive mixed messages, particularly that sustainable practices and profitability are mutually exclusive.[334]

9.4 But a clear message to this inquiry is that this is not the case, rather sustainable land use practices are profitable.

9.5 Senator Hill, former Federal Environment Minister, summed this up as long ago as 1996 "… over the long term, ecological constraints are as binding on agricultural systems as are the disciplines of the market. The view that environmental best-practice and long-term profits are competing goals is wrong…"[335]

9.6 One submission expressed it this way to the Committee: "responsible environmental management and productive agriculture are not mutually exclusive". This needs to be demonstrated to the wider community.[336]

9.7 Both the Australian Landcare Council and Landcare Australia Limited told the Committee that the benefits of conducting more sustainable approaches to agriculture include increased profitability.

9.8 According to the LAL submission Landcare farmers are found to record high levels of farm cash income, farm debt and capital invested in their property and have a higher rate of return to farm business capital.[337]

9.9 Quite incredibly, according to LAL, pasture cropping brings up profit by 25 per cent. Landcare Farming Case Study. Landcare Australia http://www.landcareaustralia.com.au/FarmingCaseStudies.asp)

9.10 In evidence, LAL's Chief Executive explained:

> **Mr PETER DRAPER MP:** From your perspective, what are the main benefits that farmers will gain if they change their farming practices to more sustainable practice and what are the downsides?

[333] Submission No 4
[334] Submission No 4
[335] Sen Robert Hill, Minister for the Environment, 23 October 1996, "Landcare Investing in Natural Capital, www.deh.gov.au/minister/env/96/mr23oct_capital.html
[336] Submission No 19
[337] Submission No 103 p6

> **Mr SCARSBRICK (Landcare Australia Ltd):** … we at Landcare Australia have been developing case studies of farming operatives, hardcore farmers who have moved to more sustainable agricultural positioning on their whole property, and clearly increasing productivity is one of the main benefits of it.[338]

9.11 Mr Binning's submission explained that the evidence shows that when landholders have a good understanding of what their land is capable of producing and adaptively respond to the impacts of farming activities, then both environmental and economic improvements can be demonstrated - even during extended drought periods.

9.12 Mr Klem also said that Landcare farmers tend to be more profitable, which in turn encourages them to care for the natural resources on which they depend to make a living. Mr Klem told the Committee that economic benefits accrue to Landcare farmers as a result of their being better educated and informed. Landcare provides a communication network that effectively replaces extension officers, who are no longer as available as previously.[339]

9.13 Mr Gardiner, who has been working in the property planning business for some time, explained how profitability from these approaches could be achieved through increased efficiencies:

> **Mr GARDINER (Upper Timbumburi Landcare):** He reduced his costs by almost 80 per cent over the same period of time and doubled his profit. Again, it was one of those classic examples of actually proving that production, profit, income, sustainability all happen at different places.
>
> **The Hon. RICHARD AMERY:** Those sort of examples encourage more to the fold.
>
> **Mr GARDINER:** Yes. The same thing has happened around Inverell, actually one of the first producers I ever got to reduce their stocking rate, he reduced his stocking rates by 10 per cent and found he had no change in production. He actually produced exactly the same amount of wool and beef from 10 per cent less stock. He made a heap more money and took the books around to his Dad and said Look Dad, we're making more money, and his father wouldn't believe him because he wasn't running as many stock.[340]

9.14 Other witnesses such as Mr Brian Binning stressed that implementing native vegetation management that both mitigates salinity and the impacts of drought was economically sustainable.

9.15 In his submission, Mr Binning stated that his property, 'Weeroona' in the Southern Tablelands, has had 15 years' effort put into intensive revegetation and pasture improvement, including the establishment of conservation areas and green corridors. The farm is in the process of being restored to a sustainable production system and slowly recovering from the effects of two years of drought.

9.16 The Central West Conservation Farming Association advised the Committee that innovative conservation farming land use practices provided opportunities to provide stock feed immediately after crop harvest. This is a profitable approach because the cost of growing crops in this way is a fraction of

[338] Transcript of Evidence 6 April 2005 p7
[339] Transcript of Evidence 7 April 2005 p11
[340] Transcript of Evidence 17 November 2004 p7

conventional cropping. Additionally, mixed farming provides up to six months extra grazing, compared with the loss of grazing due to ground preparation and weed control required in traditional cropping methods.[341]

9.17 In its submission, Stipa itemised the financial benefit to Mr Seis of a 20 ha crop of echidna oats sown and harvested in 2003 at his "Winona" property in Gulgong, NSW. The crop yielded 4.3 tonne/Ha (31 bags/acre) (although the total area of 100 ha of echidna oats averaged 3.4 tone/Ha (25 bags/acre)). With spraying, herbicide, sowing and fertiliser included in the harvest equation, the program made a $555.81/Ha profit:

> This profit does not include the value of the extra grazing. On Winona it is between $50-$60/ha because the pasture is grazed up to the point of sowing. When using traditional cropping practices, where ground preparation and weed control methods are carried out for periods of up to six months prior to the crop being sown, then no quality grazing can be achieved.[342]

9.18 Mr Peter Knowles is involved with a DIPNR barley trial which is comparing a "trial site", with seven years of zero till and a 15-year history of conservation farming, with a traditionally farmed "gaol site".

9.19 Mr Knowles told the Committee barley was planted on each site within a day of each other on similar aspects, similar soil types, same fertilizer, same machinery, same feeding rate. He said that the independent agronomist estimated an extra 20 per cent yield on the healthy soil DIPNR trial site:

> **Mr KNOWLES (Central West Conservation Farming Association):** We are putting that down to better moisture storage which is caused by the organic matter and the humus and stuff that conservation farming has done. Part of that example there, that is a random sample of heads between the two sites, and that is pretty dramatic sort of stuff. Over 400 hectares that equates to about $25,000, $24,000 extra profit for four per cent extra cost. That sort of stuff comes into its own in drought mitigation and water usage.[343]

Transitional Costs

9.20 However, while profitability is a longer-term reward for changing on-farm practices, significant transitional, short-term costs might still be a disincentive, an important point raised by Mr Scarsbrick:

> **Mr SCARSBRICK (Landcare Australia Ltd):** …There is a downside obviously in that the initial outlay for moving to some of these more sustainable positions does cost more and the return may be slow in coming, particularly if there is extensive damage or land degradation and that sort of thing, so I guess above all it is profitability. You cannot be green if you are in the red and that is very much the positioning that Landcare Australia comes from.[344]

ENVIRONMENTAL SERVICES

9.21 Sustainable farming practices can clearly provide individual reward through improved profitability.

[341] Submission No 84, Pasture Cropping, A Land Management Technique
[342] Submission No 84, Pasture Cropping, A Land Management Technique
[343] Transcript of Evidence 14 November 2004 p13
[344] Transcript of Evidence 6 April 2005 p7

9.22 Another means of rewarding landholders for providing a service for the whole community, but which might be uneconomic for the landholder, is through environmental services. (This is also known as public good conservation).

9.23 Environmental services or ecosystem services are those goods and services that are provided by ecosystems that benefit humans. Ecosystem services have been valued at between $US 16-54 trillion per year (mean $US33 trillion per annum) more than the global gross national product (GNP).[345]

9.24 Professor Eamus, from Sydney University, argues that trees provide at least three ecological services, by preventing or ameliorating dryland salinity, providing clean water and the mitigation of floods and soil and nutrient loss through surface flows. For example, trees and forests provide a major discharge path for water, determining hydrological balance in a catchment and minimising groundwater recharge.

9.25 The rationale for this is that prescriptive regulation is unlikely to promote the focus on environmental outcomes. What is needed is landholder cooperation to achieve those outcomes.

9.26 Landholders whose actions or approaches assist in providing environmental services should be recognised by the community. As Berrigan Shire Council told the Committee, that farmers who provide 'environmental services' through conserving native vegetation should be compensated.

9.27 Incentives could be for investing in some targeted farm practices that have multiple benefits for the environment (eg water saving, water quality, salinity, pest and weed control) and for investment in natural biological diversity (retention and enhancement, management, conservation and revegetation). Principles and priorities for investment in natural biodiversity have already been developed for the Murray and Murrumbidgee Catchments.[346]

9.28 Strategic incentives should complement subregional and property planning to undertake (uneconomic) actions that will have environmental benefits incentives that are locally relevant and practical for implementation.

Environmental Services Investment Fund

9.29 In July 2001, the NSW State Government announced the Environmental Services Investment Fund component of the NSW Salinity Strategy, which would fund a trial of 20 properties to provide incentives to land managers to deliver specific environmental outcomes.

9.30 The Environmental Services Scheme (ESS) was led by the Environmental Services Investment (Environmental Markets) Team jointly established between the previous Department of Land and Water Conservation[347] and State Forests of NSW[348], with input provided by NSW Agriculture and other agencies.

[345] . Eamus, D. Macinnis-Ng C. M. O., Hose Grant C., Melanie J.B Zeppel, Taylor, D.T and Murray, B.R, Ecosystem services: an ecophysiological examination, Australian Journal of Botany, 53, 2005, pp1-19.

[346] Submission No 35

[347] Now the Department of Infrastructure, Planning and Natural Resources

[348] Now the Department of Primary Industries

The main focus of the program was to integrate production-based land uses with those that produce a service to the environment.

9.31 Witnesses from DIPNR stated that the Environmental Services Scheme was a pilot program only, conceived to test a number of areas, in particular to investigate the institutional, legal and legislative arrangements necessary to establish markets for on-farm production of environmental services.

9.32 The major outcomes of the pilot Environmental Services Scheme included 20 successful bids with 16 sites located in salinity priority catchments. A broad range of farming systems were represented (13 mixed livestock and cropping, the remainder being grazed).

9.33 The cost-effectiveness of procuring enduring land use change under the trial appeared to be comparable with other approaches (such as under catchment blueprints). The report on the study concluded that given the achievement in knowledge obtained from the Environmental Services Scheme and the implementation of other regionally based pilot programs (eg TARGET and the Liverpool Plains Project), there could be an immediate roll-out of targeted, regional schemes providing income streams direct to landholders based on the environmental services they provide.

9.34 In a press release in August 2003[349], the Minister for Infrastructure, Planning and Natural Resources Minister said that the concept of funding farmers to provide environmental services would be closely monitored with a view to expanding it to more farmers in the future.

9.35 It was suggested that funds would be allocated to CMAs specifically to be used for running programs for the completive purchase of environmental services from landholders. It was further argued that allocations would carry a number of specifications related to design and implementation. CMAs could tailor programs to specific geographic areas the number and types of environmental services and the timing of implementation, in line with stated natural resources management objectives and targets.

9.36 Victoria has developed a Bush Tender Scheme in which farmers tender or auction to provide ecosystem services. The scheme was introduced in Victoria in the late 1990s to encourage farmers to increase biodiversity values on their properties, thereby providing public good.

9.37 Under the scheme, farmers bid for government funding in what is effectively an auction. The best bids - ranked according to a formula which measures the value of the proposed biodiversity improvement against the cost of undertaking the necessary work - are accepted until the budget is exhausted. Farmers who offer lower prices improve their chances of succeeding with their bids.

Productivity Commission

9.38 The Productivity Commission has considered this issue and argued that landholders and the community should share responsibility for land-use management, with the wider community paying for environmental public goods

[349] Farmers: Cash For Commonsense, www.dlwc.nsw.gov.au/mediarel/mo20030801_2097.html

9.39 The Productivity Commission has reported on this issue, acknowledging that some actions will produce private, regional and community-wide benefits. For example, salinity reduction or prevention may improve agricultural yields on individual properties and across regions and improve habitat and biodiversity.

9.40 It argued, however, landholder actions that affect soil and water quality would constitute the responsibility of the landholders individually (and/or as a group). This is because broader responsibility to their neighbours and communities is implied and indeed, where actions have broader impacts, they might be felt by surrounding communities.

9.41 The wider public should bear the costs of actions to promote public-good environmental services, ie biodiversity, threatened species preservation and greenhouse gas abatement. These benefits are likely to impinge significantly on the capacity of landholders to utilise their land for production.

9.42 It was this public-good conservation that should be purchased from landholders.

REWARDS AND RECOGNITION

9.43 Another form of reward for is through recognition of performance and payment in kind.

9.44 In evidence, Mr Binning stated that:

> Motivation is then helped by recognition: initially by friends or from local Landcare or Prograze Groups; by becoming informally recognised as "centres of excellence"-which in some cases now attract thousands of visitors; and finally by awards, ranging from UN to the NSW Ibis Award. These individuals represent invaluable "human capital"; which needs to be more widely accessible.[350]

9.45 The Central West Conservation Farming Association's submission suggested that one way to increase the uptake of land use management practices that have been shown to improve the effects of drought is to profile successful farmers. The process of selecting a "Conservation farmer of the Year" involves taking farmers around to successful farms and highlighting what is working:

> **Mr KNOWLES (Central West Conservation Farming Association):** As part of our annual seminar field day we run a conservation farmer of the year award. Those farmers are drawn from five regions throughout the central west based on various catchments, smaller parts of the catchment, Castlereagh, Lower Macquarie, Lachlan, etcetera and there are a couple of farmers, two or three farmers from each region which are judged to pick this farmer of the year, so we've got access to about fifteen farmers who are doing something pretty interesting per year in this conservation farmer of the year award.
>
> All the regional winners and the overall winner gets high publicity profile in The Land and Western magazine as part of the award. The other regional entrants are normally highlighted as part of an annual bus trip or a couple of bus trips around which we get maybe forty, fifty people visiting and checking them out, just seeing what they're doing hands on and that is a learning method there.[351]

[350] Mr Binning, Correspondence to the Committee, 5 May 2005
[351] Transcript of Evidence 17 November 2004 p12

Comment

9.46 Rewarding farmers for adopting sustainable practices will be the most effective way to drive change. The nature of the reward depends on a complex set of factors.

9.47 The first step is getting the message out that these practices will provide long-term profitability.

9.48 The community should contribute where there is a demonstrated benefit to the whole community, while the landholder should pay where the landholder ultimately benefits from the change.

9.49 There is one exception to this and that is that initial transition costs might discourage the taking of action. This disincentive of transitional costs, while not raised that widely in the inquiry, seems to the Committee to be a crucial factor in encouraging those currently not practising sustainable agricultural techniques.

9.50 It might therefore be in the community's interest to contribute in this situation with some "transition" assistance, something that LAL has already, in effect, been doing. Rewards could be financial such as payments, grants, low-interest loans, services (advice, training) or public recognition.

9.51 This overall approach of reward is certainly better than prescript.

9.52 The requirement to pay for environmental services will test the community's willingness to pay, in a sense it becomes a cost–benefit trade-off. Certainly the apparent success of the trial of the Environmental Services Investment Fund needs to be built upon.

9.53 Achieving environmental outcomes that society desires on private land will require clear specification of the environmental outcomes demanded and ongoing cooperation, knowledge and effort of landholders.

9.54 Promoting public-good conservation on private land through flexibility (such as, local variations, utilising local knowledge and encouraging innovative) and cost-effective solutions should accord with regional environmental objectives.

9.55 Landholders could receive positive incentives to retain and manage native vegetation to become an asset rather than a liability, particularly through the property management process.

9.56 However, it is essential that environmental services for on-farm practise should be linked to CMA targets and should only be for prescribed and agreed environmental outcomes.

9.57 Finally, landholders should be acknowledged for on-farm actions that benefit the broader community. Rewards to take the form of incentives, payments relief from state taxes for specific periods or low interest loans. Recognition should go beyond regional New South Wales and into metropolitan areas. For a number of years, the Sustainable Energy Development Authority publicly rewarded individuals and organisations for innovation and progress in sustainable energy practices. This might well provide a model but it should be at the highest level and a Premier's award or awards would raise the profile of sustainable farmers with justifiable recognition.

RECOMMENDATION 14: That the Government develop a policy to remunerate landholders for the environmental services provided by their farming sustainable operations that meet agreed outcomes. Programs to be audited from time to time by the NRC.

RECOMMENDATION 15: That an objective rating of the sustainable salinity performance (including salinity and drought preparedness elements) of individual properties be developed. The rating system can be used to:

a. Reward landholders through further access to services;
b. A tool for consumer support of for sustainable farming.

RECOMMENDATION 16: That funding be available to landholders who wish to adopt sustainable agricultural approaches to assist with transitional costs. This could include low interest loans.

RECOMMENDATION 17: That a network of accredited model "open farms" be established to provide working examples for interested landholders, as well as support and encouragement for each other. Owners of accredited "open farms" should receive community payment for their educational activities.

RECOMMENDATION 18: That individual and group on-farm innovations and initiatives in natural resource management should be acknowledged at regional events and an annual metropolitan event (say a Premiers Award).

APPENDIX A – LIST OF SUBMISSIONS

General submissions

1.	Mr Bryan Pape	Australian Centre for Agriculture and Law in the University of New England, School of Law, The University of New England
2.	Mr Don Matthews	
3.	Mr Mark King,	Chairman Lower Murray Darling Catchment Management Board
4.	Mr Bruce Gardiner and Mr Warwick Browne	The Rural Block
5.	Mr Jeff Esdaile	
6.	Mr Victor Eddy	
7.	Mr Rob Gourley	Managing Director, Orbtek Pty Ltd
8	Mr Bill Bolin	
9.	R Hunter	
10.	Mr Gordon and Mrs Gwen Moore	
11.	Ms Diana Gibbs,	Regional Communities Consultative Council
12.	Mr Paul Knight	
13.	Darryl & Karen Smith	
14.	W Oneill	
15.	M & B Green	
16.	J A Daley	
17.	Mr Rod Young	
18.	Mr Steve Orr,	Chief Executive Officer, State Council of Rural Lands Protection Boards
19.	Ms Di Bentley	Executive Officer, Liverpool Plains Land Management Committee
20.	Ms Jacqueline Knowles	Policy Analyst, NSW Irrigators' Council
21.	Mrs Gabrille Holmes	Chairman, Fiveways Landcare Group
22.	Mr Ray Platt, Development Officer	Central West Conservation Farming Association
23.	Mr Paul Shaw	Convenor, The Summerland Greens
24.	RJ & MK Swain	
25.	Mr Darryl Cluff	CEO, Stipa Native Grasses Association Inc
26.	Ms Therese Davis	
27.	DL McGregor	Independent Chair, Murray Catchment Management Board

28.	Hon. Bob Debus	Minister for the Environment
29.	Mr Len Sanders	President, Gunnedah Environment Group Inc
30.	Mr Allan Lugg	
31.	Mr Phillip Russell	Chief Executive Officer, Cotton Australia Limited
32.	Laurie Marchant	Secretary, South Grafton Residents Progress Association Inc
33.	Mr Raymond Perkins	Perkins Valuation Services
34.	Ms Nerida Reid	
35.	Ms Lilian Parker	Environmental Services Manager, Murrumbidgee Irrigation
36.	Mr Russell Bonney	Brindle Creek Coffee
37.	Ian McClintock	
38.	Ms Brooke Flanagan	Executive Officer,Nature Conservation Council of NSW
39.	Mr Charlie McCowen	
40.	Graham Brown	
41.	Mr Trevor Wilson	
42.	Mr John McKindlay	
43.	Mr Keith Bolton	Project Manager, Centre for Ecotechnology
44.	Hon Ian MacDonald	Minister for Agriculture and Fisheries
45.	Mr Mick Keogh	Policy Director, NSW Farmers Association
46.	Mr Derek McFarland	
47.	Mr John Brandis	
48.	Mr Peter Crawford	Commissioner, Healthy Rivers Commission
49.	Mr Brian Fisher	ABARE
50.	Ms Louise Burge	
51.	Cr Sara Murray and Cr Phyllis Miller	Local Government Association of NSW, Shires Association of NSW
52.	Hon Ian Cohen MLC	The Greens
53.	Mr Bruce Carter	
54.	L & M Secombe	
55.	Mrs Wendy Bunce	
56.	Mr Barry McMillan	
57.	Mrs Lenore Brooks	
58.	Ms Michaela Malone	Secretary Treasurer, Bickham Coal Mine Action Group
59.	Pat Fraser	
60.	CM Birchall	

61.	Mr Geoff Brown	
62.	Mr Bill Taylor	Indigenous Representative, Upper Namoi Aboriginal Resource Committee
63.	Mr Graham and Mrs Glenice Douglas	
64.	Ms Jennifer Smith	
65.	Ms Tracy Blackburn	
66.	Ms Patrice Newell	
67.	Mr Hugh Allan	
68.	TJ & CF Wills	
69.	Mrs Helen Sims	
70.	Mr Greg Schiemer	
71.	Mr Hamish Holcombe	Chairman, Boggabilla Boomi Floodplain Association
72.	Ms Wendy Murray	
73.	Mr Peter Howe	
74.	Mr Bryce Woods	
75.	OMs Jan Davis	President, Hunter Environment Lobby
76.	Ms Bev Smiles	Secretary, Central West Environment Council
77.	Mr Peter Guyer	Mallawa Creek Landcare Group Inc
78.	Mr Lawrence Sides	
79.	Mr Bob Hunter	
80.	EK Bernays	
81.	Mr NJ Crisp	

Specific Submissions (Terms of Reference (c) and (d))

82.	Mr Darvel Baird	
83.	Mr Brian Binning	
84.	Ms Sue Rahilly,	Stipa Native Grasses Association Inc
85.	Mr Geoff LeMessumer	
86.	Ms Lyn Lamkin	Natural Resource Officer (Program Support), Murray Catchment Management Authority
87.	Mr Neville Gould,	Central Western Conservation Farming Association
88.	Mr Steve Orr Protection Boards	Chief Executive Officer, State Council of Rural Lands
89.	Ms Sally Barnes	Executive Director Strategy, Communication and Governance, Department of Environment and Conservation

90.	Hon Ian MacDonald	Minister for Primary Industries
91.	Mr Rowan Perkins	General Manager, Berrigan Shire Council
92.	Mr David Ware	Chair, Upper Timbumburi Landcare Inc
93.	Mr Frank Zaknich	General Manager, Bland Shire Council
94.	Hon. Craig Knowles	Minister for Infrastructure and Planning, Minister for Natural Resources
95.	Mr Colin Earnshaw	Wagga Wagga City Council

APPENDIX B – LIST OF WITNESSES

PUBLIC HEARINGS (ALL TERMS OF REFERENCE)

3 September 2003
Mr Colin Mues, Research Development Manager, Natural Resources Economics, Australian Bureau of Agricultural and Resource Economics

4 September 2003
Mr Des Cleary, General Manager, Water Management Act Implementation, Department of Infrastructure, Planning & Natural Resources
Dr Chris Guest, Acting Deputy Director General, Department of Infrastructure, Planning & Natural Resources

5 September 2003
NSW Irrigators Council, Ms Jacqueline Knowles, Policy Analyst, NSW Irrigators' Council
Mr Doug Miell, Executive Director, NSW Irrigators' Council

17 September 2003
Mr Mick Keogh, Policy Director, NSW Farmers' Association

18 September 2003
Mr Mike Young, Director, Policy & Economic Research Unit, CSIRO

19 September 2003
Mr Don Blackmore, Chief Executive, Murray Darling Basin Commission
Ms Brooke Flannagan, Executive Officer, Nature Conservation Council of NSW
Ms Samantha Newton, Natural Resources Coordinator, Nature Conservation Council of NSW
Ms Rachel Young, Water Policy Officer, Nature Conservation Council of NSW

17 October 2003
Mr Dick Thompson, Chairman, Murrumbidgee Irrigation
Mr George Warne, Chief Executive Officer, Murray Irrigation Limited

31 October 2003
Mr Simon Smith, Acting Deputy Director General, Environment Protection & Regulation, Department of Environment & Conservation

5 May 2004
Mr Ross Carter, Acting Assistant General Manager, Water and Air, NSW Department of Environment & Conservation
Mr Michael Wright, Acting Director, Reserves & wildlife Conservation, NSW Department of Environment & Conservation

12 May 2004
Mr Kelvin Baxter , Chairman, Murray Catchment Management Authority
Mr James McDonald, Chairman, Namoi Catchment Management Authority
Mr Lee O'Brien, General Manager, Murrumbidgee Catchment Management Authority
Mr Anthony Page, Executive Officer, Namoi Catchment Management Authority
Mr John Searson, General Manager, Murrumbidgee Catchment Management Authority

13 May 2004
Dr Stuart Blanch, Fresh Water Ecologist, World Wildlife Fund for Nature
Dr Helen Foard, Fresh Water Manager, World Wildlife Fund for Nature

Dr Warwick Moss, Economic Policy Officer, World Wildlife Fund for Nature

PUBLIC HEARINGS (TERMS OF REFERENCE C AND D)

27 October 2004
John Verhoeven, Director, Natural Resource Investment, Department of Infrastructure, Planning & Natural Resources

10 November 2004
Mr Mike Sutherland, Deputy Chairperson, Central West Catchemnt Management Authority
Mr Tim Ferraro, General Manager, Central West Catchement Management Authority
Mr James Croft, Chairperson, Border Rivers-Gwyder Catchment Management Authority

Ms Amanda Cush, General Manager, Border Rivers-Gwyder Catchment Management Authority
Mr Chris Glennon, General Manager, Lachlan Catchment Management Authority
Mr Mark King, Chairperson, Lower Murray Darling Catchment Management Authority
Mr Paul Dixon, General Manager, Lower Murray Darling Catchment Management Authority
Mr Lee O'Brien, Chairperson, Murrumbidgee Catchment Management Authority
Mr John Searson, General Manager, Murrumbidgee Catchment Management Authority
Mr Kelvin Baxter, Chairperson, Murray Catchment Management Authority
Mr Anthony Couroupis, General Manager, Murray Catchment Management Authority

17 November 2004
Mr Bruce Gardiner, Upper Timbumburi Landcare Inc
Mr Noel Botfield, Upper Timbumburi Landcare Inc
Mr Stan Lee, Upper Timbumburi Landcare Inc
Mr Rick Maurice, Vice Chairman, Central West Conservation Farming Association
Mr Peter Knowles, Chairman, Central West Conservation Farming Association
Mr Neville Gould, Executive Officer, Central West Conservation Farming Association
Ms Sue Rahilly, Chair, Stipa Native Grasses Association
Mr Colin Seis, Vice Chair, Stipa Native Grasses Association

Dr Tom Parry, Commissioner, Natural Resources Commission
Mr Alex McMillan, Executive Director, Natural Resources Commission

23 March 2005
Dr Richard Sheldrake, Deputy Director-General, Department of Primary Industries
Mr John Fisher, Manager, Natural Resources Advisory Services, Department of Primary Industries
Mr Len Banks, Director, Regional Relations and Education, Department of Primary Industries
Mr Rory Treweeke, Chairperson, Western Catchment Management Authority
Mr Daryl Green, General Manager, Western Catchment Management Authority
Mr George Truman, Salinity Officer, Namoi Catchment Management Authority

6 April 2005
Mr Brian Binning
Mr Brian Scarsbrick, Chief Executive, Landcare Australia Limited
Ms Jenny Quealy, Partnership Development Manager, Landcare Australia Limited
Mr Rowan Perkins, General Manager, Berrigan Shire Council

7 April 2005
Mr Frank Zaknich, General Manager, Bland Shire Council
Mr Ian Neave, Manager, Natural Environment Wagga Wagga City Council
Mr John Klem, Member, National Landcare Council; Chairperson, Hawkesbury/Nepean Catchment Management Authority