The Senate

Environment, Communications, Information Technology and the Arts References Committee

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Living with salinity – a report on progress

The extent and economic impact of salinity in Australia

March 2006

ISBN 0 642 71637 4

This document was printed by the Senate Printing Unit, Parliament House, Canberra

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Terms of Reference

That the following matters be referred to the Environment, Communications, Information Technology and the Arts References Committee for inquiry and report by 13 October 2005:

An assessment of the long-term success of federal programs that seek to reduce the extent of and economic impact of salinity in the Australian environment, including:

(a) whether goals of national programs to address salinity have been attained, including those stated in the National Action Plan for Salinity and Water Quality, National Heritage Trust and National Landcare programs;

(b) the role that regional catchment management authorities are required to play in management of salinity-affected areas, and the legislative and financial support available to assist them in achieving national goals; and

(c) what action has been taken as a result of recommendations made by the House of Representatives' Science and Innovation Committee's inquiry 'Science overcoming salinity: Coordinating and extending the science to address the nation's salinity problem', and how those recommendations may be furthered to assist land-holders, regional managers and affected communities to address and reduce the problems presented by salinity.

Recommendations

Recommendation 1

8.48 The Committee recommends that the Australian Government and the state/territory governments extend the National Action Plan for Salinity and Water Quality for a further 10 years, with matched funding at least commensurate (on a per year average basis) with the first stage NAP funding. It is recommended that negotiations over the future of the NAP be expedited to provide certainty to regional bodies and other stakeholders. It is recommended that any further consideration of the prioritisation of NAP funds include consultation with the states/territories and the wider community.

Recommendation 2

8.49 The Committee recommends that the Australian Government extend the Natural Heritage Trust for a further 10 years with funding at least commensurate (on a per year average basis) with existing funding levels.

Recommendation 3

8.51 The Committee recommends that the Australian Government in cooperation with the states and territories continues to give priority to longer-term funding cycles and measures to ensure the continuity of funding so that where existing staff are likely to be continuing in a role there is no break in wages and the organisation's intellectual capital is not lost.

Recommendation 4

8.56 The Committee recommends that the Australian Government work with the state/territory governments and local government peak bodies to ensure that all local governments are adequately educated in, and have access to, salinity management information relevant to their locality. This will include the development of mechanisms to help local governments build and share capacity, knowledge and experience.

Recommendation 5

8.57 The Committee recommends that the Australian Government work with the state/territory governments to encourage reform of local government legislation to place a requirement on all local municipalities to align planning decisions with natural resource management principles and priorities.

Recommendation 6

8.59 The Committee recommends that, where applicable, the Australian and relevant state/territory governments examine the issue of statutory powers for regional bodies to address the current level of confusion between local government and regional bodies.

Recommendation 7

8.63 The Committee recommends that the Australian Government, through the Natural Resource Management Ministerial Council, seek greater assurance from the states/territories that land-clearing is being effectively regulated. It is recommended that extensions to the NAP funding be conditional on the states/territories meeting more rigorous accountability measures.

Recommendation 8

8.69 The Committee recommends that the Australian Government, as a matter of urgency, work in cooperation with the states/territories to implement the Australian National Audit Office's recommendation to develop corporate governance templates and core training.

Recommendation 9

8.71 The Committee recommends that the Australian Government, in cooperation with the states and territories, strengthen the accreditation process for regional bodies. The improved process will ensure that funding is conditional on rigorous investment planning, where decisions are:

Recommendation 10

8.82 The Committee recommends that the Australian Government establish an independent body to coordinate salinity research. This body will:

- **Maintain a focus on dryland, irrigation and urban salinity**
- **Identify and prioritise gaps in research across all research scales**
- **Leverage research from existing providers where priority gaps are identified**
- **Provide a 'one-stop-shop' for salinity research and information**
- **Develop and maintain a website that provides a gateway to all relevant research, policy and practice**
- **Ensure that research is able to be connected up and used at different scales**

Recommendation 11

8.83 The Committee recommends that the newly established coordinating body undertake, as one of its first pieces of work, a comprehensive audit of all salinity research and development activities in which the Australian Government invests. This will include:

- **National programs**
- **Agencies within government departments**
- **Cooperative Research Centres**
- **Research and Development Corporations**
- **National science agencies**
- **Universities**

- **Independent research centres**
- **Industry initiatives**
- **R&D needs for the development of new large-scale sustainable industries**

Recommendation 12

8.85 The Committee recommends that discrete funding be allocated in the new (post-2008) NAP funding for regional bodies to partner in regional scale research to deliver R&D outcomes that are more relevant to their regional priorities and needs. It is recommended that all research proposals be assessed by the newly created coordination body to avoid duplication of research efforts.

Recommendation 13

8.87 The Committee recommends, as a matter of urgency, that specific funds be allocated by the Australian Government for the promotion and distribution of the NDSP products – in particular, to regional bodies across Australia. It is further recommended that the newly established coordination body (see recommendation 10) take on the role of updating these products.

Recommendation 14

8.94 The Committee recommends that the Australian Government establish a working group to identify extension service issues and options for addressing these. Particular attention should be paid to:

- **The relationship between state, regional and private extension services**
- **The employment conditions, professional development and career pathways of regional extension staff**
- **Achieving nationally consistent and relevant training of extension staff, including the development of accredited courses for private extension staff that provide knowledge and skills in NRM and increase their awareness of, and engagement with, relevant regional plans**
- **Ensuring that extension services meet the needs of regional groups**

Recommendation 15

8.99 The Committee recommends that the Australian Government review existing policy mechanisms (tax incentives, MBIs etc) in order to provide a policy environment that encourages and supports the development of new, large-scale sustainable industries that meet NRM priorities.

Recommendation 16

8.102 The Committee recommends that updated assessments of salinity risks be undertaken across the states/territories, followed by detailed mapping of high risk areas with particular attention paid to urban environments. It is recommended that priority areas under the NAP be re-assessed in light of the updated assessments.

Recommendation 17

8.103 The Committee recommends that mapping is conducted in areas in which salinity is known to be a potential hazard before further urban development is approved in those areas.

Recommendation 18

8.108 The Committee recommends that the Australian Government give greater emphasis to urban salinity at a national level by:

- **building links between the administering departments and relevant agencies such as the Department of Transport and Regional Services and the Australian Transport Council**
- **supporting research into the development of technologies for managing urban salinity**
- **allocating funding to urban salinity in the next salinity program**

Recommendation 19

8.109 The Committee recommends that the Australian Government in cooperation with the state/territory governments use the accreditation process to ensure that urban salinity is adequately accommodated in regional investment strategies.

Recommendation 20

8.110 The Committee recommends that the Australian Government establish a pool of special grants to be made available for local governments to address urban salinity issues. Access to grants will be contingent on a demonstrated willingness to align planning policies and decisions with sustainable natural resource management principles.

Recommendation 21

8.111 The Committee recommends that a suitable body such as the Productivity Commission or the Australian Bureau of Agricultural and Resource Economics (ABARE) undertakes a study into the future impacts and costs of salinity on infrastructure in urban and rural environments, and develop a long-term strategy that includes consideration of federal, state and local government funding levels.

Recommendation 22

8.114 The Committee recommends that the Australian Government in cooperation with the states and territories keep a watching brief on the development of the Salinity Investment Framework 3 (SIF3), with a view to potentially implementing it (or a modified version of it) across the country. It is recommended that the framework be applied within the context of the new (post-2008) program(s).

Recommendation 23

8.117 The Committee recommends that the Australian Government develops a national policy package to leverage large-scale private sector investment in new, sustainable and profitable solutions.

Abbreviations

ABCB	Australian Building Codes Board
ACF	Australian Conservation Foundation
ALGA	Australian Local Government Association
ANAO	Australian National Audit Office
ANZLIC	Australia New Zealand Land Information Council
BCA	Building Code of Australia
BSMS	Basin Salinity Management Strategy
CMA	Catchment Management Authority
CMB	Catchment Management Board
CMO	Catchment Management Organisation (regional body)
COAG	Council of Australian Governments
CRC	Cooperative Research Centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
EMS	Environmental Management Systems
IGA	(NAP) Intergovernmental Agreement
MBIs	Market-based instruments
MDB	Murray-Darling Basin
MDBC	Murray-Darling Basin Commission
NAP / NAPSWQ	National Action Plan for Salinity and Water Quality
NDSP	National Dryland Salinity Program

NHT	National Heritage Trust
NLP	National Landcare Program
NLWRA	National Land and Water Resources Audit
NRM	Natural Resource Management
NRMMC	Natural Resource Management Ministerial Council
NRMSC	Natural Resource Management Standing Committee
SIF3	Salinity Investment Framework 3
WALGA	Western Australian Local Government Association
WSROC	Western Sydney Regional Organisation of Councils

Glossary[1]

Agronomy	The applied aspects of both soil science and the several plant sciences, often limited to applied plant sciences dealing with crops.
Annuals	Plants that live for one growing season.
Aquifer	A layer of rock which holds and allows water to move through it, and from which water can be extracted. Confined aquifers have a layer of rock above them which are impermeable to water.
Bedrock	Unweathered hard rock at the base of a soil profile.
Biophysical	Relating to biological and physical processes.
Bore	A hole of uniform diameter (usually 150 mm to 160 mm) drilled vertically into the ground to tap an aquifer. It contains a pipe through which groundwater can be pumped or can flow to the surface by artesian pressure (see also pressure and hydraulic pressure).
Break of slope	The line across a landscape at which the surface slope is reduced and where the hydraulic conductivity of the underlying material or the hydraulic gradient decreases.
Catchment	The area of land from which rainwater or snow melt drains into a reservoir, pond, lake or stream.
Discharge	Flow of groundwater from the saturated zone to the earth surface.
Discharge area	The area in which there is upward movement of groundwater and where groundwater is discharged from the soil surface. Groundwater escapes via springs, evaporation, transpiration and surface drainage (see also recharge area).
Drain	A channel for the purpose of interception and removal of excess surface or sub-surface water to a stable outlet.

1 Sourced from the *Australian Dryland Salinity Assessment 2000*, www.audit.ea.gov.au/ANRA/land/docs/national/Salinity_Glossary.html, accessed 4 January 2006.

Ecosystem	A community of organisms, interacting with each other, plus the environment in which they live and with which they also interact such as a pond or forest.
Electrical conductivity	Ability of a substance to conduct electricity.
Evaporation	The process of water changing from a liquid to a vapour.
Geology/geologic	Science of learning about the earth: its origin, structures, composition, historical changes and processes.
Geomorphology	Science of describing and interpreting landform patterns and processes of landscape formation.
Geophysics	The science of studying the earth's physical properties such as magnetism, conductivity and density.
Groundwater	All free water below the surface in the layers of the Earth's crust.
Hydrogeology	The study of groundwater movement.
Perched aquifer/watertable	A watertable above the main watertable level where impermeable soil or rock prevents the water from percolating through to the main groundwater body.
Permeability	The capacity of a substance (for example, soil or rock) to allow water to pass through it. Sand, for example, is said to have high permeability.
Perennial	Plant that lives for several years (annuals live for only one growing season).
Recharge	A component of rainfall that drains below the root zone of vegetation and joins the groundwater.
Recharge area	The area where water can enter and move downward to the groundwater. Recharge areas are usually permeable in the upper slopes and are often on shallow soils.
Regolith	Weathered or sedimentary material that is over bedrock.
Root zone	Near-surface part of a soil profile where roots are active.
Seeps/seepage	Where there is permanent or seasonal appearance of water at the soil surface causing soil salinity either directly through saline water or by evaporative concentration. Non-saline seepages also occur.

Topography	The detailed description and analysis of the features of a relatively small area, district or locality.
Water balance	A state of equilibrium when rainfall or irrigation water in a landscape is accounted for by the sum of run-off, plant water use, evaporation, recharge and changes in soil moisture content.
Waterlogging	Waterlogging occurs when the watertable rises into the root zone. It results in anaerobic (absence of free oxygen) conditions which reduce plant growth and may kill plants.
Watertable	The watertable is the upper surface of groundwater. The soil profile is fully saturated below the watertable and unsaturated above it.
Weathering	Chemical, physical and biological decomposition of rocks. This can result in the formation of a soil profile.

Chapter 1

Background to the inquiry

1.1 On 17 March 2005, the Senate referred the inquiry into the extent and economic impact of salinity to the Environment, Communications, Information Technology and the Arts Reference Committee for report by 13 October 2005. The full terms of reference may be found at page ix. On 5 October 2005 the Senate granted the Committee an extension of time to report to the second sitting day of 2006. The inquiry was an extensive one and consequently on 8 December 2005 the Senate granted the committee a further extension to 28 March 2006.

1.2 In brief, the Committee was asked to examine the long-term success of federal programs that seek to reduce the extent and economic impact of salinity in the Australian environment. This included: progress of national programs to address salinity; support available to regional catchment management authorities to achieve national goals; and action taken as a result of recommendations made by the House of Representatives' Science and Innovation Committee's *Science Overcoming Salinity* inquiry.[1]

Conduct of the inquiry

1.3 In accordance with its usual practice, the Committee advertised details of the inquiry in *The Australian* on 30 March 2005. The Committee also wrote directly to a range of organisations and individuals to invite submissions, and received 50 written submissions and numerous supplementary submissions, as listed at Appendix 1. Documents tabled in public hearings are also listed in Appendix 3.

1.4 The Committee notes that all state/territory governments were invited to submit to the inquiry. Letters were received from the Queensland, Tasmanian and Victorian Governments indicating they would not be making submissions. Further, the Committee was advised that Victorian regional bodies were not permitted to make submissions to the inquiry under the directive of the Victorian Government. There was no response from the NT Government. In light of limited evidence from these states/territories, this report predominantly reflects evidence from national, NSW, WA, SA and ACT perspectives.

1.5 In order to explore the issues in more detail, the Committee held public hearings in Canberra on 6 September 2005, Sydney on 14 October 2005, Adelaide on 16 November 2005, Perth on 18 November 2005, Wagga Wagga on 10 February 2006

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1 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, May 2004.

and Canberra on 28 February 2006. A list of those who gave evidence at these hearings is at Appendix 2.

Site Inspections

1.6 The Committee also conducted two inspections: a one-day tour of WA's Great Southern Region on 17 November 2005, and an afternoon tour of salinity-affected sites in Wagga Wagga, NSW, on 10 February 2006.

The Great Southern Region, WA

1.7 The Committee spent a day in the Great Southern Region inspecting a range of salinity-affected sites and different approaches to managing them. The day commenced with an airborne inspection of the wheatbelt, which gave a sense of the scale of the salinity problem in this region. Numerous salt scalds and lakes were clearly visible, with salt-affected areas intruding into roads as well as affecting vast areas of agricultural land. The plane landed at Kununoppin, where the Committee inspected the Gents-Trayning deep drainage site. Private money had been used to install 10 kilometres of drainage in order to reverse the effects of salinity on local properties. Later in the day, the Committee travelled to Qualandary Crossing where the Committee visited key sites and heard about the background to deep drainage in WA.

1.8 The Committee inspected the Integrated Wood Processing (IWP) Demonstration Plant at Narrogin. The plant is an innovative project trialling an industry-involved approach to salinity management. Locally planted mallee trees, which soak up groundwater, prevent the water table from rising and salt stores being mobilised. The mallees are harvested at the plant to produce renewable energy, activated carbon and high-quality eucalyptus oil. The IWP Demonstration Plant is discussed in more detail in Chapter 7.

1.9 Under the guidance of Mr Ken Wallace from the WA Department of Conservation and Land Management (CALM), the Committee inspected Lake Toolibin nature reserve, which is at threat from salinity. Lake Toolibin is listed on the Register of the National Estate and under the Ramsar Convention as a wetland of international significance. It is also recognised as a threatened ecological community and was listed as a recovery catchment for natural diversity under the WA Salinity Action Plan.[2] The recovery of the lake has two purposes: to arrest the decline of biodiversity and to serve as a case study or model for managing salinity in other areas. A mix of engineering and revegetation works is being implemented.

1.10 The Committee toured the Ballard's farm to view farming systems that are being used to manage the land sustainably and manage salinity. This was followed by an inspection of the Walton's farm where saltland pastures are being trialled. The Committee heard that saltland pastures have environmental and

2 K. Wallace, *Case Study – Toolibin Lake and Catchment*, nd., p. 2.

profitability/productivity benefits. They can soak up enough water to keep the water table down, in turn decreasing run-off of salt into rivers and properties down the slope, and they provide refuges for biodiversity. If the right mix of salt tolerant species is used, saltland pastures also provide a high protein diet for livestock.

Wagga Wagga, NSW

1.11 The City of Wagga Wagga hosted the Committee on a tour of areas affected by urban salinity. The Committee observed damage to the streetscape caused by the rising watertable and increased recharge, including potting and lifting of roads and both the breakdown of mortar and brickwork and salt efflorescence (white staining) on buildings. At the Wagga Wagga Showground and an abandoned sports field, the devastating effects of salinity were apparent in the very poor state of vegetation (patchy lawn and dying trees) and cracked ground surface with salt clearly visible.

1.12 The Committee observed important examples of how the community is fighting salinity. Emblen Park is located on a discharge area and has been successfully regenerated with salt-tolerant plants. A de-watering bore pumps water into a tank, with a computerised system controlling re-distribution. The Committee was taken to a residence modelled on sustainable living, the ErinEarth Ecological Justice Resource Centre, which includes an excellent example of a garden sensitive to salinity. The garden is gradually being replanted with a range of native vegetation once widespread in the region and uses excess water to maintain a wetland resource and water an orchard.

1.13 Wagga Wagga has adopted a 'whole of community' response to managing salinity. The local government is working together with industry, community groups and a range of agencies to provide education and awareness, revegetation and water management programs. This includes demonstrations and pilot initiatives for reducing the impact of salinity and encouraging community members to create waterwise gardens, limit water usage in homes and businesses and assist in the large-scale planting of native vegetation.

Outline of the report

1.14 Chapter 2 provides an overview of salinity and the framework in place to address it. It covers the main features of salinity and considers the extent and impact of salinity. A short outline of salinity management in Australia is provided. This includes a description of the three major national programs to address salinity (covered in more detail in Chapter 3) and other major programs and initiatives. Finally, a summary of the House of Representatives Science and Innovation Committee's report, *Science Overcoming Salinity*, is presented.

1.15 Chapter 3 concentrates on the national programs in place to tackle salinity and corresponds to the terms of reference (a). Both the achievements under the national programs and the areas requiring improvement are considered. This includes an examination of funding arrangements, the governance framework, monitoring of

program goals and natural resource conditions, and regional boundaries. Attention is also paid to the congruence between the national programs and other initiatives.

1.16 The role of regional bodies and the support provided to them is covered in Chapter 4 and corresponds to the terms of reference (b). Underpinning this chapter are the questions: how well is the regional delivery model working? and what can be done to improve existing arrangements and practices? The chapter addresses three themes: the legislative basis of regional bodies; resourcing and support available to regional bodies; and the relationships between regional bodies and other key stakeholders.

1.17 Chapter 5 considers the coordination and communication of salinity research. Attention is focused on the following issues: the scale at which research is conducted and whether it can be interpreted at a regional level; the need for more effective coordination and communication of research; national standards and protocols for research and information management; and research gaps. The House of Representatives inquiry, *Science Overcoming Salinity*, was specifically concerned with the use of the salinity science base and research data in the implementation of national programs. To this end, Chapter 5 relates most directly to the terms of reference (c).

1.18 With some notable exceptions, it became apparent during the inquiry that urban salinity is a neglected area, both in terms of community awareness and investment in managing it. Urban salinity is the focus of Chapter 6. The impact and extent of salinity in the urban environment and its cost is examined. This chapter also considers how urban salinity can be managed and examines the key barriers to achieving effective urban salinity management.

1.19 While salinity presents a major environmental problem, it is invariably bound to economic and social challenges. Chapter 7 considers salinity management within the context of balancing and achieving environmental, economic and social objectives. The tensions between different interests, desired outcomes and salinity management approaches to achieve these outcomes are examined. The chapter gives consideration to the balance between public and private interests and investment in salinity management, with a focus on securing large-scale private investment. Along with this, regulatory and policy mechanisms for encouraging changed land-use practice and engaging private sector interest are canvassed.

1.20 Finally, Chapter 8 presents the Committee's conclusions and recommendations for improved salinity management into the future. It summarises the main issues raised in each of the preceding chapters and outlines directions for addressing these issues.

Terminology in this report

1.21 Throughout the report the term 'regional bodies' is used to refer to the regional natural resource management (NRM) bodies, unless otherwise stated. The Committee notes that for some the preferred term is catchment management organisations (CMOs).

Acknowledgements

1.22 The Committee wishes to express its appreciation for the cooperation of all witnesses to its inquiry, whether by making submissions, by personal attendance at a hearing or, as in many cases, by giving both oral and written evidence. In particular, the Committee thanks those who travelled significant distances to attend and give evidence at its public hearings.

1.23 The opportunity to inspect salinity-affected land, waterways and infrastructure, and talk to farmers, scientists, landholders and other community members about the salinity threat and ways to manage it greatly enriched the Committee's understanding of salinity. The Committee would like to thank Professor Mike Ewing and Ms Natalie Lennon from the CRC for Plant-Based Management of Dryland Salinity and Dr Richard George, WA Department of Agriculture, for their invaluable assistance in organising the site inspection in WA. The Committee thanks Mr Tony Hepworth and the Wagga Wagga City Council for hosting the Committee's site inspection of urban salinity in Wagga Wagga.

1.24 The Committee would also like to acknowledge the many people involved in the site inspections:

- *WA* – Mr John Dunne, local farmer; Mr Owen Gent, property owner; Mr John McKay, WA Channel Group; Mr Don Woodcock, WA Channel Group; Mr John Bartle, CALM; Mr Don Harrison, Western Power; Mr Ken Wallace, CALM; Mr Neil Ballard, local farmer; Dr Ed Barnett-Lennard, WA Department of Agriculture; Dr Hayley Norman, CSIRO; Dr Phil Nichols, WA Department of Agriculture; Mr Chris Walton, property owner; Mr Michael and Mrs Margaret Lloyd, local farmers; Mr Tony York, local farmer, Mr and Mrs Ian Walsh, local farmers; Mr Peter Sullivan, Avon Catchment Council; and Mr Greg Richards, local Farmer.
- *Wagga Wagga* – Sister Carmel Wallis, ErinEarth, and other local residents of Wagga Wagga.

Note on references in this report

1.25 References in this report are to individual submissions as received by the Committee rather than a bound volume of submissions. References to *Committee Hansard* are to the official Hansard with the exception of the closing hearing in Canberra on 28 February 2006. In this instance, references are to the proof Hansard. Page numbers may vary between the proof and the official Hansard transcript.

Chapter 2

The framework to address salinity

What is salinity?

2.1 Salinity is a critical problem threatening the Australian natural environment and the sustainability of productive agriculture areas.[1] One of Australia's most complex and costly environmental issues, it causes damage to roads, buildings, agricultural production, biodiversity, rivers and water supplies. It is hard to quantify the cost of this damage, but one widely used estimate puts the cost of land and water degradation alone at $3.5 billion per annum in economic terms.[2]

2.2 Salts are naturally present in much of the Australian landscape. Salt stores have accumulated over geological time from cyclic rain, whereby salt has been carried inland from the oceans by wind and deposited by rainfall. Examples of this primary or naturally occurring salinity are the marine plains around the Australian coastline and the salt lakes in central and western Australia. Salts are also released from rocks as a result of weathering.[3]

2.3 Secondary salinity is the salinisation of land and water resources due to land use impact by people.

2.4 Salinity is categorised in a number of different ways, depending on how and where salt is mobilised and what the impacts are:

- **Dryland salinity** is salinity that occurs in non-irrigated areas. It usually occurs where deep-rooted perennial vegetation is replaced by crops and pastures that use less water because they have shallow root systems and shorter growth cycles. This increases leakage to the groundwater system (recharge) which, in some areas, may lead to the mobilisation of salts stored deep in the soil. Saline groundwater may rise to the surface (discharge) in low-lying areas or at the break of slope. Groundwater may also flow underground directly into streams and rivers.

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1 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, p.1.

2 Council of Australian Governments, *Our Vital Resources: A National Action Plan for Salinity and Water Quality,* November 2000, p. 1 in ANAO Report ANAO Audit Report No.17 2004-05 *The Administration of the National Action Plan for Salinity and Water Quality*, December 2004, p.13.

3 *Australian Dryland Salinity Assessment 2000*, http://audit.deh.gov.au?ANRA/land/sal)context/AUS.cfm?region_code=Aus& (accessed 4 January 2006).

Dryland salinity may also be caused by the exposure of naturally saline soils such as hypersaline clays. Sodic soils (soils that have a high concentration of sodium ions in comparison to other ions like calcium and magnesium) can also cause salinity. When wet, sodic soils disperse causing the soil aggregates to separate and block the soil pores. On drying, sodic soils are often hard and dense, and form a crust on the soil surface. The poor soil structure reduces water infiltration and there is little or no leaching of salts below the root zone. Sodic subsoils can create a perched watertable causing waterlogging of the root zone.

- **Irrigation salinity** occurs when there is a localised rise in the level of groundwater caused by the application of large volumes of irrigation water. This problem is compounded by the replacement of native vegetation with crops and pastures that use less water. Irrigation salinity is made worse when water used to irrigate is derived from salty rivers or groundwater.
- **Urban salinity** is the result of a combination of dryland and irrigation salinity processes. Clearing of vegetation for urban development and problems like over-watering parks and gardens, leaking pipes, drains and tanks, and blocking or changing natural drainage paths can cause the groundwater to rise. Besides naturally occurring salt, in the urban environment there are many other sources of salt that can contribute to urban salinity including salt contained in effluent, building materials, industrial waste water, fertilisers and chemicals.
- **Industrial salinity** results from industrial processes that concentrate salt in industrial waste water. Effluent from towns, intensive agriculture and industry can contain high levels of salt. Coal-fired power stations use water for cooling, a process in which water is evaporated and salt concentrated. Mining activities undertaken before the development of strict rehabilitation requirements have led to abandoned mines being a source of salt in some sub-catchments.
- **River salinity** is caused by saline discharges from areas affected by dryland, irrigation and urban salinity flowing into creeks and rivers. Over time, as salinity within catchments worsens, the quality of river water declines.[4]

2.5 The NSW Department of Natural Resource Management points out that salinity is invariably linked with (or contributes to) other natural resource problems. In turn, these problems have a range of environmental, social and economic impacts:

> Salinity rarely occurs in isolation from other natural resource problems such as decreasing soil and water quality, erosion and loss of native vegetation. For example, water coming from areas affected by dryland, irrigation or urban salinity flows into creeks and rivers causing salinity

4 These definitions are directly taken from the NSW Department of Natural Resource Management website – formerly DIPNR - http://www.dlwc.nsw.gov.au/salinity/basics/types.htm (accessed 24 October 2005).

levels to rise. This affects the water quality, which in turn affects the health of plants and animals. Low water quality affects farm income but may also impact on town water supply, which can have social and economic impacts for both rural and urban dwellers caused by rising council rates and taxes to cover the costs of desalinating the water supply.[5]

Historical background[6]

2.6 As noted earlier, salts are naturally present in the Australian landscape. Prior to European settlement, native vegetation adapted to Australia's natural conditions. With a high prevalence of perennial vegetation with relatively deep roots, most of the water entering the soil was soaked up. As a result, the leakage of water past the root zone into the deeper soil and groundwater was generally minimised.

Photograph: Salinity-affected land in the Great Southern Region, WA

2.7 However, changes in land use since European settlement significantly changed the hydrology of the Australian landscape. Most notably, large scale clearing of native vegetation was undertaken, which was then replaced with shallow-rooted annual crops and pastures. This activity considerably increased the amount of water entering groundwater systems. In turn, the equilibrium or balance was disturbed. As the input to the groundwater exceeded the output, the water table rose discharging

5 NSW Department of Natural Resource Management website – formerly DIPNR http://www.dlwc.nsw.gov.au/salinity/basics/types.htm (accessed 24 October 2005).

6 Material in this section draws heavily on the report of the House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, May 2004, pp 63-68.

more water to the land surface: 'Whenever this groundwater contains salt or intercepts salt stored in the landscape, salt is mobilised to these seepage faces, and hence to the land's surface, rivers and streams.'[7]

Geographical and temporal separation

2.8 The causes of salinisation and the manifestation of its effects in the landscape may be both spatially and temporally distant from each other.

2.9 Land salinisation occurs when the saline groundwater evaporates, leaving salt deposits. The salt may then be moved by rain into waterways and river systems. Water leaking beyond the root zone can also move laterally through soils and flow directly into rivers and streams. In this way, the original cause of the water entering the watertable may be distant from where the effects of salinity manifests. As explained in the House of Representatives Report, *Science Overcoming Salinity*, 'salinity can occur on-site (farm scale), elsewhere in the catchment or outside the catchment (downstream).'[8]

2.10 Further there may be a considerable time delay between the cause of salinity and its effects. Response times in groundwater levels and time lags between the original cause of salinity and its expression in the landscape may be up to 100 years or more.

The extent and impact of salinity

2.11 There are varying statistics and views on the extent and impact of salinity in Australia. In this section, the major surveys of the salinity threat are discussed.

National Land and Water Resources Audit 2000

2.12 The most comprehensive attempt to provide an overview of the (dryland) salinity threat across Australia was undertaken as part of the National Land and Water Resources Audit (the Audit) in 2000. Individual salinity assessments were conducted by six states (New South Wales, Victoria, Queensland, South Australia, Western Australia and Tasmania), which were then collated into one report, the *Australian Dryland Salinity Assessment 2000*.

2.13 In this report, the National Land and Water Resources Audit Advisory Council reported that approximately 5.7 million hectares of Australia's agricultural and pastoral zone are in regions at risk of developing dryland salinity through shallow

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7 CSIRO, cited in the House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, 2004, p. 65.

8 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, 2004, p. 66.

watertables. Predictions based on groundwater trends, field surveys and landscape characteristics indicated that unless effective solutions are implemented, the area could increase to 17 million hectares by 2050. Most is agricultural land (more than 11 million hectares):

Table 1. Areas (ha) with a high potential to develop dryland salinity in Australia[9]

State/ Territory*	1998/2000	2050
New South Wales	181 000	1 300 000
Victoria	670 000	3 110 000
Queensland	not assessed	3 100 000
South Australia	390 000	600 000
Western Australia	4 363 000	8 800 000
Tasmania	54 000	90 000
Total	**5 658 000**	**17 000 000**

* The Northern Territory and the Australian Capital Territory were not included as the dryland salinity problem was considered to be very minor.

2.14 The Audit revealed that the largest areas of dryland salinity are in the agricultural zone of south-west Western Australia, where groundwater levels are still rising. Over four million hectares have areas at risk, which could double the existing area affected by salinity by 2050. It was also found that large areas are at risk of dryland salinity in South Australia, Victoria and New South Wales.[10]

2.15 The non-agricultural area of Western Australia and far western New South Wales was considered to have a very low salinity risk and were not included in the assessment. Further, the report noted the finding of an existing salinity hazard assessment for the Northern Territory (Tickell 1994b) that the overall hazard for the Territory was relatively low. As a result, the Audit did not conduct further assessment of the NT.[11]

2.16 It was noted that northern Australia has far less dryland salinity than temperate Australia. However, it was acknowledged that dryland salinity could become a problem for many catchments with high salt stores if water balance changes

9 National Land and Water Resources Audit Advisory Council, *Australian Dryland Salinity Assessment 2000*, 2001, Table 1, p. 3 of 10, http://audit.ea.gov.au/ANRA/land/docs/national/Salinity_AUS.html, (accessed 6 January 2006).

10 National Land and Water Resources Audit Advisory Council, *Australian Dryland Salinity Assessment 2000*, 2001, pp 2-3 of 10, http://audit.ea.gov.au/ANRA/land/docs/national/Salinity_AUS.html, (accessed 6 January 2006).

11 National Land and Water Resources Audit Advisory Council, *Australian Dryland Salinity Assessment 2000*, 2001, p. 3 of 10, http://audit.ea.gov.au/ANRA/land/docs/national/Salinity_AUS.html, (accessed 6 January 2006).

led to groundwater rises. The Audit concluded that the extent of salinity in northern Australia could be minimised by preventive management.[12]

2.17 The report highlighted three factors that increase the impacts of dryland salinity:

- its off-site effects
- its social and economic consequences
- the high level of inputs required to manage salinity and the long timeframes to achieve this[13]

Photograph: salt lakes in the Great Southern Region, WA

Assets at risk of salinity

2.18 Salinity can impact on a broad range of assets including biodiversity, water quality, crops and infrastructure. The Audit report outlined on-farm and broader impacts:

> The main impact of increasing salinity at the farm level is loss of production and income. Other on-farm effects include the decline in capital

12 National Land and Water Resources Audit Advisory Council, *Australian Dryland Salinity Assessment 2000*, 2001, p. 3 of 10, http://audit.ea.gov.au/ANRA/land/docs/national/Salinity_AUS.html, (accessed 6 January 2006).

13 National Land and Water Resources Audit Advisory Council, *Australian Dryland Salinity Assessment 2000*, 2001, p. 4 of 10, http://audit.ea.gov.au/ANRA/land/docs/national/Salinity_AUS.html, (accessed 6 January 2006).

value of land, damage to infrastructure, salinisation of water storage, loss of farm flora and fauna, and loss of shelter and shade. These effects are magnified at the regional level, where they have a substantial impact on public resources such as biodiversity, water supplies and infrastructure.[14]

Table 2. Summary of assets in areas at high risk from shallow watertables or with a high salinity hazard[15]

Asset	2000	2020	2050
Agricultural land (ha) [1]	4 650 000	6 371 000	13 660 000
Remnant and planted perennial vegetation (ha) [2, 5]	631 000	777 000	2 020 000
Length of streams and lake perimeter (km) [2]	11 800	20 000	41 300
Rail (km)[2]	1 600	2 060	5 100
Roads (km)[2]	19 900	26 600	67 400
Towns (number)[3]	68	125	219
Important wetlands (number)[1, 4]	80	81	130

Notes:
[1] Data from all States, Qld only for 2050.
[2] Data from WA, SA, Vic and NSW, Qld only for 2050.
[3] Data from WA, SA, Vic and NSW.
[4] Including Ramsar wetlands.
[5] Much of the remnant and perennial vegetation reported for each State occurs on agricultural lands.

Other major assessments

2.19 In 2002, the Australian Bureau of Statistics (ABS) conducted a Land Management and Salinity Survey[16] collecting 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.

2.20 The results showed a lower level of saline land than other sources. The report suggested that these different results are most likely the consequence of different concepts, assessment methods and coverage used in each study. The ABS survey covered agricultural land as it is defined for ABS agricultural collections. This includes about 60% of Australian land. Information on all salinity, not just dryland salinity as in the other studies, was collected.[17]

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14 National Land and Water Resources Audit Advisory Council, *Australian Dryland Salinity Assessment 2000*, 2001, p. 5 of 10, http://audit.ea.gov.au/ANRA/land/docs/national/Salinity_AUS.html, (accessed 6 January 2006).

15 National Land and Water Resources Audit Advisory Council, *Australian Dryland Salinity Assessment 2000*, Table 2, p. 5 of 10, http://audit.ea.gov.au/ANRA/land/docs/national/Salinity_AUS.html, (accessed 6 January 2006).

16 Australian Bureau of Statistics, *Salinity on Australian Farms,* 4615.0, 2002.

17 Australian Bureau of Statistics, *Salinity on Australian Farms,* 4615.0, 2002, p. 3.

2.21 The survey confirmed that Western Australia is the state most affected by salinity and that the Northern Territory, Australian Capital Territory and Tasmania are the least affected.[18]

2.22 A comparison of the ABS figures with the figures from two previous studies, the 1999 report of the Prime Minister's Science Engineering and Innovation Council and the National Land and Water Resources Audit, is shown in the table below:

Table 3. Area affected by salinity, comparison of survey results with other estimates[19]

State	PMSEIC 1999	NLWRA 2001	ABS 2002
	Area of salinity affected land (a)	Area at risk of salinity (b)	Area showing signs of salinity (c)
	'000 ha	'000 ha	'000 ha
NSW/ACT	120	181	124
Vic.	120	670	138
Qld	10	n.a.	106
SA	402	390	350
WA	1802	4363	1241
Tas.	20	54	6
NT	0	0	2
Total Australia	**2476**	**5658**	**1969**

(a) As determined by experts.
(b) As estimated from water table heights.
(c) As reported by farmers.

2.23 Such variations in estimates of areas considered to be at risk as a result of the use of different testing methods were noted by Professor Copeland, Director of the Centre for Salinity Assessment and Management, University of Sydney. In response to Committee questioning on the current extent of salinity, he commented:

> I think there are different ways of measuring salinity and salinity threat. Each has its strengths and limitations, and calibration between the different methods is also not the easiest thing to do, so to base a conclusion on one type of measurement is perhaps a little bit open to question. I think the temporal aspect is also really critical. Taking a snapshot of a particular time does not really give you much information. You need to measure it over a period to see what the trend is, to establish if it is increasing or decreasing. I think that will tell you what is really happening. But I repeat that each of the techniques that is used to measure has its strengths and weaknesses, and we have got to recognise that.[20]

2.24 A recent paper by the Australian Farm Institute examined the methodologies underpinning the figures in the 2000 Audit report. It notes that the risk assessments conducted across the states were based on a range of factors and that the data available

18 Australian Bureau of Statistics, *Salinity on Australian Farms,* 4615.0, 2002, p. 3.

19 Australian Bureau of Statistics, *Salinity on Australian Farms,* 4615.0, 2002, Table 5.1, p. 5.

20 Professor Les Copeland, *Committee Hansard,* Sydney, 14 October 2005, pp 35-36.

on each of these factors was highly variable. The paper concludes that the 2000 Audit figures were considerably overestimated.[21]

2.25 However, as Mr Aldred from the Department of Agriculture, Fisheries and Forestry explained, the Audit assessment was 'based on the best available science and information at the time'. He went on to say that 'the science that underpins those sorts of assessments has continued to be worked on' and, in light of this, information and figures are in the process of being updated.[22]

2.26 Mr Peter Baker, Bureau of Rural Sciences, told the Committee that recent work indicates the salinity risk in eastern Australia is more localised than earlier predicted:

> it has become quite clear from work done over the last five years, largely financed through the National Action Plan for Salinity and Water Quality, that the concept of salt being everywhere and prevalent is not accurate. It is actually confined to some specific parts of the landscape.[23]

2.27 He went on to clarify that even if the salt is there, the risk of it actually being mobilised has been shown to be less through more detailed mapping of the landscape.[24]

2.28 In response to questions concerning the current and likely future environmental and economic impacts of salinity, Mr Lee, Natural Resource Management Team, Department of Agriculture, Fisheries and Forestry (DAFF), said:

> …I think it is fair to say that, with increasing knowledge, it seems the picture may be a little more optimistic than we thought from the first review of salinity risk provided by the National Land and Water Resources Audit. For instance, I believe that, while the aggregate figures in the projections for salinisation in the wheat belt of Western Australia are still remarkably high, they have come down somewhat from the projections that were published in 1999 or 2000 from that work. With better understanding, we are also seeing the mechanisms of salinity and understanding them better. … we are seeing that the hazard in eastern Australia is more specific and perhaps more manageable, so the picture is more optimistic than we thought.[25]

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21 M. Keogh, 'The national Dryland Salinity Audit 5 Years on: Is the 17 Million Hectare Estimate Still Valid or Useful?', *Farm Policy Journal*, Vol. 2, No. 4, November Quarter 2005.

22 Mr Tom Aldred, Executive Manager, Natural Resource Management, *Committee Hansard*, 28 February 2006, p. 37.

23 Mr Peter Baker, *Committee Hansard*, 6 September 2005, p. 3.

24 Mr Peter Baker, *Committee Hansard*, 6 September 2005, p. 4.

25 Mr Mike Lee, General Manager, Australian Government Natural Resource Management Team, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 6 September 2005, p. 7.

2.29 Mr Lee went on to explain that advances in knowledge and emerging tools enable more precise mapping and, in turn, the opportunity for more targeted interventions.[26]

2.30 Mr Lee suggested that in the light of this emerging information, revision of the previous hazard maps is required.[27] However, he did caution that while the salinity picture looks more optimistic, several years of drought has provided temporary respite. He also noted that salinity still presents a major environmental and economic challenge:

> …there is a counter-risk that the drought has essentially masked the appearance of the salinity problem over the last several years. Ground water levels have been depleted by drought, and you can see that there is a large seasonal and interseasonal component, no doubt, in ground water levels and the salinity that has been expressed. The impacts of salinity have been disguised somewhat by drought over the period. … So what is actually happening in an underlying way is probably more severe than what we are observing. But I think by any calculation we are still faced with a major threat to our biodiversity, our agriculture and our civic infrastructure across the country.[28]

2.31 This view was reiterated by Dr Bruce Munday who told the Committee that:

> I do believe there is a grave risk that we are thinking that salinity is all over because we have had a series of dry years, particularly on the east, but not only there. One of the things that we know from the National Dryland Salinity Program is that some of these ground water systems are very sluggish. They respond very slowly. Some of them, the local ones, respond quite quickly but the regional intermediate ones take a long time to respond. So if we go into a wet period, and none of us can predict whether we will or not, particularly if it is dominated by episodic events—floods—we may well find that it all comes back to bite us again. We will just repeat it all and people will trawl out statements that people made 10 years ago and say, 'Why didn't we listen?' We are having a bit of a honeymoon or spell from dryland salinity at the moment. I would have to be honest and say that is a gut feeling, but one based on having read a lot of stuff.[29]

2.32 The National Land and Water Resources Audit 2000 salinity assessment provided a broad brush picture of the salinity threat in Australia. Evidence suggests this has been instrumental in focusing greater attention on the salinity problem. The Committee was encouraged to hear that recent knowledge and more sophisticated mapping offer an outlook that is not quite as bleak as previously thought. However,

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26 Mr Mike Lee, *Committee Hansard*, 6 September 2005, p. 7.

27 Mr Mike Lee, *Committee Hansard*, 6 September 2005, p. 8.

28 Mr Mike Lee, *Committee Hansard*, 6 September 2005, p. 8.

29 Dr Bruce Munday, *Committee Hansard*, 16 November 2005, p. 58.

the Committee appreciates that salinity still presents a significant environmental and economic challenge.

Salinity management in Australia

2.33 The range of measures the Australian Government is applying to the salinity problem includes research and development, making direct on-ground interventions, and developing timely information on salinity and building capacity.[30] In collaboration with the states and territories, the Australian Government is dealing with salinity through a wide range of initiatives and research and development bodies. The major programs and initiatives are discussed below.

2.34 The three main programs administered at the Commonwealth level to tackle salinity and other national resource management issues are the National Action Plan for Salinity and Water Quality (NAP), the Natural Heritage Trust (NHT) and the National Landcare Program (NLP). The NAP is directed at improving salinity and water quality conditions in the Australian environment whilst the NHT is focused on the protection and sustainable use of Australia's land, water and marine resources. The NLP focus is on ensuring sustainable agriculture practices and providing support to landholders at the local level.[31] The Natural Resource Management Ministerial Council (NRMMC) oversees the development and implementation of these national natural resource management programs.

The Natural Resource Management Ministerial Council

2.35 The Natural Resource Management Ministerial Council (NRMMC) consists of the Australian, state/territory and New Zealand government ministers responsible for primary industries, natural resources, environment and water policy. The Council is the peak government forum for consultation, coordination and, where appropriate, integration of action by governments on natural resource management issues. Its objective is: 'to promote the conservation and sustainable use of Australia's natural resources'.[32]

The NRMMC seeks to:

- develop policies and strategies for national approaches to the conservation, sustainable use and management of Australia's land, water, vegetation and biological resources;

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30 Department of Agriculture Fisheries and Forestry and Department of Environment and Heritage, *Submission 24*, p. 2.

31 Department of Agriculture Fisheries and Forestry and Department of Environment and Heritage, *Submission 24*, pp 2-3.

32 Natural Resource Management Ministerial Council, http://www.mincos.gov.au/about_nrmmc.htm, (accessed 22 August 2005).

- oversee the development and implementation of national natural resource management programs including the National Action Plan for Salinity and Water Quality (NAP), the Natural Heritage Trust (NHT) and other agreed programs;
- monitor and evaluate outcomes of these policies, strategies and programs and the health of the nation's natural resources;
- promote community understanding of and engagement with the key challenges associated with the sustainable use and management of Australia's land and water, vegetation and biological resources; and
- liaise with other Ministerial Councils and other bodies on matters relevant to the activities of the Council.[33]

Natural Resource Management Standing Committee

2.36 The Standing Committee supports the Council in meeting its objectives. Membership is comprised of all departmental heads/CEOs of the Australian, state/territory and New Zealand government agencies responsible for natural resource policy.

2.37 Expert advisory committees have been established to provide advice to the Standing Committee and the Council. In turn, a range of working groups and ad hoc task forces support the work of the advisory committees.[34]

The National Action Plan for Salinity and Water Quality[35]

2.38 In November 2000, at the Council of Australian Governments' meeting, Premiers and Chief Ministers supported the Prime Minister's proposal for the National Action Plan for Salinity and Water Quality (NAP). The goal of the NAP is to motivate and enable regional communities to:

- prevent, stabilise and reverse trends in salinity, particularly dryland salinity affecting the sustainability of production, the conservation of biological diversity and the viability of our infrastructure; and
- improve water quality and secure reliable allocations for human uses, industry and the environment.

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33 Natural Resource Management Ministerial Council, Terms of Reference, http://www.mincos.gov.au/about_nrmmc.htm, (accessed 22 August 2005).

34 Natural Resource Management Standing Committee, http://www.mincos.gov.au/about_nrm_sc.htm (accessed 22 August 2005).

35 Information in this section is from the Department of Agriculture Fisheries and Forestry and Department of the Environment and Heritage, Submission 24, Attachment B and the National Action Plan website, http://www.napswq.gov.au/, (accessed 20 January 2006).

2.39 Through the NAP the Australian and state/territory governments are investing a total of $1.4 billion over the period to 2007-08. These funds support the actions of communities and land managers in selected priority regions across Australia to manage salinity and improve water quality in their region.

2.40 The NAP operates in 21 priority regions across Australia and is complemented by region-based planning and action through the extension of the NHT.

2.41 Support is provided in three main ways:

- Foundation funding is provided by the National Action Plan to help make sure all priority regions have accredited regional catchment strategies to support future investment. Foundation funding allows the development of targets to measure landscape changes, and enables community participation and support plan development. Activities in a foundation program can include: development of an investment plan and a communication plan, facilitated risk and R&D needs analysis, and preparing a strategy for monitoring and evaluation. The foundation program can be used to fill information gaps and to provide natural resource data and information required for ongoing salinity planning and monitoring.
- Priority actions are proposals agreed between the Australian Government, state/territory governments and regional bodies prior to accreditation of the regional catchment strategy. The proposals recognise that, in some areas, significant planning efforts have already been made in consultation with the community. The actions proposed are expected to be consistent with priorities identified under existing plans and activities.
- Capacity building is a high priority and all investments are directed to providing information, tools or skills to support the outcomes of the National Action Plan. There is an emphasis on building the capacity of communities and landholders to assist them to develop and implement an accredited regional catchment strategy.

2.42 The NAP incorporates six key elements:

- setting of targets and standards for natural resource management;
- investment based on integrated regional natural resource management plans;
- capacity building for communities;
- improved governance frameworks;
- clear roles for all levels of government and communities; and
- public communication programs.

2.43 In December 2004 the Australian National Audit Office (ANAO) tabled its audit report on the administration of the National Action Plan for Salinity and Water

Quality.[36] The objective of the audit was to examine and report on the planning and corporate governance for the new regional delivery model of the NAP program.

2.44 A more detailed discussion of this report is dealt with in Chapter 3.

The National Heritage Trust[37]

2.45 The NHT was set up in 1997 to assist in the restoration and conservation of Australia's environment and natural resources. The NHT provides funding for environmental activities at a national, state, regional and community level. Its goal is to stimulate activities in the national interest to achieve the conservation, sustainable use and repair of Australia's natural environment.

The Natural Heritage Ministerial Board

2.46 The Natural Heritage Minsiterial Board was established under the *Natural Heritage Trust of Australia Act 1997*. It is comprised of the Minister for the Environment and the Minister for Agriculture, Fisheries and Forestry.

2.47 The Board is a formal mechanism through which the two portfolios liaise and collaborate on matters relating to the Trust package. The two Ministers are requried to consult with each other on all decisions relating to the expenditure of Trust funds. All decisions must accord with the principles of ecologically sustainable development.[38]

Natural Heritage Trust extension

2.48 In the 2001 Federal Budget, an additional $1 billion was allocated to the NHT, extending the funding for a further five years. It was specified that at least $350 million of this additional funding was to be spent on measures to improve Australia's water quality. A further $300 million was announced in the 2004 Federal Budget, extending the funding to 2007-2008. This made the total investment in the NHT $3 billion.

2.49 Under the NHT extension (NHT2) there was a fundamental shift towards a more targeted approach to environmental and natural resource management in Australia. These included improved water quality, less erosion, improved estuarine health, improved vegetation management and improved soil condition. State and territory governments match the Australian Government's investment in delivering the NHT at a regional level, with funding going to activities based on regional plans.

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36 Australian National Audit Office, *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17 2004-2005.

37 Information in this section is from the Department of Agriculture Fisheries and Forestry and Department of the Environment and Heritage, Submission 24, Attachment B and the Natural Heritage Trust website, http://www.nht.gov.au/about-nht.html, (accessed 20 January 2006).

38 Natural Heritage Trust website, http://www.nht.gov.au/orgcom/nhmb.html (accessed 20 March 2006).

National Landcare Program[39]

2.50 The National Landcare Program (NLP) supports the landcare movement and the sustainable use and management of natural resources. The NLP consists of two sub-programs - Community Support and the National Component.

2.51 NLP Community Support provides support for community landcare groups and resource-based industries with the purpose of ensuring effective links with regional NRM plans and investment strategies of NAP and NHT. The role of landcare is to facilitate links between regional plans and farmers through their common need for information about effective natural resource management practices, including those to manage salinity.

2.52 The NLP National Component supports activities of a national or overarching nature. This has included grants for groups or individuals to test innovations that contribute to improved natural resource management. The National Component also supports partnership projects with industry groups and includes development and implementation of industry strategies to manage the causes and effects of salinity.

2.53 Since the 1993-94 financial year, the Australian Government has allocated $830 million to the NLP. In the 2004-05 budget the Australian Government appropriated a further $110 million to this program over the three financial years 2005-06 to 2007-08.

The Regional Model

2.54 A regional model underpins the delivery of the NAP and the NHT. A total of 56 NRM regions have been established across Australia with a corresponding regional body. Each region develops a regional plan, which is accredited in accordance with agreed national standards. These plans form the basis for investment of NAP and NHT funds.[40]

2.55 The regional bodies are responsible for: regional planning and investment; engaging community involvement in the planning process; and reporting against targets at the regional scale.[41]

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39 Information in this section is from the Department of Agriculture Fisheries and Forestry and Department of the Environment and Heritage, Submission 24, Attachment B, and the National Landcare Program, http://www.daff.gov.au/content/output.cfm?ObjectID=D2C48F86-BA1A-11A1-A2200060B0A04273, (accessed 20 January 2006).

40 Department of Agriculture, Fisheries and Forestry and Department of Environment and Heritage, *Submission 24*, Attachment I, p. 33.

41 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, p. 4.

2.56 Environments differ across Australia shaped by specific local conditions. The capacity to understand and respond to these varying conditions is viewed as a critical component of the regional delivery model.

2.57 Dr Prosser from the CSIRO told the Committee that:

> the management of salinity depends on the precise local conditions and the trade-off decisions with other regional goals that have to be made within each region on its own. So this requires that the general principles are interpreted through a deep knowledge of the local conditions in each region. This is the real crux of the challenge of salinity management.[42]

2.58 The regional delivery model is discussed in greater detail in Chapter 4.

Other major program and initiatives

2.59 Along with the three major programs discussed above, the Australian Government invests in a range of research and development initiatives that address salinity management. This includes projects undertaken by: rural industry research and development corporations (RDCs); Cooperative Research Centres (CRCs);[43] science organisations such as the CSIRO; and the joint state initiative, the Murray-Darling Basin Initiative. A brief summary of some of these initiatives is provided below.

The Murray-Darling Basin Initiative – Basin Salinity Management Strategy

2.60 The Basin Salinity Management Strategy (BSMS) sits under the Murray-Darling Basin Initiative, which gives effect to the 1992 Murray-Darling Basin Agreement. The Agreement is 'to promote and coordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin'.[44] The Agreement was signed by the Australian, NSW, Victoria, South Australian, Queensland and ACT governments.

2.61 The BSMS is a 15-year strategy, which guides communities and governments in managing salinity in the Murray-Darling Basin. The strategy sets targets for the river salinity of the Murray-Darling system and each major tributary valley.[45]

2.62 The objectives of the strategy are:

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42 Dr Ian Prosser, *Committee Hansard*, 6 September 2005, p. 29.

43 The CRC Program is administered by the Department of Education, Science and Training. The program links researchers with industry encouraging a practical and commercial focus in R&D endeavours.

44 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment A, p. 1.

45 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment A, p. 1.

- maintaining the water quality of the shared water resources of the Murray and Darling Rivers;
- controlling the rise in salt loads in all tributary rivers of the Murray-Darling Basin;
- controlling land degradation and protecting important terrestrial ecosystems, productive farm land, cultural heritage and built infrastructure; and
- maximising net benefits from salinity control across the Basin.[46]

Land & Water Australia

2.63 Land & Water Australia is a statutory research and development corporation in the Australian Government Agriculture, Fisheries and Forestry portfolio. It is responsible for 'research and development (R&D) aimed at the productive and sustainable management of the land, water and vegetation resources underpinning Australia's primary industries and regional communities'.[47]

2.64 Land & Water Australia's principal contribution to salinity management was its involvement in the National Dryland Salinity Program (discussed below). However, it continues to contribute to salinity management through:

- hosting the National Land and Water Resources Audit, which invests in data collection of salinity and other NRM trends
- Managing the National Knowledge Brokering for Regional NRM Project (discussed in Chapter 5)[48]

National Dryland Salinity Program

2.65 The National Dryland Salinity Program (NDSP) ran between 1993 and 2004. The program was managed by Land & Water Australia in partnership with Australian and state government agencies, CSIRO, the Murray-Darling Basin Commission and industry research and development corporations.

2.66 The NDSP provided a national forum for awareness raising, and knowledge generation and exchange, bringing together many of Australia's leading hydrogeologists, soil scientists, agronomists, economists, social scientists and policy advisers.[49]

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46 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment A, p. 2.

47 Land & Water Australia, *Submission 26,* p. 1.

48 Land & Water Australia, *Submission 26*.

49 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment A, p. 4.

2.67 The NDSP ran over two five-year phases. During this time approximately 50 research projects were commissioned, coordinated and managed, with an investment value of almost $25 million. In the final year of the NDSP (2003-04) the findings of these projects were pulled together to create the *Managing Dryland Salinity in Australia Resource Kit*. [50]

2.68 The NDSP and the NDSP products are considered in more detail in Chapter 5.

Cooperative Research Centre (CRC) for Plant-based Management of Dryland Salinity

2.69 The CRC for Plant-Based Management of Dryland Salinity is a national organisation linking over 300 researchers and 11 industry partners across four states (WA, SA, Victoria and NSW).[51] The CRC works with the CRC for Australian Weed Management, CRC for Landscape Environments and Mineral Exploration, Land & Water Australia, CRC for Catchment Hydrology, Meat and Livestock Australia, Australian Wool Innovation, the Grains Research and Development Corporation and federal, state and territory agencies.

2.70 The CRC focuses on the interaction between the natural and agricultural ecosystems with the aim of providing new plant-based land use systems that reduce the economic, environmental and social impacts of dryland salinity.[52]

2.71 Some examples of research programs underway include:

- Sustainable Grazing from Saline Lands – researching, refining and demonstrating the scope for profitable livestock enterprises on salt affected land;
- Perennial Pasture for High Rainfall Zones – developing, testing and demonstrating new plant-based systems that are profitable and reduce off-site impacts, especially recharge to groundwater;
- Ecosystems Function in Recharge Zones – increasing understanding of water management in natural ecosystems to create the scientific fundamentals for developing plant-based solutions to dryland salinity; and
- FloraSearch – builds on the WA Search project investigating new products and industries from Australian native woody perennial plants to improve

50 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment A, p. 4.

51 CRC for Plant-Based Management of Dryland Salinity Website, www.crcsalinity.com/aboutus/index (accessed 2 March 2006).

52 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment A, p. 4.

sustainability of farming practices in the more challenging low rainfall zones where salinity is a more intractable problem.[53]

'Science Overcoming Salinity': House of Representatives Report[54]

2.72 On 18 August 2003, the Minister for Science, the Hon. Peter McGauran MP, referred to the House of Representatives Standing Committee on Science and Innovation an inquiry into the 'Commonwealth's role in managing and coordinating the application of the best science in relation to Australia's salinity programs'.[55] The Committee was asked to give particular consideration to the:

a) use of the salinity science base and research data (including the development of new scientific, technical and engineering knowledge) in the management, coordination and implementation of salinity programs;

b) linkages between those conducting research and those implementing salinity solutions, including the coordination and dissemination of research and data across jurisdictions and agencies, and to all relevant decision makers (including catchment management bodies and land holders); and

c) adequacy of technical and scientific support in applying salinity management options.[56]

2.73 The inquiry did not focus on the causes of salinity, but rather sought to determine whether the best and most up-to-date science was being applied to individual problems, and whether effective coordination was in place so that the science made it 'down to the ground'. The Committee reported its findings in May 2004 and made twenty-four recommendations.

2.74 This section provides a summary of the House of Representatives' *Science Overcoming Salinity* Report. The recommendations from the House of Representatives Report are contained in Appendix 4 of this report.

2.75 In Chapter 2, the report examined the major national programs aimed at addressing salinity: the National Action Plan for Salinity and Water Quality (NAP);

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53 Taken directly from the Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment A, pp 4-5.

54 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004.

55 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, p. xii.

56 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, p. xii.

the Natural Heritage Trust (NHT); and the National Landcare Program (NLP). Also examined were strategies to address salinity in the Murray-Darling Basin and a number of state and local government initiatives. In examining these programs four key issues of concern were identified.

2.76 First, it was found that the architecture of the NAP:

- Inhibited national research coordination;
- did not have a charter to fund salinity research;
- had geographic gaps by focussing on only 21 regions;
- excluded industry participation and marginalised state agency involvement;
- rendered achievement of targets under the Murray-Darling Basin Salinity Management Strategy vulnerable; and
- lacked a rigorous scientific basis for the allocation of funds to regions.

2.77 Second, the report highlighted a failure to incorporate key research findings into salinity programs and the mistaken presumption that economically viable solutions were available for widespread adoption.

2.78 Third, it was found that the Australian Government's science investments neglected research into new salinity management methods and technologies. This was evident in both inadequate support for R&D into new salinity management methods and technologies and poor coordination between NAP-related research agencies and state and regional activities.

2.79 Fourth, there was concern that region-based planning and delivery of NRM programs would introduce additional complexity and fragmentation into the salinity research effort and that this may be exacerbated by limitations in the capacity of some regional bodies.

2.80 The report noted considerable variation across regional bodies in the uptake of science. The Committee recommended that regional planning, investment strategies and on-ground works be informed by the best available science and that regional bodies and land managers be adequately supported to use and incorporate science into their planning and investment activities (See Appendix 4, recommendation 1).

2.81 Chapter 3 of the report provides an overview of the nature of the salinity problem and examines alternative scientific perspectives on the sources of salt, salinity processes, the extent of the salinity problem and the veracity of some public sector research and audits.

2.82 The report noted that while the precise extent of salinisation is unclear, 5.7 million hectares of agricultural and pastoral land were estimated to have a high potential for developing salinity and that two million hectares of agricultural land were currently showing signs of salinity. The effect of salinity in urban areas was also canvassed.

2.83 The costs imposed on landholders, governments and residents of rural towns as a result of salinity on infrastructure, water quality, productive land, bio-diversity, remnant vegetation and conservation reserves was identified as significant. The following estimated figures were reported:

- the loss in profits for the agricultural sector in Western Australia - estimated at between $80 and $260 million per year
- the cost of dryland salinity in eight tributary valleys of the Murray-Darling Basin - approximately $247 million per year
- the cost of salinity to consumptive users of River Murray water - totals $47 million per year
- in Wagga Wagga, the damage to infrastructure in the town would amount to $180 million over 30 years, with some residents already spending up to $20 000 to repair their homes.

2.84 Chapter 4 reviews the agencies and programs whose research efforts constitute the 'science base and research data' to address salinity at the national level. The chapter identifies that a wealth of salinity research has been undertaken by a range of Australian Government funded agencies and programs, including: national science agencies, Cooperative Research Centres, Research and Development Corporations (RDCs), the National Dryland Salinity Program (NDSP), the National Land and Water Resources Audit, and universities. Further, it identifies an array of research products and management tools that have been developed.

2.85 However, the Committee found a lack of coordination and consolidation of these research products and management tools. It identified the need for a comprehensive audit of the Australian Government investment in salinity research to: map the salinity science base and management tools currently available; identify critical research gaps; and assist in bringing greater coherence to the range of science investments for salinity and, potentially, improve their effectiveness (see Appendix 4, recommendation 2).

2.86 Chapter 5 describes the coordination of salinity research at national and state levels, the challenges for research coordination in the new NRM environment and institutional proposals for improved coordination. Evidence reviewed in this chapter suggests that there are benefits for salinity R&D to be nationally coordinated. The reasons for this were outlined as follows:

- the structural changes ushered in with the NAP, notably the devolution of NRM responsibilities to regions and the fragmentation of efforts at the national level;
- the perhaps unavoidable complexity of salinity research efforts across a large number of agencies and programs, which need to be effectively coordinated—now more than ever;
- to link research providers and their products with CMOs, land managers and others undertaking on-ground works;

- to identify the R&D issues of national significance, ensure they are adequately addressed and avoid duplication;
- to maintain the momentum developed through the NDSP in R&D and extension; and
- to better coordinate research programs with state and territory salinity strategies, so as to avoid overlap between governments at different levels.[57]

2.87 The report highlighted the then imminent closure of the National Dryland Salinity Program (NDSP) and noted that the NDSP served a unique function, which would be missed if discontinued. Consequently, the Committee argued that the role of the NDSP be continued and its functions expanded to address other relevant matters, including irrigation and urban salinity (see Appendix 4, recommendation 3).

2.88 Chapter 6 canvasses the adequacy of the science base, research needs and funding. The chapter reinforces findings in earlier chapters that, given the volume of salinity research that has been undertaken to date, the necessity for significant additional research was not an issue. However, the need to fund on-ground works and address barriers to the adoption of existing research was identified as an immediate priority.

2.89 The report outlined several salinity research needs as follows:

- additional basic research, including into the sources of salt and salinisation processes;
- improvements in groundwater mapping and monitoring methods that can be used and responded to by land managers and CMOs;
- improvements in modelling techniques to provide more useful guidance on targeted responses, rather than widespread landscape change responses;
- better understanding of the effectiveness of different engineering solutions for treating rising groundwater levels, and improving design of future engineering options (for example, to deal with saline effluent from groundwater pumping);
- better understanding of the impact of salinity on freshwater environments, biodiversity and the relationship between landscape and waterscape processes;
- intensification of urban salinity research, particularly pertaining to assessment and risk evaluation, options for treatment and management and development of appropriate building codes;
- intensification of research into vegetative solutions, including perennial plant-based systems for recharge and discharge systems;

57 Taken directly from the House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, p. xxxvi.

- development of technologies for making productive use of salinised land and water resources, with specific emphasis on generating marketable products and industries;
- combined systems research into multiple benefits from perennial vegetation, in particular biodiversity, carbon sequestration and aquatic systems;
- socio-economic analysis to improve resource allocation and better understand constraints to the widespread adoption of technologies;
- developing innovative policy instruments to deal with the diversity of management regimes required to address salinity; and
- encouraging the emergence of new industries and environmental management system frameworks for existing industries that will increase the adoption of salinity management technologies as they develop.[58]

From this analysis several recommendations were made.

2.90 The Committee noted that the arrest of salinity requires substantial land use change, which will only be achieved through the development of commercial crops and new industries. The Australian Government's calls to encourage commercially-driven tree production systems, including the development of environmental markets, and to ensure that regional bodies introduce industry development planning into their NRM planning and R&D funding prioritisation processes was reiterated and a recommendation made to this effect (see Appendix 4, recommendation 5).

2.91 Chapter 6 also discussed the effects of urban salinity and recommended the need for the development of technologies to address urban salinity, including salinity assessment and risk evolution methods and options for treatment and management (see Appendix 4, recommendation 6).

2.92 The need for multidisciplinary and interdisciplinary research in order to address the silo and specialisation approaches to both research and resource management was recommended (see Appendix 4, recommendation 7). The report noted that this specialisation clashes with the needs of landholders, who must manage a multitude of themes simultaneously and integrate knowledge across a range of disciplines. It was acknowledged that landholders require knowledge and tools that enable them to address the interplay between resource degradation issues.

2.93 Funding for nationally coordinated salinity research was highlighted. The Committee recommended that the Australian and state governments make provision within the National Action Plan for Salinity and Water Quality for the establishment of a salinity research and development fund, to finance research that is of national or state-wide significance, beyond the scope of individual regional bodies. Further, it was

58 Taken directly from the House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, pp 168-170.

advised that the allocation of the pooled research funds have regard for the research needs of regional bodies and the research priorities identified in the report (see Appendix 4, recommendation 8).

2.94 The Committee recommended that the Australian Government encourage Research and Development Corporations to invest more substantially in research for sustainable land use systems and in the development of new salinity technologies (see Appendix 4, recommendation 9).

2.95 In order to facilitate greater regional body involvement in research at the regional level, the Committee recommended that, in cooperation with the states, the Australian Government: identify and remove impediments for regional bodies to undertake or commission research, and encourage regional bodies to support research activity as part of their investment strategies; provide incentives for greater collaboration between regional bodies to support research of cross-catchment benefit; and provide an appropriate degree of support to evaluate tenders and contracts let at the regional level (see Appendix 4, recommendation 10).

2.96 Chapter 6 also outlines the need for private sector investment in salinity research (see Appendix 4, recommendation 11) and the need for governments to encourage the development of industry capacity in salinity research and development through the open tendering of public research funds (see Appendix 4, recommendation 12).

2.97 Chapter 7 reviews the Australian Government's data collection, management and retrieval arrangements and outlines a number of concerns with regard to the collection and management of salinity data. Several issues were highlighted including:

- the difficulties associated with accessing data held by individual researchers, research organisations and government agencies;
- the need for nationally consistent data measurement and collection standards across regions, states and other jurisdictions;
- the need to ensure data is maintained appropriately;
- the lack of data upon which to make informed decisions; and
- the lack of certainty over the long-term funding for the collection of salinity data.

2.98 The chapter canvasses options for improving coordination and retrieval of data and describes the Australian Government's initiatives aimed at reducing the problems associated with data management. In particular the National Land and Water Resource Audit is reviewed, as is a range of initiatives at the state and territory level. While the Committee found that the Australian Government played a vital role in the management of NRM data, problems persist. As a result, it was recommended that governments expedite the development of data management systems that are standardised, integrated and accessible (see Appendix 4, recommendation 13).

2.99 Further, the Committee recommended that with the increased involvement of regional bodies in data collection, the Australian Government increase efforts to equip managers of regional projects with the requisite skills for data management (see Appendix 4, recommendation 14).

2.100 Chapter 7 also discussed mapping technologies, with the Committee noting that mapping technologies may perform an important role in salinity management.

2.101 The final chapter of the report – Chapter 8 - reviews the adequacy of the technical and scientific support for land managers who implement salinity management options. In particular the chapter is concerned with extension services and the effectiveness of current arrangements for the transfer of information.

2.102 As in previous chapters, the Committee found that there was a need to consolidate information to build a national database of interpretative material, scientific research and data relating to salinity and its management (see Appendix 4, recommendation 15).

2.103 The Committee found that the success of salinity management depends on the commitment and actions of individuals and community groups, in particular regional bodies. Good face-to-face extension with experienced and trusted extension staff was found to lead to a more rapid and widespread adoption of new technologies and management options. Therefore, the Committee recommended that government agencies and industry groups enhance their support for face-to-face extension services (see Appendix 4, recommendation 16). Further, it was recommended that relevant state government agencies compile and publish a state-by-state manual of viable salinity management options, to assist extension staff and land managers (see Appendix 4, recommendation 17).

2.104 The Committee noted that state and territory governments were withdrawing from the provision of extension services in their traditional form and urged a review of this issue, with particular regard to: the employment conditions of extension officers; their potential career pathways; and the adequacy of the training provided for officers to ensure their knowledge of technical, scientific and policy issues, relating to NRM and in particular salinity, is current and comprehensive (see Appendix 4, recommendation 18).

2.105 The lack of comprehensive data on the Australian Government's role in the provision of salinity extension programs was raised as an issue. Consequently, the Committee recommended that governments undertake an audit of the national, state and regional extension services available for salinity management, and natural resource management more generally (see Appendix 4, recommendation 19).

2.106 Chapter 8 also examined the National Landcare Program and found that Landcare activities are vital to the transfer of information on salinity and its management. While acknowledging reservations about Landcare’s ability to facilitate sufficient land use change in its current form, the Committee suggested that this does not detract from Landcare’s role in the communication and dissemination of

information about salinity. Further, it simply highlights the need for better management options to be developed by researchers, and the strengthening of the mechanism by which information is transferred from researchers to extension providers.

2.107 The Committee recommended that the effectiveness of NLP facilitators in the design and implementation of regional plans be assessed in order to clearly delineate their role and avoid duplication with other extension services (see Appendix 4, recommendation 20).

2.108 In examining investments under the National Action Plan and the Natural Heritage Trust, the Committee reported that a number of facilitators had been employed at national/state and regional/local levels. However, the Committee recommended a need to enhance the capacity of extension staff through suitable employment conditions, career pathways and adequate training (see Appendix 4, recommendation 21).

2.109 At a regional level, the Committee reviewed the role and ability of regional bodies to provide extension services. While many regional bodies were well positioned to provide these services, the Committee found serious concerns about the capacity of many others to adequately extend salinity research and other relevant NRM information. The Committee therefore recommended that additional support be provided to regional bodies (see Appendix 4, recommendation 22).

2.110 The Committee proposed involving scientists in the direct extension of their research findings as this has the dual function of ensuring (a) findings are correctly interpreted; and (b) the priorities of land managers are relayed back to researchers. The Committee recommended that the Australian Government support the establishment of a national annual forum on salinity policy, research and management under the umbrella of the NAP for a wider range of interested participants (see Appendix 4, recommendation 23).

2.111 Finally the Committee also saw a role for the private sector in the provision of extension services and recommended that impediments be removed to facilitate this (see Appendix 4, recommendation 24).

Action taken against report recommendations

2.112 The Government response to the House of Representatives Report was published in December 2005.[59] The response and evidence received on action taken against the recommendations of the House of Representatives Report are discussed

59 The Australian Government, *Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report – Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

within the context of each of the following chapters. A brief summary is then outlined in the concluding chapter of this report.

2.113 Throughout the remainder of this report, the House of Representatives Standing Committee on Science and Innovation's report, *Science Overcoming Salinity*, will be referred to as the House of Representatives Report.

Chapter 3

National programs: achieving outcomes?

> The Salinity program in one of its various forms has provided resources to give us hope that we can beat the salinity degradation of farmland and the loss of other rural assets and provides a chance for farmers, scientists and neighbours to work together to turn ideas into action that can at least mitigate the long term effects of salinity and at most develop saline groundwater as a productive resource.
>
> Although this has not been a long-term project it does suggest the success of federal programs that seek to reduce the extent and economic impact of salinity in the Australian environment. Whether or not tangible success has yet been achieved, the program provides hope for success, opportunities to achieve that success and a recognition that the government is participating to helping solve our problems with salinity.[1]

Overview of national programs

3.1 As discussed in the previous chapter, the key national programs initiated by the Commonwealth to tackle salinity and other natural resource management issues are the National Action Plan for Salinity and Water Quality (NAP), the Natural Heritage Trust (NHT) and the National Landcare Program (NLP).

3.2 The NAP is specifically directed at improving salinity and water quality conditions in the Australian environment and is the only program with the stated goal to combat salinity and water quality degradation problems across the nation. The NHT is focused on the protection and sustainable use of Australia's land, water and marine resources. The NLP's focus is on ensuring sustainable agriculture practices and providing support to landholders at the local level.[2]

3.3 These programs address salinity problems at various levels. The NAP and the NHT support programs at the regional scale characterised by relatively large level investments within the priority regional areas. The NLP provides support to landholders at the local level to undertake salinity mitigation work consistent with the priorities in the regional plan.[3]

Goal of the NAP

3.4 The goals of the NAP are to:

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1 Mr Robert Cordover, *Submission 3*, p. 1

2 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, p. 1.

3 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, p. 1.

- Motivate and engage regional communities to use coordinated and targeted action.
- Prevent, stabilise and reverse trends in dryland salinity affecting the sustainability of production, the conservation of biological diversity and the viability of infrastructure.
- Improve water quality and secure reliable allocations for human uses, industry and the environment.

3.5 Key program design features of the NAP include:

- Targets and standards for natural resource management;
- Integrated catchment/regional management plans developed by the community and accredited jointly by the relevant governments;
- Capacity building for communities and landholders to assist them to develop and implement integrated catchment/regional plans, together with the provision of technical and scientific support and engineering innovations;
- An improved governance framework to secure the Commonwealth-State/Territory investments and community action in the long term, including property rights, pricing and regulatory reforms for water and land use;
- Clearly articulated roles for the Australian, State/Territory and local governments and the community to provide an effective, integrated and coherent framework to deliver and monitor implementation; and
- A public communication program to support widespread understanding to promote behavioural change and community support.[4]

Australian National Audit Office audit of NAP[5]

3.6 In 2004 the Australian National Audit Office (ANAO) undertook an audit to examine and report on the planning and corporate governance for the new regional delivery model of the NAP program, jointly administered by the Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage. In developing the audit methodology, the ANAO took into account the six proposed elements to achieve lasting improvements for the NAP. These included: targets and standards; integrated management plans for catchments; capacity building; improved governance framework; clearly articulated roles; and a public communication program.

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4 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, Attachment B.

5 The findings of this report are discussed throughout the following sections of this chapter and draw directly from material published in the Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005.

3.7 The audit methodology was based on a review of files and records along with interviews with staff from the federal agencies involved in implementing the program Submissions were also sought from state and territory agencies and interested parties.[6]

3.8 The ANAO audit found that the NAP was viewed, in the main, as a well-designed program. However, the report made six recommendations. The findings of this report are discussed in the relevant sections later in this chapter.

Objectives of NHT

3.9 The NHT is focused on the protection and sustainable use of Australia's land, water and marine resources. The objectives of the NHT are to increase:

- Biodiversity conservation through the protection and restoration of terrestrial, freshwater, estuarine and marine ecosystems and habitat for native plants and animals.
- The sustainable use of natural resources by managing Australia's land, water and marine resources so as to improve the productivity and profitability of resource based industries.
- Community capacity building and institutional change through support for individuals, landholders, industry and communities with skills, knowledge, information and institutional frameworks to promote biodiversity conservation and sustainable resource use and management.[7]

3.10 Investments under NHT provide a broader coverage of land and water issues than the NAP by also addressing biodiversity and the sustainable use of natural resources. The NHT uses the regional delivery framework of the NAP to provide targeted investments to meet its goals. In addition, the NHT provides investments in activities that address state-wide and national issues. An example of this is the funding of the National Land and Water Resources Audit to provide a baseline of information to assess the effectiveness of land and water policies together with related programs.[8] In a submission to the inquiry the Department of the Environment and Heritage set out the key program design features of NHT which included three major funding components:

- National/state investment in activities that have a broadscale, rather than a regional or local outcome, addressing activities occurring at a state-wide and national level;
- Regional delivery based on the model adopted for the NAP; and

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6 Australian National Audit Office, *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17 2004-2005, p. 28.

7 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, p. 6.

8 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, p. 6.

- Local level investment through the Australian Government Envirofund, which invests in small-scale community group based activities under $30,000.

3.11 Like the NAP, the regional component of the NHT allows for the provision of foundation funding to establish regional processes and priority action funding for high priority projects. Unlike the NAP, the NHT regional component includes a regional competitive component, which is nationally administered and requires no matching funding.[9]

Goals of the NLP

3.12 The NLP's focus is on ensuring sustainable agriculture practices and providing support to landholders at the local level. The investments under the NLP are consistent with the priorities identified in the accredited regional plans and investment strategies. The goals of the program are to assist in:

- Developing community, industry and governmental partnerships in the management of natural resources in Australia.
- Establishing institutional arrangements to develop and implement policies, programs and practices that will encourage sustainable use of natural resources in Australia.
- Enhancing the long term productivity of natural resources in Australia.
- Developing approaches to help resolve conflicts over access to natural resources in Australia.[10]

3.13 There are two components of the NLP: a community support component and a national component.

3.14 The following major conditions apply to NLP community support initiatives:

- Australian Government contributions are to be matched either in cash or in-kind by the States and Territories;
- Funding is to be directed to community and industry projects (including, where appropriate, local government).
- While payments are required to be made to the states, no project funding will be provided directly to State agencies.
- Where State agencies are involved in providing technical or other support, this will be determined by project proponents.

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9 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, Attachment B.

10 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, p. 7.

- Funding is to be provided for a portfolio of one-, two- or three-year projects with ongoing funding subject to progress and budget availability.[11]

3.15 The NLP National component includes the following elements:

- Landcare Support: This includes funding for the National Landcare Facilitator, Landcare Awards, capacity building projects and support for major workshops and conferences.
- Natural Resource Innovation: This includes grants to groups or individuals to investigate or test innovations that will contribute to improved NRM in primary production or processing.
- State Landcare Coordinators: This element provides national support for a network of state landcare co-ordinators to provide strategic direction and support for landcare and primary industry volunteer movements to participate in sustainable resource use and management.
- Sustainable Industry Initiatives: This includes investments in projects which assist industry to identify the NRM issues facing them nationally and provide the necessary frameworks and tools to assist addressing these issues, including information, training and best practice approaches to NRM.
- Priority National Projects: This includes funding for projects in areas of high priority identified by the Australian Government. This includes investments in targeted research to address gaps in sustainable farming systems and encouraging closer links between landholders and scientific organisations.
- Monitoring and Evaluation: This element provides funding for program evaluations and assessments in accordance with an established framework.[12]

Achievements under the national programs

3.16 The Committee was told that the goals of the three programs are long term. As discussed in Chapter 2, salinity is the result of complex interactions between biophysical and socioeconomic factors, which have taken considerable time to become evident in many landscapes[13] and, consequently, programs aimed at addressing salinity must utilise long-term approaches:

> The natural resource problems that confront Australia have developed over more than two hundred years of European settlement but the most pervasive impacts have only been broadly recognised in recent decades. National programs recognise that the task of repairing the natural resource base (where the benefits of so doing outweigh the costs) will take many decades

11 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, Attachment B.

12 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, Attachment B.

13 Centre for Salinity Assessment and Management, University of Sydney, *Submission 17*, p. 1.

> and that changes to the natural resource condition may not become immediately obvious during the program life.[14]

3.17 The Centre for Salinity Assessment and Management, at the University of Sydney, submitted that the national programs have not been in place long enough to assess their effectiveness:

> The time that has elapsed since the institution of these programs is too short to meaningfully assess their effectiveness as landscape remediation and management strategies.[15]

3.18 Similarly, the Local Government Association of Queensland noted that:

> In relation to whether the goals of national programs to address salinity have been attained, in Queensland at least, there has been insufficient time to demonstrate the program's effectiveness as a result of the current phase of planning and implementation.[16]

Support for the National Programs

3.19 A number of witnesses applauded the goals of the national programs. Dr Ian Prosser from CSIRO told the committee:

> The goals of the National Action Plan and the Natural Heritage Trust are laudable. They show continuous improvement in the way that salinity is being tackled in Australia. The central role of regional groups recognises that salinity occurs at a regional scale and recognises the need for priority setting. The framework of target setting and strategic investment plans has excellent potential, we believe, for addressing salinity in a much more effective way.[17]

3.20 The Pastoralist and Graziers Association submitted:

> These national programs are of great benefit as they provide a gateway for the provision of advice on salinity management options for land managers through Landcare officers, as well as funding support through NHT and NAP, so that farmers are able to perform on ground conservation activities.[18]

Raising public awareness and involving communities

3.21 While the effects of national programs may not become evident in the landscape for a number of years, some submitters argued that the national programs

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14 Land and Water Australia, *Submission 26*, p. 2.

15 Centre for Salinity Assessment and Management, University of Sydney, *Submission 17*, p. 1.

16 Local Government Association of Queensland, *Submission 8*, p. 1.

17 Dr Ian Prosser, CSIRO, *Committee Hansard,* 6 September 2005, p. 30.

18 Pastoralists and Graziers Association, *Submission 4*, p. 2.

have been very successful in raising public awareness to the threat and impact of salinity.[19] The Australian Conservation Foundation argued:

> The National Action Plan on Salinity & Water Quality has served at least one useful purpose: To draw community focus on dryland salinity as a major challenge to Australia's industry and environment, and one requiring a national effort.[20]

3.22 The Pastoralists and Graziers Association believe that Landcare and NAP have raised community awareness of salinity to the point where land managers now see salinity as a much wider problem, beyond their own fence line:

> Programs such as Landcare and NHT have increased the general awareness of salinity and prompted land mangers to think about salinity in the wider perspective beyond their own fence line. This has led them to adapt their own management practises in an attempt to achieve wider benefits. This is an important step that will lead to the ultimate fulfilment of the goals of these national programs.[21]

3.23 Significantly, the CSIRO argued that the national programs have also resulted in a greater take-up of salinity science and technology at the CMA planning level:

> The implementation of the National Action Plan/Natural Heritage Trust (NAP/NHT) has led to significant progress in the understanding at community level of the key processes that cause a deterioration in salinity and water quality as well as in the development of strategies and management practices to combat the land and water degradation resulting from them. It has also fostered a greater regional and community engagement in Natural Resources Management and considerable progress has been achieved in establishing processes to facilitate the uptake of science and technology in catchment management planning procedures.[22]

3.24 Whilst the Committee was encouraged by the CSIRO's comments, evidence to the inquiry suggested the incorporation of salinity science into the regional planning process is still significantly under-developed. This is discussed in more detail in Chapter 5.

3.25 As outlined above, the national programs all have the key goal of motivating and enabling regional communities to use coordinated and targeted action to address the problems of salinity and water quality. The Committee has taken evidence that suggests this is happening in a generally successful way. Mr Peter Baker from the Bureau of Rural Sciences told the Committee:

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19 Centre for Salinity Assessment and Management, University of Sydney, *Submission 17*, p. 1.

20 The Australian Conservation Foundation, *Submission 19*, p. 24.

21 Pastoralists and Graziers Association, *Submission 4*, p. 1.

22 CSIRO, *Submission 15*, p. 5.

> One of the things that has been very important with this whole process is that all of this is being done with community groups. By and large, all of these projects that you have seen have been driven by the community. We have not gone in and said: 'You've got a salinity problem. We're here to fix it.' We have gone in and talked to them to find out what they believe the problem is and how we can best address their problem. That has been a critical component.[23]

3.26 Clearly, the success of national programs, to a large degree, relies on communities and governments working together cooperatively. However, in a submission to the inquiry, the River Murray Catchment Water Management Board argued:

> … this is not a fait accompli. This situation needs to be maintained otherwise communities will not continue to donate their time. Ensuring the community remains motivated and is able to be part of the solution to this long term problem requires long term or, more appropriately, indefinite support.[24]

3.27 The need to provide appropriate support to build community commitment was also raised by the Centre for Salinity Assessment and Management at the University of Sydney:

> Public funds allocated to CMAs are unlikely to be sufficient to solve the whole problem in a catchment, but should be applied to help build ownership and capacity, and prime the process for developing project-based solutions that attract additional stakeholders.[25]

3.28 The River Murray Catchment Water Management Board went on to highlight the challenges faced in building the trust of the community in establishing effective working arrangements to tackle salinity and water quality problems:

- Perceived poor consultation or engagement in previous initiatives between Government and the community.
- Perceived lack of continuity in funding streams which results in winding back of programs, transition of staff and disconnection with community groups. When new funding streams become available and community groups are re-engaged, there is potential for community members to feel that their previous efforts have not been recognised. They can be easily frustrated by a process that may be asking them to, in a sense, re-invent the wheel and may be reluctant to donate their time again.
- Taking an active role in salinity and water quality management projects is not core business for many land-holders and they struggle to devote time to these

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23 Mr Peter Baker, Integrated Water Sciences, Bureau of Rural Sciences, *Committee Hansard*, 6 September 2005, p. 6.

24 River Murray Catchment Water Management Board, *Submission 45*, p. 1.

25 Centre for Salinity Assessment and Management, *Submission 17*, p. 2.

> activities. When growers do commit to being part of a project they can be easily overwhelmed by the amount of input that is requested from them subsequently. This needs to be carefully managed to ensure that effort and meaningful results are in balance and they don't become jaded by the process.[26]

3.29 In Western Australia the Committee heard that the success of national programs depended upon the capacity of individuals and the flexibility of solutions to ensure that set goals are achievable:

> Our observation, and in fact our analysis, is that there is still more to be done here. We need a reality check. If we run the policy instruments or options that are normally considered in an area like salinity, and that includes extension, incentives, penalties, engineering, regulation and so on, then we have to be confident that the options themselves can be adopted by those we are expecting to adopt it—that is, that it makes economic sense to do so, it is not causing other unintended consequences, and so on.[27]

Examining the process

3.30 The Committee took evidence from a range of government organisations, agencies, academics, CMAs and community members who were generally very supportive of the NAP, the NHT and the NLP. However, submitters identified a number of issues which they felt in someway diminished the effectiveness of these national programs. These are discussed below.

3.31 The Committee notes that the NAP and the NHT are currently being reviewed by the administering departments. A total of 10 reviews are being, or have been, undertaken spanning a range of NRM issues including: biodiversity outcomes; governance arrangements; salinity outcomes; sustainable agriculture; sustainable coastal, estuarine and marine environments; the facilitator network; the NHT bilateral agreements; the effectiveness of the Envirofund; and the national investment stream (as distinct from the regional investment stream).[28]

At February 2006, one of the reviews had been completed with the remaining nine due for completion between March and May 2006. As yet, a decision has not been made as to whether the review reports will be made publicly available.[29]

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26 River Murray Catchment Water Management Board, *Submission 45*, pp 1-2.

27 Mr Kevin Goss, Chief Executive Officer, CRC for Plant-Based Management of Dryland Salinity, *Committee Hansard*, 18 November 2005, p. 20.

28 Mr Gerry Smith, General Manager, Australian Government Natural Resource Management Team, *Estimates Hansard*, 1 November 2005, pp 177-178.

29 Mr Malcolm Forbes, First Assistant Secretary, Department of the Environment and Heritage, *Estimates Hansard*, 14 February 2006, p. 140.

Delays in signing the intergovernmental and bilateral agreements

3.32 Intergovernmental and bilateral agreements provide the basis for administering programs where there is a joint interest or involvement by different levels of government. Their purpose is to set out the objectives, administrative and accountability processes, and establish the respective roles and responsibilities of each level of government.[30]

3.33 The introduction of the regional delivery model has experienced delays due to intergovernmental tensions over these agreements. The ANAO Audit report of the NAP noted that negotiating bi-lateral agreements has taken a significant period of time, due largely to differences around policy and matched funding levels. In turn, this has had 'flow-on effects' for the rollout of the program.[31]

3.34 In a similar vein, the Pastoralists and Graziers Association of Western Australia noted that political inaction was responsible for the delay in NAP funding reaching the ground and that this has had a 'knock on' effect to the development of regional strategies:

> There has been little effect from the NAP in WA due to the WA Government delaying signing the bilateral agreement. There has also been a delay in the on ground use of these funds due to setbacks in the development of regional strategies and their associated investment plans, with the agricultural regions of WA awaiting approval of their investment plans and the rangelands yet to have their strategy submitted for accreditation.[32]

3.35 The Western Australian Farmers Federation echoed these concerns over the bi-lateral negotiation process within WA:

> Federal and State Government political posturing over funding arrangements for the National Action Plan for Salinity and Water Quality (NAP) and National Heritage Trust (NHT) has resulted in the State falling behind other States in the uptake of NAP and NHT funding, however, with these issues now in the past, WA Farmers is keen to see funding from federal programs “hit the ground"…
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> The late start to the most recent round of funding under federal government programs in WA makes it difficult to comment on the success or failure as catchment management authority investment plans are either in the final stages of approval and/or early stages of implementation.[33]

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30 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 48.

31 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 18.

32 Pastoralists and Graziers Association, *Submission 4*, p. 1.

33 Western Australian Farmers Federation, *Submission 41*, p. 1.

3.36 Natural Resource Management South submitted:

> The different politics between Australian and Tasmanian Governments have rendered this unnecessarily complex and politics appears to have got in the way of good regional outcomes.[34]

3.37 The Australian Conservation Foundation argued that the multiplicity of government agencies involved in the bilateral agreements adds to the complexity and tensions in the implementation of these agreements at the community level:

> The NAP/NHT2 Bilateral Agreements are being put into practice by a plethora of state and federal agencies, often resulting in mixed messages to communities, and proving to be a source of frustration to many stakeholders. Governments are undoubtedly more or less cooperating in many areas of NRM as a result of the NAP/NHT2, but even so it seems that many stakeholders, including some government agency staff with whom ACF has consulted, are frustrated by the intergovernmental tensions that persist even now.[35]

3.38 All states and the Northern Territory have signed the bilateral agreement. The ACT agreement is still under negotiation.

3.39 In addition to concerns over the time taken to sign the bilateral agreements the Committee heard evidence which suggested that there was a need to fine-tune or streamline the agreement process. Minor variations to these agreements have to be signed off by four ministers. There is potential in this process for further lengthy delays in program administration. Mr Fishburn from the NSW Department of Natural Resources told the Committee:

> We have given some advice in that regard to ask, 'Is there any way we can become a little less bureaucratic in that regard and move those things through a little bit more cleanly—in other words, streamline them?' That was probably one of our major points of concern in trying to streamline some of the arrangements so that things could happen more quickly on the ground... But quite a number of [variations] have occurred, and we have found we have had to go back to the sign-off by the four ministers—which, as you can well imagine, takes a serious amount of time.[36]

3.40 The Australian Conservation Foundation submitted that no audit of party compliance with the Bilateral Agreements has yet been undertaken.[37] The Committee believes such an audit is timely. Further, the Committee believes that the audit process should include substantial community involvement, which would be convened on a state-by-state basis.

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34 NRM South, *Submission* 29. p. 2.

35 Australian Conservation Foundation, *Submission 19*, p. 22.

36 Mr Geoff Fishburn, NSW Department of Natural Resources, *Committee Hansard,* 14 October 2005, p. 11.

37 Australian Conservation Foundation, *Submission 19*, p. 22.

Delays in the accreditation process

3.41 As discussed in Chapter 4, under the IGA it was agreed that all regional plans would be required to undergo accreditation against nationally agreed criteria. It was initially intended that the national criteria would be developed by the Australian and state/territory governments by February 2001.

3.42 However, as reported in the ANAO audit of the NAP, the criteria for the accreditation of NRM plans were not endorsed until May 2002.[38] Coupled with the protracted time-frame for many regional bodies to develop their regional plans (discussed in Chapter 4), and the delays in signing the bi-lateral agreements discussed above, the Committee notes that the delays in developing and implementing the accreditation process may impact on the overall eight-year timeframe for the NAP.

Funding

3.43 The NAP was agreed in November 2000 as a joint initiative between the Australian Government and state and territory Governments, involving expenditure of $1.4 billion over the next seven years. The Australian Government's contribution was estimated at up to $700 million over this period with the states/territories matching this amount. The NAP is delivered jointly with the states/territories through regional bodies who are responsible for the natural resource management plans and investment strategies.

3.44 All regional strategies and investment plans are assessed and approved at a state level before funding is approved from the NAP and NHT programs. Each state has a Joint Steering Committee made up of Australian Government and state government representatives and in some states community representatives are members. This Joint Steering Committee is supported by a State Investment Committee (committee names may vary across the states) and in some states a technical advisory group as well.[39]

3.45 The NHT was set up by the Australian Government in 1997 to increase investment in environmental protection. Initially $1.25 billion was provided, supported by funding generated from the sale of Telstra. In the 2001 Federal Budget, the Government announced an additional $1 billion for the Trust, extending the funding for five more years. The Natural Heritage Trust received a further $300 million in the 2004 Federal Budget, extending the funding until 2007-2008 making it a $3 billion investment.

> The Australian Government has committed $3 billion in the Natural Heritage Trust (NHT) and the $1.4 billion National Action Plan for Salinity

38 Australian National Audit Office (ANAO), *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-05, p. 63.

39 Natural Resource Management Website, http://www.nrm.gov.au/state/index.html (accessed 21 March 2006).

> and Water Quality (NAP). These programs are underpinned by a partnership between all levels of government, and regional natural resource management (NRM) organisations.[40]

3.46 During the inquiry the Committee heard a number of concerns from land managers and CMA around issues of funding. Key issues included the need for longer funding cycles, certainty in continuation of funding and the need to ensure funds were better targeted. In Wagga Wagga Mr Robert Green highlight a number of these funding issues:

> One of the major worries in accessing funding—and I suppose you hear it across all walks of life and in all areas—is the guarantee of ongoing funding. We have a major issue here in this council area now of trying to fund existing programs, let alone take on new programs, and I think that is a fairly universal thing with local government. I think it would be universally accepted that this local regionalised action and regionalised funding is the way to go, and certainly through the catchment management authorities and local government. If we look at those 220 that I referred to, probably half a dozen are the same size as Wagga. Wagga has the staffing to be able to handle things, but if you take a little council like Coolamon where is the expertise? The engineer is probably the authority on natural resource management, and some people would say that is a bit of a conflict of interest. How do we actually get the expertise, the people and whatever in those smaller council areas to generate on a pro rata scale what we have done in Wagga?
>
> It seems to me that, if we have a 15-year strategy, we should be pre-empting and funding programs for 15 years. Politically that does not sit too well, but we need those big funds… It is a huge problem. The funding is inadequate, and it is going to be an increasing problem right across the country and certainly in this catchment.[41]

Longer funding cycles for programs

3.47 Regional investment strategies are the key financial mechanism for enabling regions to address salinity and water quality issues. They are designed to be based on the accredited regional NRM plans that provide much of the scientific and economic rigour for guiding investment priorities. The original intention of the NAP was to have three-year investment cycles with payments made on the achievement of milestones.

3.48 However, the ANAO report found that funding commitments to June 2004 from investor agencies have tended to be for relatively short, 12-18 month periods.[42] Short funding cycles were introduced as an interim measure to accommodate delays in

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40 Department of Agriculture, Fisheries and Forestry and the Department of Environment and Heritage, *Submission 24*, Attachment I, p. 3.

41 Mr Robert Green, *Committee Hansard*, 10 February 2006, p. 10.

42 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 73.

accrediting regional plans. Short funding cycles was highlighted in a significant amount of the evidence as being an issue of concern. The Committee heard evidence which suggests that these short funding cycles are detrimental, as salinity is a long-term issue that needs long-term programs:

> Salinity is a long term issue, and the perception that short term funding will "fix" the problem is unrealistic.[43]

3.49 The Australian Conservation Foundation made a broader point about the impacts of short program time-frames on investment security and community goodwill:

> An additional problem with NRM programmes appears to be the uncertainty generated by their usually short time-frames, compounded by Australia's relatively short election cycle and the fact that federal election timing is subject to Government discretion. Both community goodwill and investment security can be compromised.[44]

3.50 The inability of CMAs and other regional bodies to retain experienced staff because of the uncertainty of funding their position from year to year was raised by a number of witnesses. In South Australia the Committee was told:

> I think that is the same across the nation. I heard the chairs of all the NRM bodies raising that issue as well. That is because of the three- to five-year funding cycles, and holding good staff in three- to five-year funding cycles is an issue. In the research field, it has been an issue for a long time. It is a matter of the way we do our budgeting and fund these programs.[45]

3.51 The ANAO audit report of the NAP considered that given the progress in establishing regional structures and investment strategies, there was now scope to seek a commitment from the remaining states/territories and regions for three-year investment cycles as originally intended. Additionally, the report noted that the focus of programs on large scale, strategic initiatives and the five to ten year time frames lends itself to longer-term funding. The ANAO recommended that:

> … the Departments of Agriculture, Fisheries and Forestry and Environment and Heritage, consult with the relevant State and Territory agencies, and regional bodies, as part of a concerted effort to introduce three year funding arrangements (as originally proposed) as soon as practicable.[46]

3.52 The Committee notes that the two Departments responded to this recommendation explaining that delays in introducing three-year funding cycles were

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43 Central West Catchment Management Authority, *Submission 9*, p. 2.

44 Australian Conservation Foundation, *Submission 19*, p. 24.

45 Mr Roger Wickes, South Australian Department of Water, Land and Biodiversity Conservation, *Committee Hansard,* 16 November 2005, p 8.

46 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 73.

due to the need for regional bodies to strengthen their financial and governance capacity before taking on the task of managing large funds. The Departments will continue to work with state agencies to encourage regions in longer-term planning and development of three-year investment strategies.[47]

3.53 The Australian Conservation Foundation went further to argue the need for funding cycles longer than three years:

> By securing a seven year (initially) programme (the NAP), and later bringing the timing of both the NHT2 and the National Landcare Program into line with the NAP, the Australian Government has probably taken the edge off the problem. However, given the sorts of timeframes needed for many environmental investments to show real benefits, for research and adaptive management to yield results, as well as for diverse regional stakeholders to reach accord on NRM directions and decisions, government would do well to seriously consider a longer period again. Bipartisan agreement on programme duration and basic elements of design would also help to generate a sense of security for the community and industry.[48]

Funding security beyond 2008

3.54 Funding under NAP and NHT runs until 2007-08. As yet no decision has been made as to funding arrangements beyond this date. However, the Committee was told that the NRM Ministerial Council has commenced a process to examine what will happen after the 2007-08 fiscal year. The federal minister has appointed a reference panel but the process will need joint Commonwealth-state reassessment.[49]

3.55 In South Australia the Committee was again told that the issue of NAP funding beyond another 18 months to two years was currently being addressed through the ministerial council environment. Mr Roger Wickes from the South Australian Department of Water, Land and Biodiversity Conservation told the Committee that ultimately the decision of funding beyond 2007-08 was a political one:

> We are looking at what the forward programs might be and we are on a committee looking at that. It would be good for the community if we had some ideas on those over the next 12 months because of the forward budgeting, particularly with the NRM group plans. But I guess that is for our political masters to decide.[50]

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47 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 103.

48 Australian Conservation Foundation, *Submission 19*, pp 24-25.

49 Mr Fred Tromp, Director, NRM and Salinity, Department of Environment, Western Australian Government, *Committee Hansard,* 18 November 2005, p. 10.

50 Mr Roger Wickes, South Australian Department of Water, Land and Biodiversity Conservation, *Committee Hansard* 16 November 2005, pp 9-10.

3.56 The Committee heard evidence that highlighted the need for continuity of funding for the successful regional delivery of NRM programs through the NAP and NHT, especially in regard to the maintenance and long-term development of community capacity.

> The issue of funding continuity is certainly a key issue there… it is a very long-term problem and there are concerns that the major plan which is driving us in the country does not seem to be funded on a continuing basis; it has been an accident of circumstance, of sale of assets and so on. There is a need, certainly, to have greater continuity of funding guaranteed at some level.[51]

3.57 The North Central CMA in Victoria supported the argument that the success of current national programs will depend to a large degree on the extension of current funding and government attention to this matter:

> The future success of salinity management in Victoria depends on further funding from initiatives such as NAP, NHT and State investment. The scale and significance of the issue is massive and therefore a significant and sustained investment is justified. The year 2007-08 is the last year of the NAP, and the issue of future funding urgently needs the attention of Governments.[52]

3.58 NRM South, Tasmania, highlighted the fact that the benefits of funding under NAP may only become apparent after a second or extended period of funding:

> Salinity and its manifestation in the landscape are complex issues and require long-term and regionally relevant solutions. NAP is an important program, which should be extended if it is to achieve its potential. Indeed, it is probable that in Tasmania, the real benefits from investment in salinity mitigation will only be felt during a second term for the program.[53]

3.59 Along these lines, Mr Watts from the Australian Conservation Foundation commented, 'this is not a problem that will go away in a hurry' and argued there is a need for commitment in the long-term. He noted that compared with other areas of key national interest, public investment in salinity and environmental issues more broadly 'rate second or third'.[54]

3.60 The issue of consistent funding levels over time to support community involvement was raised by Mr Daniel Meldrum from the River Murray Catchment Water Management Board:

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51 Mr Fred Tromp, Director, NRM and Salinity, Department of Environment, Western Australian Government, *Committee Hansard*, 18 November 2005, p. 8.

52 North Central Catchment Management Authority, *Submission 39*, p. 2.

53 Natural Resource Management South, *Submission 29*, p. 2.

54 Mr Corey Watts, Acting Manager, Land and Water Program, ACF, *Committee Hansard*, 28 February 2006, p. 26.

> The way the national action plan has unfolded is that we had quite high investment in the early years. In the last few months we have developed the draft investment strategies for 2006-08, and the investment is dropping off quite significantly. One of the consequences of that is that the community involvement that built up in the first few years of having access to the funding is now under threat. As the funding drops off, the ability to continue the same degree of support with those community groups is diminished. I think we need some degree of consistency over a period of time. We are talking about a long-term problem that needs to be managed well over a number of years, not just in fits and starts.[55]

3.61 The issue of varied levels of funding over the funding cycle was also made by Mr Greg Bugden of the Murrumbidgee CMA:

> We currently have three years of funding which we have to disburse in 18 months and we have been told that the NAP funding may not be as great in the year 2007-08. There is going to be a reduction of funding. So we are getting these peaks and troughs. We need to flatten it out so we can plan. We have contractual arrangements with the two land and water management plans which are looking at accelerating funding in that critical period to catch up in relation to previous funding that was not allocated.[56]

3.62 Councillor Robartson from the Western Australia Local Government Association argued the need for continued funding to provide program security to local government:

> [T]he association calls for long-term commitment from the Australian and state governments in relation to continuing the funding of NRM programs and their delivery via the regional model. These sorts of commitments are likely to provide security for local government involvement.[57]

3.63 The Regional Implementation Working Group for NRM's report *Regional Delivery of NRM – Moving Forward* of March 2005 also argued the need for a smooth transition between program cycles in order to maintain the momentum established under the current NHT and NAP funding period:

> Experience in applying delivery arrangements for the National Action Plan and the second stage of the Natural Heritage Trust has underlined the importance of early planning to achieve a smooth transition between programs. With NAP and NHT funding concluding in 2007-08, replacement program arrangements and funding need be clear by the end of 2005-06 to maintain momentum. To allow sufficient time for policy consideration, program design and community and stakeholder

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55 Mr Daniel Meldrum, Senior Project Officer, Salinity and Water Use, River Murray Catchment Water Management Board, *Committee Hansard*, 16 November 2005, p. 52.

56 Mr Gregory Bugden, Murrumbidgee Catchment management Authority, *Committee Hansard*, 10 February 2006, p. 27.

57 Councillor Clive Robartson, *Committee Hansard*, 18 November 2005, p. 76.

> consultation, governments, regional bodies and the community need to consider the shape of future NRM programs during 2005.[58]

3.64 Mr Malcolm Forbes from the Department of the Environment and Heritage told the Committee that the Government was 'acutely aware' that the NAP and NHT2 concluded in June 2008 and is actively looking at future arrangements.[59]

3.65 During Additional Estimates in February 2006, the Minister the Hon. Senator Ian Campbell indicated that the continuation of NAP and NHT was currently being examined by the Government through a number of reviews. As noted above, 10 reviews of different aspects of NRM are currently underway or completed. The Minister highlighted the Keogh review:

> [The Keogh Report] in particular is going to provide advice to the government which will feed into decisions on the whole structure of NRM and the NAP. I think some people are saying to put the two programs together and others want to keep them apart. Others are saying to scrap the whole lot and start again. It will be a big decision. That advice will feed into that decision making. I am expressing some reservations because they are incredibly important decisions. They are great programs… I think one of the most important decisions I and the government will make in the next 12 months is how we will deliver that huge amount of money effectively. It will guide the cabinet decision. So I think the Keogh report is likely to make a good contribution to the public debate on that.[60]

3.66 The Committee is encouraged by the Minister's comments but stresses that the issue of funding beyond 2007-08 will need to be addressed by governments in the near future.

Targeting funding, and rigorous investment planning

3.67 Witnesses generally acknowledged that the level of funding for NRM was an issue. Government agencies and CMAs are forced to make strategic decisions about what programs they will maintain, often at the expense of others:

> I know that it is always crass for agencies to appear before committees such as this and lament their budgets, so I will not do that. But our corporation has had a static appropriation for about the last 14 years and the only way the board has been able to invest in new areas of research … has been to discontinue work that we have been funding for 10 years.[61]

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58 Department of Agriculture, Fisheries and Forestry and the Department of Environment and Heritage, *Submission 24*, Attachment I, p. 5.

59 Mr Malcolm Forbes, First Assistant Secretary, Department of the Environment and Heritage, *Committee Hansard*, 28 February 2006, p. 37.

60 Senator the Hon. Ian Campbell, *Additional Estimates Committee Hansard*, 14 February 2006, p. 140.

61 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 24.

3.68 The Committee recognises that the problem of salinity is considerable and that the resources needed to combat it may exceed that able to be allocated from government budgets. All stakeholders involved in salinity management will be required to make strategic decisions around the allocation of resources and accept that there will be trade-offs in decisions made.

3.69 In light of the limited funding available, a number of witnesses highlighted the need for a more strategic approach to funding to make funds available to support goal-setting types of research. Mr Tromp from the Western Australian Department of Environment told the Committee:

> …in this state, in an investment sense, with both Commonwealth and state government agreement we are keeping some of the investment potential for the NAP in a strategic reserve component where we can also address statewide strategic issues.[62]

3.70 Witnesses argued that allocation of national program funding needs to be based on more rigorous investment planning to get the most out of the funds available. The Western Australian Farmers Federation argued the need for increased emphasis on research and development in determining funding priorities:

> The Federation also considers that there needs to be an increased emphasis on research and development in the future determination of funding priorities, as we clearly do not have all the answers. There is also a need for lateral thinking in the development of future strategies e.g. the use of salinised land as a resource rather than a threat, for the development of aquaculture industries, salt-land pastures, salt harvesting and desalination industries.[63]

3.71 It was also argued that a more rigorous approach would avoid the tendency to spend all funds by the end of a financial year regardless of the merits of the investment. The CRC for Plant-based Management of Dryland Salinity noted that:

> the measure of achievement should not be "dollars out the door by 30 June" but the level of confidence that investment will realize maximum impact over time, in the face of changing economic and environmental conditions.[64]

3.72 Mr Alex Campbell from the CRC for Plant Based Management of Dryland Salinity outlined the Salinity Investment Framework 3 (SIF3), which is currently being trialled in the south coast region of WA and in the North Central region of Victoria. The framework is designed to guide better investment. SIF3 is discussed in detail in Chapter 7.

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62 Mr Fred Tromp, Director, NRM and Salinity, Department of Environment, Western Australian Government, *Committee Hansard*, 18 November 2005, p. 9.

63 The Western Australian Farmers Federation, *Submission 41*, p. 2.

64 CRC for Plant-based Management of Dryland Salinity, *Submission* 18, p. 1.

3.73 Concerns were raised that a lack of thorough analysis with regard to regional investment and program funding has meant that funding originally allocated for salinity management is being used on other water management issues:

> I think it would be fair to say that perhaps not enough of that particular money is being spent on dealing with salinity as an issue, given that NAP was originally for salinity and water quality. There has been a very strong emphasis on the water quality component and perhaps not enough on the salinity, and the strategic reserve, which currently represents 20 per cent of the investment in the glass jar, is a key tool for achieving that.[65]

Transparency of funding decisions

3.74 The process by which funding priorities are decided under NAP was raised in the evidence to this inquiry. Without access to NAP funding CMAs are unable to adequately address salinity in the catchment or region.

> Despite many submissions and representations going back over a number of years, the Hunter has been excluded from NAP funding. As with all the coast, we have not received any of the national action plan funding. We have small amounts of funding under the Natural Heritage Trust, a little bit from the National Landcare Program and a little more state salt action money. It has really only allowed us to do small-scale subcatchment studies and works. We have not really been able to get a full understanding of the underlying sources of salinity and the transportation systems. They are the real gaps that we have at the moment.[66]

3.75 The Committee took evidence from some CMAs who questioned the openness and fairness of the Department in setting funding priorities. The Hunter-Central Rivers CMA submitted:

> The CMA finds it difficult to comprehend why the CMA region, and specifically the Hunter catchment, does not warrant listing as a priority catchment in the NAP. Salinity data for the Hunter and its economic impact on rural industries, including mining, power generation, viticulture, and beef and dairy production is well documented. Salinity levels in the Hunter are already in excess of future target levels in most of the priority area identified by the NAP and there is evidence that they are continuing to rise.[67]

3.76 The CRC for Plant-based Management of Dryland Salinity argued the need for a more transparent and rigorous approach to funding allocation decisions:

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65 Mr Fred Tromp, Director, NRM and Salinity, Department of Environment, Western Australian Government, *Committee Hansard*, 18 November 2005, p. 9.

66 Ms Sharon Vernon, Program Manager, Hunter-Central Rivers Catchment Management Authority, *Committee Hansard* 14 October 2005, p. 51.

67 Hunter-Central Rivers Catchment Management Authority, *Submission 2*, p. 1.

> A more rigorous approach to determining the relative allocation of funding to different regions is required, and it should understand the inherent differences in regions across Australia. Some are water supply catchments at risk from river salinity where the 'catchment management' approach is quite appropriate given externalities around the shared, high-value resources at risk. Typically this is the province of catchment management authorities (CMAs). Other regions, typically the drier zones, don't have a 'connected resource at risk' and rational decision-making will be dominated by on-farm benefits and costs, or in the case of conservation areas and rural towns, onsite benefits and costs. In all cases, the funds allocation among regions should follow rigorous assessment of assets at risk, net benefits of actions and confidence in realizing those outcomes.[68]

3.77 The ANAO audit of the NAP found that the assessment process of funding priorities would have been improved through documentation outlining a comparative analysis of needs. While agencies had initiated a comparative analysis, it was not completed and the file records did not explain how the agencies 'weighted' regional priorities and needs in order to demonstrate consistency and fairness in setting funding priorities. The audit found that documentation explains particular reasons for some individual decisions. While noting the protracted nature of the negotiations, the documentation did not explain the relative merits of selected regions on a comparative basis and did not provide sufficient assurance that all those regions selected were necessarily those 'most affected'.[69] Consequently, the report recommend that:

> The Departments of Agriculture, Fisheries and Forestry and Environment and Heritage ensure that, in all future policy processes involving the allocation of public funds to selected regions or areas of need, analysis is documented to demonstrate the comparative assessment of needs as a basis for policy decisions.[70]

3.78 When asked about the prioritising of NAP regions, Mr Mike Lee from the Department of Agriculture, Fisheries and Forestry explained that:

> The prioritisation was done at the time in terms of the appreciation of the pressing issues at hand in relation to salinity and water quality. It is true that some areas of significant salinity hazard were not included, including Western Sydney and some area of the Hunter. But, of necessity, the action plan looked at the most pressing combinations of issues.[71]

3.79 The Committee appreciates that the allocation of limited resources is always a difficult task and that inevitably hard decisions must be made. However, in light of the

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68 CRC for Plant-based Management of Dryland Salinity, *Submission 18*, p. 1.

69 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 37.

70 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 38.

71 Mr Mike Lee, *Committee Hansard*, 6 September 2005, p. 8.

ANAO findings, it is difficult for the Committee to have complete confidence that the regions 'most affected' were also the regions selected under the NAP. As will be discussed in Chapter 6, the Committee is particularly concerned that insufficient attention was given to the problem of urban salinity in the prioritisation process.

The Governance Framework

3.80 One of the principal design features of the NAP is an 'improved governance framework' to underpin government investment and community action and achieve regulatory reforms for water and land management.

3.81 The Committee received evidence that suggested more needs to be done to ensure effective regulation of land management – specifically, land clearing.

3.82 Mr Watts from the Australian Conservation Council told the Committee:

> the major driver of secondary salinisation in the Australian landscape is the clearing of native vegetation. So the first port of call is to prevent the problem before it arises, to end broadscale ad hoc clearing of native vegetation …[72]

3.83 Hunter-Central Rivers CMA, NSW, questioned the regulatory will of local government to responsibly exercise its regulatory powers in relation to urban development. The CMA argued that, at times, local government is either unaware of salinity issues when re-zoning for urban development in rural areas or simply ignores the issue failing to exercise its regulatory powers:

> Local Government provides the leadership for urban development in rural areas. There are examples in the CMA region where local government is re-zoning saline impacted or potentially saline areas for urban development. This action is undertaken sometimes without knowledge of the salinity issue and sometimes with knowledge, where land availability is limited. Whilst the longer-term impacts of salinity on the built and natural environment as a result of urbanisation are generally understood, there appears to be little regulatory will to limit this future impact.[73]

3.84 The Australian Conservation Foundation (ACF) observed that local government involvement in NRM was patchy rather than systemic despite measures introduced to encourage more widespread engagement:

> Local government support for sustainable land use still seems largely contingent on local political will, local resources and initiative, as well as persuasion from and good working relations with regional bodies. Despite ALGA's position on the Ministerial Council, and some measure of

72 Mr Corey Watts, Acting Manager, Land and Water Program, ACF, *Committee Hansard*, 28 February 2006, p. 25.

73 Hunter-Central Rivers CMA, *Submission 2*, pp 2-3.

> information provision, direction, resources and incentives from the national level for proactive NRM are not evident.[74]

3.85 ACF put forward a specific recommendation aimed at remedying this issue, which involves enshrining local government involvement in legislation:

> That CoAG agrees to a schedule for reform of local government legislation, such that all local municipalities are obliged to align their decision-making with the principles and priorities of ecosystem management.[75]

3.86 When asked what could be done at a federal level to encourage responsible use of planning powers in relation to urban development, Mr Forbes from the Department of the Environment and Heritage explained that this was largely a state responsibility:

> From the local government perspective, the zoning is strictly a state and local government responsibility. It is not a federal responsibility. Where there can be an intersection—if you like, where a stick could be raised because we tend to sit with a carrot in our hand rather than a stick—is in regard to the EPBC Act, but only in relation to an individual project which could arise out of a particular zoning, not the zoning itself.[76]

3.87 Mr Lee, Department of Agriculture, Fisheries and Forestry, added to these remarks assuring the Committee that it was anticipated regional bodies and local government would better collaborate and coordinate on planning as the regional delivery approach evolves. He further noted that work is being undertaken to improve integration between regional and local government processes:

> … as this process matures, the accredited natural resource management plans are being more widely recognised as a source of information. Variously the states are exploring options to give them some sort of recognition in their planning processes. Our hope and expectation is that over time these accredited regional plans will play a greater part in the normal planning processes of local government. Local government in most cases is an active partner in the regional bodies, with lots of local government representatives directly on the bodies. We are also working with local government associations across the country and with the national association to increase the links between local government and regional processes as well. The expectation we have is that, as I said, over time these natural resource plans will have a bigger impact on advising and informing local planning schemes and a very large communication role in relation to the salinity hazard in particular.[77]

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74 Australian Conservation Foundation, *Submission 19*, p. 51.

75 Australian Conservation Foundation, *Submission 19*, p. 12.

76 Mr Malcolm Forbes, *Committee Hansard*, 6 September 2005, p. 16.

77 Mr Mike Lee, *Committee Hansard*, 6 September 2005, p. 16.

3.88 Focusing on the NHT, the Conservation Council of Western Australia submitted that in regard to clearing of native vegetation in agricultural regions the goals of the national programs are not currently being meet. They submitted that:

> applications for clearing permit proposals are not meeting the terms of the Natural Heritage Trust of Australia Act 1997, Section 10, which states: "the Primary Objective of the National Vegetation Initiative is to reverse the long-term decline in the extent and quality of Australia's native vegetation cover by:
>
> - conserving remnant native vegetation; and
> - conserving Australia's biodiversity; and
> - restoring, by means of revegetation, the environmental values and productive capacity of Australia's degraded land and water.[78]

3.89 The Conservation Council of Western Australia argued the need for NHT funding to be made available to ascertain if the national commitments, stated in The National Strategy for the Conservation of Australia's Biological Diversity to 'arrest and reverse the decline of remnant native vegetation' are being meet.[79]

3.90 The Committee notes that in NSW there have been concerns raised in media reports about extensive illegal land clearing in the state and the ineffective regulation of this. The NSW Audit Office will conduct a performance audit of the regulation of native vegetation clearing in late 2006.

Clearly articulated roles

3.91 A further and related design feature of the NAP is:

> Clearly articulated roles for the Australian, State/Territory and local governments and the community to provide an effective, integrated and coherent framework to deliver and monitor implementation.[80]

3.92 The Regional Implementation Working Group Report on the regional model[81] outlined the roles & responsibilities identified by COAG when the regional model was introduced:

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78 Conservation Council of Western Australia, *Submission* 11, p. 2.

79 Conservation Council of Western Australia, *Submission* 11, p. 2.

80 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment B, p. 1.

81 The Regional Implementation Working Group for NRM was established by the NRM Ministerial Council to examine regional delivery. In 2004 the Regional Implementation Working Group held a Community Forum, which gave the chairs of all regional organisations an opportunity to convey their views on the progress of the regional model and areas for improvement to the NRM Ministerial Council. The findings of this Forum were presented in the report, *Regional Delivery of NRM – Moving Forward*, in March 2005. The report was submitted to the Inquiry as an attachment to Submission 24.

'The Australian Government

- provides strategic leadership to achieve longer-term improvements in natural resources in the national interest
- invests in national responsibilities and encourages a national approach to nationally significant areas

State and Territory Governments

- exercise primary legislative and regulatory responsibility for NRM within their jurisdictions
- establish infrastructure and invest in sustainable management
- manage large areas of land significant for natural resource and environmental management

Local Governments

- support NRM by providing local services, infrastructure and land use planning
- manage large areas of land significant for natural resource and environmental management

Regional Organisations

- liaise with the community to identify priorities in planning, investment strategies and targets
- coordinate investments and implement activities
- monitor and evaluate progress and report against targets at the regional scale

Community Groups

- engage with other groups and with regional organisations in identifying priorities and negotiate
- pathways contributing to NRM objectives
- take action at a local level consistent with delivering broader NRM objectives
- report on local progress'[82]

3.93 The report noted that for integrated delivery to be achieved clarification of roles and responsibilities is required. However, while the Community Forum 'sought clarification of roles and responsibilities and greater devolvement of functions',[83] the Regional Implementation Working Group cautioned against introducing more prescriptive roles than those outlined above, arguing it could be at the expense of flexibility. The Working Group concluded that:

82 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 8.

83 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 9.

> The call by the Community Forum to clarify roles may be associated with the request for less micro-management by national and state/territory governments (and greater policy alignment). Progressive devolution can grow with increased confidence by governments in improved governance and accountability on the part of regional organisations.[84]

3.94 However, it was clear from evidence received that there is still some way to go to achieve clarity around roles and responsibilities of the different stakeholder groups. The main area of concern was raised by local government groups, who reported the blurring of boundaries between local government and regional bodies.

3.95 Councillor Clive Robartson from the Western Australian Local Government Association (WALGA) argued that the roles and responsibilities between all levels of government should be clarified:

> There are signs and examples where local governments are getting involved as a partner to regional NRM but a cooperative strategic approach system for a number of stakeholders, including NRM regions, state agencies and NGOs, is needed. The approach, we think, needs to be one that better defines the roles and responsibilities of the various levels of government and the related capacity, legislative, technical and resourcing gaps and also an approach that relates this information around roles and responsibilities to address salinity priorities in the regions.[85]

3.96 The Australian Local Government Association (ALGA) highlighted the need for certainty of roles and responsibilities in terms of the legislative powers afforded to local government and the regional bodies. The ALGA argued that granting legislative powers to regional bodies would: increase community perception that regional organisations form another bureaucratic layer; confuse the boundaries between local government and regional roles and responsibilities; and under-utilise the benefits that local government can bring to salinity management:

> There is already concern in the community that the catchment organisations are just another form of government, and providing them with legislative powers is likely to increase that criticism. In addition, one of the guiding principles of the NAP is to have clear and defined roles and responsibilities of all parties. Granting legislative powers to regional organisations will blur these lines further.
>
> ALGA considers the potential benefits that local government can bring to the table have not been effectively tapped into. Local government has primary responsibility for land use planning in most states. Land use and development activities can have an impact on salinity – for example through vegetation removal, by earthworks that may alter local drainage patterns, or by land uses that may affect the amount of water entering the

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84 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 11.

85 Western Australian Local Government Association, *Committee Hansard*, 18 November 2005, p. 76.

> watertable. In addition, urban development can exacerbate salinity through increasing groundwater recharge from run off, increased watering of gardens and altering drainage flows and levels. Having local governments and catchment organisations working together means there is no need to introduce legislative powers to catchment organisations, which are not a level of government.[86]

3.97 The ALGA drew attention to concerns raised in the House of Representatives Report that local government was not adequately supported by other levels of government:

> The inquiry also noted that 'local governments were often not supported by other tiers of government'. It noted councils' significant ability to influence change through planning at the local scale and suggested that 'local government perhaps is a more effective instrument of bringing about change than Catchment Management Authorities'. There is no evidence to date to suggest that any action has occurred to improve the support provided to local government since the release of the report.[87]

3.98 Similarly, the Local Government Association of Queensland submitted that:

> … the Association believes that there are already extensive legislative powers available in Queensland to achieve sustainable environmental and natural resource management outcomes. Therefore, the Association would be opposed to moves from any other sphere of government that would usurp or diminish Council planning powers, or see non elected groups override Local Government's legitimate autonomy or decision-making role.[88]

3.99 Mr Nathan Malin from the Western Australian Local Government Association (WALGA) told the Committee that discussion with local government colleagues from other states revealed concern about the overlap of legislatively based responsibilities:

> To go back to your question about the NRM regions being non-statutory or having that sort of incorporated model that we have here, and similar to Queensland, I have been speaking to some colleagues in local government associations in other states. They have issues in terms of forming that partnership between local government and a statutory CMA. There are issues where there are legislative roles for a regional group matching that in with local government's traditional areas of responsibility.[89]

Monitoring progress towards program goals

3.100 The Committee was told that:

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86 ALGA, *Submission 13*, p. 3.

87 ALGA, *Submission 13*, p. 4.

88 Local Government Association of Qld, *Submission 8*, p. 3.

89 Mr Nathan Malin, *Committee Hansard*, 18 November 2005, p. 83.

> Under the regional model Australian, State/Territory, local government and regional organisation NRM processes are combined with the focus being on the strategic rather than the tactical, to purchase outcomes not projects. Monitoring, evaluation and reporting is becoming a higher priority to demonstrate progress towards resource condition targets against the investments directed towards those targets.[90]

3.101 As required by the Intergovernmental Agreement (IGA), agencies have put in place a national monitoring and evaluation framework for NRM programs. This framework provides a structure to monitor and evaluate both program performance and natural resource conditions.

3.102 The Natural Resource Management Ministerial Council agreed to the National Monitoring & Evaluation Framework in August 2002. The Framework is established through bilateral agreements between the Australian and state/territory governments. The *Funding Principles for Monitoring, Evaluating and Reporting Activities* requires regions to establish targets using existing state/territory datasets or, where these do not exist, to develop monitoring programs ensuring that these are suitable to state/territory datasets.[91]

3.103 The NAP, the NHT and the community support element of the NLP provide for investments to be made through accredited regional management plans, which identify immediate and longer term resource condition targets. Investments are then directed towards these targets. The Monitoring and Evaluation Framework ensures the assessment of progress of all investments against nationally agreed categories of outputs and nationally agreed indicators.

3.104 The submission from the Departments of Agriculture, Fisheries and Forestry and Environment and Heritage sets out the *Funding Principles for Monitoring, Evaluation and Reporting Activities* under the NAP and NHT:

- 'Investment proposals which address resource condition targets must include a monitoring, evaluation and reporting component.

- The monitoring and reporting component must utilise existing monitoring wherever possible. Investment by the program could support new and additional monitoring requirements which, following consideration of an appropriate cost/benefit analysis, would be fully funded as part of the investment proposal.

- Monitoring and reporting components of investment proposals must be consistent with the State/Territory requirements for the relevant core indicator.

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90 Department of Agriculture, Fisheries and Forestry and the Department of Environment and Heritage, *Submission* 24, Attachment I, p. 6.

91 Department of Agriculture, Fisheries and Forestry and the Department of Environment and Heritage, *Submission* 24, Attachment I, p. 14.

- Each State/Territory would aim to have a medium to long term strategy for the maintenance and development of the indicators in the core set.'[92]

3.105 Monitoring at the regional level involves the collection of quarterly financial reports, as well as half yearly and annual financial and progress reports. Regions have three years from the signing of the bilateral agreement to establish sufficient data to set targets.

3.106 The ANAO report of the NAP found that regional bodies were developing their own management information systems, complicating the performance information and financial reporting process and resulting in inevitable variation and lack of consistency for management purposes. It was argued that without consistent measures, reports by regions could not be aggregated to provide a summary.

3.107 The ANAO also found some confusion in regard to the expectations of Australian and state/territory agencies in this area. The regions commented that the co-ordination of performance information had been an issue for them. Further there was a perception at the regional level that the current system was overly complicated, onerous, and prescriptive. Consequently, the ANAO considers that, in a program with so many stakeholders that ultimately rely on regional bodies to provide performance information, it would have been useful to develop a consistent, integrated system:

> The ANAO recommends that the Departments of Agriculture, Fisheries and Forestry and Environment and Heritage in consultation with other service providers (including State/Territory agencies) consider implementing an integrated approach to quality assurance for, and the standardisation of, financial and performance data outputs across regions.[93]

3.108 Mr Bugden from the Murrumbidgee CMA also highlighted the difficulty from CMAs to meet a range of reports required for different levels of government:

> On the financial reporting we have different masters. We are reporting to the state and the Australian government and ministers. They are asking for different types of reports and it takes a lot of time and energy to prepare those.[94]

3.109 The Departments indicated to the ANAO that the Australian Government is working with state/territory governments to develop an information system for data access and management at the regional level.[95]

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92 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission* 24, Attachment I, pp 14-15.

93 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 91.

94 Mr Gregory Bugden, Murrumbidgee Catchment management Authority, *Committee Hansard*, 10 February 2006, p. 26.

95 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 104.

Monitoring natural resource conditions

3.110 In regional New South Wales the Committee heard that there was a need to streamline the monitoring of natural resources:

> I think there is opportunity to improve the monitoring of natural resources and the reporting on their current state. You have local government, state governments and Australian government interests and research organisations. My personal view is that, if we could pool that in a better way, we would be better able to report on progress or otherwise of the state of natural resources. That would assist us in reporting to government on progress or otherwise.[96]

3.111 Current national programs have recognised the difficulty of tracking and reporting progress on natural resource condition change. They have, therefore, incorporated a series of short and longer-term targets and outcomes to reflect assumptions that specified actions will lead to improvements in resource condition in the long-term.[97]

3.112 Dr Ian Prosser from the CSIRO noted that progress was being made towards meeting the goals of the NHT and the NAP. However it was unlikely, in his view, that the end-of-valley salinity targets were being met by the current investments because monitoring and evaluation was inadequate.

> Significant resources are put into monitoring and evaluation, but the long time scale of salinity and its sensitivity to climate variations—the particular weather conditions from one year to the next—make it a very difficult situation to monitor and evaluate. It requires the use of predictive models that can look long into the future to evaluate whether the actions being taken today are going to meet targets for the future.[98]

3.113 The Regional Implementation Working Group for NRM's report *Regional Delivery of NRM – Moving Forward*, March 2005, also noted the difficulty of monitoring and achieving changes in resource conditions. However, the working group did note that regional groups were accountable for implementation and delivery of programs for which funding has been provided and are required to report progress against management action targets with continued investment linked to the achievement of these targets:

> While regions are responsible for identifying monitoring processes and ensuring ongoing reporting of progress, regions are not directly accountable for changes in resource condition where there is a lack of major scientific

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96 Mr John Francis, Murrumbidgee Catchment Management Authority, *Committee Hansard*, 10 February 2006, p. 26.

97 Land & Water Australia, *Submission 26*, p. 2.

98 Dr Ian Prosser, CSIRO, *Committee Hansard*, 6 September 2005, p. 31.

certainty or there are significant external factors over which the participants have little or no control.[99]

3.114 Land & Water Australia, argue that to be effective the framework will require:

- a robust suite of decision-making techniques and modelling tools to refine the targets that regional groups are expected to develop; and
- considerable investment in data collection, analysis and reporting to maximise its value in demonstrating trends in salinity and natural resource issues over time.[100]

Regional boundaries

3.115 Fifty-six regions have been identified across Australia for the purposes of determining natural resource management and sustainable agriculture priorities. The boundaries for each region have been established by agreement between Commonwealth and state/territory Governments.

3.116 The original assessment for selection of the NAP priority regions was made by the Australian Government. This assessment was based on National Land and Water Resources Audit data which included information about regions significantly affected by salinity and water quality and regions where there is potential for cost effective preventative action. States and territories were consulted about what would be the priority regions under the NAP.

3.117 The regional boundaries for the NHT extension have been agreed between the Australian Government and each of the state and territory governments and are specified in each NHT Bilateral Agreement between the Commonwealth and each State or Territory. In most cases, regions are based on catchments or bioregions and, where possible, these regions are consistent with those established for the NAP.[101]

3.118 In the majority of cases regional boundaries for the two programs are aligned. The ANAO audit report of NAP found that 57% of respondents felt that regional boundaries worked well.[102] However, the Committee received evidence which highlighted the difficulty for CMAs if NAP boundaries do not incorporate perceived key areas. NRM South, Tasmania, argued that the boundaries of the Tasmanian NAP, which spans two NRM regions, are to some extent arbitrary:

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99 Department of Agriculture, Fisheries and Forestry and the Department of Environment and Heritage, *Submission 24*, Attachment I, p. 14.

100 Land & Water Australia, *Submission 26*, p. 2.

101 Australian Government, Natural Resource Management website, http://www.nrm.gov.au/about-regions/index.html#boundaries (accessed 12 January 2006).

102 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, Appendix 1.

> Although ostensibly reflecting those catchments in Tasmania that combine both salinity and water quality issues, they are essentially arbitrary. A number of areas with quite severe salinity problems (many parts of the Derwent Valley and King Island) are excluded. Tasmania's catchment profile is very complex and, for example, the Derwent Catchment as a whole has not been included, though subcatchments have been. In the development of the NAP, the Tasmanian Government and Tasmanian community requested that the whole of Tasmania be considered a NAP region. This would have eliminated the present anomalies. Alternatively, it may have been more appropriate to allocate the whole of the settled parts of Tasmania to the NAP region.[103]

3.119 NRM South went on to argue that the arbitrary nature of the boundary makes it harder to raise awareness about the extent of salinity and its potential economic impacts. Further, the involvement of two regions in planning for implementation of NAP in Tasmania has put additional pressures on the regions. The cross-regional collaboration is useful but systems need to be sensitive to the additional time that this requires.[104]

3.120 In their submission the Local Government Association of Queensland highlighted the problem of the regional boundaries not mapping local government areas, specifically noting 'confusion over regional boundaries with some councils included in 3 different regions'.[105]

3.121 The Committee appreciates that the lack of congruence between regional boundaries and local government boundaries may mean that local councils are required to work with more than one regional body. However, the regional boundaries are principally determined by catchment boundaries, which the Committee believes is the appropriate alignment for natural resource management.

Congruence between programs, initiatives, and agencies

3.122 The coordination of programs and the establishment of links between agencies are important to avoid duplication of effort and to maximise achievable outcomes and program effectiveness. As discussed previously, there are a range of programs and institutions that address salinity and water quality management – the NAP, the NHT, the Basin Salinity Management Strategy (BSMS), the Murray-Darling Basin Commission and the Great Barrier Marine Park Authority. The ANAO Audit Report noted that there has been 'extensive consultation' between relevant agencies in order to achieve a coordinated approach.[106]

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103 NRM South, *Submission 29*, pp 1-2.

104 NRM South, *Submission 29*, pp 1-2.

105 Local Govt Association of Queensland, *Submission 8*, p. 2.

106 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 52.

3.123 The ANAO performance audit of NAP found that various measures have been put in place by agencies to coordinate the NAP with existing Australian Government initiatives, including the NHT. In particular, the NAP and the NHT are jointly delivered through block funding based on a single accredited regional NRM plan for each region. Further, monitoring and evaluation processes, communications strategies and capacity building strategies are integrated for the two initiatives. There has also been improved coordination through the joint delivery arrangements implemented between DAFF and DEH.[107]

3.124 The Committee heard evidence that also pointed to strong congruency between the NAP and NHT. The Avon Catchment Authority submitted:

> The financial support available through the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT) is highly effective and highly targeted at regional priorities for salinity management. Both programs are integrated with the regional strategic and investment planning process and have enough scope to enable effective salinity management programs to be developed and implemented.[108]

3.125 The Committee also heard evidence which suggested that NAP and NHT are so well integrated that there was grounds to consider merging the two programs:

> The NAP has probably served this purpose reasonably well, but there no longer appears to be any substantive reason why the landscape management aspects (at least) of the NAPSWQ and NHT2 should remain separate.
>
> The two programmes are already largely interdependent, rely on the same regional delivery model and are managed by the same joint federal joint NRM team. Indeed, senior government agency officers involved in managing NAP/NHT2 tend to refer to these programmes as 'two sides of the one coin.' The programmes' fusion would contribute to time and monetary cost-savings at all levels, including at the level of the regional natural resource manager who, at present, has to deal with two sets of paperwork.[109]

3.126 Further, The Australian Conservation Foundation went on to argue that a merging of NAP and NHT2 would help to reduce confusion in the community, and further focus attention on a genuinely integrated approach to NRM to deliver good environmental and other public interest outcomes.[110]

3.127 However, while the Committee heard of the high levels of coordination and congruency between NAP and NHT, this was not the case across other NRM

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107 Australian National Audit Office Report *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 52.

108 Avon Catchment Council, *Submission 42*, p. 2.

109 Australian Conservation Foundation, *Submission 19*, p. 24.

110 Australian Conservation Foundation, *Submission 19*, p. 24.

initiatives or across different levels of government. The Local Government Association of Queensland noted that in a recent Queensland Government review of NRM arrangements:

> The range of NRM related programs continue to be fragmented and uncoordinated from a whole-of-government perspective… the core business of Queensland State agencies was not well aligned to provide a high level of integrated support and advice to regional bodies. In particular, there was consistent recognition of the need for clearer alignment of regional NRM planning with regional growth management frameworks available under IPA.[111]

3.128 In regard to congruency between NRM programs, the Committee was told that the National Landcare Program (NLP) sits outside the strategic regional process and does not integrate effectively with regional strategic and investment planning:

> It is recognised that economic driver identification and industry development will be effective levers in encouraging the vast majority of land managers to tackle salinity and as such the NLP has significant opportunities to assist in this process. Utilisation of the existing focus of the NLP would be highly valuable in assisting salinity management, if the Program's investment timeline and priorities were integrated with NAP and NHT and regional investment planning. Examples of effective NLP investment in regards to salinity management would be to identify genuine market drivers for Environmental Management Systems adoption and development of effective and integrated salinity management systems at the farm scale.[112]

3.129 The need for better alignment and explicit linkages between the Basin Salinity Management Strategy (BSMS) and the NAP and NHT programs was raised. Mr Leslie Roberts, from the Murray-Darling Basin Commission told the Committee:

> There is already immediately a linkage between the NHT, the regional catchment authorities, the NAP program and the Basin Salinity Management Strategy through the involvement of the jurisdictions in the commission and as signatories to the Basin Salinity Management Strategy and under the obligations of schedule C to the agreement. So there is already that level of linkage there. What has been happening in the commission recently is a further discussion with the jurisdictions about how we had better get into those regional plans the science that is going to link that investment to the valley targets. That is the part that we are really trying to focus attention on. You need to have that linkage so it comes through in the monitoring and reporting framework for all those activities, linked in to the Basin Salinity Management Strategy.[113]

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111 Local Government Association of Queensland, *Submission 8*, p. 2.

112 Avon Catchment Council, *Submission 42*, p. 2.

113 Mr Leslie Roberts, Natural Resource Management, Murray-Darling Basin Commission, *Committee Hansard* 6 September 2005, p. 44.

3.130 The Murray-Darling Basin Commission suggested that clear linkages between the BSMS and the NAP and NHT programs be established to better achieve salinity targets. Further, the Murray-Darling Basin Commission's submission recommended that:

> The inquiry may like to consider the means of ensuring that the NAP & NHT deliver on shared outcomes of the BSMS.[114]

3.131 In response to this, Mr Mike Lee, General Manager, Australian Government Natural Resource Management Team, Department of Agriculture, Fisheries and Forestry, told the Committee:

> In the accreditation process for the regional plans it was required that the targets embedded in the plans had to recognise and be consonant with broader arrangements, particularly the salinity targets, and the regional plans were required to be consistent with the Murray-Darling Basin salinity strategy. We understand that to be the case with the targets that are currently in the basin statement blueprints and catchment plans. Also, I would like to advise that, amongst the series of national evaluations that we are conducting in cooperation with the states and the regions, we do have an evaluation entitled 'Salinity outcomes for regional investment'. That national evaluation is looking at the expected outcomes. One of the things that we will be looking at is what we can see in terms of the coverage of and the adequacy of the target structures that relate to salinity across the various plans, trying to put the bigger picture together to see what it looks like at the regional, state, basin and national levels in terms of the coverage, the basis for a portfolio of investments and the likely expected outcomes. So we will have a better picture after that process of how the salinity targets across the various basin states actually integrate towards the basin strategy. We will be involving the Murray-Darling Basin Commission in that process as well.[115]

3.132 The CRC for Plant-Based Management for Dryland Salinity also highlighted the effectiveness of the BSMS approach to the selection of realistic targets.

> The process adopted for end-of-valley targets under the Murray-Darling Basin Salinity Management Strategy gives some pointers – sufficient trend data and analysis, consultation around an interim target, and independent assessment and accreditation of the tools needed to estimate the economic impact of salinity management actions "in the river". The range of targets needs to be sufficient to underpin accountability; it is not necessary to have a target for every catchment objective.[116]

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114 Murray-Darling Basin Commission, *Submission 21*, p. 3.

115 Mr Mike Lee, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard,* 6 September 2005, p. 11.

116 CRC for Plant-Based Management for Dryland Salinity, *Submission 18*, p. 1.

Conclusion

3.133 Overall, the Committee received very little evidence to make categorical assessments on whether the goals of the national programs had been attained. The Committee agrees with submitters who observed that it was still too early in the process to comment on the success or otherwise of these programs. However, the Committee was made aware of a number of issues which detracted - or which may in the future detract - from the effective contribution that the national programs will make to salinity management.

3.134 Undoubtedly, NRM programs are a very positive step in the right direction. However, it is important that commitment to these programs is maintained to build on the advances made by NAP and NHT. As the Australian Conservation Foundation argued:

> While a welcome initiative, Australia's flagship NRM programmes – the NAP and NHT2 - are not properly equipped to tackle the challenge of landscape decline without a major refit and a lot more horsepower. In the three and a half years since the NAP commenced, there have been some welcome environmental advances and outcomes. Overwhelmingly, however, progress has been slow and piecemeal, and the major sustainability challenges facing the future of our rural landscapes remain unresolved.[117]

117 Australian Conservation Foundation, *Submission 19*, p. 60.

Chapter 4

The role of regional bodies

The Regional Model

4.1 In November 2000 the Council of Australian Governments (COAG) agreed to a regional model for the delivery of the NAP. Following this, the NRM Ministerial Council adopted a regional delivery model for NHT funding of environmental activities at a regional level, leading to the integrated implementation of both programs based on regional needs.[1]

The principal driver underpinning the regional delivery model for NRM is to 'harness the capacity of those closest to the problem on the ground', building on local knowledge, experience and expertise and enabling flexible and responsive solutions to local NRM challenges.[2]

4.2 The key features of the regional delivery model include:

- the development of a framework that sets out the respective NRM roles for Commonwealth, state/territory and local governments and the community;
- a shift from funding of individual projects to funding outcomes determined through regional NRM strategic planning;
- devolution of decision-making to a regional level – that is, a dispersed rather than centralist approach that allows for flexible decision-making tailored to local conditions and needs;
- introduction of national standards and targets to guide and provide direction for investment in NRM;
- a comprehensive accreditation, monitoring and evaluation framework to achieve consistent and acceptable standards of program delivery; and
- encouragement of community capacity building through involvement in local NRM.[3]

4.3 A total of 56 NRM regions have been established across Australia. The boundaries for each region were agreed to by the Australian and state/territory governments.

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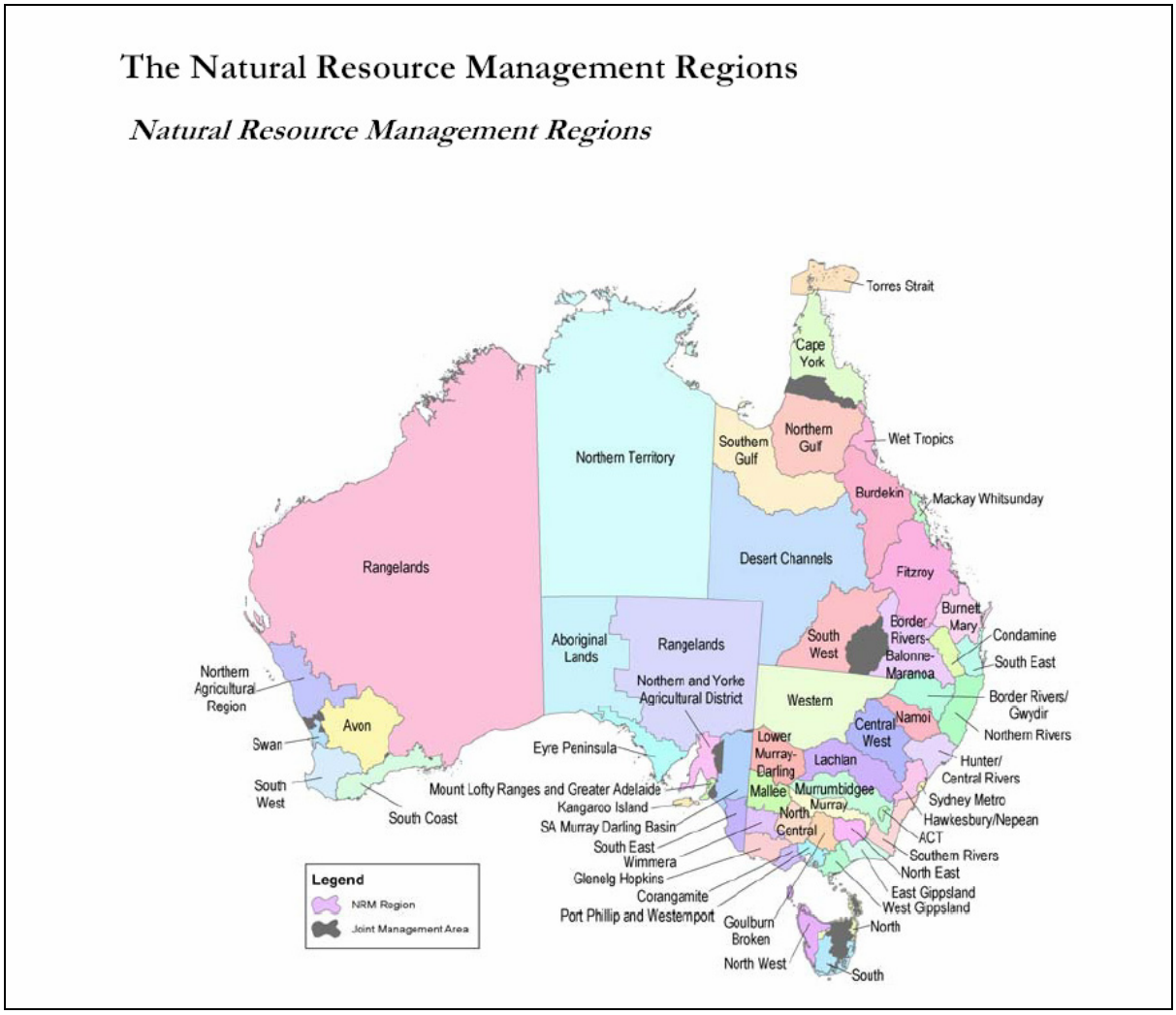
1 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 33.

2 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 6.

3 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 33.



Map Source: Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment G

The role of regional bodies

4.4 The Australian Government Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage describe the role of the regional bodies responsible for these regions as follows:

> The key role of regional bodies involves undertaking regional natural resource management planning, prioritising regional level investments, co-ordinating actions at the landscape scale, getting community ownership in decision making and reporting on progress.[4]

4.5 The role of regional bodies includes:

- mobilising community involvement and contributions to achieving positive NRM outcomes at a regional level;

4 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, p. 4.

- undertaking comprehensive consultation with the broad community and segments of the community with interests in natural resource management;
- developing integrated NRM plans that would form the basis for strategic investment by governments, the community and other stakeholders in action to improve management of natural resource and the environment;
- developing management, resource condition and aspirational targets as agreed by governments and communities in partnership as part of building the integrated NRM plans;
- developing investment strategies as a basis for undertaking targeted investment by governments and community to provide on ground NRM improvements;
- facilitating the delivery of education and information to the broad community and segments of the community with interests in natural resource management;
- providing advice on priorities for investment of grants and other related funding;
- monitoring and evaluating progress and reporting against targets at the regional scale;
- ensuring effective governance arrangements are in place in both establishing priority setting processes and in accounting and administering government and community funds; and
- representing regional community NRM interests to State and Australian Government governments.[5]

Regional Plans

4.6 Government investment in the form of NHT and NAP funding for the regions is based on regional plans rather than allocated on the basis of individual project applications. The regional plans identify regional priorities and set up a framework for investment in action.

4.7 The regional bodies develop their plans with feedback and advice from all levels of government and specialist advisory bodies. All key stakeholders are included in the planning process through consultation and negotiation. Stakeholder groups include communities, Indigenous people, academic/scientific communities, environmental groups, industry, local governments and state/territory and Commonwealth agencies. The plans are jointly agreed to by government and the community and, along with investment strategies for implementing the plans, they outline the goals, timelines and roles and responsibilities of all relevant parties.

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5 Taken directly from the Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, p. 13.

4.8 The regional planning process takes account of the environmental, economic and social dimensions of any natural resource management issues and should be based on sound science.[6]

The accreditation process

4.9 All regional plans must be accredited before they can be implemented. Plans are accredited against criteria that were developed by the Australian and state/territory governments through the Natural Resource Management Ministerial Council in May 2002.

4.10 The accreditation criteria require regional bodies to demonstrate that their plans:

- cover the full range of natural resource management issues
- are underpinned by scientific analysis of natural resource conditions, problems and priorities
- have effective involvement of all key stakeholders in plan development and implementation
- focus on addressing the underlying causes rather than symptoms of problems
- include strategies to implement agreed natural resource management policies to protect the natural resource base
- demonstrate consistency with other planning processes and legislative requirements applicable to the region
- set targets at the regional scale, consistent with the national framework for natural resource management standards and targets
- identify strategic, prioritised and achievable actions to address the range of natural resource management issues and achieve the regional targets: this includes an evaluation of the wider social economic and environmental impacts of such actions and of any actions needed to address such impacts
- provide for continuous development, monitoring, review and improvement of the plan.[7]

Support for the Regional Model

4.11 The delivery of national programs through a regional model was viewed favourably by a number of witnesses. The key advantages of a regional approach identified were the ability for locally-based management to engage different

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6 Australian Government Natural Resource Management Website, http://www.nrm.gov.au/about-regions/index.html#boundaries (accessed 5 January 2006).

7 Taken directly from the Australian Government Natural Resource Management Website, http://www.nrm.gov.au/national/index.html (accessed 5 January 2006).

community stakeholders, to build on local knowledge, and to tailor programs and practices to local need. The North Central CMA, Victoria, observed:

> The regional approach necessarily taken by CMAs is appropriate to efforts to mitigate the effects of salinity: local-scale, appropriate decisions can be implemented as required. Additionally, CMAs are able to demonstrate leadership on diverse natural resource management issues – this cannot be achieved using a 'centralist' approach.[8]

4.12 Similarly the South Coast Regional Initiative Planning Team, WA, submitted:

> We believe that the NRM Regional Model and the role of Regional NRM Groups in the management of salinity-affected areas will create significant positive benefit. The reasoning behind this is that the regions have a good understanding of the local issues and the management options available and how to achieve them through local knowledge and experience.[9]

4.13 The Centre for Salinity Assessment and Management, University of Sydney, highlighted the importance of community driven action:

> The regional catchment management authorities (CMAs) are good vehicles to coordinate and manage catchment scale projects on salinity and other natural resource issues. CMA involvement ensures strategies address local problems, and are driven by communities rather than research providers.[10]

This was affirmed by the Burnett Mary Regional Group, Queensland:

> Regional arrangements have created a groundswell of community actions and participation in activities to address salinity in our region.[11]

4.14 The benefits identified by witnesses resonated with those reported by the Regional Implementation Working Group for NRM, which was established by the NRM Ministerial Council to examine regional delivery. In 2004 the Regional Implementation Working Group held a Community Forum, which gave the chairs of all regional organisations an opportunity to convey their views on the progress of the regional model and areas for improvement to the NRM Ministerial Council. The findings of this Forum were presented in the report, *Regional Delivery of NRM – Moving Forward*, in March 2005. The following benefits of the regional model were identified:

Regional delivery has contributed to systemic changes including:

- development of landscape-wide solutions;
- integration of NRM activities through plans and investment strategies;

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8 North Central CMA, *Submission 39*, p. 2.

9 South Coast Regional Initiative Planning Team, *Submission 27*, p. 2.

10 Centre for Salinity Assessment and Management, *Submission 17*, p. 1.

11 Burnett Mary Regional Group, *Submission 30*, p. 1.

- formation of institutions and frameworks for delivering programs; and
- implementation of improved monitoring and evaluation programs.

It has helped generate attitudinal and social changes including:

- cultural change in acceptance of the need for catchment-wide solutions;
- target-setting and acceptance of the need to evaluate progress;
- an outcomes focus on the need for projects to contribute to overall improvements; and
- the development of local leadership and community commitment.[12]

4.15 In their joint submission, the Australian Government Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage concluded that the key message from regional communities expressed at the Regional Implementation Working Group's community forum was 'to continue with this approach as it provided the best means to deal with catchment wide natural resource management problems'.[13]

Governance Arrangements

4.16 The governance arrangements of regional bodies differ across the states and territories. As Mr Mike Lee from the Australian Government Department of Agriculture, Fisheries and Forestry noted, the regional bodies are 'creatures of the state'.[14] That is, the governance structures of the regional bodies have been developed within the varied context of each state and territory. In some cases, regional bodies pre-existed the NAP and NHT delivering state-determined NRM outcomes. In WA, for example, the regional bodies were based on existing advisory committees. In Queensland and the ACT, alternatively, regional bodies were created following the identification of the NAP regional areas.[15] Mr Forbes from the Australian Government Department of the Environment and Heritage told the Committee that regional bodies that pre-existed in some other form may have been inferred powers from the state.[16]

4.17 In their submission, the Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage provided an overview of the

12 Taken directly from the Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 6.

13 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, p. 4.

14 Mr Mike Lee, *Committee Hansard*, 6 September 2005, p. 10.

15 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, p. 12.

16 Mr Malcolm Forbes, *Committee Hansard*, 6 September 2005, p. 10.

legislative arrangements of regional bodies on a state-by-state basis.[17] This overview is summarised below with additional information as referenced. In brief, regional bodies in NSW, Victoria, Tasmania and South Australia are underpinned by legislation. There is currently no legislative basis for regional bodies in other states/territories.

State-by-state summary

South Australia

4.18 In July 2004, the SA Parliament passed the *Natural Resources Management Act 2004*, which provides a more integrated, streamlined and transparent system for NRM in South Australia. The Act established eight new statutory boards, one for each existing NRM region. Prior to this there were over 70 boards separately managing issues relating to water, pest plants and animals and soil conservation.

4.19 Following the introduction of the Act, interim Integrated Natural Resource Management (INRM) groups or boards were established. Statutory-based NRM Boards formally assumed responsibility for the delivery of natural resource management on 1 July 2005.

4.20 Each regional NRM board is comprised of up to 9 members appointed by the Governor on the nomination of the Minister. Appointments are based on relevant skills, expertise and experience in different aspects of NRM and land management, business administration, state and local government administration, regional and urban planning and Aboriginal heritage and land management. A majority of the board must reside within the region.[18]

4.21 The Act also provided for a new state NRM Council, which forms a peak body providing independent advice and developing and reviewing a state NRM plan. The first skills based council was appointed in April 2005 based on criteria identified in the Act.

4.22 The NHT is delivered through all eight NRM regions and the NAP is delivered through the regional bodies covering three priority NAP regions.

New South Wales

4.23 In 2003, the NSW Government introduced natural resource management reforms aimed at ending broadscale land clearing and encouraging responsible land management practices. Three bills were passed in the NSW Parliament to govern these reforms and enable a regional model for the delivery of natural resource management:

17 Department of Agriculture, Fisheries and Forestry and Department of Environment and Heritage, *Submission 24*, Attachment F.

18 *Natural Resource Management Act 2004*, Part 3, Division 3 (25).

- *Natural Resources Commission Act 2003*;
- *Catchment Management Authorities Act 2003*; and
- *Native Vegetation Act 2003*.

4.24 The *Natural Resources Commission Act 2003* established an independent Natural Resources Commission (NRC). The role of the NRC is to develop standards and targets for natural resource management, and to monitor the progress of catchment management authorities (CMAs) in reaching these targets.[19]

4.25 The *Catchment Management Authorities Act 2003* created 13 regional catchment management authorities (CMAs). The principal role of the CMAs is to coordinate natural resource management programs and services. This includes the development and implementation of Catchment Action Plans (CAPs) and associated investment strategies. Under the *Catchment Management Authorities Act 2003* the CAPs must take account of the state-wide standards and targets set by the NRC.[20]

4.26 In January 2004, the CMAs were formally constituted as statutory authorities with a responsible and accountable board. CMA boards are appointed by, and report directly to, the Minister for Infrastructure and Planning and Minister for Natural Resources. Appointments are merit-based according to knowledge and experience in the following areas: primary production, environmental, social and economic analysis, state and local government administration, negotiation and consultation, business administration, community leadership, biodiversity conservation, cultural heritage, and water quality.[21]

4.27 Prior to the establishment of the 13 CMAs, a total of 21 Catchment Management Boards (CMBs) were involved in natural resource management in New South Wales.

4.28 The *Native Vegetation Act 2003* covers the management of native vegetation and the prevention of broadscale clearing. It predominantly applies to private rural land. CMAs hold powers under the Act and are responsible for assessing land-clearing proposals.

4.29 The NHT is delivered through all 13 regions while the NAP is delivered through the CMAs that cover seven priority regions.

Tasmania

4.30 The *Natural Resource Management Act 2002* is the principal piece of legislation underpinning natural resource management in Tasmania. The Act sets out

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19 NSW Department of Infrastructure, Planning and Natural Resources, *Submission 22*, p. 2.

20 NSW Department of Infrastructure, Planning and Natural Resources, *Submission 22*, p. 2.

21 *Catchment Management Authorities Act 2003*, s. 8 (4).

the roles, functions and powers of the Tasmanian Natural Resource Management Council and three regional committees (NRM Cradle Coast, NRM North and NRM South). It also provides for the development of regional strategies and the accreditation process.

4.31 The role of the Natural Resource Management Council is to advise government and to liaise with the regional committees. The Council is comprised of up to 16 members appointed by the Government and reflecting a representative mix from the following groups: each of the regional NRM committees, the Aboriginal community, industry and land managers, conservation interests, state and local government, and community groups.[22]

4.32 The three regional committees facilitate and coordinate regional natural resource management and are responsible for developing regional strategies. They do not have a regulatory role and therefore do not have enforcement powers.[23] The committees are appointed by the Government in accordance with selection criteria that aims to ensure a representative mix from the following stakeholder groups: community and conservation interests, the Aboriginal community, state and local government, industry and land managers.[24]

4.33 Tasmania has one priority region under the NAP - the Midlands Region - which falls in both the North and South NRM regions.

Victoria

4.34 In Victoria, 10 regional Catchment Management Authorities (CMAs) deliver the NAP and the NHT at the regional level. The CMAs are body corporates established under the *Catchment and Land Protection Act 1994*. Members (up to 15) of authorities are appointed by the Victorian Minister for Environment and Conservation and comprise:

- A mix of experience and knowledge of land protection, water resource management, primary industries, environmental conservation and local government;
- a representative of the relevant department(s);
- at least one half of the members being persons whose principal occupation is primary production.

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22 Department of Primary Industries, Water and Environment, *Tasmanian Natural Resource Management Framework*, 2002, p. 22.

23 Department of Primary Industries, Water and Environment, *Tasmanian Natural Resource Management Framework*, 2002, p. 24.

24 Department of Primary Industries, Water and Environment, *Tasmanian Natural Resource Management Framework*, 2002, p. 25.

4.35 Prior to the introduction of the *Catchment and Land Protection Act 1994* the 10 regional bodies were land protection boards.

4.36 Under the *Catchment and Land Protection Act 1994*, the CMAs are responsible for the development and implementation of regional catchment strategies and provide advice to State Government on both federal and state resource priorities in the region.

4.37 Under the *Water Act 1989* the CMAs may also have responsibilities in relation to waterway management, floodplains, irrigation and regional drainage systems.

4.38 The NHT is delivered through all 10 regions and the NAP is delivered by the CMAs covering four priority regions.

Queensland

4.39 In Queensland there are 15 NRM regions and 14 regional bodies. The regional bodies were established in 2003 and each body is responsible for developing and implementing a regional NRM plan. The NAP is delivered through the regional bodies covering four priority regions.

4.40 There is no legislative basis for the support of regional bodies in Queensland. Regional Bodies are, in the main, incorporated entities and not catchment management authorities.

Western Australia

4.41 There are six NRM regions in Western Australia and six corresponding regional bodies. The regional bodies are responsible for developing and implementing (accredited) regional plans.

4.42 Western Australia has four priority NAP regions and a fifth priority NAP region (the Ord) that overlaps with the Northern Territory.

4.43 Regional bodies in WA are not founded on any legislative basis. The regional bodies are incorporated entities but not catchment management authorities. The bodies are based on existing advisory committees following the identification of priority regions under the National Action Plan.

4.44 Management committee/board membership of the six regional bodies is set out in each organisation's constitution. Membership varies across the six organisations, however, all constitutions state that members must demonstrate a connection to, and live in, the region. Membership of each governing body is a mix of

state government and community members, with community members including local government, Indigenous, natural resource and land management interests.[25]

4.45 It should be noted that a state-wide review of delivery and management of NRM in Western Australia, including the governance arrangements and status of regional bodies, has commenced.

Northern Territory

4.46 The Landcare Council of the NT (LCNT) was appointed as the regional body for the NT Region (the entire NT is one region) under the NHT Bilateral Agreement, which was signed in June 2003. In December 2003 the LCNT took on the additional role as regional body for the delivery of the NAP.

4.47 There is no legislative basis for the support of the regional body in the Northern Territory.

4.48 The LCNT is a community and industry based advisory body appointed by the NT Minister for Lands and Planning. The Council comprises representatives from industry, Aboriginal Land Councils, local government, non-government organisations, research bodies and the Territory Government and has an independent community chairperson. Executive support and financial and administrative management is provided by the Department of Infrastructure, Planning and the Environment. The NT Government is moving towards creating an incorporated entity to function as the regional body, which is expected to take effect in the 2005-06 financial year.

Australian Capital Territory

4.49 The ACT forms a single region for the delivery of NRM. The Natural Resource Management Territory Body acts as the regional body for the ACT and works closely with the Murrumbidgee Catchment Management Authority in NSW. The Murrumbidgee region, which is a NAP priority area, encompasses the ACT.

4.50 The ACT is currently negotiating its bi-lateral agreement for the delivery of the NAP. Originally, the ACT was not listed as a NAP region because it was anticipated it would be covered by the NSW NAP region (the Murrumbidgee-Lachlan), which encompasses it. However, the ACT now considers this is not the most productive way to address salinity in the ACT and is negotiating an agreement as a single region.[26]

4.51 There is no legislative basis to support the regional body in the ACT. The regional body is not incorporated. It was created following the establishment of the

25 WA Department of Environment, answer to question on notice, 18 November 2005 (received 8 March 2006).

26 Dr Maxine Cooper, Executive Director, Arts, Heritage and Environment, ACT Chief Minister's Department, *Committee Hansard*, 28 February 2006, p. 11.

bilateral agreement for the delivery of the Natural Heritage Trust in the ACT, which sets out its membership and responsibilities.

Is more legislative support required?

4.52 Terms of Reference (b) to this inquiry sought to establish whether adequate legislative support was available to assist regional bodies in achieving national goals. However, little attention was given to the issue of legislative support in submissions received. WA was the exception to this. As noted above, the introduction of statutory arrangements for regional bodies is currently under consideration in WA within the context of a review of NRM delivery.

4.53 In their submission the Avon Catchment Council, WA, explained that an advantage of greater legislative recognition of regional bodies is that it would enhance their status, bringing them to the table on external but related decision-making processes:

> Legislative recognition of Regional NRM Groups in Western Australia is an ongoing issue that is currently under review. In the interim it would be useful if environmental legislation review or development recognises the role and function of Regional Groups. This is not creating a role for NRM Groups in the delivery or coordination of legislation but is ensuring that a level of consultation is sought with NRM Groups in the decision making process.[27]

4.54 At a public hearing in Perth, Mr Peter Sullivan, CEO of the Avon Catchment Council, expanded on this statement reiterating the benefits of further 'legitimising' the role of regional bodies. However, this was qualified by the concern that statutory recognition of regional bodies in WA could potentially weaken the community-based character of these organisations:

> On the notion of a statutory umbrella and perhaps to what extent that statutory process feeds down to council level really we are quite open-minded about the benefits and, I suppose, some of the threats that that may pose. There certainly are benefits in terms of legitimising council's position in a state and regulatory context, but we do not want to undermine the fundamental basis of council, which is a community group. That can be managed in a statutory context, as it can in our current context as an incorporated association. The bottom line is that, if statutory meant not attacking the fundamental benefits of being a community based organisation and having community decisions reflected as part of the process, a statutory model would not necessarily be an issue for us.[28]

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27 Avon Catchment Council, *Submission 42*, p. 3.

28 Mr Peter Sullivan, *Committee Hansard*, 18 November 2005, p. 34.

4.55 Similarly, Mr Mike Lee from the Department of Agriculture, Fisheries and Forestry pointed to the tension between holding statutory powers and remaining a community driven body and highlighted the benefits of a community model:

> The issue of when a regional body acquires enough statutory powers to perhaps cease to feel like a representative of the community is an interesting one. At this stage right across the country we are seeing regional bodies having a very large community content; the people involved have great energies, enthusiasm and passion. That is very good for governments, because it allows us to work with these people and implement our programs.[29]

4.56 Commenting on the WA context, Councillor Clive Robartson, Western Australian Local Government Association, told the Committee that the Association favoured the current non-statutory approach, in part because it facilitated better relationships with local government:

> [T]he association is supportive of the NRM regions remaining non-statutory as this enables greater flexibility for the NRM regions as a catalyst for change and improves the opportunity for partnership with local government.[30]

4.57 Whilst limited evidence was received on this issue, the Committee believes that in the longer-term there could be a need to embed NRM decisions in the planning laws of local governments. For this reason, the Committee believes that further attention should be given to the issue of a statutory role for NRM bodies.

Planning powers

4.58 In SA, the Committee heard that the regional NRM boards hold the legislative power to amend development applications. However, as yet, regional boards have not resorted to this legislative power, instead working in consultation with local councils. Mr Wickes from the Department of Water, Land and Biodiversity Conservation explained:

> Under the current act, the board can make a change to the development applications. Where they set it up and say, 'This is what we're going to do in our district,' the boards can make a change to that. Under law they have not because, as soon as they start talking about it, they work together. We are just changing the development act so that it has to take account of those activities and put in new arrangements, so the development act and the Natural Resources Management Act will work closely together in doing what you are saying. So we are setting the processes up. We have a planning strategy to now recognise those things, and that planning strategy then influences the planning programs of the council. We have started a process where they then have a program of what should happen and that

29 Mr Mike Lee, *Committee Hansard*, 6 September 2005, p. 10.

30 Councillor Clive Robartson, *Committee Hansard*, 18 November 2005, p. 76.

> can influence that program. We are trying to get all those connections going at the moment with local government and the planning fraternity.[31]

4.59 The Australian Conservation Foundation saw a legislative role for regional bodies in relation to planning and put forward a specific recommendation:

> That appropriately accredited regional NRM bodies be granted referral powers on local government land-use planning decisions, and be resourced appropriately to ensure that local government decisions match regional NRM standards.[32]

4.60 While the Committee received limited evidence from regional bodies on the issue of legislative support and legislative powers, from a local government perspective significant concerns were expressed. As discussed in Chapter 3, the view put to the Committee was that investing regional bodies with statutory powers could infringe on local government's areas of responsibility. The ALGA firmly opposed regional bodies holding legislative powers:

> ALGA rejects any proposal to grant catchment management authorities legislative powers.[33]

Consistency in arrangements

4.61 The House of Representatives Report observed that the legislative basis and organisational structure of the regional bodies varies considerably across the states and suggested there could be some merit in introducing national consistency in this respect.[34]

4.62 However, this did not emerge as a concern in this inquiry. In fact, from a WA perspective Councillor Clive Robartson from WALGA argued against consistency on the grounds that the broader political and regulatory environments were different across states:

> I would not like to see statutory CMAs being put into place in Western Australia, because the situation here is different to what is happening in the eastern states. … I was on the Australian Landcare Council for a period of time, representing the Australian Local Government Association, so I had a bit of feedback and liaison with people from particularly New South Wales with their CMA—Catchment Management Authority, or whatever they are called—and it struck me that that probably fitted New South Wales quite well. There seems to be greater political influence in local governments in New South Wales, so there is a different understanding. There is a different approach to local government. That does not happen as much in Western

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31 Mr Roger Wickes, *Committee Hansard*, 16 November 2005, p. 15.

32 Australian Conservation Foundation, *Submission 19*, p. 12.

33 ALGA, *Submission 13*, p. 3.

34 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity*, May 2004, p. *xxxiii.*

> Australia. We tend to work together in local governments in a different way and so encouraging voluntarily involvement, I think, is important for Western Australia, at this point anyway.[35]

4.63 Given the lack of evidence, it is difficult for the Committee to assess the extent to which legislative consistency and greater legislative support across the states is possible and desirable. Any move to reform the broader governance structures of regional bodies is, perhaps, best determined on a state-by-state basis. In this way, arrangements can be introduced that take into account the existing governance structures, relationships between state and local governments and the regional bodies, and the level of maturity of regional bodies. The starting point for reform should be: how can we best deliver the desired NRM outcomes in this state, under these conditions?

Other Issues

4.64 Not withstanding the support for the concept of the regional model discussed earlier, a number of concerns about the regional model in practice emerged during the course of the inquiry.

Uneven capacity of regional bodies

4.65 Evidence revealed a significant concern about the uneven capacity of regional bodies both across and within states. While there is general appreciation for the concept of a regional model, in practice performance to-date has been variable. Greening Australia observed that those regional bodies functioning effectively have built on existing 'local knowledge, skills and experience'. At the same time, other regional bodies have 'returned to first principles' prolonging the planning process at the expense of on-ground action.[36]

4.66 Within the Queensland context, the Local Government Association of Queensland reported that local government councils were concerned that there was a 'general lack of capacity of the regional bodies to effectively undertake the required tasks'.[37]

4.67 The CRC for Plant-Based Management of Dryland Salinity conveyed its support for the regional model and noted the potential of regional bodies, while highlighting their uneven ability. This variation in capacity was viewed as a product of the differing stages of development or maturity of regional bodies across the states:

> We are committed to supporting the regional delivery model for national programs, and increasingly are working with catchment management authorities on R&D delivery. Importantly regional bodies have the potential

35 Councillor Clive Robartson, *Committee Hansard*, 18 November 2005, pp 80-81.

36 Greening Australia, *Submission 16*, p. 3.

37 Local Government Association of Queensland, *Submission 8*, p. 2.

> to draw together sound science, National/State priorities and community preferences into a rational investment process and should be given time and a relatively stable policy environment in which to work. However, we observe that their capacity to meet program and community expectations is uneven across Australia, reflecting an 'evolutionary process' from differing State/Territory starting points.[38]

4.68 Similarly, Mr Corey Watts from the Australian Conservation Foundation noted 'a great deal of variety in the quality of regional delivery' and argued that 'decision-making tools' were needed across all regions to enable a strategic approach and enhance the capacity to engage landholders and other groups.[39]

4.69 Along these lines, Dr Prosser from the CSIRO told the Committee, 'We believe that regional authorities have a crucial role to play in salinity management, but they have widely ranging capacities to meet their goals'. He went on to explain that many regional bodies do not have the requisite skills to apply current research to local conditions:

> [T]here are significant technical challenges in assessing how to manage salinity in each catchment. Techniques are available to identify the assets for protection, the salt sources and the flow pathways and to design the management options. Research in these areas is continuing to provide more accurate and sophisticated techniques. … However, our experience is that the use of that research is limited, because it requires translation to be relevant to local conditions. The general principles are understood, but their application to each local condition needs to take into account the local environment and the local cause and effect relationships of salinity. That requires expert interpretation of those general principles using the local knowledge. Many regional groups have not developed those skills to date. They do not have the skills amongst their staff to do that.[40]

4.70 When questioned further about the reasons for the uneven capacity of regional bodies and whether it was funding levels or other factors driving their level of performance, Dr Prosser responded in the negative:

> No, it is about their capacity, it is about their skill levels and it is about their youth as institutions. A lot of these regional groups are fairly young institutions. The longest existing ones are the Victorian CMAs, and they are the most sophisticated. I do not believe that is a coincidence. It is just the time it takes to develop up that regional scale, the thinking and the tackling of these problems in a strategic way to develop other skills in house.[41]

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38 CRC for Plant-Based Management of Dryland Salinity, *Submission 18*, p. 2.

39 Mr Corey Watts, Acting Manager, Land and Water Program, ACF, *Committee Hansard*, 28 February 2006, p. 27.

40 Dr Ian Prosser, *Committee Hansard*, 6 September 2005, p. 30.

41 Dr Ian Prosser, *Committee Hansard*, 6 September 2005, p. 33.

4.71 Mr Leslie Roberts from the Murray-Darling Basin Commission, which deals with 20 regional bodies in the Murray-Darling region, similarly expressed the view that funding levels was not the problem.[42]

4.72 In accord with the views put forward by the CRC for Plant-Based Management of Dryland Salinity and the CSIRO, Mr Matthew Kendall from the Murray-Darling Basin Commission pointed out that there is a strong correlation between the maturity of regional bodies and their capacity for a coordinated and integrated approach:

> Looking at the Victorian example, where they have had catchment groups in place for 10 years or more, there has been an increasing level of coordination, to the degree where there is very good integration between the state government, those catchment groups and the Commonwealth through the national action plan. Certainly the independent audit group has reflected on the differing stages that each state is at in terms of its catchment bodies. Some are much newer—for example, Queensland.[43]

Delays in on-ground action

4.73 A concern raised by Greening Australia was the amount of time taken for regional bodies to prepare their catchment strategies. While noting that this is 'an undeniably difficult and complex task', Greening Australia stated:

> Our core submission is that the tasks of strategic planning and on-ground action need to be more effectively linked. This requires a framework for empowering action and then learning from the results. This will require increased devolution of budgets and decision-making and improved monitoring and evaluation to assess the effectiveness of alternative approaches.[44]

4.74 Similarly, the Local Government Association of Queensland suggested that 'excessive strategic planning is limiting funding for on-ground projects'.[45]

4.75 The ANAO audit of the NAP reported that in many regions comments had been made about the challenges of the planning process by regional bodies, state agencies and research institutions. Again, this varied depending on the stage of development of the regional body. Newly established organisations were restricted by a lack of research material and data. Established organisations were able to draw on existing resources and, for some, existing plans. The report further noted that the

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42 Mr Leslie Roberts, *Committee Hansard*, 6 September 2005, p. 39.

43 Mr Matthew Kendall, *Committee Hansard*, 6 September 2005, p. 40.

44 Greening Australia, *Submission 16*, p. 3.

45 Local Government Association of Queensland, *Submission 8*, p. 2.

degree of (geographical) access to research institutions impacted on the planning process.[46]

Getting beyond the local

4.76 The Centre for Salinity Assessment and Management, University of Sydney, pointed to a potential downside or risk in the local nature of the regional delivery model. Without diminishing the value of local knowledge and activities, the Centre argued for the importance of ensuring CMAs tap into current research being carried out at a national and even international scale:

> … there are risks in CMAs primarily focusing on local and community-based activities, including local knowledge not being linked with the best contemporary national and international research, and not giving appropriate weight to scientific endeavours. It is also important to recognise that natural resource management problems in Australia are too large to be solved by local scale activities alone …[47]

4.77 The need for regional bodies to have improved access to current research was a major concern raised in the inquiry. This is discussed in more detail in Chapter 5.

Improving the accreditation process

4.78 The CRC for Plant-Based Management of Dryland Salinity emphasised the role that a strong accreditation process can play in achieving consistent, quality standards of NRM program delivery. It was argued that the accreditation process needs to be strengthened, with particular attention directed towards mechanisms that enable sound investment decision-making. The need for guidance and support for regional bodies in meeting strengthened accreditation requirements was noted:

> A stronger accreditation process is required, making funds conditional on use of a rigorous approach to selection of investments by regional bodies. Investment decisions should be (a) science-based, (b) outcome-focused and (c) designed around an understanding of landholder adoption of conservation technologies. For instance, use of conventional decision tools such as benefit/cost analysis should be expected. There should be guidelines and training support for regional bodies in the use of such an approach to investment. The principle of adaptive management is important here – the measure of achievement should not be "dollars out the door by 30 June" but the level of confidence that investment will realize maximum impact over time, in the face of changing economic and environmental conditions.[48]

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46 Australian National Audit Office (ANAO), *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-05, p. 55.

47 Centre for Salinity Assessment and Management, *Submission 17*, p. 1.

48 CRC for Plant-Based Management of Dryland Salinity, *Submission 18*, p. 1.

4.79 At a public hearing in Perth, Mr Goss, CEO of the CRC, expanded on the CRC's concerns noting that an improved accreditation process would help to bring into line the performance of regional bodies in terms of governance, planning, and investment decision-making, and counteract some of the teething problems of the NAP and NHT:

> On the matter of accreditation, this is really an acknowledgment that the regional bodies are still evolving—and that is uneven across Australia—and also that the National Action Plan for Salinity and Water Quality and the Natural Heritage Trust themselves are programs that have only a few years behind them, and they have gone through some pretty painful iterations in settling things down.
>
> The accreditation process becomes very important in not only starting to bring in governance for investment of this scale, but also in starting to bring in some consistency, and even some learning behind it, so that the groups that have different starting points start to get to a level of common good planning, good governance and good investment behaviour. We see accreditation, and in fact benchmarking and performance, as very important means to that end.[49]

4.80 Commenting on the state of play as at late 2004, the ANAO Audit Report noted that the quality of accredited regional plans was variable, which could, in turn, impact on the timing and quality of outcomes.[50] This variability undermines the intent of the accreditation process, which was introduced to provide quality assurance and, concomitantly, consistency.

Relationships with Other Players

4.81 As noted above, one of the perceived advantages of the regional delivery model is the access to local knowledge, expertise and need. Regional bodies are positioned to engage with landholders, environmental groups, industry bodies, Commonwealth, state and local governments, Indigenous communities, and science-research communities. Central-West CMA, NSW, made the observation that 'You need to engage people to create change'.[51]

4.82 It was pointed out to the Committee, however, that this engagement at the local level is also one of the major challenges for regional bodies. The Avon Catchment Council, WA, made the general point that regional bodies have many stakeholders to liaise with and many different – and sometimes competing – interests to weigh up; this is a 'difficult and complex task'.[52]

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49 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 19.

50 Australian National Audit Office (ANAO), *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-05, p. 64.

51 Central West CMA, *Submission 9*, p. 3.

52 Avon Catchment Council, *Submission 42*, p. 1.

4.83 Mrs Elizabeth Eaton, Chair of the Northern Agricultural Catchment Council, also noted the challenge faced by regional bodies in accommodating different interests:

> In terms of on-ground delivery, there can be some tensions between a technical assessment of what will make a difference to the natural resource as opposed to what land-holders might see as being a more productive response. Regional groups again are charged with being able to find a pathway that achieves the required difference to the natural resource and encourages sufficient private investment to contribute to that difference. That is one of the challenges of the strategy and investment planning process.[53]

4.84 Particular relationships were highlighted in the evidence received:

- relationships between regional bodies;
- relationships between regional bodies and local government;
- relationships between regional bodies and industry groups; and, more broadly,
- the capacity of regional bodies to engage the community.

These are discussed below.

Relationships between regional bodies

4.85 Mr De Landgrafft from the WA Farmers Federation told the Committee that communication between regional bodies needs to improve if the salinity programs are to be successful:

> The real success of these programs will come by tackling some very major projects. To that end, these catchment groups have to talk to each other a little bit more, too. I am aware of one example where the Avon Catchment Council through its drainage corner, if you like, is very keen on the Swan River project, but I have heard some very senior people in the Swan Catchment Council saying, 'Over my dead body.' There needs to be a lot of communication internally as well as externally, and some cooperation in delivering outcomes.[54]

4.86 This observation is a reminder that, to some extent, regional boundaries are artificial when it comes to salinity management. In some cases, cross-catchment work may need to be undertaken. In NSW, for example, Mr Neville Pavan from the Hawkesbury-Nepean CMA told the Committee that the CMA was working collaboratively with other CMAs from neighbouring regions to address salinity issues in the adjoining areas.[55] In other cases, action taken in one region could have impacts on land and water quality in another region – construction of deep drains and potential

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53 Mrs Elizabeth Eaton, *Committee Hansard*, 18 November 2005, p. 37.

54 Mr Trevor De Landgrafft, *Committee Hansard*, 18 November 2005, p. 57.

55 Mr Neville Pavan, *Committee Hansard*, 14 October 2005, p. 62.

downstream effects for example. For these reasons, good communication between regional bodies is important.

4.87 As noted earlier, the ACT, whilst a region in its own right, is also located within the Murrumbidgee Catchment region. Dr Maxine Cooper from the ACT Chief Minister's Department told the Committee that being the 'hole in the doughnut', working cooperatively with the Murrumbidgee CMA is important. She explained: 'environmental issues do not respect any political jurisdiction'. As a result, the ACT regional body and the Murrumbidgee CMA are developing a memorandum of understanding to underpin their relationship.[56]

4.88 Sound communication between CMAs can also lead to exchange of information, circumventing the problem of 'reinventing the wheel' or duplicating effort. In their submission Hunter-Central Rivers CMA suggested that a framework for communication between CMAs – a 'framework that facilitates exchange of salinity information' – would lead to improved use of investment.[57]

4.89 Mr Aldred from the Department of Agriculture, Fisheries and Forestry, told the Committee that as the regional groups are maturing, communication and information exchange between them is increasing. He further explained that the Australian and state/territory governments are providing more forums for regional bodies to formally meet and exchange ideas and concerns and provided examples of this kind of activity.[58]

Relationships between regional bodies and local government

4.90 Local Government has the capacity to play a significant role in salinity and broader natural resource management. The Australian Local Government Association explained that councils can undertake a range of tasks to help regions meet their salinity targets, for example, modifying watering of parklands and reserves to reduce saline discharge and recharge, and taking on an educative role with the community.[59]

4.91 The Australian Conservation Foundation (ACF), outlined the broad range of policy tools that local government can use to contribute to natural resource management:

- Land-use planning
- Development approvals
- Public land management

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56 Dr Maxine Cooper, Executive Director, Arts, Heritage and Environment, Chief Minister's Department, ACT, *Committee Hansard*, 28 February 2006, p. 14.

57 Hunter-Central Rivers CMA, *Submission 2*, p. 2.

58 Mr Tom Aldred, Executive Manager NRM, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 28 February 2006, pp 40-41.

59 Australian Local Government Association, *Submission 13*, p. 3.

- Infrastructure management
- Financial incentives
- Management agreements
- Revolving funds
- Joint NRM Authorities
- Environmental levies
- Financial management assistance
- Community capacity building and networks
- Direction and leadership[60]

4.92 A major concern expressed by the ALGA was that there has been a lack of coordination between regional bodies and local government leading in turn to a lack of congruence between regional and local plans. It was clear from the ALGA's comments that local government should be involved in the regional planning process and not simply the implementation process:

> To date there has been a lack of effective local government involvement in the regional arrangements. A recent ALGA Natural Resource Management (NRM) survey of councils suggested that while 73 per cent of councils had attended briefings by their regional organisations, only 12 per cent had actually contributed to their regional plan. This is not effective engagement and will not result in local and regional plans being compatible. As a result, optimal environmental outcomes can not be achieved.[61]

4.93 However, the ALGA went on to say they imagined a more productive relationship in the future as regional bodies moved into the implementation stage. Greater consultation and collaboration would, it was suggested, minimise duplication:

> We would anticipate that as the regions move from a planning phase into an implementation phase, greater consultation with local governments will occur. This will reduce duplication and will result in good partnership projects to reduce salinity levels. Catchment management authorities need to understand the role councils play in environmental management and the benefits of working with councils to achieve environmental goals, such as reduced salinity.[62]

4.94 The Local Government Association of Queensland (LGAQ) submitted that member councils of LGAQ who were represented on regional boards were generally satisfied with the regional process. Those councils with no direct board involvement, in the main, did not share this satisfaction. Some of the concerns put forward were:

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60 Taken directly from the Australian Conservation Foundation, *Submission 19*, p. 50.

61 Australian Local Government Association, *Submission 13*, p. 2.

62 Australian Local Government Association, *Submission 13*, p. 2.

'lack of appreciation of local government roles and responsibilities to influence natural resource management', 'lack of understanding and skill to effectively engage Councils' and 'confusion over regional boundaries with some councils included in 3 different regions'.[63]

4.95 Mr Malin from the Western Australian Local Government Association told the Committee that within WA local government representation on the regional bodies had improved.[64] However, Councillor Robartson observed that it would have been beneficial to have greater local government involvement from the outset.[65] He went on to explain that a move in WA to establish regional local government structures would better place local government to actively engage in regional natural resource management.

4.96 In SA, a proactive and considered approach was taken to ensuring local government involvement from the beginning. Mr Wickes from the Department of Water, Land and Biodiversity Conservation said that local government was involved in developing the legislation to underpin the regional model. Further, local government representation is achieved through designated observer positions on the NRM boards. However, Mr Wickes explained that the process of securing broad local government involvement is ongoing, with some Councils actively involved while others are less interested:

> The Local Government Association helped us to draw up the legislation and actually sat here in this house the whole time it was debated to help us with it. Built into it is quite a strong relationship with local government. The issue, of course, is maintaining that relationship. Local government here have always looked after quite strongly the animal and plant control and feral side of it, and they are all very keen to get into the broader natural resources debate. As we have said, some councils have taken that on very strongly, whereas others have not. The challenge now is to get all those local governments to embrace that. The rural areas are probably more around it than the Adelaide type councils. But it is on the local government agenda; it is quite regularly on the agenda of the local government forum with our minister—in fact, it is on the agenda for the next forum. So it is something that we are trying to build up. People with local government experience are members of the NRM boards, and each board can have on it a person representing local government, like a chief executive, who is not a voting member but partakes in all the meetings. We are trying to make that a stronger relationship, and there are quite a number of forums going on at the moment where the NRM, the natural resource management, chair and the executive officer are meeting with all the local governments.[66]

63 Local Government Association of Queensland, *Submission 8*, p. 2.

64 Mr Nathan Malin, *Committee Hansard*, 18 November 2005, p. 79.

65 Councillor Clive Robartson, *Committee Hansard*, 18 November 2005, p. 79.

66 Mr Roger Wickes, *Committee Hansard*, 16 November 2005, p. 15.

4.97 Regional body responses to the issue of local government engagement were varied. Some described a strong and engaged relationship with local governments in their region. For example, Namoi CMA, NSW, talked positively of their relationship with local government. In a supplementary submission they stated: 'Local Government is very supportive of work carried out by the CMA and provides resources and time'.[67]

4.98 Similarly, Mr Gledhill from the Lachlan CMA told the Committee that local government 'has taken us on 100 per cent' and explained the CMA has formed a reference group with local government partners.[68]

4.99 Mr Dan Meldrum from the River Murray Catchment Management Board in SA told the Committee that their organisation had a 'reasonable level of understanding' of local government's policy and regulatory roles in NRM and that communication between the regional body and local government was good.[69]

4.100 On the other hand, as discussed in Chapter 3, a regional body in NSW expressed concern about local government's lack of understanding about - or lack of willingness to - take into account, salinity management issues in relation to urban development of rural lands.[70] This observation highlights the need for a willingness by all stakeholders to engage with the challenge of salinity.

4.101 Like the ALGA, the Australian Conservation Foundation (ACF) stated that the potential of local government in NRM is not adequately harnessed. However, ACF was quite critical of local government's role in contributing to this state of affairs:

> The potential NRM capacity of local municipalities remains grossly untapped, and the linkages between regional NRM and investment plans appear to be weak for the most part. ACF's consultations with representatives of several regional NRM organisations reveal a high level of frustration with local government involvement (or lack thereof) in the regional planning process is very common. At best, local government support for integrated catchment management and sustainable land use is variable; at worst local government obstinacy and ignorance of the principles of Integrated Catchment Management can make the efforts of regional-catchment planners a waste of time.[71]

4.102 The Committee believes that the regional bodies are best-placed to be the primary managers of NRM as this is their specific function and area of expertise. However, clearly local government has a strong role to play. As discussed in the previous chapter and noted above, the Committee heard concerns that some local governments do not adhere to NRM principles in their planning decisions and other

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67 Namoi CMA, *Submission 25a*, p. 1.

68 Mr Robert Gledhill, Chair, Lachlan CMA, *Committee Hansard*, 28 February 2006, p. 30.

69 Mr Dan Meldrum, *Committee Hansard*, 16 November 2005, pp 48-49.

70 Hunter-Central Rivers CMA, *Submission 2*, p. 2.

71 Australian Conservation Foundation, *Submission 19*, p. 51.

processes. In light of this, the Committee believes that local government peak bodies and individual councils should direct more attention to strengthening local government's NRM practices and integrating local government processes with those of the regional bodies.

4.103 Local government involvement in the management of salinity was a major issue that emerged in the inquiry. In the previous chapter the following issues were discussed within the context of the governance framework for national programs: lack of clarity around the roles and responsibilities of local government and regional bodies, and the use of planning powers. In Chapter 6 the role of local government is again addressed within the context of urban salinity. The Committee notes that while there is a clear need to better integrate local government and regional body processes, there were also impressive examples presented to the Committee of local government, regional bodies and other stakeholders working collaboratively and productively together. Some of these examples are outlined in Chapter 6.

Relationships with industry

4.104 Encouraging industry engagement in salinity management was an issue raised during the inquiry and in the House of Representatives Report. At a regional level, the importance of developing partnerships with private sector players was brought to the Committee's attention.

4.105 The Namoi CMA submitted that focusing on developing regional partnerships – particularly with agribusiness – will be important in achieving 'on-ground change'.[72] Mr Truman from the CMA explained to the Committee that:

> There is an opportunity for joint funding here between the CMA and agribusiness to try and extend the money that we have for our incentives. Although we have only had a limited budget initially, if we can develop some partnerships there then we may be able to extend our funding and our ability to do our on-ground works longer.[73]

4.106 Mr Meldrum from the River Murray Catchment Management Board in SA agreed that there was a need to develop regional partnerships and that good communications networks were critical to achieving this:

> I think effective communication networks are the key. We seem to be going down that path at the moment. We are in the process of establishing a resource information centre for the South Australian Murray-Darling that Minister Maywald will be launching next week. Basically, that initiative is to share information between natural resource management agencies and industry groups to have multiple use of the same information so that they

72 Namoi CMA, *Submission 25*, p. 2.

73 Mr George Truman, *Committee Hansard*, 14 October 2005, p. 28.

> are sort of managing issues jointly. Regional development boards and the Department of Trade and Economic Development are part of that as well.[74]

4.107 The Committee was encouraged to hear that some regional bodies are actively seeking to build partnership with industry in order to fund necessary salinity management projects. In regional New South Wales the Committee heard from the Lachlan CMA who told the Committee that they had been very successful in leveraging $16 million in non-government money:

> [W]e are just about to sign off on our 1,000th project in the Lachlan catchment in the last 18 months, which roughly totals $30 million. The important message there is that out of that $30 million $14 million has been provided by the New South Wales state government and the Commonwealth government. The other $16 million is private money that has come in from outside, and the list of people who have been putting those dollars in is in the papers we have provided. They are people like TransGrid, Country Energy and local government. I think that is an important message: that for every dollar the government is putting in we are managing to get outside dollars in as well.[75]

The Committee concurs with Mr Gledhill that this is indeed an important message.

Community engagement

4.108 The WA Farmers Federation registered its support for the role of regional bodies but expressed concern that not all regional groups were effectively engaging with the community – in particular, with landholders. This was seen to lead to an imbalance in the decision-making process and, in turn, the outcomes sought:

> WAFarmers supports the roles of regional catchment management authorities. The major criticism that WAFarmers has of the regional catchment management authorities is the lack of community awareness of what their role is and what activities they are undertaking. Whilst one group's communication is very good, others range from basic to non existent.
>
> Given this uncertainty, community concern is being expressed over a perceived focus on biodiversity outcomes as opposed to sustainable farming and salinity control outcomes.
>
> A perception also exists of excessive Government agency influence in group decision making processes, particularly when these agencies may be competing for project funding.
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> These perceptions highlight a major shortfall in this process. There is an urgent need to engage more landholders in the process.[76]

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74 Mr Dan Meldrum, *Committee Hansard*, 16 November 2005, p. 49.

75 Mr Robert Gledhill, *Committee Hansard*, 10 February 2006, p. 29.

76 WA Farmers Federation, *Submission 41*, p. 3.

4.109 This concern was reiterated by Mr Binning, CEO of Greening Australia:

> The critical comment I would make is that if you did a survey of land managers in most regions of Australia they would be unaware of what the regional process is doing. They would have a fair degree of uncertainty and fear around that process.[77]

4.110 In the 2005 report by the Regional Implementation Working Group, *Regional Delivery of NRM – Moving Forward*, the difficult task for regional bodies in keeping community groups engaged in planning and development of investment strategies was noted. The report indicates that some community individuals and groups have felt marginalised in the regional process.[78]

4.111 As noted in the previous chapter, the River Murray Catchment Water Management Board identified three challenges in building community trust and securing ongoing community engagement: prior poor consultation between government and the community; lack of continuity in funding streams from one program to the next; and limited time/resources for landholders and other community members to take part in activities.[79]

4.112 The Australian Conservation Foundation submitted that the Landcare movement and other community networks have not been adequately supported or harnessed in the move to a regional delivery model for NRM:

> … the regional NRM processes are largely bypassing Landcare and other community networks. The sense in Landcare circles is that, if this is the case, Landcare has no option but to 'go its own way;' regardless of the directions and priorities of the regional bodies. What is striking is that this view seems to be shared even by many of those Landcarers on regional and catchment boards, and others in the movement, most of whom seem to see the potential in the regional model.[80]

Another layer of bureaucracy?

4.113 An issue potentially inhibiting community engagement is that regional bodies are viewed by some sections of the community as another layer of bureaucracy and not embedded in the community. The Regional Implementation Working Group observed:

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77 Mr Carl Binning, *Committee Hansard*, 28 February 2006, p. 20.

78 Department of Agriculture, Fisheries and Forestry and Department of Environment and Heritage, *Submission 24*, Attachment I, p. 18.

79 River Murray Catchment Water Management Board, *Submission 45*, pp 1-2.

80 Australian Conservation Foundation, *Submission 19*, p. 48.

> Some community groups have perceived regional organisations as just another level of bureaucracy remote from the 'real' community.[81]

4.114 This was certainly a view expressed by the Wheatbelt Drainage Alliance – a group of land managers in WA's wheatbelt, committed to putting forward land manager concerns to the state and federal governments. In their submission, they characterised the regional delivery structure as follows:

> … a new level of bureaucracy that has no structure or line of command with a top down approach ignoring long established sub regional and structured groups within the region.[82]

4.115 The Pastoralists and Graziers Association, WA, argued that many landholders did not feel a part of the regional planning processes, which could lead to the view that regional bodies are another tier of bureaucracy. The need for the regional groups to remain community-based was emphasised:

> The Regional catchment management groups have the potential to be very valuable or detrimental to the fight against salinity. The "Decade of Landcare" program has created a groundswell of grass roots support for salinity management. The development of the strategies and investment plans by these groups is a long and complex process and many landholders feel detached from the process and therefore often the catchment groups themselves. This leaves the potential for the catchment groups to be seen as bureaucracies by the land mangers, which would work against the goodwill and support that the land managers have for salinity management. These groups must remain community based so that they reflect community perceptions and aspirations. The groups need to be clearly separated from the government agencies and their directives to avoid the perception of a bureaucracy.[83]

4.116 As noted in Chapter 3, the ALGA suggested that granting regional bodies legislative powers would increase community perception that they were another bureaucratic layer.

4.117 Mrs Elizabeth Eaton, Chair of the Northern Agricultural Catchments Council, raised this issue within the context of the WA review of governance arrangements of regional bodies. She noted that not all sections of the community are supportive of potential moves to strengthen the corporate governance requirements of regional bodies to bring them in line with corporate boards. While the rationale underpinning any such move is to ensure greater accountability, for some, more rigorous requirements are seen to be a form of bureaucratisation:

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81 Department of Agriculture, Fisheries and Forestry and Department of Environment and Heritage, *Submission 24*, Attachment I, p. 18.

82 Wheatbelt Drainage Alliance, *Submission 44*, p. 6.

83 Pastoralists and Graziers Association, *Submission 4*, p. 2.

> I have been a member of that governance review committee where regional groups are being compared roughly to boards of organisations and expected at that level to demonstrate the kind of accountability that you would expect of a board.
>
> In the subset of regional groups that they used for the study, they found all regional groups were demonstrating at least satisfactory performance on that issue and that a couple of them were actually at better practice. There is a clear expectation with the expenditure of government funding that we have that level of accountability and transparency of operations. Some portions of our community are not overly comfortable with that approach and will say that we are becoming bureaucratic. We do get a bit caught in that parcel of criticism and I think the community groups are committed to making sure that their operations are transparent to gain the confidence of the government in our operations.[84]

4.118 The Committee understands the importance of community-based NRM planning. However, the Committee does not hold to the view of community members, reported by Mrs Eaton above, that strengthened corporate governance amounts to bureaucratisation. Rather, the Committee supports robust corporate governance arrangements to ensure accountability for public funds, providing requirements are not disproportionate to the size and complexity of the organisation.

Ensuring a representative mix in NRM Planning

4.119 The Committee appreciates the challenges that regional bodies face in engaging a diverse set of stakeholders with a sometimes diverse set of interests. However, given that regional planning is, by design, community driven, the Committee stresses the importance of ensuring that all relevant stakeholder group interests are represented in a balanced way.

4.120 Several examples of good practice in community engagement were provided to the Committee during the inquiry.[85] The Committee suggests it would be beneficial to systematically gather mechanisms for stakeholder input from across the states so that the most effective mechanisms can be adopted in less successful jurisdictions. A balanced mix of stakeholder input though formal mechanisms should be continued and encouraged.

4.121 The Committee notes that board representation is one mechanism through which broad stakeholder representation is currently achieved in some jurisdictions,

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84 Mrs Elizabeth Eaton, *Committee Hansard*, 18 November 2005, p. 37.

85 See for example, Department of Agriculture, Fisheries and Forestry and Department of Environment and Heritage, *Submission 24*, Attachment I, pp 19-21. Good practice examples in the following areas are provided: an innovative community engagement plan, a Dairy Australia initiated program to bridge the gap between NRM plans and land manager interests, and Queensland's regional approach to Indigenous engagement. See also, Glenelg Hopkins CMA, *Submission 7*, p. 4, for details of consultation actions for developing their Salinity Plan.

while in other states boards are merit-based. In light of concerns expressed about the adequacy of the corporate governance arrangements of some regional bodies (discussed below), the Committee warns of the challenges in using a representative board model as a means of securing broad community input. Representative board members can face significant challenges in balancing sectional interests with their governance (fiduciary) duty to act in the interests of the organisation as a whole. Additionally, representative boards have a tendency to be large (to accommodate all stakeholder groups), which can, in turn, lead to inefficient decision-making.

Resourcing and Support

4.122 Given the uneven capacity of regional bodies reported by several witnesses (discussed above) it is clear that more support and guidance for regional bodies is required.

4.123 This is consistent with the ANAO Audit Report, which presented findings of a survey with regional bodies showing that 54% disagreed or strongly disagreed with the statement: 'In shifting to the regional delivery model for the NAP and other initiatives, adequate guidance and information was provided to assist regions in dealing with increased workload and responsibilities'.[86] The Report also revealed concerns about ongoing support:

> Regions in particular have commented about the shortcomings in the level of ongoing support in the preparation of regional plans.[87]

Corporate governance guidance

4.124 Mr Andrew McMillan from the WA Farmers Federation told the Committee of early concerns from regional bodies in WA about their ability to manage the new programs. Specifically, unease was expressed about their standards of corporate governance:

> I have only been in the state for a handful of years, but I have been here since the NRM groups were first kicked off. My first introduction was at a seminar in Fremantle where Sir James Hardy and the group that was overseeing the whole program came across. I think four of the groups presented and, at the end of it, every one of those groups said, 'We have a real issue in our ability to manage the corporate governance of these schemes.' It was a cry for help. But when the bureaucrat summarised at the end of the day, it seemed he must have been in a different room because he certainly did not hear that.

86 Australian National Audit Office (ANAO), *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-05, p. 97.

87 Australian National Audit Office (ANAO), *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-05, p. 59.

> Since then I think these groups have been struggling to come to terms with the role, the accountability, the legal implications of what is required in managing considerable amounts of taxpayers' funds.[88]

4.125 Similarly, concerns about the standards of corporate governance at the regional level were also reported following the ANAO audit of the NAP. The ANAO Report referred to a 2003 report by the Victorian Auditor-General, which noted concerns surrounding corporate governance for the State CMAs. The Victorian report highlighted a lack of knowledge and experience of financial management at the board level. The ANAO expressed concern about these findings given that the Victorian CMAs are advanced in relation to other states/territories.[89]

4.126 The ANAO put forward a recommendation that corporate governance templates and relevant training to ensure regional bodies meet acceptable standards of corporate governance be introduced.[90] The Regional Implementation Working Group similarly proposed that guidelines on best practice in governance and accountability be developed.[91]

Access to research and data

4.127 A major theme that emerged during the inquiry was inadequate access to, or capacity of regional bodies to access, latest science and research findings. Enhancing the capacity for regional bodies to incorporate good science into their regional plans through adequate support was directly addressed in the House of Representatives Report in recommendations one, three and fifteen. This issue is addressed in Chapter 5.

Financial Support

4.128 At a public hearing in Perth, Mr Bradley, CEO of the Northern Agricultural Catchments Council, told the Committee that he had undertaken an analysis that showed the Council was only receiving 10% of the funding needed to effectively manage NRM in the region.[92] Mrs Eaton, Chair of the Council, explained that this made prioritising of investment – in particular, weighing up competing interests – very challenging.[93] Mr Bradley's and Mrs Eaton's comments highlighted the need for

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88 Mr Andrew McMillan, *Committee Hansard*, 18 November 2005, pp 54-55.

89 Australian National Audit Office (ANAO), *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-05, pp 82-83.

90 Australian National Audit Office (ANAO), *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-05, p. 84.

91 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 5.

92 Mr Alan Bradley, *Committee Hansard*, 18 November 2005, p. 42.

93 Mrs Elizabeth Eaton, *Committee Hansard*, 18 November 2005, p. 42.

the careful prioritising of investment and tools to assist regional bodies in achieving this.

4.129 The Avon Catchment Council submitted that broadly the 'true cost of managing salinity' was not covered by existing funding. However the Council reflected positively on the financial support at a regional level:

> The financial support available through the National Action Plan for Salinity and Water Quality (NAP) and the Natural Heritage Trust (NHT) is highly effective and highly targeted at regional priorities for salinity management. Both programs are integrated with the regional strategic and investment planning process and have enough scope to enable effective salinity management programs to be developed and implemented.[94]

4.130 Namoi CMA in NSW expressed concern about the impacts of required monitoring and evaluation on the CMA's resources:

> Expensive monitoring and evaluation requirements are time consuming and are heavy resource users. CMA's are small entities with limited resources. [95]

4.131 Mr Bugden from Murrumbidgee CMA noted the time, energy and resources needed to fulfil the different financial reporting requirements of the state and Australian governments.[96]

4.132 As discussed in the previous chapter, the most pressing issues raised were short funding cycles and funding security beyond 2008.

4.133 As discussed in Chapter 3, some regional bodies raised concerns about the prioritising of funding under the NAP. Mr Neville Pavan from the Hawkesbury-Nepean CMA told the Committee that not all CMAs have access to adequate financial support because their region was not designated a priority area under the NAP:

> [A]ll catchment management authorities do not have the financial support to effectively manage salinity. The Hawkesbury-Nepean catchment, which includes Sydney's drinking water catchment and the rapidly expanding development of Western Sydney, is not designated as a national action plan priority area. This means that the Hawkesbury-Nepean Catchment Management Authority has limited access to funding to address rural and urban salinity issues.[97]

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94 Avon Catchment Council, *Submission 42*, p. 2.

95 Namoi CMA, *Submission 25*, p. 2.

96 Mr Gregory Bugden, Business Manager (Investment), Murrumbidgee CMA, *Committee Hansard*, 28 February 2006, p. 25.

97 Mr Neville Pavan, *Committee Hansard*, 14 October 2005, p. 59.

Conclusion

4.134 The Committee heard substantial evidence that there is strong support for the regional delivery model. However, there were significant concerns expressed about the uneven capacity of regional bodies across the country to effectively plan and achieve salinity management outcomes. The major impediments identified were:

- inadequate standards of corporate governance
- an inadequate accreditation process
- limited ability to apply research at a catchment level
- insufficient access to local current data.

4.135 The Committee notes that these concerns largely reflect those expressed in the ANAO audit report of the NAP, and the Ministerial Council's Regional Implementation Working Group Report.

4.136 The Committee was particularly concerned about the last two of the above dot points: limited ability to access research and insufficient access to local data. These two issues are considered in more detail in the following chapter within the context of a discussion on supporting and communicating research.

4.137 Ensuring all relevant players are adequately engaged in the regional planning and implementation process emerged as another area requiring greater attention. In particular local government involvement in salinity management, and NRM more broadly, is an area that requires greater attention.

Chapter 5

Supporting and communicating the research

> There is no silver bullet solution and the wide range of information on salinity can be confusing for land managers. The development of productive and effective management tools requires ongoing local research and development, coupled with good extension activities. The co-ordination of research would streamline the path from the plot to the paddock and increase the efficiency of delivery.[1]

Supporting the research

5.1 As discussed in Chapter 3, the major NRM programs are directed towards developing a coordinated approach to deliver programs and funding directly to land mangers on the ground. However, behind these programs there must be sound salinity science. The House of Representatives Report discussed in detail the salinity science base (chapter 4). This report does not intend to go over the same ground. In this chapter the Committee identifies a number of key areas where the effectiveness of NRM programs may be hampered by current aspects of salinity science and research. These include:

- the need for research to be conducted and connected across a range of scales;
- the need for national standards and protocols for research and information management;
- the need for more effective coordination and communication of research; and
- the need for more research and data in key areas: salinity risk mapping and profitable salinity management solutions.

Research scale

5.2 There is a wide range of stakeholders with an interest in, and responsibility for, salinity management. These range from individual farmers to larger regional bodies and industry groups. Each group has different requirements for salinity science and information. The Committee heard significant evidence that suggests there is a need for science to be translated across a range of scales. The CSIRO submitted:

> While there is often detailed knowledge of specific research subjects and sites, and knowledge of broad scale processes, there are significant challenges in integrating current knowledge across the range of scales needed to apply it to landscapes, regional and paddock scales. It is not surprising that both practitioners and users of science are having difficulty

1 Pastoralists and Graziers Association, *Submission 4*, p. 2.

> coming to grips with the complexities of managing both natural and developed ecosystems.[2]

5.3 The ANAO audit of *The Administration of the National Action Plan for Salinity and Water Quality* reported challenges in undertaking research at the right scale and in forms that could be readily used by regional communities:

> One of the key challenges noted by many regions was the difficulty in obtaining adequate data and analysis at an appropriate scale on natural resource conditions and trends for the regional planning process. Most data from key research institutions is either at a national scale (such as the NLWRA) or selective in terms of its applicability to particular regions. A submission from a salinity research institution to the ANAO noted particular gaps for NAP regions in the:
>
> - knowledge of salt stores and water flows in rural and urban landscapes necessary to provide accurate estimates of the extent, severity and the potential risks of salinisation of land and water resources;
> - economic analysis of salinity mitigation options;
> - mapping of salt hazards at a level suitable for property management purposes;
> - identification of the sources of salinity in catchments; and
> - the impacts of salt on wetlands.[3]

5.4 Mr Andrew Campbell from Land & Water Australia highlighted a gap between large scale research and priorities, and farm or paddock scale action:

> We also need to be reorganising ourselves to be able to meet the needs of catchment bodies and land-holders for natural resource management work and, in particular, to bridge the gap between catchment scale targets and priorities, and farm and paddock scale action. At the end of the day, the action mainly happens on farm, and decisions are made at that scale. There is some very challenging science involved in moving up and down between a decision as to what to plant in a particular paddock or where to put trees and the impact on a river 100 kilometres away.[4]

Funding regional and large-scale research

5.5 While witnesses identified the need for research at local and regional scale, the Committee heard that the current funding arrangements under the NAP are for on-ground works and therefore the program does not have the capacity to fund regional level research. Further, the Hunter-Central Rivers CMA submitted that NHT funding has limited scope for research at a regional level:

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2 CSIRO, *Submission 15*, p. 7.

3 Australian National Audit Office, *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 56.

4 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 25.

> NHT investments are currently driven by a formula that is biased towards on-ground actions so under the current federal agreement there is little investment available for research at the catchment level.[5]

5.6 The Committee heard from some CMAs who argued that current funding guidelines under the NAP has lead to gaps in research, which, in turn, make it difficult for CMAs to effectively target on-ground works. For example, the Hawkesbury-Nepean Catchment Management Authority noted that the national groundwater flow system information did not cover all catchments to show local and sub catchment variations in salinity processes. Similarly, data on basic surface and groundwater quality and flow trends were limited in some catchments, yet:

> These types of issues and the need to carry out investigations to fill data gaps are generally not allowed for in guidelines for funding and reporting.[6]

5.7 Similarly, Dr Petrina Quinn from the Central Riverina Landcare Network and Murrumbidgee Landcare Association, noted the need for NAP funding to be made available so that research into the local hydro-geological system could be undertaken:

> The charter of the National Action Plan does not include funding salinity R&D, beyond a limited role for regional level implementation. In the case of salinity and its temporal attributes R & D in particular considering groundwater levels, water quality attributes and geology is essential to understanding the local hydro-geological systems and thus the impact of what we can and are doing. There does appear to be a gap in regional R & D and that deemed of national relevance.[7]

5.8 The Committee heard evidence that the lack of funding for research may limit the regional bodies' capacity to build relationships with researchers. Dr Vervoort from the Centre for Salinity Assessment and Management, University of Sydney, said:

> Several people from the CMAs, from the contacts we have, have pointed out to us that a lot of the funding they are getting is based on on-the-ground works and that it creates very few opportunities to build relationships with research providers because there is no money available for research.[8]

However, the Centre for Salinity Assessment and Management, University of Sydney cautioned that CMA activities need to be linked to the best contemporary national and international research.[9]

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5 Hunter-Central Rivers CMA, *Submission 2*, p. 3.

6 Hawkesbury-Nepean Catchment Management Authority, *Submission 12*, p. 2.

7 Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Submission 48*, p. 3.

8 Dr Rutger Vervoort, McCaughey Senior Lecturer, Hydrology and Catchment Management, Faculty of Agriculture, Food and Natural Resources, University of Sydney, *Committee Hansard*, 14 October 2005, p. 42.

9 Centre for Salinity Assessment and Management, University of Sydney, *Submission 17*, p. 1.

5.9 Dr Ian Prosser from CSIRO argued that while there is a need for regional scale research, regional organisations doing their own research was not a wise use of resources:

> You run the risk … of inventing 57 rail gauges across Australia if they are all doing their own research. They share many common things, particularly with neighbouring regions which may have similar environments, and it would be very inefficient for each one to be doing their own investigations.[10]

5.10 Land & Water Australia made a similar point and argued the need for pooled resources to fund research on common areas of need:

> The need to connect regional groups with national knowledge generation also has lessons for the design of national programs. Clearly it will not be the most effective use of resources for 57 regional groups to develop and implement research programs that duplicate each other. However, under funding arrangements for the NAP all Australian Government funds were committed at the regional level, through state agreements. The difficulty in coordinating funding contributions from each region to support a national research initiative on fundamental problems means such research simply may not be undertaken. The need for some form of national funding pool should be recognised in future program arrangements.[11]

5.11 The CRC for Plant-Based Management of Dryland Salinity similarly argued that there is a need for larger-scale research, which is currently not accommodated in the national programs:

> There needs to be better integration into the program of issues that are better handled at scales larger than the regions (i.e. state or national). The following responses are usually better handled at a larger scale, and research indicates that they are often more cost-effective than the types of responses currently being prioritised by CMAs. They should be funded from core salinity program funds if required, rather than left to chance. This implies that a significant share of program funds should not be directed through CMAs.
>
> - Development of improved technologies, such as more profitable (more adoptable) farming practices for salinity management.
> - On-ground works on public lands (e.g. pumping in nature reserves, engineering responses to protect infrastructure and safe disposal).
> - Legal/regulatory approaches (e.g. the need to purchase water rights to plant perennials in water resource catchments, as discussed in the National Water Initiative).

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10 Dr Ian Prosser, Water Resources, Commonwealth Scientific and Industrial Research Organisation, *Committee Hansard*, 6 September 2005, p. 34.

11 Land & Water Australia, *Submission 26*, p. 4.

- Research to provide improved data for subsequent planning, including biophysical and socioeconomic research.[12]

5.12 Both the concerns discussed above – the need for regional level research, and the need for pooled funds to research issues of cross-jurisdictional significance - were captured in the House of Representatives Report. Recommendation 10 proposed that the Australian Government work with the states to:

> identify and remove impediments for catchment management organisations (CMOs) to undertake or commission research, and encourage CMOs to support research activity as part of their investment strategies.[13]

5.13 At the same time, the need for national funding to support research which is of nationwide significance was argued:

> The Committee is concerned that the NAP does not have a charter to fund salinity R&D, at least not beyond that required for regional level implementation. Adequate funding should be available to support on-going salinity R&D, particularly into generic issues that are of nationwide significance or for research that is beyond the scope of individual CMOs.[14]

5.14 The report recommended the establishment of a salinity research and development fund (recommendation 8). In its response to recommendation 8 the Government noted that:

> The state and territories have not supported the establishment of a separate national research and development fund…Considerable Australian Government funding is provided for salinity research outside the NAP… financing salinity research at the national and state-wide level.[15]

5.15 In its response to recommendation 10 of the House of Representatives Report, the Government explained that the principal role of the regional bodies is to 'plan, deliver and represent on on-ground management actions' rather than being 'primary

12 CRC for Plant-Based Management of Dryland Salinity, *Submission 18*, p. 2.

13 House of Representatives Standing Committee on Science and Innovation, May 2004, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, p. 193.

14 House of Representatives Standing Committee on Science and Innovation, May 2004, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, p. 188.

15 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 9, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

providers' of research. However, the Government noted that regional bodies contribute to partnerships with research bodies through in-kind assistance.[16]

5.16 The Committee acknowledges that research of national significance is currently undertaken by relevant CRCs and other bodies. It further appreciates that one of the main role of regional bodies is to conduct on-ground works. However, it is clear from evidence received that there are still gaps in research at both a regional and cross- regional level, which do not appear to be able to be addressed under the current funding arrangements.

5.17 The Committee further notes that regional bodies have indicated a need to establish stronger links with industry (discussed in Chapter 4). The Committee believes that regional bodies have a strong role to play as partners in research and development with industry and research bodies. It is important that regional needs are accommodated in salinity research priorities. In order to get the best out of research partnerships and provide input into guiding research priorities, dedicated research funding for regional bodies is required. The Committee further believes that the capacity for regional groups to alter their projects as new research becomes available should be factored into the funding allocated to regional bodies and in their investment strategies.

National protocols for research and information management

5.18 Witnesses from the Centre for Salinity Assessment and Management highlighted the need to develop national standards and protocols for research and information management. Dr Vervoort told the Committee that this was particularly important when public money was being used to support this research:

> The key thing to me is that [information management] has to be built on national standards. When we have publicly funded projects, the data monitoring and research—whether it is NHT monitoring or NAP monitoring of waterways or whatever—should be organised and collected using some national standard or protocol. It has to be some national body that develops that. Right now there are state bodies that collect data, and different states use different protocols. There is no real overlap. There is at least some attempt to do a metadata collection in terms of spatial data. The ASDD is one example of a body that is trying to collect metadata. That still does not give access to the actual data—sometimes it does; sometimes it does not. So there is a question of accessibility and usability. A national

16 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 11, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

> program should make sure that there is a standard protocol in the collection of research data.[17]

5.19 Dr Vervoort went on to explain that without consistency and coordination of data collection, data can be lost:

> What happens a lot is that a researcher has a program, collects data and writes a paper and the data sits on a floppy, which disintegrates, or is put in report, or whatever else. It is difficult. .. So there is a real issue there. That is why I think there probably should be some attempt at a national level to try to build that together.[18]

5.20 Professor Les Copeland, the Director of the Centre for Salinity Assessment and Management, highlighted the tension which exists between the competitive and collaborative nature of research. The competitive aspects are needed to ensure sound research and science, and collaboration is needed to ensure knowledge sharing and dissemination:

> I think it comes down to finding mechanisms for sharing information in the first instance and then having some sort of strategic outlook that goes across the various sector boundaries; that might be community, that might be different types of programs. It is managing this competitive versus collaborative tension. You need to have a bit of both. You need to have some competitive element to make sure the science and the work is strong and robust. On the other hand, you need to make sure that that does not inhibit collaboration. That is a very fine point. Where that balanced point is is very hard to define.[19]

5.21 The Committee heard that consideration must also be given to how natural resource data is used as it has implications for land valuation and property rights:

> There are also some real issues with natural resource data. That is why I think a national body should get involved in dealing with privacy, land valuation and property rights. They all need to be addressed before we can release natural resource data in public format, particularly when it deals with agricultural enterprises.[20]

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17 Dr Rutger Vervoort, McCaughey Senior Lecturer, Hydrology and Catchment Management, Faculty of Agriculture, Food and Natural Resources, University of Sydney, *Committee Hansard*, 14 October 2005, p. 39.

18 Dr Rutger Vervoort, McCaughey Senior Lecturer, Hydrology and Catchment Management, Faculty of Agriculture, Food and Natural Resources, University of Sydney, *Committee Hansard*, 14 October 2005, p. 39.

19 Professor Les Copeland, Dean of Faculty, Agriculture, Food and Natural Resources, and Director, Centre for Salinity Assessment and Management, University of Sydney, *Committee Hansard*, 14 October 2005, p. 38.

20 Dr Rutger Vervoort, McCaughey Senior Lecturer, Hydrology and Catchment Management, Faculty of Agriculture, Food and Natural Resources, University of Sydney, *Committee Hansard*, 14 October 2005, p. 39.

5.22 The House of Representatives Report (chapter 7) emphasised the importance of sound data collection, management and retrieval processes. While the report acknowledged there was a range of federal and state government initiatives to encourage and facilitate sound data management, the need for improvement in this area was noted. Recommendation 13 proposed that the relevant Australian and state government agencies 'accelerate' development of standardised, integrated and accessible data management systems.[21] Recommendation 14 proposed that ANZLIC (spatial information council) and the National Land and Water Resources Audit be resourced to support sound data management practices at a regional level.[22]

5.23 In response to the recommendations, the Australian Government noted its support of sound data collection and management systems and explained that, in conjunction with the states, they are addressing recommendation 13 through their support of the National Land and Water Resources Audit (NLWRA). It was further reported that a new body had recently been established under the Natural Resource Management Ministerial Council. The Executive Steering Committee on Australian Salinity Information will be responsible for coordinating salinity information and will work closely with the NLWRA.[23]

5.24 In response to recommendation 14, the Australian Government reported that a Natural Resources Information Management Toolkit is available online. The toolkit provides resources to facilitate good data/information management and sharing practices at a regional and local level. The toolkit was developed by the NLWRA and ANZLIC.[24]

5.25 The Committee appreciates the importance of consistent and robust data/information management and encourages ongoing action by the Australian and state/territory governments in this area. The Committee notes that there needs to be a process for ensuring that national protocols are agreed to. This will require the Australian Government to enter into an agreement with research providers and

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21 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, p. 216.

22 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, p. 217.

23 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 15, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

24 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 14, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

partners and ensure mechanisms are in place to monitor compliance with these protocols.

Communicating the research

5.26 In the previous section the Committee discussed the need for salinity science to be produced at a variety of scales, and for regional bodies to be supported in research partnerships to ensure research priorities take account of regional need. The section also raised the issue of standardised research protocols and information management to ensure that research is produced and maintained in a consistent format to enable use by the range of salinity management stakeholders.

5.27 This following section examines how, once produced, salinity research can best be communicated. It identifies the need to:

- better link research providers to users;
- communicate salinity science to a range of stakeholders; and
- develop a knowledge brokering system to meet these objectives.

Linking research providers to users

5.28 The House of Representatives Report found that a wealth of salinity research had been undertaken by a range of Australian Government funded agencies and programs and that from this, an array of research products and management tools had been developed.[25] However, during this inquiry the Committee heard that the use of this material was not as widely used as could be. Land & Water Australia posed the question:

> While high quality knowledge products such as these exist, they may not be being used to the extent possible by regional groups. Key considerations for the Committee might be 'to what extent are they actively used by planners and land managers?' and 'what can be done to improve the use of this knowledge?'[26]

5.29 As discussed at length in the House of Representatives Report (chapters 5 and 8), the management and dissemination of the salinity science base and research to regional bodies and land managers is a key challenge. Dr Bruce Munday told the Committee:

> One of the barriers, which I am sure you would be aware of, is not that people are short of information but that they are short of effective ways of providing that information. Most of us are deluged with information. The challenge for us is to understand what the researchers are doing, interpret

25 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, Chapter 4.

26 Land & Water Australia, *Submission 26*, p. 3.

> that and put it into a language and form which is suitable and useful for the end users, who may be local government, farmers, farm advisers, government agencies and so forth.[27]

5.30 The ANAO audit report of the NAP identified an urgent need to better link research providers and their products with regional groups, land managers and others undertaking on-ground works. In particular, it was argued that it was crucially important to the evolution of the NAP regional delivery model that the regions have access to the practical lessons being learned and the emerging science, economic analysis or better practice examples from other NAP regions and other relevant programs such as the NLP and the NHT.

5.31 Further, it was argued that investment will be wasted if interventions are poorly targeted or not based on sound science or economics. The report noted that Australian Government agencies (with their national focus, the NRM website, the employment of facilitators in all regions and the annual NRM forum) were well placed to provide these services and guidance to the regions in conjunction with state agencies. The report recommended that:

> The Departments of Agriculture, Fisheries and Forestry and Environment and Heritage in consultation with other service providers (including State and Territory agencies and national level research providers) develop measures to strengthen the access by NAP regional bodies to lessons learned and better practice NRM relevant to salinity and water quality in the NAP priority regions. These measures may include mechanisms to better link research providers to users and facilitate research at the appropriate scale and in forms that can be better utilised by regional bodies.[28]

5.32 The need to better link research providers to users to ensure that research is appropriate and targeted was acknowledged by the NRMMC Regional Implementation Working Group:

> The generation of good information is not sufficient on its own; it must be relevant, useful and made available to those who need it. Partnerships need to be formed between community and regional groups and research bodies to generate information relevant to the needs of the area.[29]

5.33 The focus on partnerships suggests that the communication between researchers and research-users must be a two-way process. The Committee believes that unless this mutual exchange occurs, there is a very real risk that the research undertaken will not be relevant to the needs of research users.

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27 Dr Bruce Munday, *Committee Hansard*, 16 November 2005, p. 55.

28 Australian National Audit Office, *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17, 2004-2005, p. 61.

29 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 13.

5.34 CSIRO also argued the need to develop sufficient linkages or mechanisms to channel new science research and information to regional bodies:

> In our view, it is less certain whether the NAP/NHT have established sufficient mechanisms to efficiently transfer new scientific information and understanding from research and development agencies such as CSIRO and the CRCs to catchment management authorities.[30]

5.35 The CSIRO suggested this communication could be achieved through a coordinating body:

> The flow of quality scientific and technical information, albeit greatly enhanced by NAP/NHT, still needs to be considerably improved, potentially through a focused body comprised of key scientists and major stakeholders that interfaces closely with Catchment Management Authorities, State Agencies and the Commonwealth.[31]

5.36 Similarly, Professor Les Copeland, the Director of the Centre for Salinity Assessment and Management, argued the need for improved communication channels. In particular, he highlighted the need for information in a relevant and accessible format:

> I think there has to be a promoting of discussion forums, a sharing of access to information systems, a developing of information systems to the point where they are not just accessible to people with a high level of technical knowledge. There are ways of capturing that data that is scientifically and technically adequate, but translating that into a form that can be used by people in the local communities is something that probably needs to be developed. There is probably a need for some capacity building and a need to provide more transfer of how to use that information to the people who are actually the practitioners. It is the technology transfer issue that applies much more widely.[32]

5.37 The NRMMC Regional Implementation Working Group discussed 'learning circles' as a method to bring together a range of stakeholders to better deliver technical advice:

> 'Learning circles' created through the formation of technical advisory groups across several regions to focus on catchment-wide priorities (eg. salt, biodiversity and river restoration) would help bring together researchers/technical personnel with relevant regional and community personnel to review how each is managing the issue. [33]

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30 CSIRO, *Submission 15*, p. 5.

31 CSIRO, *Submission 15*, p. 5.

32 Professor Les Copeland, Dean of Faculty, Agriculture, Food and Natural Resources, and Director, Centre for Salinity Assessment and Management, University of Sydney, *Committee Hansard*, 14 October 2005, p. 38.

33 Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 13.

Communicating to a range of stakeholders

5.38 A number of submitters felt that their information needs were not being adequately met. ALGA highlighted that local governments needed information in a form which is user friendly:

> Local governments need access to the latest science in a user-friendly format. Information is required to both assist councils with their decision making and for councils to educate their community.[34]

5.39 Mrs Sharon Fingland from the Western Sydney Regional Organisation of Councils highlighted the fundamental difference between the objectives of salinity science and research and those of local government in delivering services.

> We stressed the fact that science is problem orientated, yet government is service orientated—and there was a bit of an issue there.[35]

5.40 The Committee also heard that regional bodies themselves were not necessarily very good at sharing information. As discussed in Chapter 4, the range of resources available to regional bodies varies significantly across the country, as does the level of capacity. The Hunter-Central Rivers Catchment Management Authority raised its concerns that there was limited sharing of information on salinity between regional bodies, and that there was not a single database or an awareness of sources of information available to local land managers and users.[36]

5.41 The need to develop networks along which salinity science can be transferred was raised as critical. Mr Simon Veitch from the Landcare and Invasive Species Natural Resource Management Division within the Department of Agriculture, Fisheries and Forestry also highlighted the fact that research can no longer be about a single issue and that management must be whole-of-catchment. Consequently, the science must be communicated to a wide range of stakeholders and land managers:

> It is true that a strong collegiate group dealing with salinity science has been built up over the last decade. In more recent years it has directed its energy towards translating the research and development, and the understanding of salinity, for people on the ground… There is still a question concerning how research and development reaches the hands of people who directly manage the land. I think increasingly the question is now being translated more into one of whole-of-catchment type of management—that it is not just a single issue and that the issue of land uses needs to be considered and the impact that they have on water management. That will of course impact on salinity. There are other considerations. A single-issue approach to natural resource management will only take you so far, and we have seen some of the limitations of that. Now the focus is more

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34 Australian Local Government Association, *Submission 13*, p. 5.

35 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 16.

36 Hunter-Central Rivers Catchment Management Authority, *Submission 2*, p. 3.

> on how we bring those things together and put useful information and useful tools in the hands of the people who directly manage land.[37]

Knowledge brokering

5.42 CSIRO suggested the need for an information brokering service to assist with information sharing and to ensure that information is provided in a distilled and user-friendly format:

> There is a need for an information brokering structure accessible by NRM planners that provides up-to-date information and assistance. Such a structure should also provide a forum for planners, decision makers and scientists to exchange ideas to identify research gaps and signpost new research avenues.[38]

5.43 Similarly, Mr Andrew Campbell from Land & Water Australia told the Committee:

> …we are going to need highly skilled intermediaries between the science and the practice if we are going to inform good decision making at those different scales—farm, catchment and region.[39]

5.44 Land & Water Australia submitted that they had recognised the critical need for effective brokering to facilitate uptake of knowledge, and had established 'Knowledge for Adoption' as one of its three core strategies within its new five-year Strategic Plan:

> Under this strategy we are developing a broad suite of methods to manage for adoption, from direct engagement or collaborative research through to tailored communication products and finally to indirect information provision. An important new initiative that goes directly to the heart of the issues is the "Knowledge Brokering for Regional NRM" project, funded through the Natural Heritage Trust and managed by Land & Water Australia.[40]

5.45 The National Knowledge Brokering for Regional NRM project aims to build stronger links between national research and information providers and the regions. The project's scoping report identified five key areas of concern for regional bodies in relation to knowledge exchange:

- Fragmentation – the information base is highly fragmented
- Volume – the sheer volume of information is daunting

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37 Mr Simon Veitch, Manager, Landcare and Invasive Species, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 6 September 2005, p. 12.

38 CSIRO, *Submission 15*, p. 7.

39 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 25.

40 Land & Water Australia, *Submission 26,* p. 5.

- Relevance – much of the information seems of dubious relevance
- Two-way-flow between regions and national organisations
- Information sharing – within and across regions[41]

5.46 Land & Water Australia submitted that the project is working with regions to investigate and test ways to overcome these areas of concern and to improve knowledge connections. Some of the mechanisms that will be used include:

- A feasibility study into a 'first-stop knowledge shop' that would assist regions to find the most appropriate source of information for specific needs
- Improving the use of existing tools and the development of tool kits
- Synthesis documents, case studies and best practice manuals
- Workshops, regional roadshows and national forums
- Region-to-region mentoring and information exchange [42]

5.47 The Committee is encouraged that communicating salinity science and research continues to be a major focus for government agencies involved in supporting NRM and supports the views of Land & Water Australia who argued:

> Through better information support, regions will be able to undertake more informed NRM planning, decision making, implementation and evaluation activities. Access to good scientific information and knowledge is paramount to the success of NRM; as is responsiveness by relevant research organisations to regional needs.[43]

5.48 However, the Northern Agricultural Catchments Council pointed out that access to information is only half of the picture. The other half of the picture involves ensuring that land managers' practices reflect this science:

> [G]ood and up-to-date science is not the main factor in improved natural resource management (NRM). Many of the components to improved NRM are already well-known but not undertaken by land managers.[44]

5.49 The Committee notes that land use change is difficult to achieved unless land managers are well supported via extension services and are provided with viable alternative practices.

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41 Land & Water Australia, *Submission 26*, p. 5.

42 Land & Water Australia, *Submission 26*, p. 6.

43 Land & Water Australia, *Submission 26*, p. 6.

44 Northern Agricultural Catchment Council, *Submission 6a*, p. 2.

Extension services

5.50 In their submission to the House of Representatives Standing Committee on Agriculture, Fisheries and Forestry, *Inquiry into Rural Skills, Training and Research*, Land & Water Australia submitted:

> Land & Water Australia remains of the view that the job of achieving landscape-scale adoption of more sustainable land management practices requires highly skilled intermediaries between science and practice. Research funding bodies, like Land & Water Australia, can no longer assume that the outputs of its research investments will be picked up by a well-structured, well-organised, well-trained and resourced rural extension system.[45]

5.51 In regional New South Wales, the Committee heard of the important and valued role played by natural resource facilitators and extension officers. Mr James Phillips, who was employed by the Soil Conservation Services of New South Wales from 1950, told the Committee:

> The council natural resource facilitators are at the forefront of organising and also at the forefront of dealing with the media. I feel that to maintain councils and people like that is most important.[46]

5.52 Sister Carmel Wallis, also a Wagga Wagga resident, endorsed this position:

> We would never have been able to do what we have done without the help of the council and their natural resource facilitators. I sometimes do not think that the elected council members have an understanding of the important role they play right across the community. It is very important. Even their networking and their sense of the overall issues is excellent. We are very grateful to them.[47]

5.53 The importance of extension services was a major theme of the House of Representatives Report (see chapter 8). Despite a number of recommendations made on the need to provide adequate support for extension services to ensure continuity of local capacity, this inquiry has found that a number of concerns still remain. The Pastoralists and Graziers Association of Western Australia noted the continuing decline in government provided extension services:

> The issue of declining extension activities needs to be addressed. The State Agriculture Department has made a clear move away from the provision of extension in general and there is no commercial market for these services in the salinity area. The Landcare program may be able to fill this gap in some

45 Land & Water Australia, *Submission 26b*, p. 12.

46 Mr James Phillips, *Committee Hansard*, 10 February 2006, p. 16.

47 Sister Carmel Wallis, *Committee Hansard*, 10 February 2006, p. 16.

> way but would need a significant increase in capacity, funding and support.[48]

5.54 Mr Tom Aldred from the Department of Agriculture, Fisheries and Forestry commented on the decline in state and territory extension services and argued that, to a certain extent, the 'burden' has shifted to the Australian Government:

> I think it is quite reasonable to say that there has been a decline in traditional extension services by state and territory governments, which, as you pointed out, have prime responsibility for those. At the same time, I believe an increasing share of the burden, if you like, has been shouldered by the Australian government through programs such as the National Heritage Trust, the National Action Plan for Salinity and Water Quality and the National Landcare Program and so on. A very significant number of natural resource management coordinators or facilitators are funded either directly through those programs or are picked up as part of projects funded under the regional planning arrangements.[49]

5.55 Land & Water Australia highlighted the diminishing investment by the states on extension and the critical importance of NAP, NHT and Landcare in developing community involvement. However, they also argued that there has been a disinvestment in the extension profession:

> There has been a marked shift in expenditure on extension (broadly defined) from the States to the Commonwealth over the last fifteen years. Commonwealth funding of facilitators and coordinators through Landcare, the Natural Heritage Trust and the National Action Plan has been critical in facilitating community involvement and on-ground activities funded through these large national programs. However, there has been a gradual disinvestment in the underlying extension profession, and the infrastructure that supports it.[50]

5.56 Mr Geoff Fishburn, from the NSW Department of Natural Resources, raised the significance of NHT funding to support natural resource officers. Mr Fishburn also told the Committee that in NSW it is anticipated that the number of officers on the ground will rise in the future:

> With regard to the establishment of catchment management authorities just from our organisation alone, we automatically shifted across 93 natural resource officers in terms of their NHT funded positions. I guess we could call them Landcare based in certain areas. It is probably best to call them natural resource officers. I just want to differentiate between those particular staff that we moved across and the 262 staff that we moved across from the recurrently funded section of the organisation. With regard

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48 Pastoralists and Graziers Association, *Submission 4*, p. 2.

49 Mr Tom Aldred, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 28 February 2006, p. 47.

50 Land & Water Australia, *Submission 26*, p. 6.

> to those 93, with the $436 million allocation over four years, my view is that, across the state in the 13 CMAs, that number will grow rather than reduce in terms of the on-ground projects the CMAs will effect across all the natural resource areas in that four-year period. So I am not expecting that we will see a diminution in expertise or numbers on the ground; I think we will see a rise in numbers on the ground.[51]

5.57 However, the Committee heard a significant amount of evidence on the decline of extension services. A major concern was that due to diminishing funding, the retention of experienced extension staff was difficult. In turn, this brings the credibility of extension services into question. The Western Australian Farmers Federation submitted:

> The current level of extension services available to provide information/advice/assistance on control measures to suit individual circumstances is inadequate and requires further consideration. There is also a perception amongst some landowners that those involved in co-ordination and extension services lack credibility due to a lack of experience and insufficient time spent in the field.[52]

5.58 These issues were canvassed at length by Land & Water Australia in their submission to the House of Representatives inquiry into rural skills training and research:

> The remaining advisors and the new facilitators are often relatively young and even if well qualified in the sciences, they lack significant experience… The predominance of short-term contract work, high levels of staff turnover and loss of good people from the sector results in institutional amnesia and lack of support for people in the field. It also means that it is not easy to find out what is being done/has been done elsewhere, and what lessons have been learned. Regional NRM staff feel as if wheels are being reinvented all over Australia.[53]

5.59 The Committee heard that most extension officers are on short term tenure, do not receive adequate professional department/agency support, have poor training opportunities and consequently, limited career paths.

5.60 The Central Riverina Landcare Network and the Murrumbidgee Landcare Association submitted that:

> Much intellectual property has been lost from our communities because of lack of tenure or even contracts beyond a 12 month duration and

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51 Mr Geoff Fishburn, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 9.

52 The Western Australian Farmers Federation, *Submission 41*, p. 2.

53 Land & Water Australia, *Submission 26b*, p. 2.

> unsatisfactory remuneration for those designated as extension and related agency staff.[54]

5.61 Mr George Truman, a salinity officer in the Namoi CMA, argued that due to disinvestment in extension officer positions, an increasing and unsustainable work-load is falling on fewer individuals:

> I am the salinity officer; there is only one of me. I am only funded for two years. I am funded under NHT. This is this issue with continuity and having those people on the ground. Because of that lack of people in the other agencies to provide that technical input and getting the investigations, a lot of my time is spent trying to do the investigations or trying to find out what information is coming out of some of the research, getting it into a form that we can deal with and then extending it. It puts a lot of pressure onto the one person but also, in terms of trying to get the most up to date across such a large catchment, it is very limited in terms of getting a really good, broad on-ground works happening because of the limitations of that.[55]

5.62 The Committee was told that only one extension officer is employed by NSW to co-ordinate salinity action along the coast.[56] The limited number of extension officers means that it is often difficult for these individuals to be over all the technical information that is available and to ensure that this information filters down to land managers.[57] Additionally, the complexity of the information needs of land managers contributes to the strain placed upon existing extension service arrangements.

5.63 The House of Representatives Report recommended that:

> the relevant Australian Government agencies in consultation with state and territory governments review the issue of diminishing state extension services, with a particular focus on:
>
> (a) the employment conditions of extension staff;
>
> (b) the potential career pathways of extension staff; and
>
> (c) the adequacy of the training provided for extension staff to ensure their knowledge of technical, scientific and policy issues, relating to natural resource management and in particular salinity, is both current and comprehensive.[58]

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54 Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Submission 48*, p. 3.

55 Mr George Truman, Catchment Officer, Projects (Salinity), Namoi Catchment Management Authority, *Committee Hansard*, 14 October 2005, p. 25.

56 Hunter-Central Rivers Catchment Management Authority, *Submission 2*, p. 3.

57 Mr George Truman, Catchment Officer, Projects (Salinity), Namoi Catchment Management Authority, *Committee Hansard,* 14 October 2005, p. 29.

58 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, p. 249.

5.64 In response, the Australian Government argued that extension services are primarily the responsibility of the states and territories, as are the employment conditions, career pathways and training of staff. Further, the role of regional bodies in identifying their extension needs was noted:

> Regional catchment management organisations are expected to identify their specific requirements for natural resource management extension services within their regional plans and investment strategies and to determine the service delivery methods most appropriate to their circumstances. This could include direct employment of staff with specific extension skills or acquisition of these services from an outside public or private service provider. Many states have moved to a demand driven model where the services delivered are tailored to the specific needs of the end user.[59]

5.65 The Committee heard that the decline in extension services in production agriculture was being addressed, to a large extent, by private advisory services. However, this solution had not, as yet, burgeoned in the natural resource management sector:

> Like other R&D funders and providers in Australia, LWA can no longer assume that the outputs of its research investments will be picked up by a well-structured, well-organised, well-trained and resourced rural extension system. In production agriculture, the decline in state-funded extension services has largely been offset by private advisory services through consultants and agribusiness firms. However in natural resource management, public funding remains dominant and there has not been a similar emergence of private service providers. It should be noted however that as the regional model matures, it may well foster private sector provision of services to regional organisations on public benefit NRM matters.[60]

5.66 However, the Government response to the House of Representatives Report noted the increasing move by private enterprise to undertake a greater role in coordination and facilitation of NRM issues. To date 680 agricultural advisers across NSW, Victoria, South Australia, Queensland and Western Australia have taken part in the nationally accredited salinity training program to develop national competency standards in salinity.[61]

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59 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, p. 18, accessed on 9 February 2006 at: www.daff.gov.au/salinity.

60 Land & Water Australia, *Submission 26*, p. 6.

61 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 17, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

5.67 Mr Goss, CEO of the CRC for Plant-Based Management of Dryland Salinity also reported the growing role of private extension services and provided information on the CRC's role in training extension professionals on NRM issues:

> The best estimates are that there are about 4,000 professionals in Australia at the moment that are servicing agriculture in an extension capacity and, of the 4,000, about 1,200 are in the private sector. The 1,200 figure is growing and the 4,000 figure is probably static. That says something about the shifting balance of where farmers are going for their information and for knowledge that supports their decision process. So we have the AWB Landmark company involved in the CRC and they have about 300 crop agronomists in the field. We are working closely with the company by assisting the agronomists, through training and field experience, to understand salinity, to understand the natural resource management issue facing farmers …[62]

5.68 The WA Farmers Federation emphasised the need for more extension services. However, Mr Trevor De Landgrafft, President, told the Committee that it would be preferable to reinvest in public sector extension services:

> We call it the retail sector versus the wholesale sector, which is really what the government is, which has traditionally been closer to the research and the development and the ones who probably have worked with the farmers. To have it rolled out via a retail sector I think loses a fair bit. Our organisation, whilst an avid user of consultants, does not necessarily believe that they are the people who should hold the right to deliver the outcomes of public research. Taking it out via the retail sector, you certainly will not get the spread. You will have people who are averse to paying consultants for what they believe they have contributed to, in any case.
>
> Of course, during a phase of moving this way—which is to favour that method of extension—we have seen the running down of extension services within the Department of Agriculture. Sure, we have a problem, but we believe that turning that around is a better idea. I think that the private consultants certainly have a place, but I think the closer farmers are to the Department of Agriculture and that extension, the better.[63]

5.69 While there were strong concerns about the decline of extension services, not all witnesses agreed that an increase in traditional extension services is the solution to improved communication of information to regional bodies and landholders. As regional bodies and Landcare groups mature, their own level of expertise also develops to the point where they require greater levels of technical and scientific support. These groups are increasingly seeking expert information directly from the expert:

> It can be argued now that it is not extension staff we need – rather hydro-geologists and specialist technical and scientific staff whose knowledge – if

62 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 18.

63 Mr Trevor De Landgrafft, *Committee Hansard*, 18 November 2005, p. 53.

> not themselves are available to the community. We are seeking to understand the flow of sub-surface water, its quality, spatial and temporal attributes in often very complex contexts. The opportunities for many of us to access "extension type" information directly through the power of technology and our own increased understandings have increased, without the need for the middle "man"…on many/most occasions. We're increasingly seeking the expert information direct from the expert. The need for brokering functions between the expert and the community I believe is diminishing in the traditional sense of face-to-face extension.[64]

5.70 The ALGA submitted that local government plays an increasing role in the provision of extension services but is not adequately resourced to do this:

> Whilst councils have the tools to manage salinity, they are not always adequately resourced. As such, their potential to manage salinity is not fully realised...
>
> Increasingly, councils are being asked to provide a whole range of environmental extension services without additional funding, due to the demise of state agency extension staff. Some councils already provide their community with education and extension services in relation to salinity.[65]

A national coordination body

5.71 In 1993 Land & Water Australia and its partners[66] established the National Dryland Salinity Program (NDSP). The program was a collaborative research, development and extension (R, D & E) program, which investigated the causes of, and solutions to, the national problem of dryland salinity. It was funded in three phases over 11 years, commencing in 1993 and concluding in 2004. Land & Water Australia outlined the three phases:

> The initial phase had a strong technical focus and it aimed to improve the knowledge of causes and impacts of salinity. It made significant headway in developing better research methods, coordinating research efforts and engaging rural communities in catchment management planning.
>
> Phase 2 examined catchment processes, industry, engineering, policy, local government, environmental and regional dimensions of salinity.
>
> The final phase in 2003-04, focused on enhanced communication during which the partners in the program drew together the R&D knowledge that they had accumulated over the past ten years and developed six specific

64 Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Submission 48*, p. 2.

65 Australian Local Government Association, *Submission 13*, p. 4.

66 The partners included: Grains Research & Development Corporation, National Land and Water Resources Audit, Murray-Darling Basin Commission, Department of Agriculture, Fisheries and Forestry, Rural Industries Research and Development Corporation, CSIRO and the state governments of NSW, Qld, SA, Tasmania, Victoria and WA.

> resource kits and communication modules for land and water managers across Australia.[67]

5.72 The House of Representatives Report highlighted the valuable and critical role played by the NDSP and recommended that the NDSP be continued beyond 2004 with an expanded role to include irrigation and urban salinity. Recommendation 3 states:

> The Committee recommends that the Australian Government ensure the continuation of the National Dryland Salinity Program (NDSP) as a matter of urgency, and that:
>
> (a) the role of the NDSP be expanded to address irrigation and urban salinity, with the Program renamed the National Salinity Program (NSP) or similar;
>
> (b) the NSP be managed within Land & Water Australia (LWA);
>
> (c) the NSP adopt research, coordination and communication strategies that assist the regional delivery of natural resource management programs and the requirements of the National Action Plan for Salinity and Water Quality specifically;
>
> (d) the functions of the NSP have regard for those identified in this report;
>
> (e) the NSP/LWA be adequately resourced to perform its functions by the Australian and state governments;
>
> (f) relevant Research and Development Corporations, Cooperative Research Centres, national science agencies, universities, state agencies and the private sector be strongly encouraged to partner the NSP; and
>
> (g) there be a continuing role for an Operations Committee, or equivalent, in providing independent scientific advice with that advice coming from a broad cross-section of scientific personnel from both the government and non-government sectors.[68]

5.73 In 2004, due to stagnant funding, Land & Water Australia and NDSP partners made the decision to discontinue the program. This decision was necessary in order to fund other critical areas of research:

> I know that it is always crass for agencies to appear before committees such as this and lament their budgets, so I will not do that. But our corporation has had a static appropriation for about the last 14 years and the only way the board has been able to invest in new areas of research, such as Australia's northern rivers or new work on vegetation and biodiversity or on the social aspects of natural resource management, has been to discontinue work that we have been funding for 10 years. So the corporation took a very hard decision to stop funding the National Dryland

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67 Land & Water Australia, *Submission 26*, p. 4.

68 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, Canberra, May 2004, p. 158.

> Salinity Program but did invest in this final year to ensure that we at least had good legacy products from all that wonderful research.[69]

5.74 The Committee notes the Government response to the House of Representatives Report recommendation 3 that:

> Land & Water Australia and the other National Dryland Salinity Program partners have decided not to continue the program.[70]

5.75 Whilst the decision was made to discontinue the program, Mr Campbell spoke of Land & Water Australia's willingness to restore the NDSP if adequate funding was made available:

> We stand ready to do that but, on a fixed appropriation—and, given that the board has had a very hard look at research priorities and has decided that it needed to be investing more in Northern Australia, particularly on the water resources of Northern Australia—we had to make a very hard decision after 11 years to stop funding the NDSP. … Nevertheless, I believe that it was a terrific vehicle and if we had additional resources we would love to continue doing it.[71]

5.76 Mr Campbell went on to explain that if the NDSP were reinstated it would need to be modified to better meet the needs of the regional model. He further noted that it would be 'stretching' Land & Water Australia's 'mandate', as a rural R&D corporation, to take on urban salinity.[72]

5.77 A wide range of stakeholders in the scientific community keenly felt the loss of NDSP. The CSIRO submitted:

> 2004 witnessed the demise of the National Dryland Salinity Program (NDSP), the only salinity research funding and coordinating entity operating across Australia. Its principal aim was to initiate and coordinate relevant research at a national level and to play a major role in developing communication networks between researchers, regional groups and policy.[73]

5.78 Similarly, the Australian Conservation Foundation noted:

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69 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 24.

70 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

71 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, pp 24-25.

72 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 24.

73 CSIRO, *Submission 15*, p. 5.

> The closure of the Australian Government's chief integrative body for salinity management R&D – the National Dryland Salinity Program (NDSP) – leaves a hole in the Australian Government's NRM programmes. The country is now left without an institution with a proven track record to minimise competition between agencies and to effect good collaborative work, tailored to meet the needs of different users at different scales.[74]

5.79 The CRC for Plant-based Management of Dryland Salinity highlighted the valuable role played by the NDSP in promoting the use of scientific knowledge to those on the ground:

> We still get feedback praising the knowledge output of the former National Dryland Salinity Plan and lamenting no adequate replacement for it as a national network of salinity stakeholders. Although the CRC Salinity and Land & Water Australia have taken over NDSP's communication products, its former constituency don't have the same access to a coherent knowledge network.[75]

5.80 The closure of the NDSP raised concerns over the lack of a national coordinating institution. Dr Bruce Munday told the Committee that with the loss of the NDSP, national research was no longer being coordinated:

> At the end of the program, there was no national coordination of the research. The cooperative research centre for salinity is probably the nearest thing, but it really deals only with plant based solutions. It does not deal with hydrogeology, it does not deal with engineering solutions and it does not deal with airborne geophysics. It has a peripheral interest in those things but it is not actively involved in them. Therefore the national research is not being coordinated. Obviously, the knowledge brokerage is not being coordinated nationally either.[76]

5.81 Mr Andrew Campbell also drew attention to the loss of research coordination:

> The gap that the NDSP leaves is with the coordination of the research activities and some of the communication of that science in ways that advisory services, catchment bodies, and policymakers can pick up and find accessible.[77]

5.82 The CSIRO noted a pressing need for a national coordinating body:

> The benefits of a coordinating research and implementation structure across Australia are undeniable and with the demise of the NDSP and no obvious succession strategy, there is a pressing need for a similar initiative.[78]

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74 Australian Conservation Foundation, *Submission 19*, p. 58.

75 The CRC for Plant-based Management of Dryland Salinity, *Submission 18*, p. 1.

76 Dr Bruce Munday, *Committee Hansard*, 16 November 2005, p. 57.

77 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 25.

78 CSIRO, *Submission 15*, p. 5.

5.83 Similarly, ACF highlighted the need for a national body with a high-level strategic focus:

> As yet, there is no indication of what, if any, institution will replace the NDSP. ACF's preference is for a national body, with a focus on integrated and ecologically sustainable landscape management, to take on this role.[79]

5.84 The Committee was told that without any coordination at either state or Commonwealth level, there is a real risk of:

- disconnection between science providers and NRM implementation; lack of investment in strategic research required to overcome knowledge gaps underpinning regional plans;
- lack of uptake of new technology;
- lack of coherence between different regional plans and monitoring;
- failure to learn from mistakes made by others;
- lack of acceptance of lessons coming from science;
- greater influence of local interest groups; and
- of a regulatory framework to ensure best management practice for engineering schemes.[80]

5.85 The States have responded differently to the vacuum left by the closure of NDSP.

Table 3: Overview of state bodies responsible for salinity research coordination in the absence of the NDSP[81]

South Australia	Centre for Natural Resource Management (CNRM) – broker research on NRM issues
Queensland	Centre for Integrated Research Management (CIRM) has existed for a number of years, but its role has changed recently to be similar to the CNRM
Victoria	State-wide (non-regional) programs have been formed to transcend regional investigation priorities
New South Wales	State-wide Salinity Strategy operating through Catchment Management Authorities

5.86 Mr Roger Wickes from the Department of Water, Land and Biodiversity Conservation, South Australia told the Committee about the Centre for Natural Resource Management:

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79 Australian Conservation Foundation, *Submission 19*, p. 58.

80 CSIRO, *Submission 15*, p. 5.

81 CSIRO, *Submission 15,* p. 6.

> We set about creating a centre of natural resource management. We put some of the national action plan money into that centre so they could run the projects. We then formed a committee to run that centre headed by an independent person, and it has on it some scientists from the universities, the department and the Commonwealth. It also has three natural resource management boards. We had two—and we expanded out to include NHT and we put three natural resource management board representatives on it. We are connecting that group to the Natural Resource Management Council. The idea was to have the funds for our research and development, and then the regional boards and people from the science fraternity met and worked through their issues. They came up with a series of projects that meet the outcomes that the community want to make that connects science with the regional community. It is working fairly well.[82]

5.87 The Committee commends South Australia for establishing the Centre and notes that while nationally research ability and goodwill are not lacking, there remains a need for cohesion and coordination with regards to salinity funding and research across the country. Mr Andrew Campbell from Land & Water Australia told the Committee that while NDSP partners sought to maintain communications networks after the closure of the NDSP the mechanisms for information sharing are significantly diminished in the absence of specific resources:

> The partners in the National Dryland Salinity Program, which include the Murray-Darling Basin Commission, several states and territories and several agricultural industries, including meat and grains, are all promoting this through their networks. A communication network was set up through the National Dryland Salinity Program. As we said in our submission to the last salinity inquiry, the National Dryland Salinity Program is no longer continuing as it was. We put in place some mechanisms to promote this information but it is fair to say that, in the absence of some specific resources being dedicated to it, this work will not be promoted as well as it could or should have been.[83]

5.88 However, not all submitters argued the need for the NDSP to continue. The Grains Research and Development Corporation (GRDC) stated in their submission that:

> The GRDC is not convinced that a continuation of the National Dryland Salinity Program is the appropriate vehicle for coordination. The CRC for Plant based Management of Dryland Salinity can fulfil their role to some extent. However, the CRC does not cover all aspects of salinity management. The National Action Plan for Salinity and Water Quality

82 Mr Roger Wickes, Executive Director, Natural Resources Management, Department of Water, Land and Biodiversity Conservation, South Australia, *Committee Hansard* 16 November 2005, pp 5-6.

83 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 23.

> could take a more active national role in coordinating broader salinity management issues.[84]

5.89 The GRDC also argued that information on salinity management could be made accessible to those who wish to implement land use change via a national database that is freely accessible, interactive and free of institutional bias:

> A web-based information retrieval system that allows salinity workers and catchment authorities to assess information from all sources will help to allay the need for high level national coordination.[85]

5.90 The House of Representatives Report recommended the establishment of a database of interpretative material, scientific research and data, related to salinity and its management (recommendation 15). The Australian Government noted that it supported this recommendation, through the following data management arrangements: The National Dryland Salinity Program "Enhanced Communication Year" publications; the National Land and Water Resources Audit, Australian Natural Resources Atlas; and through salinity science information available from the Australian Government Natural Resource Management web site and the web sites of the National Dryland Salinity Program, Cooperative Research Centre for Plant-Based Management of Dryland Salinity, Cooperative Research Centre for Landscape Environments and Mineral Exploration, Land & Water Australia and the Murray Darling Basin Commission.[86]

5.91 However, the Committee heard evidence from land managers who argued that current information on salinity management was not in a format that was most accessible:

> I see no evidence that recommendation 15 has been implemented down to my level of community access. We would welcome access to such a database and its contents. Currently there remains to my knowledge no one stop shop … or an agreed national broker of salinity data – inclusive of dryland and urban salinity.[87]

NDSP products

5.92 As discussed earlier in this chapter, the Committee heard a significant amount of evidence which highlighted the valuable role and the significant achievements of

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84 Grains Research and Development Corporation, *Submission 5*, p. 5.

85 Grains Research and Development Corporation, *Submission 5*, p. 5.

86 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 16, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

87 Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Submission 48*, p. 2.

the NDSP. During the final phase in 2003-04, the NDSP drew together the R&D knowledge that they had accumulated over the past ten years and developed six specific resource kits and communication modules for land and water managers across Australia:

- Dryland Salinity: On-farm Decisions and Catchment Outcomes – a guide for leading producers and advisors.
- Dryland Salinity and Catchment Management – A Resource Directory and Action Manual for Catchment Managers.
- Managing Dryland Salinity – a report on the key research findings.
- Breaking Ground - Salinity Key Findings and Research Outcomes – An Overview Report.
- Breaking Ground – Key findings from 10 years of Australia's National Dryland Salinity Program – the full report.
- PRISMS – Practical Index of Salinity Models – a CD ROM incorporating information on over 90 practical tools, models and frameworks for natural resource management and planning at the regional scale.[88]

5.93 The value of these resources is that they were developed and tailored to specific audiences, both in terms of the questions tackled and the language used. In effect, more than 400 separate research reports were distilled and brought together in one accessible and searchable package.[89] As Land & Water Australia noted in their submission:

> These products represent the state of the art in Australian knowledge of the salinity problem – and the best such compendium in the world at this time.[90]

5.94 Despite the usefulness of this material, the Committee was concerned to learn that some regional bodies were unfamiliar with the NDSP products and resources.

5.95 On hearing the response of one regional body to the question of the NDSP's usefulness, Dr Bruce Munday, who was involved in the production of the NDSP products, commented:

> needless to say, my jaw dropped when Dan said he had not seen it. It just goes to show that it is one thing to produce it and another to distribute it.[91]

5.96 Mr Campbell from Land & Water Australia told the Committee that all (former) partners of the NDSP were promoting the products through their respective

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88 Land & Water Australia, *Submission 26*, p. 4.

89 Land & Water Australia, *Submission 26*, p. 4.

90 Land & Water Australia, *Submission 26*, p. 3.

91 Dr Bruce Munday, *Committee Hansard*, 16 November 2005, p. 54.

networks. However, in the absence of further NDSP funding, promotion of the products was not as comprehensive as it should be.[92]

Gaps in the research

5.97 While a great deal of research into salinity management has been undertaken the Committee was told there remained areas where more research and more up-to-date research was needed. The two areas emphasised were salinity hazard and risk mapping and research and development into profitable salinity solutions.

Mapping

5.98 As discussed in Chapter 2, salt is stored in the ground and may be mobilised by water where it is then transported causing damage to major assets – vegetation, soil, water and infrastructure. The management of salinity is assisted by a range of tools of which mapping to provide a three-dimensional understanding of the landscape and the hydrological processes is one. Spies and Woodgate explain:

> Mapping is the means by which we gain an understanding of what lies on and beneath the Earth's surface. The major uses of mapping in the studies of dryland salinity are to delineate areas affected by surface or vegetation expressions of dryland salinity, and to identify areas not yet affected but at risk of salinisation. At least 30 satellite, airborne and ground mapping techniques are available for mapping and delineating soil, landforms, water flow and pathways through the subsurface.[93]

5.99 In late 2003, the Australian Academy of Technological Sciences and Engineering in conjunction with the Australian Academy of Science, undertook a review of salinity mapping methods. The focus of the review was to produce a technical report on salinity mapping methods and a user guide to their application. In a submission to the inquiry Professor Ian D. Rae, the Technical Director from the Australian Academy of Technological Sciences and Engineering, noted the need to continue to develop technologies, and to further their application to salinity mapping and related national problems:

> It was evident during the review that a range of salinity mapping methods was available in Australia and that, in some cases, depended on very advanced technology… Innovative scientists will need access to support for research and development, and potential users of the technology will likewise need support - at least in the early stages of application - if we are to get full benefit from the scientific and technological effort already expended in this work. In short, a lot has been achieved, but more is needed.[94]

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92 Mr Andrew Campbell, *Committee Hansard*, 6 September 2005, p. 23.

93 B. Spies & P. Woodgate, *Salinity Mapping Methods in the Australian Context*, Natural Resource Management Ministerial Council, June 2005, p. xi.

94 Australian Academy of Technical Science and Engineering, *Submission 1*, p. 1.

5.100 As part of the review, *Salinity Mapping Methods in the Australian Context* [95] was published in June 2005. The book outlines various methods that can be used in the Australian environment to acquire and present information about dryland salinity. In covering 26 different methods of salt mapping it presents natural resource managers with options as to how their mapping needs can be best met. Mr Malcolm Forbes from the Department of the Environment and Heritage told the Committee that:

> Community land care groups, regional authorities and government agencies will benefit from new guides that help decide how to map, predict and monitor salinity in the Australian landscape.[96]

5.101 The Committee heard evidence on the success of salinity mapping to identify where the salt is occurring on the land. Airborne electromagnetic mapping has allowed a much better understanding of where salt is stored in the landscape therefore allowing a more targeted approach to management:

> Using this whole approach we have come down from 300,000 hectares—only knowing that there was an outlet here spitting salt—to actually being able to identify down to about 20,000 hectares where this salt was stored in the landscape. … We can target where we need to do the work. We can make sure that we are putting that excellent work that has been done in the past in exactly the right place and maximising the bang for our buck where we do it.[97]

5.102 Mr Daniel Meldrum from the River Murray Catchment Water Management Board also told the Committee of the usefulness of airborne geophysics and ground based electromagnetic surveys for the management of salinity:

> In terms of the scientific knowledge base that has been developed, the airborne geophysics and ground based electromagnetic surveys I find are very beneficial in producing some good on-ground information.[98]

5.103 But Mr Meldrum went on to argue that that national land use mapping did not provide enough resolution to provide useful, practical information for growers.[99]

5.104 While airborne and ground mapping techniques have delivered significant benefits, the Hunter-Central Rivers Catchment Management Authority submitted that there are currently no mechanisms to investigate large-scale salinity sources and

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95 B. Spies & P. Woodgate, *Salinity Mapping Methods in the Australian Context*, Natural Resource Management Ministerial Council, June 2005, p. 7.

96 Mr Malcolm Forbes, *Committee Hansard*, 6 September 2005, p. 3.

97 Mr Peter Baker, Integrated Water Sciences, Bureau of Rural Sciences, *Committee Hansard*, 6 September 2005, pp 4&6.

98 Mr Daniel Meldrum, Senior Project Officer, Salinity and Water Use, River Murray Catchment Water Management Board, *Committee Hansard*, 16 November 2005, p. 47.

99 Mr Daniel Meldrum, Senior Project Officer, Salinity and Water Use, River Murray Catchment Water Management Board, *Committee Hansard*, 16 November 2005, p. 47.

transportation issues in that region. Specifically the submission noted that there is no investment in large-scale aerial electromagnetic surveys of saline catchments in the Hunter. Consequently, investigations occur on a small scale and concentrate on areas where saline impacts are currently known.[100]

Hazard mapping and risk mapping

5.105 Dr Vervoort, from the Centre for Salinity Assessment and Management, University of Sydney, explained that hazard mapping in itself tells you where the salt is but it does not tell you the likelihood of it being mobilised and hence becoming a problem:

> I think there was confusion for the public between what is risk and what is hazard. There is a difference between those two things. Up until now, most of the approaches have been based on hazard, on looking at hazard. But the fact that there is a large hazard does not actually mean that there is a risk.[101]

5.106 The report, *Salinity Mapping Methods in the Australian Context*, defines hazard as: 'anything that can potentially cause harm to an asset. Salt is a hazard as it has the potential to cause harm to an asset if mobilised by water and transported to the asset'. Risk is defined as: 'the chance of something occurring that will affect the achievement of objectives. In the context of salinity we can define the level of risk as the degree of severity of a hazard as it adversely affects a defined asset multiplied by the probability of occurrence of that hazard at a specific time in the future. Thus the level of risk that is assessed in this way gives a measure of the level of unwanted consequences'.[102]

5.107 The report states that:

> Risk should be assessed in the context of the assets to be protected, which include agriculture, water quality, infrastructure and the environment. Cost-benefit analyses in salinity management should take into consideration total cost and total benefit in context with the value of all assets.[103]

5.108 A clear understanding of hazard versus risk allows a more targeted and refined approach to salinity investment and management. Spies and Woodgate define both hazard and risk maps:

> A salinity hazard map defines the spatial location (both vertically and horizontally) and concentration of salt load. Salinity hazard maps are

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100 Hunter-Central Rivers Catchment Management Authority, *Submission 2*, p. 3.

101 Dr Rutger VerVoort, McCaughey Senior Lecturer, Hydrology and Catchment Management, Faculty of Agriculture, Food and Natural Resources, University of Sydney, *Committee Hansard*, 14 October 2005, p. 37.

102 B. Spies & P. Woodgate, *Salinity Mapping Methods in the Australian Context*, Natural Resource Management Ministerial Council, June 2005, p. 24.

103 B. Spies & P. Woodgate, *Salinity Mapping Methods in the Australian Context*, Natural Resource Management Ministerial Council, June 2005, p. xii.

> normally presented in summary form and do not include whether the salt can or cannot be mobilised.
>
> Salinity risk maps should identify the actual class of asset under threat, the timing of the impact of that threat, the level of anticipated impact should it occur, and the geographic location of both the risk and the asset.[104]

5.109 Dr Vervoort told the Committee that the value of hazard mapping is limited and more attention should be given to risk:

> Hazard mapping is purely static and it needs to also take into account those dynamic components which deal with land use and different effects on the ground which actually deliver the risk analysis. So that is an important component that has not been developed.[105]

5.110 Advances in mapping clearly facilitate a more targeted approach to salinity management. The Committee would like to see updated assessments of the salinity risk accelerated across the states and territories, followed by more detailed mapping of high-risk areas. In particular, the Committee believes more attention should be directed to urban areas at risk of salinity and rural lands being considered for urban development. As discussed in the following chapter, urban salinity remains a largely neglected area in salinity management.

R & D into profitable solutions

5.111 Providing land managers with up to date salinity science is only part of the equation in achieving sustainable land practices that are able to mitigate dryland salinity. Alternative profitable farm systems must be developed to allow land managers to migrate to more sustainable land practices. The Saltland Pastures Association submitted:

> The concept of adapting to salinity, rather than controlling or preventing it is relatively recent, and comes with the realisation that there is no 'silver bullet' solution to salinity. SPA however, believes that the saline environment should not be treated as wasteland, and that there are ways to manage this land to make it profitable.[106]

5.112 Mr Goss from the CRC for Plant-Based Management of Dryland Salinity emphasised the need to develop new industries that were profitable and provided alternative farm systems:

> If you were to look across agricultural areas today, for many parts of the agricultural areas there are not profitable options for farmers to address

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104 B. Spies & P. Woodgate, *Salinity Mapping Methods in the Australian Context*, Natural Resource Management Ministerial Council, June 2005, p. 31.

105 Dr Rutger Vervoort, McCaughey Senior Lecturer, Hydrology and Catchment Management, Faculty of Agriculture, Food and Natural Resources, University of Sydney, *Committee Hansard*, 14 October 2005, p. 37.

106 Saltland Pastures Association, *Submission* 40, p. 1.

> salinity. That is just a reality we face. An astute national program has to recognise that and address it.[107]

5.113 Similarly, a submission from the Saltland Pastures Association argued the need for continued R & D into productive and profitable saline tolerant pastures:

> …we believe there is a need for much more research in this area, particularly in light of the fact that several research initiatives, such as the National Dryland Salinity Program, SGSL and the CRC for Plant-based Management of Dryland Salinity have finished or have a limited life. The potential for increased production and profitability of the saline areas and therefore the whole farm is immense. This increase will come from improved pasture species, both new and enhanced existing species, improved management techniques as well as improved understanding and appreciation of the value of the increasing areas of saline land.[108]

5.114 Mr Gregory Fraser from the Grains Research and Development Corporation highlighted a range of R & D projects that the corporation is currently undertaking, which have an emphasis on both sustainability and profitability:

> These include projects that investigate whole-of-catchment approaches to integrated water and nutrient management and other projects that identify ways to improve nutrient availability and uptake under new cropping systems such as no-tool or legume rotational systems while reducing nutrient loss. Related projects aim to improve the management of raised bed and non-raised bed cropping systems in high rainfall zones to achieve improved water quality and productivity outcomes. [109]

5.115 Dr Martin Blumenthal from the Grains Research and Development Corporation told the Committee:

> Whilst there are bigger environmental issues nationally, salinity is the one that really does impact on the grains industry and economic sustainability much more than any other. So with that in mind we have invested and continue to invest in salinity management.[110]

5.116 Land managers and farmers are supportive of the need to develop profitable farm systems. Mr Alex Campbell, the Chairman of the Cooperative Research Centre for Plant-Based Management of Dryland Salinity, told the Committee:

> The CRC, as it was being developed, had a very strong focus on profitable perennials and profitable farm systems to enable that large-scale

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107 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 18.

108 Saltland Pastures Association, *Submission* 40, p. 5.

109 Mr Gregory Fraser from the Grains Research and Development Corporation, *Committee Hansard*, 28 February 2006, p. 3.

110 Dr Martin Blumenthal from the Grains Research and Development Corporation, *Committee Hansard*, 28 February 2006, p. 3.

> implementation activity. As a farmer, that was my attraction to being part of the CRC.[111]

5.117 However, as yet the suite of profitable farm systems across the wide range of salinity problems is limited. The Committee concurs with the House of Representative Report that there is a greater need for R & D into profitable salinity management methods.

Conclusion

5.118 The Committee heard evidence that research needs to be conducted at different scales and effectively communicated or translated across these scales. Importantly, research and data must not only be accessible to regional bodies and land managers, it must also be presented in a meaningful and applicable way so that it can be incorporated into their salinity management efforts.

5.119 The Committee further heard that current funding arrangements through the national programs limit research at both a national level and a regional level. This was of particular concern for a number of regional bodies who argued that research gaps at the regional level inhibited targeted salinity management.

5.120 In this chapter the Committee found there remains a need to better target and communicate salinity science and research to land mangers and regional bodies on the ground. The Committee heard a significant amount of evidence which argued the need for improved funding to extension services. The Committee is disappointed that there has been little effort to address the difficult situation that many extension officers find themselves in, in regard to their employment conditions. The continued lack of support for these valuable professionals is undermining the NRM programs themselves.

5.121 While the Committee acknowledges that some extension services are being provided by the private sector, there remains a need for greater government involvement and funding of extension services in the natural resources sector. State-based extension services are not necessarily the 'best fit' for the regional delivery model. The Committee believes that the Australian Government has a strong role to play in improving employment and training for extension workers to meet the needs of regional groups.

5.122 The Committee also heard that the closure of the NDSP has left a research coordination vacuum, which is yet to be filled. Further, the lack of a national body has meant that useful salinity management tools are not being adequately promoted and remain underutilised resources. The Committee acknowledges the high standard of salinity research available in Australia but is concerned that unless governments commit adequate resources to the support, communication and dissemination of this research, considerable capacity will be lost at the grass roots level.

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111 Mr Alex Campbell, *Committee Hansard*, 18 November 2005, p. 14.

5.123 Finally, the Committee heard that while valuable research is underway, there is a need for much greater investment in research and development on profitable solutions for salinity management and a demand for updated salinity mapping.

Chapter 6

Urban salinity: a sleeping giant?[1]

> The largest economic impacts of dryland salinity are not really on agricultural production… The largest economic impacts are likely to be on urban infrastructure and on other public assets such as biodiversity.[2]

6.1 During this inquiry the issue of urban salinity emerged as a neglected area in regard to community awareness, urban development, funding and mitigation. This neglect is of concern, as urban salinity has the potential to become a significant problem with a considerable economic impact on the community. This chapter outlines what urban salinity is, the impact and extent of salinity in the urban environment and its potential cost.

6.2 The Committee heard concerns that current land re-zoning and urban development practices have little regard for salinity. While criticisms were levelled at some local governments, the Committee heard evidence that many local governments are actively engaged with the issue of urban salinity. However, for wider action and effectiveness, local governments need greater support to meet this challenge.

6.3 This chapter outlines current approaches to address urban salinity and highlights the need to engage a range of stakeholders. The Committee argues the need to provide adequate funding and support and for a greater focus on urban salinity in current NRM programs.

What is urban salinity?

6.4 In Sydney, Ms Sian McGhie, the Senior Natural Resource Officer from the New South Wales Department of Natural Resources, tabled a set of documents from the Local Government Salinity Initiative, which dealt with many aspects of urban salinity. One publication defined urban salinity as:

> The redistribution of salts, and the impact these salts have on our urban environment. Salt is a natural part of the Australian landscape. Urban salinity occurs in areas where humans have changed natural ecosystems and affected the movement and storage of salt and water in the environment.[3]

6.5 Urban salinity occurs as a result of a combination of excess water and salt in the environment. The Victorian Department of Primary Industries argued that as with salinity in non-urban areas, the processes vary from region to region according to

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1 Mr James Phillips, Private Capacity, *Committee Hansard*, 10 February 2006, p. 11.

2 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 17.

3 New South Wales Government, Department of Infrastructure, Planning and Natural Resources, *Introduction to Urban Salinity*, 2003, p. 1.

differences in geology, geomorphology (landforms) and climate. Urban salinity occurs when:

> Deep-rooted native vegetation is cleared and replaced with shallow-rooted garden plants and lawns, which use much less water. This creates an imbalance in the water cycle, allowing large amounts of water to escape past the root zone and down to the underlying groundwater (referred to as 'groundwater recharge'). The installation of roads, buildings and other infrastructure can also alter natural drainage patterns, while other sources of excess water may result from leaking sewerage, stormwater and water pipes.
>
> Over time, the groundwater system fills, bringing with it dissolved salts that had been stored in weathered rocks deep below the surface and from other sources … Where salty groundwater rises to within about 1.5 metres of the soil surface, it is drawn up by capillary action to form 'saline groundwater discharge' sites. These sites most often occur in low-lying areas.[4]

6.6 A number of submitters highlighted that urban salinity is, in part, due to increased pressures placed on the environment by modern urban living. Dr Petrina Quinn from the Central Riverina Landcare Network and Murrumbidgee Landcare Association argued:

> I believe the public perception with respect to the rising saline water-tables was not that our City and Shire forebears engaged in poor planning, development and residential practices. Rather, rapid growth and an acceleration in our average consumptive use of water, continued low density living accompanied by Californian-style gardens, frequently with sizeable swimming pools, public recreational space demands and so forth overtook capacity in the major regional centres.[5]

6.7 The Australian Local Government Association also submitted that current land practices in the urban environment contribute to an increasing salinity problem:

> Land use and development activities can have an impact on salinity – for example through vegetation removal, by earthworks that may alter local drainage patterns, or by land uses that may affect the amount of water entering the watertable. In addition, urban development can exacerbate salinity through increasing groundwater recharge from run off, increased watering of gardens and altering drainage flows and levels.[6]

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4 Victorian Government, Department of Primary Industries website, What is urban salinity, :http://www.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/urban_salinity_what (accessed 21 February 2006).

5 Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Submission 48*, p. 2.

6 Australian Local Government Association, *Submission 13*, p. 3.

Extent and impact of urban salinity

6.8 An appreciation of the significance of urban salinity is a fairly recent occurrence. In 2000 the National Land and Water Resources Audit (NLWRA) identified urban salinity as having an adverse effect on infrastructure (houses, roads, bridges etc.) in both rural and urban areas.

6.9 The Committee heard that urban salinity was a major problem in a number of regional New South Wales towns, such as Wagga Wagga, Yass, Boorowa, Parkes, Forbes and Cowra. Mr Robert Gledhill told the Committee that:

> At the main cricket ground at Boorowa, salt patches are coming through. You drive past some of the brick homes and you can see the white salt going up the side. We are all aware of that. You see the plaster falling out from between the bricks. There is rising damp in our courthouse.[7]

6.10 In WA, salinity affects a number of rural towns, with 38 towns involved in the state's Rural Towns Program (discussed later in the chapter).[8]

6.11 In Wagga Wagga, Mr Bryan Short from the Wagga Wagga City Council told the Committee of some of the symptoms of urban salinity:

> Just to give you a quick flip through what some of the symptoms of urban salinity are, it is springs popping up in the middle of roads, in nature strips and in footpaths, footpaths that remain damp all year, water seeping into gutters and salt stains on your gutter, salt marks.[9]

6.12 In Western Australia, local governments also have to deal with the impact of salinity on civic infrastructure. Councillor Clive Robartson from the Western Australian Local Government Association told the Committee:

> In terms of impacts of salinity on local government, there are a number of salinity impacts local governments are increasingly having to respond to. These include the direct effects of salinity on infrastructure—that includes roads and drainage networks—and its impact on urban centres.[10]

6.13 The Committee heard that the effects of salinity on buildings can be significant, as saline water travels up brick work and eventually corrodes the bricks themselves:

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7 Mr Robert Gledhill, Lachlan Catchment Management Authority, *Committee Hansard*, 10 February 2006, p. 35.

8 WA Department of Agriculture website, www.agric.wa.gov.au/pls/ (accessed 14 November 2005).

9 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 42.

10 Councillor Clive Robartson, Western Australian Local Government Association, *Committee Hansard*, 18 November 2005, p. 77.

There are areas in the old original brickwork that you can put your hand through. Underneath the houses you can … start getting this hour-glass effect where the brick pier could eventually fail if that was allowed to continue. In another house, fortunately the majority of its structure was hardy plank. In the veranda column you can see the impact of salinity on the brickwork.

Most of the houses in this area, which is probably about 80 years old, are double brick on the outside and brick walls inside … as the damp course fails, because these houses are 50 or 60 years old, the water starts to seep up the walls and you get the plaster starting to fall off the walls.[11]

Photograph: Salinity damage to brickwork, Wagga Wagga, NSW

6.14 Dr Suzanne Wilson outlined the range of infrastructure that can be affected by salinity:

- roads (including gutters and culverts) and bridges;
- stone and brick buildings;
- footpaths, driveways and other concert structures;
- water, stormwater and sewerage systems;

11 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 42.

- powerlines, fences and other steel structures; and
- railway lines.[12]

6.15 The Committee heard from a number of government organisations, who all discussed the range of civic infrastructure damage by salinity. Mr Geoff Fishburn highlighted the impact of salinity on roads:

> I have seen the impacts of salinity on the Sturt Highway between Wagga and Narrandera. There are a number of areas on that road that have been repaired repeatedly because of the impact of the rising water tables. I used to travel the catchment quite a bit. I would see the local council grading the table drains, and I would see the seepage come up straight through the grade each time. The roads were very severely impacted in a number of areas and repaired repeatedly.[13]

6.16 Local governments argued that the impact of salinity on council-managed infrastructure was considerable. In particular concerns were raised over the impact of salinity on buried pipes. The Committee heard that in Western Sydney councils were expecting pipes in certain areas to fail as a result of salinity. It is anticipated that this situation will present local government with a significant and unfunded problem in the not-to-distant future.[14]

Costs of urban salinity

6.17 While the Committee did not receive any figures on the cost nationally of urban salinity, witnesses acknowledged that costs are significant and are rising. The Local Government Salinity Initiative publication, *Costs of Urban Salinity*, provides an overview of the literature on the economics of urban salinity and notes that a cost-benefit analysis is most commonly used to cost the effects of urban salinity. However, the publication notes that such a method cannot adequately assess the environmental and social consequences of salinity in the urban environment.[15]

6.18 Mr Geoff Fishburn from the NSW Department of Natural Resources told the Committee that the costs of urban salinity may exceed those for agriculture:

> It is also becoming apparent that the financial impact on urban infrastructure, buildings and businesses will possibly be even greater than the cost impact on agriculture. These costs will impact on local

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12 S. Wilson, *Understanding and preventing impacts of salinity on infrastructure inn rural and urban landscapes*, www.southburnett.com.au/pdfs/saliitynov2003.pdf (accessed 20 November 2005).

13 Mr Geoff Fishburn, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 9.

14 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 22.

15 New South Wales Government, Department of Infrastructure, Planning and Natural Resources, *Costs of Urban Salinity*, 2003, p. 1.

> government, domestic households, commercial and industrial businesses, state government agencies and public utilities.[16]

6.19 Similarly, Mr Andrew Campbell from Land & Water Australia forecast the looming and significant costs of urban salinity, arguing that urban infrastructure along with other public assets such as biodiversity would be more severely economically affected than agricultural production.[17]

6.20 The Australian Local Government Association highlighted the cost of salinity to local government across a wide range of infrastructure:

> Salinity has economic costs to councils in terms of the costs of repair and maintenance, replacement and shortened lifespans of assets. Salinity causes damage to a whole range of urban infrastructure, including housing, playing fields, footpaths, parks, gardens and trees, piping (gas, water and electricity), stormwater systems, roads and bridges. This can have a significant impact on council planning activities and can restrict funding available for other essential services provided by councils.[18]

6.21 In Wagga Wagga, the Committee heard from Mr Robert Green who argued that costs for infrastructure replacement as a result of salinity in that shire were enormous and were currently not being met:

> If we take Wagga City Council specifically in costs of infrastructure, people will acknowledge that we are way behind in terms of broad infrastructure. A study about three years ago showed that we need $146 million spent on infrastructure generally, which means we should be spending $20 million a year to catch up. We are spending about $6 million. The proportion of that attributed to salinity is probably reasonably subjective, but certainly a large part of that relates to salinity.[19]

6.22 Mr Geoff Fishburn, from the Department of Natural Resources told the Committee that salinity was estimated to cause approximately $9 million in damage to roads and highways in the south-west of NSW.[20]

6.23 The Local Government Salinity Initiative publication, *Costs of Urban Salinity*, notes that in New South Wales:

> Roads and bridges were by far the most important expenditure item identified for local councils. Of the total $8.2 million of repair and maintenance expenditure on infrastructure damaged by salinity or rising

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16 Mr Geoff Fishburn, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 3.

17 Mr Andrew Campbell, *Committee Hansard*, 6 September 2005, pp 19-20.

18 Australian Local Government Association, *Submission 13*, p. 2.

19 Mr Robert Green, Go-Green Services, *Committee Hansard*, 10 February 2006, p. 5.

20 Mr Geoff Fishburn, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 2.

> watertable over the twelve-month accounting period surveyed, 85% was attributed to repair and maintenance of roads and bridges.[21]

6.24 Mr Bryan Short from the Wagga Wagga City Council highlighted the diminished life of infrastructure as a result of salinity damage:

> What invariably happens in terms of cost to the community and the impact on infrastructure is that it effectively reduces your road lot by about half. A road like that is probably about $1 million a kilometre. At one of the local hospitals the car park was only about three years old and it just started to collapse. When I say 'half-life' sometimes it is even a lot less than that.[22]

Urban planning and regulation

Rezoning for urban development

6.25 In light of the significant costs and the threatening scale of the problem, it was not surprising that concerns were raised over urban development planning and regulation issues. The Committee heard evidence from a range of witnesses concerned that governments did not adequately consider the long-term implications of salinity in the urban environment when making land available for housing developments. The Western Sydney Regional Organisation of Councils (WSROC) raised concerns that land was being released for housing development, which will impact downstream on areas already negatively affected by salinity:

> [T]he state government has recently released plans for growth centres in that area. WSROC is particularly concerned about that issue because of the previous environmental issues for that area. The major growth centre that they are proposing in the Bringelly area in the south-west of Sydney will impact on the other part of the South Creek catchment. We think that may well have downstream impacts on the ground water and on salinity in areas that are already suffering salinity… Unfortunately, the information that has been released from the state government on the growth centre has not covered anything that deals with this particular issue, so we are not aware of what has been done in that area.[23]

6.26 The political pressure on state governments to release land for urban development is clearly immense, as is the implication that public knowledge of salinity impacted land could have significant detrimental effects on the real estate market:

> As to that Western Sydney situation, two or three years ago the development was just snowballing. It was just this monster that kept going.

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21 New South Wales Government, Department of Infrastructure, Planning and Natural Resources, *Costs of Urban Salinity*, 2003, p. 3.

22 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 42.

23 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 17.

> I think I can say this here. One state minister said: 'Well, I can't stop it. If I stop the development now to take account of the salinity which we know we're going to develop, all hell will break loose in the real estate market in terms of costs and whatever, so we'll just let it roll out.' I understand that places around Penrith are going to have massive salinity issues, and houses have now been built on there.[24]

6.27 As discussed in Chapter 3, the Committee also heard evidence that was critical of some local governments in regard to rezoning for urban development in salinity prone areas. It was argued that some councils were either unaware of some of the issues to do with salinity or simply chose to ignore them. The Hunter-Central Rivers Catchment Management Authority stated that 'there appears to be limited regulatory will to limit' the future impact of salinity.[25]

6.28 The ACF submitted that support from local government for sustainable land use was contingent on a variety of factors:

> Local government support for sustainable land use still seems largely contingent on local political will, local resources and initiative, as well as persuasion from and good working relations with regional bodies.[26]

6.29 As discussed in Chapter 4, the ACF put forward a recommendation that regional bodies be granted referral powers on land-use planning decisions as a means of ensuring that decisions reflected natural resource management standards.[27]

6.30 At a public hearing in Canberra, Mr Corey Watts from the ACF expanded on this recommendation, noting that regional bodies would need to be functioning at an acceptable standard to take on this role. He noted that regional bodies are potentially valuable partners to local government in the planning process:

> Where there is a certain level of development, they should have powers of referral so that where local government is developing land use plans, zoning plans and so on that these are referred to the catchment authority which is suitably qualified. They have obviously reached a level where they are capable of working with local government. They have the right information at their disposal to make good sound judgments.[28]

6.31 However, as discussed in Chapter 4, local government witnesses were opposed to the granting of legislative powers to regional bodies. It was argued this would lead to confusion over roles and responsibilities and lead to the perception that regional bodies formed another layer of bureaucracy. It was argued that there were

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24 Mr Robert Green, *Committee Hansard*, 10 February 2006, pp13 – 14.

25 Hunter-Central Rivers Catchment Management Authority, *Submission* 2, p. 3.

26 Australian Conservation Foundation, *Submission 19*, p. 50.

27 Australian Conservation Foundation, *Submission 19*, p. 51.

28 Mr Corey Watts, Acting Manager, Land and Water Program, ACF, *Committee Hansard*, 28 February 2006, p. 35.

already sufficient legislative powers to achieve natural resource management outcomes. [29]

6.32 In light of these concerns, some submitters argued the need for greater federal government involvement. Mrs Sharon Fingland from WSROC claimed that the issue of urban salinity was so large that it required all levels of government to be involved as planned urban development often occurs with little regard of possible effects:

> Sometimes some of the decisions that are made at that level actually have consequences at the lower level, which we would argue are not always taken into account. That is why an issue like salinity, which is of such national importance, really needs all levels of government—firstly, to be aware that it is such a major issue and then to deal with it together. It is not something that just local government or just state government could deal with. We have tried to get the message across a number of times.[30]

6.33 Other witnesses were more positive about local government's role in salinity management and the dynamic between regional NRM standards and local government planning. Mr Forbes from the Department of Environment and Heritage told the Committee:

> Local governments, clearly, are very interested in some of the infrastructure questions, and I think local governments can actually learn a great deal from the regional construct and planning which has gone into the regional investment strategies and the underpinning work which has gone into creating those regional plans. So I think there is a linkage between the two, the planning process at the regional level and how it intersects with local government planning and how that will affect infrastructure, but infrastructure funding is not an issue that we have addressed.[31]

6.34 In Western Australia the Committee also heard support for a greater partnership between local government and the NRM regional process in regard to urban development and biodiversity conservation. Mr Nathan Malin from the Western Australian Local Government Association told the Committee:

> In urban areas, there are a couple of projects that are looking at parts of the south-west and also at the greater Perth metropolitan region. The association is very supportive. The South West Catchments Council and the Swan Catchment Council have two projects, the Perth Biodiversity Project, and now the South West Biodiversity Project, which is looking at building the capacity of local governments in relation to their natural area

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29 Australian Local Government Association, *Submission* 13, p. 3 & Local Government Association of Queensland, *Submission 8*, p. 3.

30 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard* 14 October 2005, p. 19.

31 Mr Malcolm Forbes, First Assistant Secretary, Australian Government Natural Resource Management Division, Department of Environment and Heritage, *Committee Hansard*, 28 February 2006, pp 37-38.

> management and having a strategy for how they reflect that in town planning schemes and their rezoning of some land… There was an identified need to try to improve the connectivity there and provide technical support to both the NRM regions and the local governments so that, over time, they can better incorporate those NRM considerations into their local planning strategies and town planning schemes.[32]

6.35 While the Committee was pleased to hear that partnerships are developing between local governments and regional bodies, which will ideally lead to more environmentally responsible planning decisions, the patchy involvement of local government in salinity management and NRM more broadly is somewhat alarming. The Committee appreciates that planning decisions are largely the regulatory responsibility of state and local governments; however there is a clear need for greater national leadership to encourage responsible planning by state and local governments.

Building codes

6.36 The Committee heard that the Building Code of Australia (BCA) does not currently specify requirements for building in saline environments. Coupled with a lack of salinity specific data in urban areas, this lack of regulation leads to poor development in potentially saline environments:

> [T]he Australian Building Codes Board has recently issued a discussion paper relating to building in saline environments and therefore does not currently provide effective legislative requirements for new homes. … Urban salinity is triggered by different parameters than those in agriculture. The lack of salinity-specific data, particularly in the urbanising areas in the Hawkesbury-Nepean catchment, enables development to proceed in potentially saline hazardous areas without recognising the saline environment.[33]

6.37 The Building Code of Australia is produced and updated by the Australian Building Codes Board (ABCB). It is a performance-based code, which sets out the various technical provisions that buildings and other structures across Australia must meet. The BCA has been given the status of building regulations by all states and territories.[34]

6.38 The ABCB is a joint initiative of all levels of Australian Government and includes representatives from the building industry. It was established by an inter-governmental agreement in 1994. The ABCB is responsible for:

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32 Mr Nathan Malin, Western Australian Local Government Association, *Committee Hansard*, 18 November 2005, p. 79.

33 Mr Neville Pavan, Catchment Coordinator, Implementation, Hawkesbury-Nepean Catchment Management Authority, *Committee Hansard*, 14 October 2005, p. 60.

34 Australian Building Codes Board, *Submission 47*, p. 1 and ABCB website, http://www.abcb.gov.au/ (accessed 8 March 2006).

- developing and managing a nationally uniform approach to technical building requirements, embodied in the Building Code of Australia (BCA);
- developing a simpler and more efficient building regulatory system; and
- enabling the building industry to adopt new and innovative construction technology and practices.[35]

6.39 The Australian Building Codes Board is currently working towards incorporating broader salinity provisions in the BCA. The ABCB explained that only minimal attention is given to 'salt attack' in the current BCA. However, in September 2004, the Board released a discussion paper, *Buildings Subject to Attack from Salt and Acids Sulphate Soils*, for comments from government, industry and other stakeholders. The paper discussed the damage caused to buildings by salinity and put forward a proposal for amendments to the BCA. In accordance with the COAG Principles and Guidelines for Standard-setting Bodies, the proposal is being developed into a Regulation Document (RD) and a Regulation Impact Statement (RIS). It is anticipated this will be released for public comment and amended if necessary later this year.[36]

6.40 However, the Committee heard from one witness that inadequate resources are hampering this process:

> The Australian Building Codes Board voted in late 2001 to investigate the efficacy of the building code in relation to salinity. The discussion paper only came out late last year. I think they need some assistance; they are finding it difficult—their staff keeps changing, and getting the experts in there that know building as well as salinity has been an issue.[37]

6.41 The Committee heard that there are variations to the Building Code in some states to include salinity-specific provisions. Ms Sian McGhie from the NSW Department of Natural Resources stated:

> On the subject of state variations, at the moment there is a South Australian one for salinity and recently we adopted one in New South Wales, simply because this other process was taking so long.[38]

6.42 Witnesses argued that there was merit in unifying building codes:

> Other issues are guidelines in urban areas—looking at how we can bring in and unify the building codes and make sure that everyone is aware of what needs to be carried out.[39]

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35 Information taken directly from the ABCB website, http://www.abcb.gov.au/index.cfm?fuseaction=DocumentView&DocumentID=85 (accessed 8 March 2006).

36 Australian Building Codes Board, *Submission 47*, pp 2-3.

37 Ms Sian McGhie, Urban Salinity, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 12.

38 Ms Sian McGhie, Urban Salinity, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 12.

6.43 Mrs Sharon Fingland from WSROC also highlighted:

> …the need for national coordination of salinity management efforts including the housing and development industry, especially in relation to the BCA.[40]

6.44 The need for national salinity standards on the construction of roads was also raised in a submission from the Hawkesbury-Nepean Catchment Management Authority. The CMA argued that current national standards do not address the issues of salinity impacts on roads and other major infrastructure.[41]

Addressing urban salinity

6.45 The Committee heard evidence that a range of programs and measures are currently in place to ensure that urban development in saline environments is minimised and that the effects of salinity on buildings and infrastructure is reduced. These include the use of mapping, revegetation programs, engineering programs, training programs and education programs.

Mapping

6.46 As discussed in the previous chapter, the use of mapping to detect and plan for salinity has been particularly important in addressing issues of agricultural dryland salinity. Mapping also has a valuable role to play in urban development. In Wagga Wagga the Committee heard that the City Council has worked with the NSW State Government to develop salinity planning maps:

> In essence, prior to the CMA the government department of the day assisted Wagga City Council to develop a land and water management plan, and all those sensitive areas have been mapped. The areas that could become saline in the next 10 or 15 years have been highlighted and so forth. Our best available knowledge has been mapped and we can start to plan where urbanisation should go.[42]

6.47 However, not all councils felt that they had access to adequate mapping at an appropriate scale and therefore raised concerns that urban sub-division was occurring on land which had the potential to become saline:

> We called for further research, particularly mapping at an appropriate scale, and talked about the ramification of actions that had been taken, such as the effect on land value, anger in the community at the lack of detailed

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39 Mr Neville Pavan, Catchment Coordinator, Implementation, Hawkesbury-Nepean Catchment Management Authority, *Committee Hansard*, 14 October 2005, p. 65.

40 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 16.

41 Hawkesbury-Nepean Catchment Management Authority, *Submission 12*, p. 1.

42 Mr Gregory Bugden, Murrumbidgee Catchment Management Authority, *Committee Hansard*, 10 February 2006, p. 22.

> information and the further deterioration in surface water quality as subdivision proceeds and inappropriate water management techniques are used in new developments.[43]

6.48 As discussed in Chapter 5, salinity risk and hazard mapping is a valuable tool and if used in the urban context has the potential to avoid significant problems. However, mapping must be undertaken to ensure that state and local governments have access to information to make the appropriate development decisions.

Building in a salinity affected environment

6.49 The Wagga Wagga City Council has been actively engaged in the management of urban salinity since 1993. During this period the Council has produced a number of publications to assist the community in understanding and managing urban salinity. Mr Short told the Committee that the council had produced, as part of the Local Government Salinity Initiative, a document called *Building in a Saline Environment*. The publication told 'people that they should use heavier duty damp courses, better quality bricks and better ways of damp coursing to protect the house in the long term'.[44]

6.50 Also in Wagga Wagga, the Committee heard from Mr Green who suggested that incentives could be offered to home builders to protect houses against salinity at the building stage:

> We could counter that with an incentive to address salinity—a bit like the First Home Owners Scheme where they got a $1,000, $7,000 or whatever. To put in a damp-proof course to protect a house against salinity, I think, costs about $4,000 for a proper system. Whatever the figure is there could be some sort of incentive to assist with that. There are things that everyone basically has to do like termite control, so why not include salinity control and give some sort of incentive for people to address the issue that way.[45]

Revegetation programs

6.51 Evidence was received which suggests that urban developers should be more actively engaged with local government and contribute to the funding of revegetation of saline affected land.[46] Mr Bugden from the Murrumbidgee CMA argued that a land classification system could be developed that would match the salinity risk with an appropriately weighted revegetation responses:

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43 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 15.

44 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 46.

45 Mr Robert Green, *Committee Hansard*, 10 February 2006, pp 15-16.

46 Mr Gregory Bugden, Murrumbidgee Catchment Management Authority, *Committee Hansard*, 10 February 2006, p. 21.

> Then the responsibility is on the developer to pay for some of that land use change, or the incumbent is going to take over that land. The vision is that certain land classes will require 100 per cent vegetation, some 20 per cent and some 30 per cent. Some of those saline scalds need to be fenced out and so forth. That gives the council the platform to move forward.[47]

6.52 The Committee heard that the Wagga Wagga City Council has actually created a development control plan for vegetation in rural residential areas, which sets out what percentage of the block should be vegetated and what sorts of species should be used.[48] However, concerns were raised that the control plan was not being adhered to:

> There is a DCP—a development control program—which actually nominates how much vegetation such as shrubs and trees and whatever is in these areas. It addresses things like the size of lawns, which is the landscaping side of it. But just as a general comment—and I am commenting because it is a bit of a community view or a component of the community view—it is not being done adequately. As to some of lawns out in Tatton, for instance, a comment was made to me the other day, 'Why are they still putting in these large lawns or why is council allowing it?' It might not be the council; it might be developers.[49]

6.53 Dr Petrina Quinn noted that while there are planning requirements in Wagga Wagga, which developers are required to comply with, monitoring this can be time-consuming and expensive.[50]

6.54 In the urban environment, the Wagga Wagga City Council has undertaken a range of strategies such as revegetating parkland and nature strips, and involving the local community to reconsider approaches to gardens:

> In terms of revegetation, we revegetated all the areas that were easy to revegetate: parkland that had not been developed, nature strips. We tried to involve the community… In one area we thought we would try and change landscaping patterns in houses. We got a landscape architect in to meet with the community and talk about different treatments that could be used on nature strips and gardens… This is typically what we came up with: mulching, low water use plants and paving.[51]

6.55 The Committee commends the approach taken by the Wagga Wagga City Council to revegetate the urban environment. However, the Committee notes with concern witness comments about the resource burden of monitoring developers'

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47 Mr Gregory Bugden, Murrumbidgee Catchment Management Authority, *Committee Hansard*, 10 February 2006, p. 21.

48 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 42.

49 Mr Robert Green, *Committee Hansard*, 10 February 2006, p. 13.

50 Dr Petrina Quinn, *Committee Hansard*, 10 February 2006, p. 13.

51 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 41.

compliance with planning requirements and concerns that compliance is being breached.

Engineering programs

6.56 As discussed in the next chapter, there is a need to balance both long-term solutions of salinity mitigation, such as revegetation, with necessary quick-result-producing programs, such as engineering solutions. In Wagga Wagga, 70 per cent of the Council's expenditure on salinity programs has been spent on engineering solutions, with about 45 per cent spent on rear of block drainage programs and about 25 per cent on pumping programs.

6.57 The Committee acknowledges that while engineering solutions are very expensive, in some circumstances the cost is justifiable. In Wagga Wagga the watertable had been rising in some areas at a rate of approximately 0.2 to 0.5 of a metre per annum. The Council felt that the potential impact on real estate values in the town warranted action that would deliver immediate results. As Mr Bryan Short from the City Council told the Committee:

> The engineering solutions are expensive but they are a quick fix, and that is how we were able to allay people's fear. By putting in that bore field, we were able to get the water table down quickly. That was the only way we were able to avoid blood in the streets. We knew there was a problem there. If we did not have any programs up our sleeves, the real estate values in that area would have plummeted and people would have been locked in there and would not be have been able to sell or get out. You have to be careful when you identify the problem to go with the solution as well, and it has to be a solution that works in a reasonable time frame.[52]

Training programs and information for all stakeholders

6.58 Witnesses argued that there is a need to ensure that all stakeholders involved in urban development and management have a sound understanding of urban salinity and are provided with appropriate information to enable them to address this issue in an effective way. The Committee was told that communication between land managers with a knowledge of urban salinity and engineers, builders and planners was limited:

> We have natural resource managers, but we have to talk to engineers, builders and planners, who do not traditionally talk to each other. For example, when a ground water person talks about a well-sorted aggregate, they mean it is all one size, whereas to an engineer that is poorly sorted—well sorted means they have a lot of each of the different sizes, because that is how they compact their roads. They have not naturally spoken to each

52 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 48.

> other in the past and they do not always speak the same language. That lack of information flow makes it hard to assess the impacts.[53]

6.59 It is clear that in some states initiatives are underway to address this issue. Mr Dan Meldrum from the River Murray Catchment Water Management Board told the Committee that in SA collaboration between planners, engineers and local governments was happening:

> We have trained planners and environmental engineers working closely with local government associations, so I think we have a reasonable level of understanding.[54]

6.60 The Committee heard that a number of local governments have employed salinity officers to raise the level of awareness about the issues and to provide technical support and information.[55] Mr Neville Pavan from the Hawkesbury-Nepean Catchment Management Authority told the Committee about the local government salinity program, which provides both training and information across the state of NSW:

> The local government salinity program—which is now being carried out by the Department of Natural Resources through the salinity team leader—has been state-wide and has produced and provided a lot of information for people to get a hold of. We did a short training session with some of our officers, and that type of awareness—the pictures and the explanations—is around and it is very good.[56]

6.61 In NSW, the Department of Natural Resources supported the development of the Local Government Salinity Initiative, which provides training, education and technical support to councils to manage urban salinity. Eleven booklets have been produced in the LGSI series, which bring together a range of information on urban salinity management. The project was undertaken in response to a high level of frustration felt at a local government level about the lack of support available to tackle urban salinity. The Department followed these publications with training sessions, often instigated at the request of local councils:

> A lot of them have been involved in training; 25 per cent of councils in New South Wales have sent staff to training. That might be one staff member from a small council but some of the Western Sydney ones have sent about 40 staff members… So all staff within councils—not just the engineers but the builders, the planners and the people from parks and

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53 Ms Sian McGhie, Urban Salinity, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 10.

54 Mr Daniel Meldrum, Senior Project Officer, Salinity and Water Use, River Murray Catchment Water Management Board, *Committee Hansard*, 16 November 2005, p. 48.

55 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 19.

56 Mr Neville Pavan, Catchment Coordinator, Implementation, Hawkesbury-Nepean Catchment Management Authority, *Committee Hansard*, 14 October 2005, p. 65.

> gardens—are working together to build up a knowledge of what the impacts and processes are within their town and to come up with a list of things that they can do to implement change that suit that level of risk and their resources. It has been very successful.[57]

6.62 The Committee also heard from WSROC that in 1999, in association with the department, WSROC hosted a Western Sydney Salinity Working Party, which brought together the Hawkesbury-Nepean Catchment Management Trust and the Upper Parramatta Catchment Trust, three other councils in Western Sydney, the Housing Industry Association, the Department of Urban Affairs and Planning, the LGSA and the Office of Western Sydney, to discuss the issue of urban salinity and develop a range of planning and management responses to the problem. Since March 2000, this group has been involved in the Western Sydney Salinity Management Project, funded by the Natural Heritage Trust.[58] Councillor George Campbell from WSROC told the Committee:

> First of all I must admit to being on a bit of a steep learning curve on this issue… WSROC has been very heavily involved in training member councillors in the issue, providing information and so on. Our main concern I guess is that, when we think of salinity, we often think of salinity in the countryside and how it affects farming and so on. We are very concerned that it is a major problem in the Western Sydney area—or a potential problem. We want to ensure that urban salinity is taken very seriously.[59]

Educating the community

6.63 The Committee heard of the need to educate the community about urban salinity:

> We need a positive approach. Certainly in Wagga we have taken that. Some of the council people refer to some of the things that we have done and some of which you might have seen: water-wise gardens and our urban salinity tour, which we will go on this afternoon. Another one is the salinity glove box guide, done by the DPI and the community. These things are starting to put in front of people things that they can understand in a common language. Whilst I agree that we need professional people, we also need to be able to get that simple message across to people.[60]

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57 Ms Sian McGhie, Urban Salinity, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 4.

58 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 14.

59 Councillor George Campbell, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 13.

60 Mr Robert Green, *Committee Hansard*, 10 February 2006, p. 5.

6.64 The Wagga Wagga City Council has produced an excellent range of publications, from booklets to PowerPoint presentations burnt on CD, informing Wagga Wagga residents about the impact and management of urban salinity.

6.65 While in Wagga Wagga, the Committee visited ErinEarth run by Sister Carmel Wallis. The home and garden was conceived in 1997 and sits in stark contrast to the original 1870 convent building with its extensive lawns and European style gardens.

Photograph: ErinEarth sustainable garden, Wagga Wagga, NSW

6.66 Sister Wallis told the Committee about ErinEarth:

> It is a site on 0.4 hectares. It has a solar passive house where I live with another sister and we very often have visitors staying with us. It has water-wise house gardens that try to break the concept of lawn, iceberg roses and annuals. It offers alternatives to most thirsty gardens. We have vegetable gardens and a small orchard in process, and compost systems and chooks

> that are suitable for Wagga backyards. We now have a dam and wetland ponds on that tiny site, and they are filled by the stormwater from the old convent buildings. This was a salinity alleviation project that has had great biodiversity consequences. We are amazed watching it unfold before our eyes.[61]

6.67 A key objective of ErinEarth is to educate and involve the community and to provide an alternate perspective to urban living and gardens:

> I was thinking about the beauty of the site in terms of salinity education. The beauty is that there is the possibility of a practical, clear object lesson for past and present stories. From a single vantage point on the site, people can see the buildings from the 1870s with the downpipes and overland gutters into the railway, and that has its story. They can see the two hospitals, behind which the saline discharge was eating away foundations. There is the other story. They now have a dam and wetland ponds which collect the water. It has biodiversity spin-offs. We are able to educate the connection between salinity and biodiversity, which is pretty crucial. We are able to demonstrate the plants that are suitable for a recharge zone by looking at them. Standing in the one spot, you see the lot.[62]

6.68 Sister Carmel also raised the social justice implications of salinity in towns where the more affluent homes are located on the top of hills yet the runoff from large gardens and the consequent rise in the watertable manifests itself in the lower lying and often lower socio-economic parts of the town:

> I think the other reason it is useful as an education site is that, as Sisters, we have had a background in education and social justice. Much of the salinity issue on both the micro and macro themes is a social justice issue—or it certainly has social justice implications. Here in Wagga, in the recharge zones, we have the larger homes with the more affluent gardens doing a lot of watering, and the implications are felt in the lower socioeconomic areas of Wagga.[63]

Impact on real estate values and the role of education

6.69 The Committee heard evidence about the impact of urban salinity on real estate values and the importance of information and community education to address what potentially could be a damaging community issue.

6.70 In Wagga Wagga the Committee was told that once the effects of salinity had been identified by the Council, it was decided that a community consultation and education program was needed:

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61 Sister Carmel Wallis, ErinEarth, *Committee Hansard*, 10 February 2006, p. 6.

62 Sister Carmel Wallis, ErinEarth, *Committee Hansard*, 10 February 2006, p. 7.

63 Sister Carmel Wallis, ErinEarth, *Committee Hansard*, 10 February 2006, p. 7.

> We felt that if we had this information we needed to make it public, because if we sat on it we would be liable for court cases if people subsequently found out that we had the information and had not told them and they had damage caused to their houses and property… At the same time that we let this information lose out to the public, we also went out with a strong community consultation process. We told people that we had four programs that we were going to put in place, which we were hopeful could manage the rising water tables under the urban area.[64]

6.71 Mr Short went on to explain that real estate in salinity affected areas:

> …nosedived initially, to the point where you could not sell houses in those areas. After we got into the education program the houses started to sell again, but they dropped by the amount it would take people to do repairs. A lot of the time people were hiding them. They would put a fresh coat of paint on something. What tended to happen was that the house valuation would drop by $15,000 to accommodate the repairs that might have to be done to it, on the expectation that the programs that council put in place would not let it happen again.[65]

6.72 The Committee was told that banking institutions were also involved in a process of re-education as some would not lend for the purchase of houses in salinity affected areas:

> …some of the banks and lending organisations started to say they would not lend money for houses in those areas. We had to go through an extensive education process with them to convince them that the package that we were putting together would mitigate the effects that the rising watertable was having. It took about 18 months before we could get them to change their mind and start lending in those areas again.[66]

6.73 The experience of home owners in Wagga Wagga highlights the importance of re-education programs in salinity-affected residential areas. Further, it underscores the need for better planning and management of housing developments on potentially saline land.

Rural Towns Program – WA

6.74 The Committee heard that a program to manage urban or townsite salinity has been underway in WA for a number of years.[67] The Rural Towns Program was established in 1997 and is administered by the WA Department of Agriculture. The program is supported by a 12-member management committee comprised of six

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64 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 40.

65 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 46.

66 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 41.

67 Mr Fred Tromp, Director, NRM and Salinity, Department of Environment, *Committee Hansard*, 18 November 2005, p. 3.

government representatives and six local government/rural sector representatives. The purpose of the program is to assist communities in managing townsite salinity. A total of 38 towns and communities are involved in the project.[68]

Rural Towns – Liquid Assets

6.75 The Rural Towns – Liquid Assets project is being run over three years. It is a partnership between the Department of Agriculture, Local Government, CSIRO, and regional catchment councils. The project aims to demonstrate how to control townsite salinity and produce returns from saline groundwater production.

6.76 The objectives of the project are:

- Protect townsite infrastructure from salinity
- Protect remaining biodiversity areas in or adjacent to towns
- Produce a model for integrated town water management
- Develop alternative new supplies plus recycled water schemes
- Reduce reliance on scheme water in towns
- Foster high value industries using new water supplies
- Promote local ownership of water resource management issues[69]

6.77 The total cost of the project is $6 million. The Department of Agriculture has committed $1.5 million in cash and $500,000 in in-kind contributions. A total of 1.5 million through regional catchment councils' NAP funds will be sought. A total of 1.5 million will be sought from local governments. Other partners will make in-kind contributions.[70]

Greater support for urban salinity

6.78 Evidence to this inquiry suggests that, in the main, the current level of support to address urban salinity is limited. The key areas of concern are:

- lack of information and guidance
- local governments are under resourced to do the massive task that has fallen to them
- there is a lack of emphasis on urban salinity in the current national programs

6.79 Mrs Sharon Fingland told the Committee that WSROC had identified a range of issues contributing to the failure to adequately deal with the challenges of urban

68 WA Department of Agriculture website, www.agric.wa.gov.au/pls/ (accessed 14 November 2005).

69 Taken directly from the Department of Agriculture, *Rural Towns – Liquid Assets*, p. 1.

70 Department of Agriculture, *Rural Towns – Liquid Assets*, p. 2.

salinity. These included a lack of information, guidance, state and federal government leadership and local government resources:

> A whole lot of issues were identified including issues of liability, process and information dissemination, a lack of guidance to councils on how to alert residents to the problem and potential damage, a lack of information mapped at an appropriate scale, a lack of council resources to deal with the growing community concerns as residents became aware of the impacts of salinity, the need for clear and consistent council action based on guidelines covering things like planning instruments, the need to build methods into the Building Code of Australia to talk about salinity issues, the need for greater federal government leadership to coordinate actions across all levels of government and the need for stronger state government commitment to addressing salinity concerns, particularly for large scale urban releases in Western Sydney.[71]

Supporting local councils

6.80 Because of their primary role in urban planning and development, their ownership of civic infrastructure and their management of wastewater, local government are central to urban salinity management. The Australian Local Government Association submitted that:

> Councils have influence over salinity management through local planning and land use controls, conservation of biodiversity and the management of the water cycle. Councils are also directly impacted upon by salinity, particularly by urban salinity. Urban salinity has significant costs for both councils and their communities, in terms of salt affected infrastructure such as roads, housing and drainage …[72]

6.81 A number of submitters also highlighted the role played by local government beyond salinity management to broader issues of natural resource management. Mr Charles Willcocks, from the Department of Agriculture, Fisheries and Forestry told the Committee:

> It is also important to point out that local government intersects with natural resource management in a number of areas—think about weeds and feral animal management, management of public land, roads and so on—so it is not just a salinity issue. Local governments engage pretty heavily on natural resources across a range of issues.[73]

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71 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 15.

72 Australian Local Government Association, *Submission 13*, p. 1.

73 Mr Charles Willcocks, Landcare and Sustainable Industries, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 6 September 2005, p. 17.

6.82 Mrs Sharon Fingland from WSROC also argued that urban salinity needs to be considered in the broader context of water management:

> We argued that urban salinity needed to be considered within the broader context of integrated water management—in other words, how salinity affects stormwater management, water sensitive urban design and community behavioural norms… We argued that salinity is an issue of prime national importance for Australia. It is particularly an issue for urban areas of Western Sydney, which has significant implications for asset management, risk liability and costs to our community.[74]

6.83 Despite the complexity of the management issues around urban salinity and natural resource management more broadly, witnesses felt that councils were under-resourced and were increasingly asked to do more with less. Dr Petrina Quinn from the Central Riverina Landcare Network and Murrumbidgee Landcare Association, told the Committee:

> When it comes to urban salinity west of the divide, the main game is local government. Any main policy pressures applied to local government have to be ones that have to be managed without huge amounts of resources. More and more is being dumped on local government and, frankly, it is unfair and unreasonable. They do a huge amount and account must be taken of the much broader portfolio in NRM that local government are now required to engage with.[75]

6.84 The Committee was told that councils themselves feel that the Australian Government has, over the past decade, become less involved in urban issues more generally:

> We would go further inasmuch that, for about the last 10 to 15 years, we would argue there has been less involvement at the federal government level in terms of a whole host issues to do with urban areas. A lot of projects that were actually initiated under the Building Better Cities program, for example, very helpful to areas like Western Sydney but there has been little engagement in those sorts of issues over the last decade.[76]

6.85 The Local Government Salinity Initiative is a positive example of program support made available to local government. Mr Andrew Campbell from Land & Water Australia also highlighted an NDSP project which aimed to provide local government with examples of 'best practice' council programs aimed at addressing urban salinity:

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74 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 16.

75 Dr Petrina Quinn, Central Riverina Landcare Network and Murrumbidgee Landcare Association*, Committee Hansard*, 10 February 2006, p. 16.

76 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 22.

> There was an NDSP project that highlighted best practice in local government and provided examples of what the more progressive councils are doing around salinity. It is very heartening, but they are little candles in the darkness in comparison to the scale of the issue.[77]

6.86 However, 'little candles in the darkness' are unlikely to provide the necessary support needed by local government.

Funding solutions

6.87 Local government argued that lack of financial support was a significant barrier to addressing urban salinity.[78] This was affirmed by other witnesses:

> They are at the low socioeconomic end of the funding set-up, and they are always looking for money.[79]

6.88 Mr Bryan Short from Wagga Wagga City Council highlighted the difficulty local government has in raising funds for urban salinity management:

> We find that we have some difficulty convincing our partners in the rural areas that urban salinity is a legitimate player in the action plan. Their view is that local government should go out and fund that itself. But local government is struggling for funds, or it is in New South Wales anyway, with rate pegging.[80]

6.89 Dr Petrina Quinn told the Committee that the difficulty in accessing federal funding was a significant impediment to local government involvement:

> It has been a huge problem. Historically, in 1996-97, a couple of years after it became general knowledge in the community that we had a high saline water table, it was exceedingly difficult to access funds from national programs.[81]

6.90 The Committee heard that, pre-access to NHT funding, the Wagga Wagga City Council was fortunately able to sell off an asset to finance the development of an urban salinity implementation program.[82] However, Dr Quinn from the Central Riverina Landcare Network and Murrumbidgee Landcare Association argued:

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77 Mr Andrew Campbell, Land & Water Australia, *Committee Hansard*, 6 September 2005, p. 27.

78 Australian Local Government Association, *Submission 13*.

79 Mr Robert Green, *Committee Hansard*, 10 February 2006, p. 10.

80 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 43.

81 Dr Petrina Quinn, Central Riverina Landcare Network and Murrumbidgee Landcare Association, Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Committee Hansard*, 10 February 2006, p. 9.

82 Dr Petrina Quinn, Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Committee Hansard*, 10 February 2006, p. 9.

> [M]ost regional towns are not in that position, and they need access to federal funds to at least begin the substantial work that then becomes a lever for a range of other sound environmental practices to follow.[83]

6.91 Additionally, the Local Government Association of Queensland submitted that the current focus of NRM through both NAP and NHT was very narrow and did not give adequate consideration to the role played by local government in the management of services that impact on the natural environment. It was suggested a broader focus for these national programs would be more useful.[84]

6.92 In Wagga Wagga the Committee heard that NAP funding is directed to on-ground projects and that this restricts local governments from developing education programs, which are equally valuable to their communities:

> Also, when programs or projects were being called for under the national action plan, the council put forward a proposal for a one-stop shop for managing urban salinity for Wagga. We were seeking funding out of the Australia-wide part of the program rather than the state program. But that did not get up…
>
> The current program with the national action plan in New South Wales is concentrated more on works on ground. We would like to see a bit of a better balance between works on ground and education programs. At the moment, while we are getting funding under the national action plan, we are letting that fund the works on ground and we are using our own money to fund the education side of the issue.[85]

6.93 Mrs Sharon Fingland from WSROC told the Committee that, whilst national funding for urban salinity is limited, WSROC has been able to access NHT funding:

> Particularly in Western Sydney, the issues that were identified were a lack of acknowledgment at the federal level of urban salinity issues for the region—we were not getting any financial support—a lack of public awareness on the impact on residents and urban infrastructure and a lack of financial support to repair damage to economically disadvantaged areas. As a result we got the natural heritage funding, which certainly has assisted. We are very grateful for that.[86]

6.94 Similarly the Wagga Wagga City Council were, more recently, also able to access funding from the NHT:

> In terms of funding, initially we drew on the NHT program and, to some extent, the smaller projects of the environmental trust. The funding ratio

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83 Dr Petrina Quinn, Central Riverina Landcare Network and Murrumbidgee Landcare Association*, Committee Hansard*, 10 February 2006, p. 9.

84 Local Government Association of Queensland, *Submission 8*, p. 1.

85 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 43.

86 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 15.

> was about $3 of council money to about $1 grant money from state and federal government plus about $1 in-kind contribution from the state government agencies and CSIRO. Because we were the first cab off the rank, we got a lot of support—and we still do get support, but probably not as much as we think we should—from the agencies. There was a drying up of funds for about three years while the NAP—the national action plan—funding was sorted out.[87]

Urban salinity – recognition in national programs

6.95 Evidence to this inquiry indicates that the priority given to urban salinity by national programs is inadequate and that there is currently an overemphasis on agricultural salinity:

> Each time we have tried to highlight the fact that one in 11 of the Australian population live in our region and yet, when regional issues are considered, it appears that urban regions do not get the same level of attention that rural regions get for some of the issues. Issues such as salinity and urban salinity, for our region, are something that have to be thought of at a regional and national level.[88]

6.96 In September 2005, Mr Mike Lee from the Department of Agriculture, Fisheries and Forestry, noted the imbalance in investment in civic infrastructure and told the Committee that urban salinity was not sufficiently accommodated in regional investment plans:

> I would like to suggest as a personal observation that it would be good to consider the balance of investment and attention being paid to civic infrastructure—roads, rail, foundations, sewage treatment and what have you—in relation to salinity hazard. That was certainly one of the specific references in the national action plan. But we have found with experience that that area is not appearing in the investment proposals or strategies as strongly as it might in terms of what is coming forward, and yet we know that impacts on infrastructure in terms of the economic effect of salinity are very large. So this is one area that we will certainly be looking at in our salinity evaluation, which I referred to previously, of the balance of the investment portfolio that we have in salinity. Our suspicion is that it is potentially weak in the area of protecting civic infrastructure. That is an area which local government has a very strong interest in, as do other state agencies that are involved in road, rail and what have you. It spreads the net further than the more traditional aspects of salinity impacts that we have looked at.[89]

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87 Mr Bryan Short, Wagga Wagga City Council, *Committee Hansard*, 10 February 2006, p. 42.

88 Mrs Sharon Fingland, Western Sydney Regional Organisation of Councils, *Committee Hansard*, 14 October 2005, p. 19.

89 Mr Mike Lee, Australian Government Natural Resource Management Team, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 6 September 2005, p. 17.

6.97 In February 2006, Mr Aldred from the Department of Agriculture, Fisheries and Forestry told the Committee that the heightened focus on agricultural salinity (and the lack of attention on urban salinity) may be due to the fact that the two departments responsible for administering the NRM programs at a national level have a rural and agricultural focus:

> I would say at the outset that, largely, the two portfolios represented here do have a particular focus on rural and agricultural lands, and in some senses that was the genesis of the National Action Plan for Salinity and Water Quality. There are certainly significant issues in relation to built environments and major infrastructure, but they are not the primary emphasis of the programs that these portfolios deal with.[90]

6.98 Ensuring the 'viability of infrastructure' is one of the goals of the NAP. As a result, the Committee believes it is the responsibility of the Australian Government to ensure that the administering departments build links with relevant Commonwealth and state agencies so that they are sufficiently informed of, and able to provide leadership on, urban salinity issues at a national level.

Conclusion

> Urban salinity is five or 10 years behind dryland salinity—as dryland was five or 10 years behind irrigation salinity.[91]

6.99 The Committee heard that urban salinity is shaping to be a significant issue in the future. Of concern to the Committee is not simply the potential size of this problem but that local, state and federal governments are generally ill prepared to deal with it.

6.100 The Committee was heartened that the state government in WA and local governments, such as Wagga Wagga City Council, the Western Sydney Regional Organisation of Councils and a number of CMAs are currently dealing with the issue of urban salinity through a range of programs. However, funding and appropriate recognition in national programs for urban salinity is both limited and fragmented:

> Too often urban salinity along with everything else in NRM is a bit fragmented. This is problematic. There is fragmentation of NRM across all levels of government. In terms of urban salinity, I suggest that systemic approaches are better.[92]

6.101 The Committee believed there is a need for greater emphasis to be given to urban salinity – a potential sleeping giant.

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90 Mr Tom Aldred, Executive Manager, NRM, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 28 February 2006, pp 37-38.

91 Ms Sian McGhie, Urban Salinity, NSW Department of Natural Resources, *Committee Hansard*, 14 October 2005, p. 10.

92 Dr Petrina Quinn, Central Riverina Landcare Network and Murrumbidgee Landcare Association, *Committee Hansard*, 10 February 2006, p. 16.

Chapter 7

The triple-bottom line

> … Economics play a part; it's why that Dollar sign.
> And yes, it is the driver of that Triple Bottom Line.
> Farmers need the confidence that they can make it pay.
> They have to get their money back, there is no other way.
> We need a greener attitude to show the world we care,
> To leave this land in better shape when we're no longer there.
> We need to know what we do now won't cause some future pain.
> We hold this land in sacred trust - not for selfish gain.
> The Social side's important, too. More people need to stay.
> Should we just ignore this land –? Give up and walk away?
> With ev'ry salty farm that's sold to neighbours down the road,
> It's one more family that has gone – One less to share the load. …[1]

7.1 Balancing economic, environmental and social objectives and outcomes emerged as a key theme in evidence received. During the course of the inquiry it became evident that there are further and interrelated tensions inherent in the complex task of salinity management:

- balancing public and private interests and investment in salinity management
- what is best - preventing salinity, reversing salinity or adapting to salinity?
- balancing voluntary, persuasive and prescriptive regulatory/policy measures

7.2 Managing these tensions well will be critical to achieving the goals of the national programs.

7.3 In this chapter the Committee considers evidence on the above tensions, and major themes emerging from these tensions: the need for a mix of approaches to salinity management, the need for greater industry involvement and private investment in salinity management, and the role that a streamlined investment framework and the right mix of regulatory and policy instruments could play in achieving these goals.

Balancing economic, environmental and social objectives

7.4 As noted in Chapter 4, development of regional plans, which form the basis for salinity management and natural resource management more broadly, must take into account the social, the economic and the environmental. Whether a balance between the three is being effectively achieved was an issue raised during the inquiry.

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1 Mr Michael Lloyd, *Submission 40*, p. 6.

7.5 The Conservation Council of WA expressed concern that Australian Government Research is driven by economic factors at the expense of environmental ones:

> … it appears that the emphasis of the Australian Government research is driven by the '$ profit motive' rather than protection of the nations ecological wealth and natural capital, with a classic case in point being the axing of Australian Government funding from wildlife and ecology research but not from biotechnology research.[2]

7.6 The Committee was concerned to hear that there have been few studies on the impacts of salinity on biodiversity in the eastern states.[3] The most comprehensive work was undertaken in 2001. This national study was commissioned by the Standing Committee on Conservation for the Australian and New Zealand Environment Conservation Council (ANZECC). Information on this study provided to the Committee suggests there are gaps in the data collated. For example, figures provided for NSW are 'substantial underestimates' as they only cover forests on freehold land.[4]

7.7 On the other hand, the Committee heard evidence that attention was focused on biodiversity at the expense of productivity outcomes in WA. The WA Farmers Federation reported that: 'community concern is being expressed over a perceived focus on biodiversity outcomes as opposed to sustainable farming and salinity control outcomes'.[5]

7.8 As discussed in Chapter 4, concerns were raised about different interests not being heard in the regional decision-making process. The WA Farmers Federation suggested that an imbalance of stakeholder representation on regional committees led to an imbalance in areas targeted for investment, with productivity outcomes losing out:

> … in respect to the running of the councils, who is on them and who is making the decisions, certainly one of the perceptions or the realities is that there is a balance of people on those committees not necessarily balanced towards productivity outcomes.[6]

7.9 Evidence suggested that commercial drivers were integral to the successful management of salinity For example, Mr De Landgrafft from the WA Farmers Federation said:

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2 Conservation Council of WA, *Submission 11*, p. 6.

3 Department of the Environment and Heritage & Department of Agriculture, Fisheries and Forestry, answer to question on notice, 6 September 2005 (received 1 November 2005).

4 Department of the Environment and Heritage & Department of Agriculture, Fisheries and Forestry, answer to question on notice, 6 September 2005 (received 1 November 2005).

5 WA Farmers Federation, *Submission 41*, p. 3.

6 Mr McMillan, *Committee Hansard*, 18 November 2005, p. 55.

> The question of salinity is a complex one and there are a lot of people who have a few ideas about what the solution might be, but one thing is for sure, and that is that any real and lasting solution will have to be a commercial one. Whilst there will be people who will try this and try that and say there is limited success with it, if the farmers cannot make money out of the solution, they will continue to walk away from the problem. It has been better business to walk away from the problem and buy more farmland than to try to bring back country that has gone down.[7]

7.10 The Avon Catchment Council, WA, similarly acknowledged that 'economic driver identification' is a lever in encouraging land managers to address salinity.[8]

7.11 The CRC for Plant-Based Management of Dryland Salinity observed that the investment planning process needs to be able to balance the economic effects on farmers and the broader salinity impacts:

> To underpin investment planning, CMAs need access to the capacity to analyse the trade-off between on-farm economic impacts, and off-farm salinity impacts.[9]

7.12 This view was affirmed in research by Professor David Pannell, who further notes that farmers may be forced by economic circumstances to choose short-term gains over long-term gains. Salinity mitigation may take years to take effect. It can be hard for farmers to voluntarily change their land management practices when short-term demands prevail: 'those farmers who are forced by circumstances to give priority to short-term profits are unable to adopt preventative measures even if they would eventually be profitable enough to offset the up-front costs and interest'.[10]

7.13 In SA, Mr Wickes from the Department of Water, Land and Biodiversity Conservation told the Committee that their programs seek to achieve a balance between 'primary production and the biodiversity of the region':

> We listen to all those communities to try to make the matter balance. Our aim is to improve the biodiversity as well as protecting the agricultural land that is available. It has to be seen in a total catchment context; it cannot be seen as one versus the other.[11]

7.14 Dr David Masters, CRC for Plant-Based Management of Dryland Salinity made the point that farming activity and environmental improvement are not necessarily mutually exclusive. He also argued that revegetation is not necessarily a cost but may also be viewed as an investment:

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7 Mr Trevor De Landgrafft, *Committee Hansard*, 18 November 2005, p. 54.

8 Avon Catchment Council, *Submission 42*, p. 2.

9 CRC for Plant-Based Management of Dryland Salinity, *Submission 18*, p. 2.

10 D. Pannell, 'Voluntary versus Regulatory Approaches to Protecting the Environment in Rural Areas', *Farm Policy Journal*, vol. 2, no. 3, August Quarter 2005, p. 2.

11 Mr Roger Wickes, *Committee Hansard*, 16 November 2005, p. 7.

> I would like to take the opportunity to get a couple of points across that are the basis for my involvement in salinity management. The first is that farming is frequently seen as being in conflict with environmental improvement, particularly with salinity. This is not necessarily the case. The second is that similarly revegetation of saline areas and introduction of plants that reduce the risk of salinity have been viewed as a cost and not as an investment, at least from a farm business perspective. This is also not necessarily true.[12]

7.15 The Committee also heard that economic considerations are invariably bound up with social impacts. For example, discussions in WA suggested that farmers with diminishing tracts of workable land were selling up their properties. In turn, neighbouring farmers were buying this land to supplement their own diminishing supply of profitable land – a more cost effective and immediate option than attempting to remedy saline-affected areas. This results in larger farms with smaller communities, which has flow-on social and economic effects - for example, social isolation and a decline of rural towns and businesses in response to a smaller demand for services.

7.16 Mr Dunne, a WA landholder, told the Committee that: 'Our population is diminishing so quickly it is going to be all over soon for some of the small communities'.[13]

7.17 Mr Tallentire, Director of the Conservation Council of WA also highlighted the impact of salinity on rural communities:

> An area that I do want to quickly touch on is the social cost. We all know that in the rural regions of Western Australia, and I guess across the country, we have a significant decline in rural populations, decline in amenity values in rural areas, and we also see things such as the 'desperately seeking Sheila' phenomenon—the female famine—where people do not want to live in a desolate landscape. That is as a result of a number of declining environmental factors, and salinity is certainly amongst those.
>
> When you combine the rural gender imbalance with severe financial stress that many in the rural sector are facing, and a degraded environment, you have a cocktail for poor mental health, family breakdown and sometimes—most tragic of all—suicide. We all know that Australia has a particularly high youth suicide rate, perhaps one of the worst in the world, and it is in the rural areas that we see that manifesting itself at the worst levels. So there is no doubt that there is a linkage between the environmental, social and economic factors in the regions that are touched by salinity. We cannot underestimate the role that salinity plays.[14]

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12 Dr David Masters, *Committee Hansard*, 18 November 2004, p. 16.

13 Mr John Dunne, *Committee Hansard* , 18 November 2005, p. 70.

14 Mr Christopher Tallentire, *Committee Hansard*, 18 November 2005, pp 60-61.

7.18 Professor Copeland, University of Sydney, told the Committee that addressing salinity requires taking account of social and political sensitivities as well as developing science solutions:

> The benefits are not only in solving the salinity problem per se. There are social and community and political sensitivities that need to be taken into consideration. I do not know what sort of group holds the expertise to do that. Scientists are part of it, but to develop a scientific model is going to be very much a small part of what needs to be done.[15]

A silver-bullet solution?

7.19 Several witnesses highlighted that there is no 'silver bullet' solution to salinity and seeking one is flawed. Dr Munday's comments typified this view. Reflecting on the decision to complete deep drainage in the Upper South-East region in SA and the deep divisions in the community resulting from this (discussed in the case study below), Dr Munday said:

> I think that it highlights the peril of looking for one silver bullet to solve this. I am not suggesting that the drain was the silver bullet but to some extent it was in the upper south-east. That was where everyone pinned their hopes: the drain would get rid of the floodwater and halt the rising ground water. That was the big ticket item and that is what people got really interested in. But we have known for a long time that it is never as simple as that.[16]

7.20 The most appropriate solution(s) will vary from region to region, depending on a range of conditions such as soil types, terrain and climate and the range of assets that are under threat, for example, biodiversity, agricultural land and infrastructure.

7.21 Mr Leak from the SA Department of Water, Land and Biodiversity Conservation noted that finding solutions that can produce a range of outcomes and satisfy all parties is never easy:

> It is a difficult balance to find solutions on the ground that provide biodiversity and environmental outcomes and primary production outcomes as well. …we do bring everybody to the table as part of the decision-making process to try to understand what all the issues are. The role that we have is to try to bring those into an integrated solution that meets the issues that are identified for each individual catchment.[17]

7.22 As discussed in Chapter 2, there may be a geographical dislocation between the cause of salinity and where it takes effect. Further, implementation of solutions in one area may lead to (positive or negative) impacts in another area. For example,

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15 Professor Les Copeland, *Committee Hansard*, 14 October 2005, p. 37.

16 Dr Bruce Munday, *Committee Hansard*, 16 November 2005, p. 55.

17 Mr Michael Leak, *Committee Hansard*, 16 November 2005, p. 7.

drainage can have downstream effects. Mr Wickes' comments on the SA Upper South East Dryland Salinity Program highlighted this issue:

> People in various parts of the catchment have different views and people want different outcomes and they can have different impacts on each other. Having worked in the south-east in the other part of the drainage system, I know there are quite a number of different views and outcomes that people have and want. It does not matter where you go; you are going to get that. The particular issue we have at the moment is that we are in two catchments that have salinity at the top end and some biodiversity and other outcomes at the bottom end that we need to protect. How you put all that together to come up with some satisfactory solution is where we are at. That is why there is a lot of discussion at the moment about those programs.[18]

7.23 Salinity management can involve trade-offs. Part of managing the salinity problem involves assessing and accepting certain trade-offs. Reflecting on the Murray-Darling Basin, Mr Kendall told the Committee that:

> The other issue with the Murray-Darling Basin is that salinity is very much about trade-offs. Managing salinity in the upper states—Victoria and New South Wales—may involve, for example, putting drains in irrigation areas. The drains in irrigation areas will improve local salinity and are an essential part of managing salinity, but the trade-off is that that drainage puts more salt into the river. That can increase river salinity levels and, obviously, for the downstream jurisdiction—South Australia—that is a major issue. Adelaide, with over one million people, relies on the Murray for a large proportion of its water. The role of the Murray-Darling Basin Commission is to bring the governments together, look at those trade-offs and manage salinity within limits.[19]

7.24 In SA the Committee heard about the trade-offs and tensions involved in managing salinity. The following case study illustrates the complexity of dealing with a range of stakeholders with different expectations of salinity management.

Case study - Upper South-East (USE) Dryland Salinity and Flood Management Program

Background

7.25 The Upper South East Dryland Salinity and Flood Management Program (USE Program) in South Australia was launched in the early 1990s to address the growing problem of salinity in the region. Key objectives of the program are to control surface water flows to alleviate the effects of flooding and to lower the watertable that brings salt to the surface.

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18 Mr Roger Wickes, Department of Water, land and Biodiversity Conservation, *Committee Hansard*, 16 November 2005, p. 9.

19 Mr Matthew Kendall, Murray-Darling Basin Commission, *Committee Hansard*, 6 September 2005, p. 39.

7.26 The program consists of three sub-programs:

- construction of a network of deep drains across the region to channel away water both on the surface and in the watertable;
- delivery of initiatives to protect biodiversity, restore watercourses and maximise the productive potential of the region; and
- provision of business services (planning, administration and strategic communications) to ensure the effective delivery of the program.

7.27 The USE Program is supported by specially enacted legislation, the *Upper South East Dryland Salinity and Flood Management Act 2002.* The Act was created to ensure the efficient implementation of the drainage network across the region. It grants powers to the South Australian Government to compulsorily acquire land without payment and levy landholders for the costs of constructing the drainage network. Immediate costs to landholders are considered to be offset by the environmental and productivity benefits that can be expected by reducing salinity.[20]

7.28 The Australian and SA Governments are contributing $19.15 million each under the National Action Plan for Salinity and Water Quality to the implementation of the Upper South East Program. This builds on earlier joint Government investment of $18 million.[21]

7.29 The Act is due to expire on 12 December 2006 which places imperatives on USE Program administrators to deliver project milestones on schedule.[22]

7.30 The USE Program has achieved the construction of 495 kilometres of drainage, with 165 kilometres still to be installed. A total of 1,250 hectares of land have been revegetated, 6,500 hectares of remnant vegetation fenced, and more than 2,600 hectares of wetland protected.[23]

Examining the USE Program

7.31 There is widespread community acceptance of many initiatives within the USE Program, such as revegetating the land to reduce groundwater recharge and taking action to conserve the wetlands and biodiversity. The community is divided, however,

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20 The Hon John Hill, Minister Hansard (2002), *Record of debate on 2nd reading of the Upper South East Dryland Salinity and Flood Management Amendment Bill.* House of Assembly, 5 December 2002.

21 Department of Agriculture, Fisheries and Forestry & Department of the Environment and Heritage, *Submission 24*, p. 9.

22 The Environment, Resources and Development Committee, Parliament of South Australia, *Upper South East Dryland Salinity and Flood Management Act 2002 – Report July 2003-June 2004,* 28 November 2003, p. 3.

23 Mr Roger Wickes, Executive Director, Natural Resources Management, *Committee Hansard,* 16 November 2005, p. 4.

on the issue of constructing the remainder of the deep drain network. Principal areas of concern brought to the Committee's attention are the economic viability of the drainage network as a primary treatment for salinity in the region and the longer term impact on the environment of the drainage system.

Photograph courtesy of Mr Frank and Mrs Carole Burden: the 'Grand Canyon' – deep drain, SA

7.32 Local landholder, Mr Burden, stated in his submission that less intrusive and more economical options were not adequately explored before agreeing to the drainage system.[24] He argued that the USE Program administrators made the assumption that the only method of reducing the impact of salinity was through the network of drains.[25] Similarly, Mr Hayward submitted that the 'option to not dig a drain' was not given sufficient consideration.[26]

7.33 It was asserted that less intrusive and more economical options are available, such as planting of deep-rooted perennial vegetation pastures to manage recharge and installing shallow surface drains to relieve flooding:

> We do not require or want a deep drain, as we manage the existing watercourse via a wide shallow surface water drain [150 mm] which does

24 Mr Frank Burden, *Submission 38,* pp 1, 2, 6.

25 Mr Frank Burden, *Submission 38,* p. 3.

26 Mr Bill Hayward, *Submission 34*, p. 2.

> not draw down the water table, but does effectively move the surface water down stream to the wetlands northwest of my property.[27]

7.34 A number of submissions questioned whether the financial benefits of the drains outweighed costs of construction and long term maintenance. A landholder cited his property as an example where salinity has been present for '18,000 years and yet has been highly productive under salt-tolerant pastures'.[28]

7.35 Concern was raised about the impact of the drainage system on the natural environment and biodiversity.[29] Mr Burden stated that the advantages of deep drains are 'grossly exaggerated' and are restricted to the sides surrounding the drain.[30] He reported that evidence of the degradation of sub-soil structure around the drains has already occurred and is predicted to increase.[31]

Photograph courtesy of Mr Frank and Mrs Carole Burden: Parrakie Wetlands, SA

7.36 Another submission referred to a report from the CSIRO, claiming that there is a 'lack of scientific information on the effects of drainage on native vegetation, on the fresher perched groundwater lens, and on salt loads in the catchment'. [32] This may

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27 Mr Patrick Ross & Ms Pip Rasenberg, *Submission 35,* p. 2.

28 Mr Frank Burden, *Submission 38,* p. 3.

29 Mr Frank Burden, *Submission 38,* p. 3; Ms Josie Jackson, *Submission 32,* p. 1.; Vogelsang & Partners, *Submission 31,* p. 2; Mr Rod Johnson, *Submission 28,* p. 1.

30 Mr Frank Burden, *Submission 38,* p. 1.

31 Mr Frank Burden, *Submission 38,* p. 5.

32 Mrs Susan Prosser, *Submission 33,* p. 1.

result in damage to the environment in the longer term, as well as the additional costs to the community to manage such problems.

7.37 From a different perspective, the Coalition of Concerned Landholders' (a group of 20 landholders) submission supports the construction of the remaining deep drains. The Coalition stated that deep drains have proven to be effective in lowering the water table to the pre-salinity state, increasing the agricultural productivity of the land and generating revenue for the community.[33]

7.38 Mr McCarthy, a technical consultant to the Coalition, informed the Committee that shallow drains are not considered a viable alternative, referring to instances where they had been constructed and yet were not successful in returning saline land to production.[34] The Coalition's submission also made the claim that shallow drains are ineffective during years of high rainfall and have limited use in years of average rainfall because very little water is diverted to wetlands.[35]

7.39 The Coalition does not support the view that planting native vegetation will reduce the water table, and consequently, salinity levels. They argued that this will not be successful because the levels of salt and other chemicals in the soil are too high and growth of some pasture plants is inhibited in waterlogged soil.[36]

7.40 The Coalition stated that areas once badly affected by salinity have been regenerated since the installation of deep drains, demonstrating the success of the drainage network.[37] Drains with a depth of 2.0 metres 'protect flats from dryland salinity and protect flats from groundwater mounding associated with increased flows and retention of surface water in the wetlands and watercourses'.[38]

Balancing competing priorities

7.41 Evidence suggests that the drainage network may be assisting to preserve traditional agricultural production, but potentially inflicting damage to the environment in ways not presently apparent, such as to wetlands, soil structure around the drains and biodiversity in areas receiving water extracted from the land. Further, it would seem that some landholders are benefiting from deep drains while others are not. However, Mr Roger Wickes from the Department for Water, Land and

33 Coalition of Concerned Landholders, *Submission 43*, p. 11.

34 Mr Donald McCarthy, Technical Consultant, Coalition of Concerned Landholders, *Committee Hansard,* 16 November 2005, pp 37-38.

35 Coalition of Concerned Landholders, *Submission 43,* p. 21.

36 Coalition of Concerned Landholders, *Submission 43,* p. 14.

37 Coalition of Concerned Landholders, *Submission 43,* pp 16-18, 22-23.

38 Coalition of Concerned Landholders, *Submission 43,* p. 12.

Biodiversity Conservation told the Committee the program aims to balance production and environmental outcomes.[39]

7.42 Several submissions (with one submission expressing the views of six landholders) expressed dissatisfaction that the views of the community are not being adequately considered in relation to the future of the USE Program.[40]

7.43 The administering Department put forward a different view. Mr Leak told the Committee: 'we do bring everybody to the table as part of the decision-making process to try to understand what all the issues are'.[41] This was affirmed by Mr Calvert from the Australian Government Department of Agriculture, Fisheries and Forestry:

> From my contact with that program … overall it has an extensive communications component. Where a recommendation is sought from the board, the actual extent of landholder consultation is always a critical underpinning of any advice going to the board.[42]

7.44 It is outside the terms of reference for the Committee to further investigate and assess the merits of the 'for' and 'against' cases.[43] However, the USE Program clearly illustrates some difficult tensions in managing salinity:

- the difficulty of balancing environmental, social and economic objectives
- the difficulty of balancing competing interests
- solutions to salinity may involve trade-offs – it remains unclear whether the perceived trade-offs or costs (environmental damage and high economic costs) in installing deep drains in the USE region are outweighed by the benefits

Achieving Multiple Outcomes

7.45 Some evidence focused on the desirability of achieving multiple outcomes through NRM activities. Greening Australia argued:

> Projects in the environmental arena that focus on a single objective are fraught. It would be far more desirable to require projects to deliver across a range of benefits, especially as these can be readily achievable. In this context, efforts to mitigate salinity can also have benefits on water quality,

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39 Mr Roger Wickes, Executive Director, Natural Resources Management, *Committee Hansard,* 16 November 2005, p. 7.

40 Mr Patrick Ross & Ms Pip Rasenberg, *Submission 35,* Attachment 1, p. 3; Mrs Susan Prosser et al, *Submission 33,* p. 3; Mr Bill Hayward, *Submission 34*, p. 2; Mr Frank Burden, *Submission 38a*, p. 14.

41 Mr Michael Leak, *Committee Hansard*, 16 November 2005, p. 7.

42 Mr David Calvert, *Committee Hansard*, 28 February 2006, p. 45.

43 The Committee also notes that the SA Parliament's Environment, Resources and Development Committee is currently investigating complaints about the USE Program.

> biodiversity and even reducing greenhouse gases by establishing carbon sinks. If these multiple benefits are actively sought, the return on investment will be significantly enhanced. Designing for multiple outcomes can be complex and requires an open-minded, inclusive process. It needs to be carried out at the regional scale rather than at the scale of individual patch or property. The desire to achieve multiple benefits, and hence greater value for money, should be a fundamental principle of the NAP.[44]

7.46 Mr Robert Vincin submitted that protection of natural assets – water, soil, vegetation and atmosphere – cannot be considered in isolation:

> [W]ater soil vegetation atmosphere are the core assets of the nation and planet. These assets are interlinked, insolubly linked, you cannot interfere with one without interfering the others. Salinity, drought, flood, devegetation, lack of water, climate change, can only be addressed collectively.[45]

7.47 In a similar vein, the Conservation Council of WA stated:

> It still appears that many projects and programmes are still 'single outcome' focussed rather than looking at 'multiple outcomes'. For example, many salinity remediation based projects are not incorporating aspects such as carbon sequestration for climate change mitigation, biodiversity conservation, or 'triple bottom line (ie the ecological and social components), etc. The main issue of concern still appears to be focussed on profit driven productivity issues, with an economic rationalist's ethic, rather than a holistic approach to achieving landscape change.[46]

7.48 The Conservation Council noted two exceptions to this 'single-outcome focus': the Greening Australia Western Australia's Farm Forestry Program, and the Integrated Wood Processing Plant at Narrogin, which is looking at carbon sequestration and salinity mitigation.[47]

7.49 Professor David Pannell argues, however, that seeking multiple outcomes is, in some cases, 'counterproductive'. Against the view that 'each dollar does more than one job', Professor Pannell suggests that investment should be based on the degree of risk to an asset and the value of that asset so that limited dollars can be targeted accordingly:

> A focus on generating multiple benefits may lead investors away from protecting some very valuable assets that are only facing a single threat. Even if there is only a single threat to an asset, it may be that the severity of that threat is very high – potentially higher than a combination of threats to another comparable asset. …If there are several threats requiring attention,

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44 Greening Australia, *Submission 16*, p. 3.

45 Mr Robert Vincin, *Submission 10*, p. 1.

46 Conservation Council of WA, *Submission 11*, p. 3.

47 Conservation Council of WA, *Submission 11*, p. 3.

> it is highly likely that the asset in question will be especially expensive to protect. Given that budgets are limited, this greater expense tends to reduce the attractiveness of a strategy that would effectively protect that asset at the expense of several other more cheaply protected assets.[48]

7.50 In particular, Professor Pannell notes that the intervention required to manage dryland salinity is great and requires a highly focused and resource intensive effort.[49]

7.51 In short, while in some circumstances aiming for multiple outcomes is advantageous, doing more than one job is not necessarily the most efficient use of each dollar.

7.52 Making a different but related point, the Northern Agricultural Catchments Council submitted that achieving NRM outcomes through one program was improbable. Reflecting on the NAP the Council stated:

> We consider that any expectation of delivery of improved resources through a single program to be unrealistic. The program has however served to highlight the importance of its goals, to increase community involvement in delivery of improved natural resource management, and to begin the challenging task of integrating whole of community (including agency) action towards achievement of these goals. These goals underpin on-ground change and would not have been achieved without the program.[50]

Public good versus private good

7.53 Mr Bradley, CEO of the Northern Agricultural Catchments Council, told the Committee that the WA Salinity Investment Framework guidelines emphasise public funds being used for public good. He explained that:

> Any private benefit needs to be measured against private input as well as the public benefit that comes from that investment. We are having our investment couched by those guidelines, and it may appear that the output is biodiversity protection as opposed to sustainable farming practices.[51]

7.54 The Wheatbelt Catchment Alliance, a group of community advocates for deep drainage, similarly pointed out that WA's Salinity Investment Framework targets public benefit rather than private gain. They argued that, following this, the framework places a focus on biodiversity rather than 'national economic strength'.[52] The Alliance was critical of this distinction inferring that public benefit and private

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48 D. Pannell, *Seeking Multiple Outcomes in Environmental Programs*, p. 1, from http://cyllene.uwa.edu.au/~dpannell/pd/pd0068.htm (accessed 31 January 2006).

49 D. Pannell, *Seeking Multiple Outcomes in Environmental Programs*, p. 1, from http://cyllene.uwa.edu.au/~dpannell/pd/pd0068.htm (accessed 31 January 2006).

50 Northern Agricultural Catchment Council, *Submission 6*, p. 1.

51 Mr Alan Bradley, *Committee Hansard*, 18 November 2005, p. 41.

52 Wheatbelt Catchment Alliance, *Submission 44*, p. 7.

gain are not necessarily mutually exclusive categories. Investment that may enhance private gain might, in turn, enhance 'national economic strength', which could be viewed as being to the public benefit.

7.55 This view was reiterated by the WA Farmers Federation who submitted:

> There is also a need for Government to communicate a clear vision that it is prepared to support saving the long-term economic benefits of agricultural production and its multiplier effect on employment and wealth creation. This objective tends to be lost in debates of "public good v private good". It also tends to be secondary to saving biodiversity and rural infrastructure when the interdependence and well being of them all should be obvious.[53]

7.56 The Committee supports the WA Salinity Investment Framework's emphasis on public funds being used for public goods. The Committee also supports the investment of public funds for biodiversity outcomes *and* agricultural productivity outcomes. However, public investment on private land can only be justified if there is demonstrable public benefit. Whilst public benefit and private gain are not, as noted above, necessarily mutually exclusive, there must be real public returns on any public investment made. In other words, attention must be paid to the balance of money invested in private land and the amount or degree of public good achieved.

Accountability for public funds

7.57 The Conservation Council of WA argued that there needs to be greater accountability by landholders for public funds received for salinity management:

> There has been far too much public funds wasted on ineffectual programmes, and landholders need to have a greater sense of mutual obligation (as per legally binding mutual obligation schemes such as Work for-the-Dole) when they accept public funds for salinity mitigation and rehabilitation. For example, if a landholder is found to be clearing native vegetation whilst in receipt of public funds then the landholder should have to repay those public funds. Private landholders should be held accountable for receipt of tax payer funded schemes in the same manner as disadvantaged or marginalised sectors of society such as the unemployed.[54]

7.58 At a public hearing in Perth, Mr Tallentire, CEO of the Conservation Council, expanded on the above concerns:

> What we have found disappointing is when it has been suggested that, in return for receiving large amounts of public money for some Landcare works, some land-holders —and particularly, again, their peak bodies— have declined to want to protect that revegetation work with conservation covenants or some sort of guarantee that in years to come there would not

53 WA Farmers Federation, *Submission 41*, p. 3.

54 Conservation Council of Western Australia, *Submission 11*, p. 3.

> be a subsequent application for a land clearing permit. That has been quite disappointing and that is what we mean by the idea of mutual obligation.[55]

7.59 Mr Tallentire told the Committee this issue has been widely publicly reported in the past few years. His colleague, Ms Anna-Marie Penna, confirmed these concerns based on anecdotal evidence:

> When I was working as a conservation covenanting officer, I did hear a number of different reports of people saying, 'So-and-so conducted reveg here but when the new landowner bought it they cleared it so that they could put in vineyards,' or something like that. I do not have any hard-core information but I have certainly heard a lot of anecdotal stories. When I was working in the conservation covenanting program, one thing we did do was to encourage land-holders to incorporate part of their reveg as part of the conservation covenant, particularly where it formed linkages between the remnant vegetation that was being covenanted to protect the corridors et cetera. Another aspect to that mutual obligation is that land-holders should not be in receipt of public moneys for revegetation or drainage mitigation or whatever if they are also found to be clearing native vegetation, which we know is a primary cause of salinity. It is double dipping. It is immoral, in a way.[56]

7.60 Ms Penna told the Committee there appeared to be little follow up on the actions of those allocated public funds, and no penalties imposed for landholders known to be in receipt of public funds who were also engaged in land-clearing.[57]

7.61 As noted in Chapter 3, the Committee was concerned to hear that there are insufficient controls in place (or the will to enforce those controls) to adequately regulate land-clearing. While the Committee appreciates that many landholders are genuinely committed to sustainable land management practices, more rigorous accountability requirements and more effective regulation would bring inappropriate land management practices under control.

Preventing salinity, reversing salinity or adapting to salinity?

7.62 Salinity management can take three forms: actions to prevent further salinity, actions to reverse or reduce existing saline areas, and actions to adapt land management practices to a saline environment.

7.63 The Committee heard evidence on the need to, in some circumstances, adapt to saline land conditions. At the same time, evidence was received arguing that salinity should be reversed to restore the land and enable the continuation of existing farm practices.

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55 Mr Christopher Tallentire, *Committee Hansard*, 18 November 2005, p. 66.

56 Ms Anna-Marie Penna, *Committee Hansard*, 18 November 2005, p. 67.

57 Ms Anna-Marie Penna, *Committee Hansard*, 18 November 2005, p. 67.

Adapting to salinity - saline land as an asset

7.64 In WA Mr Michael Lloyd and Ms Sally Phelan from the Saltland Pastures Association,[58] emphasised the need to view saline land as an asset and not necessarily a 'curse'. In their submission they argued that it will not be possible to prevent or control all salinity and, therefore, the concept of adapting to salinity must be encouraged.[59] Acknowledging that different areas will require different responses, they pointed out that in some circumstance working with saline land is the best approach. Ms Phelan told the Committee:

> [T]he Saltland Pastures Association perspective is that we need to adapt to saline land in order for agriculture to remain profitable and in order to keep communities intact.[60]

7.65 The main objective of the Saltland Pastures Association is to facilitate the revegetation of one million hectares of salt-affected land in WA over a 10-year period with saltland pastures. This will be achieved by encouraging and assisting farmers to adopt saltland pastures through the provision of on-ground planning and support. The possibility of an incentive payment scheme is also being discussed with regional NRM groups.[61]

7.66 Mr Lloyd highlighted the importance of the triple-bottom line. He outlined the economic, environmental and social benefits of working with saltbush:

> The big benefit from saltland pastures economically is the ability to be able to provide out-of-season feed, with the green feed in the autumn, which is very much lacking in Western Australia. The high protein in the saltbush itself is balanced by the high levels of energy and carbohydrate in the understorey that we saw yesterday. Another factor that has only come out recently is the high levels of vitamin E in the saltbush leaf, which means that sheep, which traditionally in Western Australia have a deficiency in vitamin E in the autumn, when they are grazed on saltbush can overcome that deficiency and are much healthier.
>
> On the environmental side, we see the lowering of watertables and the reduction of salt at the surface as being a very important factor, not just for the farm itself to be able to grow better salt-sensitive annual plants but the export of salt from the farm into the waterways is reduced considerably. There is less erosion—both wind and water—on saltland pastures, and we

58 The Saltland Pastures Association is a WA farmer-initiated and driven group, which was established in 1997 to promote the use and benefits of saltland pastures in the wheatbelt of WA. The Association has secured funds through the NLP for a project manager.

59 Saltland Pastures Association, *Submission 40*, p. 1.

60 Ms Sally Phelan, *Committee Hansard*, 18 November 2005, pp 44-45.

61 Saltland Pastures Association, *Submission 40*, p. 3.

> have noticed this at home. … we are reducing the amount of waterlogging and increasing environmental benefits.[62]
>
> Regarding the triple bottom line, the other leg of it is the social side. As we develop more opportunities for farmers with salt land, more people can stay on the land. Farmers' sons and daughters will not have to leave the land to get a job: there will be plenty of opportunities for them on the farm with the increased productivity. We may even slow the drift from the farms to the cities with people having more of a social life and improving the social structure of the local communities.[63]

7.67 The Committee inspected a property where saltland pastures were being trialled during its tour of the Great Southern region in WA. Meeting with local farmers and scientists, the Committee heard about the benefits of saltland pastures and also the need for continued research into breeding of better adapted plants and more reliable methods for establishing saltland pastures.

7.68 The need for further research was highlighted by Mr McMillan, Director of Policy at the WA Farmers Federation:

> saltbush is fine and it is natural, but it does not really carry a lot of livestock. At the end of the day, we need the research and development and we need to use all of the technology available.[64]

7.69 Dr Masters from the CRC for Plant-Based Management of Dryland Salinity told the Committee about the work the CRC was undertaking:

> Importantly, I think that through that project we have been able to demonstrate that there are profitable options for revegetation of saline land to be used for grazing livestock but, also importantly, some of the returns from these are still a little bit marginal and there is a bit of a lack of confidence from primary producers in adopting some of these technologies because of the risks of failure, which is one of the things that is a key outcome of what we are addressing. The second thing that is coming out of there is that we have been able to demonstrate through some strategic revegetation that we can actually stabilise the watertable in some part of the landscape. This is really important because it means that we should be able to prevent the increase in salinisation. Both of those things have been done in a profitable, producer-driven business framework.
>
> There are some new complementary activities that are going on within the CRC that I think have the ability to transform saline land well past what we are looking at the minute. They involve things like: the generation of new salt-tolerant plants, which is already well down the track; the development of new animal management systems, understanding how animals behave in those sorts of grazing environments; and cheaper establishment costs,

62 Mr Michael Lloyd, *Committee Hansard*, 18 November 2005, p. 45.

63 Mr Michael Lloyd, *Committee Hansard*, 18 November 2005, p. 46.

64 Mr Andrew McMillan, *Committee Hansard*, 18 November 2005, p. 58.

> making it much cheaper and less risky for people to put plants in the ground. That is an example of the saline land activities we are involved in.[65]

7.70 The Central West CMA in NSW also argued that there is a need to adapt to some areas of saline land:

> Areas of catchments will remain saline, focus needs to be placed on using saline resources.[66]

7.71 The Committee's attention was drawn to a major program underway that focuses on saline land as an asset: Sustainable Grazing on Saline Land (SGSL). SGSL is a subprogram of 'Land, Water & Wool', which is a joint program of Australian Wool Innovation, Meat and Livestock Australia and Land and Water Australia. SGSL is being undertaken by the CRC for Plant-based Management of Dryland Salinity and involves testing and demonstrating land use systems for salt-affected landscapes.[67]

Controlling and reversing salinity

7.72 Mr John Dunne from the Wheatbelt Catchment Alliance presented an alternate view arguing that salinity can and should be controlled and reversed. The Wheatbelt Catchment Alliance is comprised of land managers in the Wheatbelt of WA. Members are pro-drainage advocates who have formed the Alliance in order to 'present a united front to funding and regulatory bodies at both State and Federal level'.[68] Mr Dunne told the Committee that salinity could be reversed through engineering solutions and asked for the opportunity to prove the best method:

> … basically the CRC for Plant-Based Management of Dryland Salinity is plant based management; it is an adaptation of our farming operations to salinity. It is not fixing it; it is putting up with it.
>
> We believe that salinity can be controlled, we believe it can be reversed and it can be done safely. We really need to set up a cooperative research centre for engineering solutions. I would not try to divert the attention of the CRC from plant based solutions and say, 'Well, look, we can easily tack that onto them.' Let us have them in competition. Let us have some engineering solutions. They might cooperate in terms of sites for trialling these alternatives, and then we can make some judgments on which is the best method.[69]

7.73 On Mr Dunne's invitation, the Committee visited agricultural land where an engineering solution (drainage) had been implemented, during its site inspection of

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65 Dr David Masters, *Committee Hansard*, 18 November 2005, p. 17.

66 Central West CMA, *Submission 9*, p. 2.

67 Department of Agriculture, Fisheries and Forestry & the Department of the Environment and Heritage, *Submission 24*, p. 19.

68 Wheatbelt Catchment Alliance, *Submission 44*, p. 3.

69 Mr John Dunne, *Committee Hansard*, 18 November 2005, p. 73.

WA's Great Southern Region. The Committee was able to witness the positive impacts that the drains were having on local land and vegetation and hear, first hand, about the impacts of salinity and its mitigation through drainage on farmers' lives and livelihood.

Photograph: Gents-Trayning deep drainage site, WA

7.74 The Committee appreciates that in some cases, engineering solutions - including deep drainage - may be the most appropriate solution. The Committee further supports more research into engineering solutions and their downstream impacts. However, the more common view presented to the Committee was that a multi-pronged approach to salinity management – adapting, preventing and reversing – was seen as the most economically viable and practical approach. Evidence pointed to the conclusion that there is not a 'silver bullet solution' or 'best method', rather a mix of plant-based and engineering solutions is required.

7.75 Further, engineering solutions are expensive to install and expensive to maintain. The Committee believes that all solutions or approaches to salinity management should be subjected to a robust cost-benefit analysis. As discussed

above, this should include consideration of the balance between public investment and private benefit.

Encouraging industry involvement

7.76 The issue of industry involvement in salinity management takes three forms:

- engaging existing industries in salinity mitigation advocacy and practice
- increasing private investment in salinity research and mitigation
- developing new landscape-scale industries

7.77 Encouraging private sector involvement in salinity management was a prominent theme in the House of Representatives Report. At the regional level, the need for regional bodies to engage with industry was highlighted in the following recommendation:

> … that the Australian Government encourage catchment management organisations to introduce industry development planning into their natural resource management planning and funding prioritisation process.[70]

7.78 As discussed in Chapter 4, some regional organisations highlighted the importance of industry involvement and the need for regional bodies to strengthen links with industry.

7.79 In the Government's response to the House of Representatives Report it was noted that the three national programs – the NAP, NHT and the NLP – and the primary industry research and development corporations are all designed to encourage industry/regional body collaboration. In particular, it was noted that the Sustainable Industry Initiative component of the NLP has led to partnerships with major resource-based industries. The partnerships link business and industry priorities with regional planning processes. [71]

Engaging existing industries in salinity mitigation advocacy and practice

7.80 Industry can be a major contributor to salinity. In their submission, the Hunter-Central Rivers CMA explained that 'land-disturbance industries' such as coal mining and power generation are a significant factor in the problem of salinity in the Hunter region and more needs to be done to understand and remedy the impacts of this:

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70 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the national's salinity problem*, May 2004, p. *xxv*, recommendation 5.

71 The Australian Government Response to the House if Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 6, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

> The national economic worth of production from these land-disturbance industries is very significant, but there is little long-term federal investment in understanding the future impacts on the environment and Hunter rural industries.[72]

7.81 Ms Sharon Vernon from the Hunter-Central Rivers CMA noted that while the problem was significant, industry in the region had made a contribution to managing the salinity problem through the Hunter River Salinity Trading Scheme:

> Under the Hunter River Salinity Trading Scheme, which I think is unique in Australia, the catchment management authority runs an operation subcommittee which is set up under the New South Wales Protection of the Environment Operations Act. Under that scheme the salt level of the river is monitored by the Department of Natural Resources and on high flows mining and power generation industries are allowed to discharge their saline water into the river and they pay. They have credits to be able to do that. The operation of that scheme costs something like $0.5 million a year, which the industry is paying for. They can buy and use those credits. They have recently had the first auction. It was over $500 for one credit unit. I am not sure what the credit unit is, but it is a significant cost to them to run that scheme. They are doing their bit to try to reduce their impact on salinity levels in the river.[73]

7.82 Mr Tallentire from the Conservation Council of WA argued that agribusiness should be making a more substantial contribution to managing salinity:

> … funding for salinity has traditionally been seen as the preserve of government type programs—sell-offs of Telstra. We would like to present to you the need for greater involvement on the part of agribusiness. We often talk about having industry involvement, but there really is a very significant need for agribusiness—the section that makes the money out of the rural areas—to be contributing towards fixing the problem. … It is the agribusiness chain that creams off the profits that are made from the ecosystem that we are exploiting for our agricultural activity.[74]

7.83 The Committee notes that the Australian Government is currently piloting market-based instruments (discussed in more detail below) under its National Market-based Instruments Pilots Program, as a means of encouraging sustainable management of natural resources in Australia.[75] Some of the pilot projects underway deal specifically with industry contributions to the problem of salinity and its management. For example, the Green Offsets for Sustainable Regional Development pilot seeks to manage salt loads in the Murray-Darling Basin through offsets. Some industries in the

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72 Hunter-Central CMA, *Submission 2*, p. 2.

73 Ms Sharon Vernon, *Committee Hansard*, 14 October 2005, p. 51.

74 Mr Christopher Tallentire, *Committee Hansard*, 18 November 2005, p. 61.

75 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment C.

region contribute substantially to the salt load in the catchment. These industries offset their emissions by investing in activities that reduce saline discharge from diffuse sources.[76]

Increasing private investment in salinity research and mitigation

7.84 Focusing on research and development, the House of Representatives Report recommended that the Australian government explore ways to facilitate private sector investment in research and development for commercial measures to manage salinity and other NRM issues.[77] A related recommendation advised that the Australian and state/territory governments work together to ensure that tendering processes enable industry to fairly compete with publicly funded bodies for public research funds.[78]

7.85 In their submission the Departments of Agriculture, Fisheries and Forestry, and Environment and Heritage explained that the Australian Government uses a range of incentive measures to encourage private sector investment in salinity and NRM research and development. These measures include levies, the R&D tax concession and the landcare operations tax concession.[79] In the Government's response to the House of Representatives Report, it was further noted that the Cooperative Research Centre model provides an important mechanism for linking researchers to industry.[80]

Developing new landscape-scale industries

7.86 As discussed in Chapter 5, one of the major research gaps identified by witnesses was the development of profitable landscape-scale solutions. The Committee heard that there is a need for profitable solutions that can be rolled out over a large enough area to make an impact. In conjunction with this is the need for support of development of new landscape-scale industries.

7.87 The Government's response to the House of Representatives Report identified a range of commercial activities that also produce environmental benefits. It was noted that substantial funding has been injected into oil mallee projects under the

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76 Natural Heritage Trust, *Managing Our Natural Resources: Can Markets Help?*, nd., p. 8.

77 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the national's salinity problem*, May 2004, p. *xxvii*, recommendation 11.

78 House of Representatives Standing Committee on Science and Innovation, *Science Overcoming Salinity: Coordinating and extending the science to address the national's salinity problem*, May 2004, p. *xxvii*, recommendation 12.

79 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, p. 20.

80 The Australian Government Response to the House if Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 12, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

NHT.[81] The oil mallee project in WA (the Integrated Wood Processing Demonstration Plant) was also raised by several witnesses as an innovative venture and is discussed below.

7.88 For these, or other, commercially and environmentally viable activities to be developed into sustainable industries will require substantial support and commitment from Government. In a report commissioned by the Australian Conservation Foundation and the Joint Venture Agroforestry Program, *Fuelling Landscape Repair*, which considers the role a bioenergy industry could play in curtailing land degradation and climate change, the need for government backing was highlighted. [82]

7.89 In an accompanying press release it was pointed out that government backing will include access to measures that other competing industries currently enjoy (or the removal of these measures) – notably, subsidies.[83]

An example of industry innovation - the Integrated Wood Processing (IWP) Demonstration Plant

7.90 Mr Andrew Campbell, Executive Director of Land and Water Australia, pointed to the Integrated Wood Processing (IWP) Demonstration Plant in WA as an exciting trial of an industry-involved approach to salinity management which, it is hoped, will also produce environmentally and economically attractive products:

> I would like to draw the committee's attention to the fact that that the integrated wood processing plant at Narrogin is about to commence its wet commissioning process, its trial process. That is one of the most significant developments in salinity management in Australia. Wheat belt landholders have planted more than 10,000 hectares of oil mallees to go into a plant which will produce bioenergy, high-quality natural essential oils and activated carbon. The plant will provide its own energy to run itself from the eucalyptus oil biomass. It is the first time in the world that these three processes have been brought together in the one plant and it is being trialled at the moment, funded by Western Power to date, which is terrific.[84]

7.91 Mr Campbell went on to tell the Committee:

> I think we all should be watching this experiment extremely closely from a broader public policy point of view, not just an energy point of view. Western Power is not a dryland salinity agency or a land management

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81 The Australian Government Response to the House if Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 7, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

82 Australian Conservation Foundation, *Submission 19*, Attachment 1.

83 Australian Conservation Foundation, *Submission 19*, Attachment 2.

84 Mr Andrew Campbell, *Committee Hansard*, 6 September 2005, p. 26.

agency; it is an energy utility and it is interested in seeing how the plant goes from an energy point of view. That is perfectly rational but it will be a tragedy for the land-holders who have established 10,000 hectares of oil mallees and for broader salinity management options if that plant is not evaluated across the whole triple bottom line and not just its energy production. The next three or four months are going to be critical in that process, after 10 or 15 years work.[85]

Photograph: the Integrated Wood Processing Demonstration Plant, Narrogin, WA

7.92 The IWP Demonstration Plant project at Narrogin, WA, addresses two environmental concerns, farmland salinity and global warming. The plant is trialling the co-production of renewable energy, activated carbon and eucalyptus oil from locally planted mallees.

7.93 The deep roots of the salt-tolerant mallee trees soak up groundwater, thereby preventing the water table from rising and, in turn, controlling salinity. Mallees store food and energy in their underground roots or lignotubers. When above-ground branches are removed, the trees are able to re-grow because of this food storage system. This means the mallees can be repeatedly harvested (every second year) without the need to replant.

7.94 The IWP plant converts the mallee wood into charcoal, which is then triggered to convert it to activated carbon. The activated carbon is used in air and liquid purification. High quality eucalyptus oil is distilled from the leaves, with the depleted leaves used to produce fuel for the plant's boiler. The oil will be used in the

85 Mr Andrew Campbell, *Committee Hansard*, 6 September 2005, p. 27.

pharmaceutical market and, it is planned, as an environmentally-friendly industrial solvent. The heat from both the wood conversion and the oil extraction processes are used to generate electricity. The electricity produced is an alternative to fossil fuel and is carbon dioxide neutral.

7.95 The project is funded by the Australian Greenhouse Office, the Department of Industry Science and Resources, the Department of Transport and Regional Services and the NAP. In addition, the following organisations have contributed to the project: Western Power, Enecon Pty Ltd, the CSIRO, the WA Department of Conservation and Land Management (CALM), the Oil Mallee Company of Australia, the Oil Mallee Association, Murdoch University, Curtin University and the Rural Industries Research and Development Corporation.[86]

7.96 The aim of the project is to prove the viability of the technology, the harvest and delivery systems and the potential markets for the products. In summary, the desired outcomes of the project are:

- a stable cash crop for farmers
- control of salinity
- a profitable renewable energy source
- three products (oil, renewable energy and activated carbon) from one plant ensuring the commercial viability of the operation

7.97 The Committee was fortunate enough to visit the oil mallee power plant in Narrogin as part of its inspection of salinity problems and solutions in the Great Southern Region of WA. The Committee looks forward to hearing the outcomes of this important trial and encourages the Australian and state and territory governments to continue their support of such innovative projects.

Securing large-scale private investment

7.98 Whilst acknowledging that some projects under the NAP and the NHT2 have increased business contributions, the Australian Conservation Foundation submitted that a lot more needs to be done to encourage broad-scale private sector investment in NRM:

> Unlike other areas of public policy, such as health and education, precious little effort has been made mobilising and motivating the private sector to deliver environmental benefits. The absence of an institutional framework for leveraging large-scale private investment in commercially viable and environmentally beneficial ventures remains a gaping hole in the national NRM programmes.

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86 The information in the above section is taken from the Western Power website, www.westernpower.com.au/about_us/environment/renewable_energy and the Department of the Environment and Heritage website, http://www.deh.gov.au/settlements/industry/corporate/eecp/case-studies/western-power.html

> Although some NAP/NHT2 projects have undoubtedly resulted in business investment in NRM-related activities, and a few regional communities have been successful in raising philanthropic funds for environmental works, these have been opportunistic rather than strategic, and generally small-scale.
>
> Furthermore, the vast bulk of private investment in rural Australia is aimed at more or less traditional agricultural and infrastructure developments. Arguably, most of these have at least as many, if not more, environmental costs as benefits, and substantially fail to address problems like dryland salinity, river system decline and biodiversity loss. Most public investments in agriculture give little more than lip-service to sustainability.[87]

7.99 Mr Kevin Goss, CEO of the CRC for Plant-Based Management of Dryland Salinity, told the Committee that he envisaged the future successful management of salinity as involving a mix of landholder, industry and public investment, on a 70%, 20%, 10 % breakdown respectively:

> My prediction is that in the successful program, about 70 per cent of the positive result will come because farmers have invested in that out of their farm businesses. About 20 per cent of that positive outcome will come because new industries have been attracted into the rural and regional areas of Australia, because they have opportunities and they have invested in things that contribute to salinity. You had a window on that yesterday, when you went to Narrogin and saw the oil mallee venture.
>
> What that says to me is that about 10 per cent of the outcome will come from public moneys. The inference is quite clear—that it is in the astute use of public moneys to get the 90 per cent result. That is clearly a policy challenge. We are quite happy to take that a little further, but perhaps I will just underline the point by saying that there is work on market base instruments. You will hear about that. There is work on payments for ecosystem services.[88]

7.100 Mr Goss went on to explain that in order to attract industry and landholder investment the best use of the 10% of public funds needs to be carefully thought through:

> I would like to make an additional point which goes back to my 70 per cent, 20 per cent, 10 per cent scenario. The question is, 'Where is the best use of the 10 per cent public fund component and where is the best use of the total investment?' It seems an obvious point for me to make: the public funds have to take care of those very high value assets that society holds dear, such as biodiversity, water quality and water supply catchments et cetera. It is a very important priority for public funds.
>
> On the other hand, there needs to be enough leverage from the public investment through research and development and astute approaches to

87 The Australian Conservation Foundation, *Submission 19*, p. 55.

88 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 15.

> bring in private investment which is going to do so much more for farmland and for those things that are very much in a commercial interest. It is how you balance that that becomes quite important. From our perspective, we do not see it as a trade-off. We see that biodiversity is very important and it is in fact part of our CRC. Our focus is on doing no further damage to biodiversity, not inadvertently introducing some of these perennial plants that become weedy. So we have measures to deal with that. We know that we can predict with confidence in the future the biodiversity implications of what farmers do on their farm. That is our contribution. But by focusing, as Alex says, on the profitability part of the story, it is our reasonable assumption that what farmers will do on their farm out of self-interest will largely take care of the threat to farmland.

7.101 The Australian Conservation Foundation praised the Market-Based Instruments Pilots Program (discussed below), which is currently being run by the Australian Government to encourage changed land-use practices. However, the ACF argued that it could be taken further:

> The $10M Market-Based Instruments (MBI) Pilots Program established under the NAP is a good, albeit tentative first step towards understanding and developing the role of such policy tools in NRM.
>
> ACF applauds the NRMMC decision to trial a range of different MBIs, but believes that, at least along two particular lines of private sector engagement, there are good arguments to move beyond the trial stage to the next step.[89]

7.102 The ACF put forward a recommendation that a national policy framework be established to drive large-scale private investment in a range of sustainable and profitable NRM ventures:

> That CoAG establishes a national policy package to leverage large-scale private sector investment in new, more sustainable and profitable land-uses and farming systems, specifically by:
>
> The establishment of statutory investment companies as tax-preferred investment vehicles to raise access to private capital for accredited commercial-environmental ventures;
>
> An integrated package of taxation offsets and concessions tailored to make environmental investments more attractive, with the aim of revenue neutrality;
>
> Nationally agreed accreditation criteria of plans for commercial-environmental ventures to ensure consistency with national and regional NRM priorities;
>
> Seed funding to be made available for innovative commercial ventures that yield verifiable environmental benefits;

89 Australian Conservation Foundation, *Submission 19*, p. 55.

> An Environmental Enterprise Fund to administer these programmes and concessions.[90]

7.103 Mr Watts from the Australian Conservation Foundation re-emphasised the need for large-scale private investment in new commercial ventures at a public hearing in Canberra.[91]

7.104 In a report by the Allen Consulting Group, *Repairing the Country: Leveraging Private Investment – Summary Report*, it was noted that whilst there is a range of instruments in use to encourage land-use change, little attention has been given to accessing capital markets - 'the largest pool of investment funds available'.[92]

7.105 Further research into profitable solutions and, correspondingly, the development of new industries are required if the salinity problem is to be effectively managed. For this to be achieved, substantial private investment is needed to supplement limited public funds. The Committee supports a greater focus on achieving large-scale private sector investment.

Balancing voluntary and prescriptive regulatory/policy measures

7.106 How to best regulate salinity management, and natural resource management more broadly, was an issue that was brought to the Committee's attention. Concerns were raised about the regulatory will of local government to use planning powers to control land-clearing and to contribute to effective natural resource management more broadly, and of state government to enforce compliance with native vegetation legislation (discussed in Chapters 3 and 6).

7.107 As noted above, there is also a tension between balancing public and private interests. One of the challenges is ensuring that arrangements provide a sufficient, secure regulatory environment that encourages salinity and broader environmental management but does not increase financial uncertainty for, or place an unfair financial burden on, private landholders or unnecessarily inhibit local industries.

7.108 At the same time, the Committee has heard that greater industry involvement in salinity management and the capacity to attract large-scale private investment will be instrumental to successful salinity management - as will government support for the development of new industries. This will require having appropriate regulatory and policy mechanisms in place so that industry involvement is encouraged and new industries are not disadvantaged by competitors.

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90 The Australian Conservation Foundation, *Submission 19*, p. 57.

91 Mr Corey Watts, *Committee Hansard*, 28 February 2006, p. 29.

92 Australian Conservation Foundation, *Submission 19*, Attachment 3, p. 11.

7.109 In order to meet these challenges, it is a matter of getting the right balance between voluntary and prescriptive measures, and penalty and incentive-based mechanisms.

Getting the right mix of regulatory/policy measures

7.110 Professor Copeland from the Centre for Salinity Assessment and Management, University of Sydney, drew the Committee's attention to a paper by Professor Pannell, which deals with regulation within the context of environmental protection in rural areas.[93] The paper, *Voluntary versus Regulatory Approaches to Protecting the Environment in Rural Areas*, addresses the issue of regulation and voluntarism.[94] In summary, Professor Pannell argues that appropriate mechanisms for land management regulation should be carefully determined on the basis of 'scientific understanding' and 'socioeconomic considerations'. His arguments are set out in more detail below.

7.111 There are a number of factors inhibiting voluntary regulation within the context of land management:

- lack of profitable options – in some cases, actions to mitigate salinity are unprofitable
- long time scales – positive effects of changed practices might not be realised for many years and farmers may be compelled to prioritise short-term profits over long-term gain
- uncertainty – the value of proposed land management changes may be uncertain
- problems with trialling the options – in some cases, trials need to be conducted on a large-scale for observable results. Farmers may not be in a position to invest in large-scale trialling
- off-farm impacts – the source of salinity may not be where the impacts are felt. Therefore there is no incentive for the farmer at the source to take action and a reduced incentive for the farmer affected to take action, who may feel the burden should rest with someone else.[95]

Types of regulatory/policy instruments

7.112 There is a range of regulatory instruments or tools, for example: legislation, codes of conduct, standards, registration, licensing, accreditation and performance management systems.

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93 Professor Les Copeland, *Committee Hansard*, 14 October 2005, p. 33.

94 D. Pannell, 'Voluntary versus Regulatory Approaches to Protecting the Environment in Rural Areas', *Farm Policy Journal*, vol. 2, no. 3, August Quarter 2005, pp 1-9.

95 D. Pannell, 'Voluntary versus Regulatory Approaches to Protecting the Environment in Rural Areas', *Farm Policy Journal*, vol. 2, no. 3, August Quarter 2005, p. 2.

7.113 Within the context of land management, Professor Pannell outlines six policy mechanisms that can be said to influence or control land management practices. While not all of these mechanisms would conventionally be classed as regulatory tools – namely, education and technology development – they can all be seen as forms of intervention that aim to shape and delimit land management practices:

- education, persuasion, peer pressure, technology transfer – for example, extension services
- accreditation
- beneficiary-pays policy instruments – for example, subsidies and grants
- technology development
- property-rights-based approaches – for example, tradeable permits
- polluter-pays policy instruments – for example, taxes on activities that negatively impact on the land[96]

7.114 The best policy instrument(s), Professor Pannell argues, will differ according to the problem presented, and the environmental, economic and social circumstances in which the problem presents. In some cases, voluntary measures will be adequate. In other cases, enforceable measures are required. Or a problem may be addressed through a mix of measures. Different policy responses will be required for four different types of salinity impacts: recharge areas with impacts on waterways, recharge areas with impacts on land-based assets (biodiversity and infrastructure), recharge areas with impacts on agricultural land, flood risk and remnant vegetation on farms, and salt-affected agricultural land. In turn, the selection of policy tools should be based on a range of biophysical and socio-economic factors – for example, the responsiveness of groundwaters to interventions and the farm-level economics of perennial plant-based options.[97]

Market-based instruments (MBIs)

7.115 Alongside conventional regulatory measures, the Australian and state/territory governments are currently piloting market-based instruments (MBIs) through the National Market-Based Instruments Pilots Program, which falls under the NAP. The NRM Ministerial Council announced the funding of 10 pilot projects in April 2003.

7.116 MBIs are tools that are seen to complement (in some situations, effectively replace) traditional or prescriptive regulatory mechanisms and persuasive measures. The Department of Agriculture, Fisheries and Forestry and the Department of the Environment and Heritage explained that:

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96 D. Pannell, 'Voluntary versus Regulatory Approaches to Protecting the Environment in Rural Areas', *Farm Policy Journal*, vol. 2, no. 3, August Quarter 2005, p. 2.

97 D. Pannell, 'Voluntary versus Regulatory Approaches to Protecting the Environment in Rural Areas', *Farm Policy Journal*, vol. 2, no. 3, August Quarter 2005, p. 5.

> Market Based Instruments are tools that use a range of market like approaches to positively influence the behaviour of people to improve landuse management. They are able to achieve landuse management change by altering market prices, setting a cap or altering quantities of a particular good and improving the way a market works. [98]

7.117 MBIs aim to 'correct market failure'. Market failure arises as a result of: insufficient information, for example costs are hard to assess; lack of incentives for individuals to protect a public good such as biodiversity; and externalities - individuals/organisations/industries do not carry all the costs and benefits of their actions because the impacts of these actions are felt by another user.[99]

7.118 Three types of MBIs are identified:

- priced-based MBIs – 'correct price signals to encourage a change in behaviour, leading to the adoption of more sustainable practices.' They include auctions, grants, rebates, subsidies and taxes.[100]
- quantity-based MBIs – remedy market failures by allowing for flexible compliance with NRM requirements. They include cap and trade, and offsets.[101]
- market friction MBIs – improve an existing market by facilitating private investment and/or providing more information to the market. They include mechanisms to reduce uncertainty and risk, for example insurance, approaches to leverage private investment, and product differentiation.[102]

7.119 In SA, the Committee was provided with an example of a quantity-based MBI. Mr Cole from the Department of Water, Land and Biodiversity told the Committee about the salinity zoning policy, which has been developed to ensure that SA's salinity management accords with the Murray-Darling Basin Agreement. Salinity zoning uses a system of salinity credits and debits to offset the salinity impacts from irrigation developments:

> Typically, an irrigation developer will approach our licensing people and indicate an intention to develop a parcel of land, and a particular volume of water will be transferred. We will use that underlying model to calculate the salinity debit that would derive. The South Australian government then has

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98 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, p. 10.

99 Natural Heritage Trust, *Managing Our Natural Resources: Can Markets Help?*, nd., p. 3, http://www.nrm.gov.au/publications/nrm-mbi/pubs/nrm-mbi.pdf (accessed 10 January 2006).

100 Natural Heritage Trust, *Managing Our Natural Resources: Can Markets Help?*, nd., p. 4, http://www.nrm.gov.au/publications/nrm-mbi/pubs/nrm-mbi.pdf (accessed 10 January 2006).

101 Natural Heritage Trust, *Managing Our Natural Resources: Can Markets Help?*, nd., p. 7, http://www.nrm.gov.au/publications/nrm-mbi/pubs/nrm-mbi.pdf (accessed 10 January 2006).

102 Natural Heritage Trust, *Managing Our Natural Resources: Can Markets Help?*, nd., p. 9, http://www.nrm.gov.au/publications/nrm-mbi/pubs/nrm-mbi.pdf (accessed 10 January 2006).

> an obligation within the Murray-Darling Basin Ministerial Council arena to offset that debit, and within the state the irrigator has an obligation to the state to offset that debit. There are a range of strategies that could be applied to that. Some of those are still developmental, but the primary pool of credits has been generated by actions such as the rehabilitation of poor infrastructure in irrigation districts, improved irrigation practice by irrigators themselves, and salt interception schemes.[103]

Streamlining salinity investment processes

7.120 The Committee heard evidence of the need to streamline investment processes. The CRC for Plant-Based Management of Dryland Salinity argued that resources need to be targeted more effectively:

> Many of the issues associated with national programs are to do with their administration and pre-occupation with 'getting dollars on the ground'. Our analysis has identified situations where viable salinity management options are not available - that further investment in R&D or no action may be a better option than incentives or regulation. We will further develop and refine for CMA use an investment decision tool.[104]

7.121 At a public hearing in Perth, Mr Kevin Goss, CEO of the CRC, expanded on this point noting that little effort was being made to ensure cost-effective investment and that development of new technologies was hampered as a result:

> We are not observing a very strong effort on salinity management actions being made less costly with a real focus on innovation and competition to get the cost of actions down. The unfortunate consequence of grants programs is that they tend to freeze in time the technologies of the day.[105]

7.122 The CRC argued vigorously for a more streamlined, targeted and systematic approach, to be achieved through a sound decision-making framework.[106]

7.123 Professor Les Copeland from the Centre for Salinity Assessment and Management, University of Sydney, concurred with this view arguing there needs to be a sound basis for decision-making:

> I think you have got to have a basis for making decisions. Clearly the magnitude of the problem is far greater than the available resources that can be brought to bear. I think we have to recognise that we have got to do the best with what we have got. That means putting into priority where those resources are going to provide the most value, targeting problems that can make a difference, perhaps recognising that there may be areas that are

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103 Mr Phil Cole, *Committee Hansard*, 16 November 2005, p. 10.

104 CRC for Plant-Based Management of Dryland Salinity, *Submission 18*, p. 2.

105 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 15.

106 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 16.

> beyond the scope of what can be managed, and we do not really have a good framework to do that.[107]

7.124 The CSIRO submitted that a 'triage approach' is required:

> There is a need for a triage approach to salinity management for both public and private investment – some major assets (water resources, biodiversity areas of international significance, urban areas, etc.) can justify the major intervention required to protect them while other areas need to be managed to minimise the adverse impacts and maintain ecological function. Any remaining areas will require management that adapts to the more saline conditions. We need to be able to provide spatially explicit information to determine most appropriate responses. Without a robust investment prioritisation framework, there is a risk of widespread inappropriate intervention (method and scale).[108]

7.125 However, not all witnesses agreed that investment needs to be more targeted. Dr Bruce Munday expressed concern about the over-targeting of resources arguing that it can inhibit widespread cultural change:

> Sometimes I am concerned about the recommendations to target investment. Clearly, investment must be targeted, but the derisory reference to the 'vegemite approach' to public investment and so forth concerns me …I think it is very short-sighted to put all your eggs in that basket. If we funded sport or the arts in that way, we would fund only elite sports people or elite artists. We need to change the culture so that the whole community accepts the responsibility for managing our natural resources, of which managing salinity, ground water, is just one. So there does need to be encouragement for local groups to become involved.
>
> The emphasis should not just be on the money part; it is the capacity building that was alluded to before—all those sorts of things. If they miss out because they are not in the target, we will all miss out. Changing the culture is more important than anything in terms of the way in which the nation manages its natural resources.[109]

Risk management for investment planning

7.126 Professor Copeland from the Centre for Salinity Assessment and Management told the Committee that greater attention to risk analysis is required:

> In terms of the science, more work should be done on risk analysis. Are we targeting the areas where most benefit could be gained? This is a fairly new

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107 Professor Les Copeland, *Committee Hansard*, 14 October 2005, pp 36-37. See also, the Australian Conservation Foundation, *Submission 19*, p. 30.

108 CSIRO, *Submission 15*, p. 7.

109 Dr Bruce Munday, *Committee Hansard*, 16 November 2005, pp 57-58.

> area of science, particularly in natural resource management, and one that I believe should develop.[110]

7.127 The report, *Salinity Mapping Methods in the Australian Context*, similarly highlights the importance of a risk management approach to salinity management. A risk assessment framework is proposed, which takes into account the following features:

- the identification of the asset(s) at risk (e.g. water quality, crops, infrastructure, biodiversity)
- the probable timing of the risk impact
- the likelihood of the risk occurring
- an assessment of the social, economic and environmental impacts on the asset(s) if the risk occurs[111]

7.128 The next step is to work out the risk management options. That is, actions that could be undertaken to protect the asset and a cost-benefit analysis of each action, taking into consideration the value of the asset(s).[112] It should be noted that 'no action' may be the most viable option if the costs outweigh the benefits.

7.129 As discussed in Chapter 5, an updated assessment of salinity hazards and risks will be critical to sound investment planning. Mr Goss from the CRC for Plant-Based Management of Dryland Salinity explained to the Committee that an updated assessment is required to undertake cost-benefit analyses :

> The issue—and I think this is one that speaks to the recommendations coming out of the House of Representatives report—is that there is no indication to us that there is a program to update the assessment of risks and hazards associated with salinity and to give us the basis for ongoing estimation of the benefits and costs in handling the problem.[113]

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110 Professor Les Copeland, *Committee Hansard*, 14 October 2005, p. 33.

111 B. Spies & P. Woodgate, *Salinity Mapping Methods In The Australian Context*, Department of the Environment and Heritage and Department of Agriculture, Fisheries and Forestry, 2005, p. 31 & p. 67.

112 B. Spies & P. Woodgate, *Salinity Mapping Methods In The Australian Context*, Department of the Environment and Heritage and Department of Agriculture, Fisheries and Forestry, 2005, p. xii.

113 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 15.

Salinity investment framework 3 (SIF3)[114]

7.130 SIF3 was developed by Professor David Pannell and Dr Anna Ridley from the CRC for Plant-Based Management of Dryland Salinity. It is a decision-making framework for the selection of appropriate salinity investment options for a broad range of biophysical and socio-economic circumstances across Australia. The framework is based on research across the fields of biology, hydrogeology, resource economics, farming systems, social science and policy mechanism design. The framework is currently being field-tested in collaboration with two regional bodies: North Central CMA (Victoria) and South Coast Regional Initiative Planning Team (WA).[115] SIF3 has been developed to support a more considered, robust approach to salinity investment.

7.131 Mr Alex Campbell, Chair of the CRC for Plant-Based Management of Dryland Salinity, told the Committee that:

> SIF helps a region to decide how they can make the best investment for a multitude of outcomes that they are seeking to achieve.[116]

7.132 Mr Kevin Goss, CEO of the CRC for Plant-Based Management of Dryland Salinity, provided further detail to the Committee on the Salinity Investment Framework 3 (SIF3):

> Our observation, and in fact our analysis, is that there is still more to be done here. We need a reality check. If we run the policy instruments or options that are normally considered in an area like salinity, and that includes extension, incentives, penalties, engineering, regulation and so on, then we have to be confident that the options themselves can be adopted by those we are expecting to adopt it—that is, that it makes economic sense to do so, it is not causing other unintended consequences, and so on.
>
> What we have attempted to do is, firstly, to understand what farmers and catchment management bodies and state agencies have before them that are realistic at the moment, and what still needs a lot more work in terms of research and development to get to that point in the future, and then to look region by region at, on the back of that assessment, whether it makes sense to go down the regulatory path, to go down the incentives and financial

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114 SIF3 is separate from, but builds on, WA's state-based Salinity Investment Framework (versions 1 and 2). The Australian Conservation Foundation commented favourably on WA's framework, noting that it has generated a higher level of understanding of salinity and ways to manage it as well as improving communication between stakeholder groups. *Submission 19*, p. 29.

115 A. Ridley & D. Pannell, *Salinity Investment Framework III (SIF3): A comprehensive investment framework for dryland salinity in Australia* and *SIF3: An Investment Framework for Managing Dryland Salinity in Australia*, www.general.uwa.edu.au/u/dpannell/sif32pgr.htm (accessed 20 January 2006).

116 Mr Alex Campbell, Chairman, Cooperative Research Centre for Plant-Based Management of Dryland Salinity, *Committee Hansard* 18 November 2005, p. 21.

> assistance path, or to go cautiously in that area and put more into technology development and research and development.
>
> In brief, it looks at what is at risk in terms of the value of the asset. It then looks at the salinity threat: is it high or is it low? It then looks at the responsiveness of the ground water if you put perennials into the system. And then you look at the economics of the options that you have available. Once you start to play that out, you end up with this very complex matrix which informs a lot more precisely what a catchment management authority might do.[117]

7.133 In the development of SIF3, 57 discrete circumstances were identified. Each was differentiated by a combination of the type and (financial and non-financial) value of asset at risk, the hydrological conditions, social and economic factors and the cost of management options. The strengths and limits of different responses to these varying salinity situations were assessed, and recommended or guiding responses identified.

7.134 The framework considers four different categories of salinity impacts:

- water resources
- high-value terrestrial assets such as built infrastructure (roads, buildings, pipes, communications infrastructure) and biodiversity
- dispersed assets such as agricultural land
- salt-affected land

7.135 Responses to salinity are organised into the following broad categories:

- extension – technology transfer and education
- incentives – financial incentives such as subsidies and MBIs, which are used to encourage land management practices
- penalties – negative incentives to discourage certain damaging practices
- engineering approaches
- plant-based R&D for profitable farming systems
- other R&D – e.g. research into the performance and design of engineering solutions
- no action – no response is selected when the costs of intervention outweigh the benefits[118]

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117 Mr Kevin Goss, *Committee Hansard*, 18 November 2005, p. 20.

118 A. Ridley & D. Pannell, *Salinity Investment Framework III (SIF3): A comprehensive investment framework for dryland salinity in Australia* and *SIF3: An Investment Framework for Managing Dryland Salinity in Australia*, www.general.uwa.edu.au/u/dpannell/sif32pgr.htm (accessed 20 January 2006).

7.136 Resonating with the discussions on regulation and risk management above, the rationale underpinning SIF3 is: how the problem of salinity (and other land management challenges) is best influenced and controlled should be based on solid scientific information, a risk and cost-benefit analysis, and an understanding of the strengths and weaknesses of each policy mechanism.

7.137 Asked to respond to the concern expressed by the WA Farmers Federation that there is too much focus on biodiversity (discussed above), Mr Campbell, Chair of the CRC for Plant-Based Management of Dryland Salinity told the Committee that SIF3 would be an important tool for objectively weighing up different interests:

> From their lobbying point of view, that would be their focus, and I would not speak against that proposition. But this is where the Salinity Investment Framework III starts giving an almost independent umpire overview as to what is a good investment mix through the National Action Plan or any other source of funding that you would have. I hope that once SIF3 has been field tested, as Kevin explained earlier, and we can start demonstrating that process to them, it will give them more comfort as to how a mix of investment can properly address all of the issues that you try and cover: profitability, farm landscape, protecting your environmental assets, protecting your infrastructure assets—roads, towns et cetera. Getting the balance of investment I think has to be the true focus.[119]

7.138 The Committee was particularly impressed by SIF3, which appears to offer a sound framework for making informed, objective and transparent investment decisions in a systematic way. Further, the Committee was encouraged to hear that the relevant Australian Government departments have held discussions with Professor Pannell about SIF3 and view the framework as potentially useful.[120] The Committee will watch for the outcomes of the testing phase with great interest.

Conclusion

7.139 In this chapter the Committee has canvassed significant tensions and challenges involved in salinity management: the challenge of balancing the environmental, the economic and the social, and public and private interests; the necessity of a tiered approach to salinity management: prevention, reversal and adaptation; and the importance of employing the right regulatory and policy measures to effectively tackle salinity and encourage industry engagement.

7.140 Evidence presented to the Committee on the Upper-South East Dryland Salinity Program in SA demonstrates the enormous difficulty that decision-makers face in balancing competing interests and achieving economic and environmental

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119 Mr Alex Campbell, *Committee Hansard*, 18 November 2005, p. 23.

120 Mr Tom Aldred, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 28 February 2006, p. 43.

outcomes. It also highlights both the importance, and the challenge, of bringing all community stakeholders to the table.

7.141 Several conclusions can be drawn from the evidence discussed:

- there is no one right way to approach salinity. In some cases cure will be the aim. In other circumstances adapting to saline conditions will be the most viable option;
- there is no one solution or response to salinity. The most appropriate solution(s) will be determined by a range of factors including: topography, groundwater flow systems, soil condition, demographic circumstances and economic conditions;
- balancing competing interests and accepting trade-offs will be an ongoing dimension of salinity management; and
- salinity management options must take into account the triple-bottom-line.

7.142 The Committee has heard compelling evidence that a more rigorous and systematic approach to salinity investment is required. This would involve a comprehensive risk management approach that takes into account a broad range of bio-physical, social and economic factors. Regulatory and policy instruments would be tailored to specific situations. Such a framework would provide an objective basis from which to assess competing interests and target limited resources. It would assist in managing the tensions outlined above.

7.143 Securing greater industry involvement in salinity and the capacity to attract large-scale private investment also emerged as significant themes. The Committee believes more attention must be directed to these issues.

Chapter 8

Salinity management into the future

> I think the programs that are in place should be seen as priming the longer term process, because it is a problem of such magnitude and such timescale. It is also trying to get people engaged in something that they will have no real ownership of the solutions for and the people who benefit from the solutions will probably be future generations. It is about getting away from: 'It is not really my problem, I am dealing with things that affect me here and now,' which I hear quite often. It is getting over that that is an important barrier.[1]

8.1 In this report the Committee has considered the extent and economic impact of salinity, focusing attention on the efficacy of current arrangements to manage salinity across Australia. As discussed in Chapter 2, as more detailed mapping of areas potentially threatened by rising saline watertables has taken place, our knowledge of which parts of the landscape are likely to be damaged by salinity has improved and the extent of land 'at risk' has been revised down. At the same time, a better understanding of the hydro-geology of these landscapes along with better modelling of the impacts of intervention techniques on groundwater recharge, has led us to revise up the amount of intervention required and the time it will take to have a measurable effect. Witnesses emphasised the long-term nature of salinity, noting that it can take years to manifest and could take years to remedy:

> Salinity is the result of complex interactions between biophysical and socioeconomic factors, which have taken considerable time to become evident in many landscapes (50 or more years in some cases). Remediation measures are likely to require a similar time frame to be effective.[2]

8.2 The Committee was encouraged to hear that the commitment of COAG in 2000 to manage salinity and water quality through the NAP has greatly enhanced public awareness of the problem. At the same time, the Australian Government has invested in some major research and on-ground projects. The Committee applauds these achievements. However, given the time-scale of this problem, managing salinity into the future will require an ongoing commitment from all levels of government. And, as with any major program or set of programs, there is always scope for improvement.

8.3 In this chapter the Committee outlines its conclusions and provides recommendations to build on the work that has taken place over the last five years. The first section of the chapter provides a brief précis of progress against

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1 Professor Les Copeland, Centre for Salinity Assessment and Management, University of Sydney, *Committee Hansard*, 14 October 2005, p. 38.

2 Centre for Salinity Assessment and Management, University of Sydney, *Submission 17*, p. 1.

recommendations from the House of Representatives Science and Innovation Committee's report, *Science Overcoming Salinity*. This is followed by a summary of the major issues that emerged in this inquiry with accompanying recommendations.

The House of Representatives Report

8.4 As discussed in Chapter 2, the House of Representatives Report concentrated on the use of the salinity science base and research data in the implementation of national programs. A total of 24 recommendations were made across the following areas:

- the nation's programs to combat salinity
- the salinity science base
- the coordination of salinity research
- the adequacy of the science base, research needs and funding
- data management and mapping technologies
- support for implementers: extending the science

The nation's programs to combat salinity

8.5 It was recommended that 'mechanisms be developed to ensure that validated salinity research findings are considered in regional planning processes' (recommendation 1).

8.6 This Committee considers that simple measures to improve the accessibility of the latest scientific research could greatly enhance the effectiveness of regional planning processes and on-the-ground action. It is suggested that what is needed is the combination of better coordination between research providers in the type of research undertaken and the kind of data collected, together with better integration and communication of research results to deliver information that is relevant to the needs of regional groups in language they can understand. The synthesis products developed by the National Dryland Salinity Program (NDSP) are considered excellent examples of what is possible. However, more work is needed to make this information accessible to those who need it, and to update it and interpret it to meet the needs of particular regional and producer groups. By undertaking this coordination, the Australian Government would greatly improve the effectiveness of its investments in salinity mitigation and increase the capacity of regional bodies to use the latest science to make good investment decisions.

The salinity science base

8.7 It was recommended that 'the Australian Government, in cooperation with state agencies, conduct an audit of the totality of salinity research and development activities undertaken by all agencies and programs in which the Australian Government invests' (recommendation 2).

8.8 The Australian Government response to this recommendation reported on the synthesis of salinity-related research and development activities completed under the NDSP[3] – which had in fact been undertaken and completed before the House of Representatives Inquiry had concluded and represented a synthesis of older R&D activity which took place before the NAP regional approach was fully developed. As noted above, the Committee believes the NDSP products provide an extremely valuable resource for those working in salinity management, including NAP regional bodies. However, the Committee notes that recommendation 2 called for a comprehensive audit of salinity R&D activities across *all* agencies and programs in which the Australian Government invests. The NDSP products are, in the main, a synthesis of work undertaken by NDSP partners. The Committee believes an audit should be undertaken. Further, there is an ongoing need for a research gap analysis which looks across the totality of Australian salinity R&D efforts, compares this to our priority landscapes and the needs of NAP regional bodies to develop future R&D priorities. A dedicated body should be established to achieve this (discussed below).

The coordination of salinity research

8.9 It was recommended that the National Dryland Salinity Program (NDSP) be continued with an expanded role to address irrigation and urban salinity, and renamed to reflect this expanded role (recommendation 3).

8.10 The Government response to this recommendation notes that while the NDSP has not been re-instated a number of other initiatives have continued to build on existing research. Further, the Natural Resource Management Ministerial Council has recently established an Executive Steering Committee on Australian Salinity Information, which is responsible for coordinating salinity information.[4] The Government response seems to miss the main point of the original recommendation – that it is the effective coordination of salinity R&D (to ensure it is well targeted to priority areas and avoids duplication) that is at issue, rather than the amount of research conducted or the pooling of the resulting information.

8.11 The loss of the NDSP and the coordination gap this has left emerged as a major issue in this inquiry. The Committee believes this should be addressed as a matter of urgency (discussed below).

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3 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 4, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

4 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, pp 4-5, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

The adequacy of the science base, research needs and funding

8.12 Nine recommendations were made. Firstly, it was recommended that 'the Australian Government give greater emphasis through its investments in salinity science to develop new, economically viable land and water use systems' (recommendation 4). It was further recommended that 'the Australian Government encourage Research and Development Corporations to invest more in sustainable land use systems and new salinity technologies' (recommendation 9).

8.13 This Committee notes that the Government has continued to support research in this area through its primary industry research and development corporations and relevant CRCs. It is worth noting that these R&D efforts are a result of the investment priorities and decisions of individual industry Research and Development Corporations and the CRC Program and do not represent a coordinated Government response to these recommendations. Ongoing funding to these projects is by no means guaranteed and the future of 'public good' CRCs has been called into question by changes to CRC Program funding guidelines.

8.14 It was recommended that 'the Australian Government encourage catchment management organisations to introduce industry development planning into their natural resource management planning and funding prioritisation process' (recommendation 5).

8.15 This Committee acknowledges the Government's indication of support for this recommendation and the emphasis given to industry/regional body collaboration in the national programs. However, the Committee believes that collaboration between regional bodies and industry could be greatly enhanced if dedicated funding was provided for regional-industry research partnerships (discussed below).

8.16 It was recommended that 'the Australian Government emphasise, through its investment in salinity science, the development of technologies to address urban salinity' (recommendation 6).

8.17 In the Government's response to this recommendation it is noted that 'measures to address urban salinity are within the scope of existing support for salinity'. The CSIRO's program, Water for a Healthy Country Flagship, and the Rural Towns – Liquid Assets project in WA are provided as examples.[5]

8.18 Notwithstanding the importance of the projects mentioned, urban salinity clearly remains a seriously neglected area, with the administering national departments pointing out their portfolios naturally emphasise salinity in agricultural

5 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 7, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

areas.[6] As discussed later in this chapter, the Committee believes a lot more needs to be done to address urban salinity.

8.19 It was recommended that the Australian Government 'foster greater cooperation amongst scientists' through an annual salinity conference and 'examine ways to foster interdisciplinary research in natural resource management' (recommendation 7).

8.20 The Government noted its support for this recommendation and reported on several forums that bring together scientists, policy makers and other stakeholders, for example:

- The 'Productive Use and Rehabilitation of Saline Lands' group, which includes representatives from all states/territories, several industry groups, CSIRO, research and development corporations and farmers. The group operates through convened conferences.
- The Cooperative Research Centre for Plant-Based Management of Dryland Salinity's 2004 conference.
- The Basin Salinity Modelling Forum established by the Murray Darling Basin Commission.

8.21 The Government further noted that the newly established Executive Steering Committee for Australian Salinity Information will provide a forum for national leadership and coordination. On this basis, the Australian Government concluded that this recommendation 'is being substantially addressed'.[7]

8.22 The Committee acknowledges all current efforts that encourage cross-fertilisation of ideas and exchange of information. However, the Committee notes that each of these examples are limited in scope to particular end users (production from saline lands, plant-based research, hydro-geological modelling) and are not necessarily ongoing. To this end, the Committee believes that there is still a place for (1) an annual conference that specifically meets the information and networking needs of NAP regional groups (2) regular events to ensure information sharing across the totality of all salinity research and development. The Committee encourages the Australian Government, through the Executive Steering Committee for Salinity Information, to pursue this.

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6 Mr Aldred, Department of Agriculture, Fisheries and Forestry, *Committee Hansard*, 28 February 2006, p. 37.

7 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 9, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

8.23 It was recommended that provision be made within the NAP for the establishment of a salinity research and development fund for research of national or statewide significance that 'pertains to the development of new technologies and industries for salinity management' (recommendation 8).

8.24 In the Australian Government's response to this recommendation it was noted that the states and territories do not support a separate national R&D fund. That is, they do not support allocating resources from each bilateral process into a multilateral, national program. The Government reported that there are several existing mechanisms (outside the NAP) through which the Australian Government invests in research of national significance.[8]

8.25 The Committee appreciates that important work on salinity is being undertaken at a national level by ventures and organisations in which the Australian Government invests. The Committee further notes that WA has established a strategic reserve with NAP funds to address issues of state-wide significance.[9] However, evidence in the inquiry suggests that more needs to be done on a national scale to address gaps in research and, importantly, its communication to on-ground workers. This is discussed later in the chapter.

8.26 It was recommended that the Australian and state/territory governments 'remove impediments' for regional bodies to 'undertake or commission research', 'provide incentives for greater collaboration' between regional bodies for research of cross-catchment benefit and provide support to evaluate tenders and contracts at the regional level (recommendation 10).

8.27 The Australian Government response noted that the main role of regional bodies is to implement on-ground works and that contributions to research by regional bodies were made on an in-kind basis.[10]

8.28 As discussed in Chapter 5, the Committee believes that for regional bodies to establish and maximise partnerships with industry and researchers, and ensure that regional needs are included in national research priority setting, discrete research funding is required (discussed below). It is important to recognise that results from

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8 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 9, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

9 Mr Fred Tromp, WA Department of Environment, *Committee Hansard*, 18 November 2005, p. 9.

10 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 11, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

national research projects are not necessarily immediately applicable at a regional or local level and may require region-specific research to interpret and adapt research outcomes to meet the needs of regional bodies or local producers.

8.29 It was recommended that 'the Australian Government examine ways to encourage private sector investment in research and development for commercial measures to arrest salinity' (recommendation 11). Further, it was recommended that the Government, in cooperation with the states, 'encourage development of industry capacity in salinity research and development' by ensuring tender specifications provide opportunities for industry to compete for public research funds and that tendering processes are transparent (recommendation 12).

8.30 This Committee notes that the Australian Government provides a number of incentives and mechanisms to encourage private sector investment in salinity and NRM research and development. The Cooperative Research Centre model, for example, is designed to build links between researchers and industry. At the same time, levies from Australian industries contribute to research through the Research and Development Corporations. Various tax incentives also encourage private sector investment in R&D.

8.31 While the Committee commends these activities, evidence suggests that large-scale private investment remains largely untapped. The Committee believes that large-scale private investment is required to develop substantial commercial measures to mitigate salinity.

8.32 No evidence was received on tendering processes. However, this Committee notes that Australian Government tendering processes adhere to the Commonwealth Procurement Guidelines for procurement of good and services. These are based on best-practice principles.[11]

Data management and mapping technologies

8.33 It was recommended that relevant Australian and state government agencies 'accelerate the development of data collection, management, and retrieval systems that are standardised, integrated and accessible' (recommendation 13).

8.34 The importance of consistent standards and protocols for data collection and management was emphasised in evidence received. This Committee understands that the Australian and state/territory governments recognise the importance of standardised and accessible data and are working towards this through their support of the National Land and Water Resources Audit. The Committee was particularly

11 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 13, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

heartened to hear that the newly established Executive Steering Committee on Australian Salinity Information will work towards improvements in data collection and management.

8.35 It was recommended that ANZLIC, the spatial information council, and the National Land and Water Resources Audit 'be resourced to support managers of regional projects to develop and implement best practice data management policies' (recommendation 14).

8.36 The Government response to this recommendation reported that ANZLIC and the NLWRA have produced a toolkit, which provides resource materials to build the capacity to manage data and information at regional and local levels. The toolkit is available online. Further, the Audit is coordinating various efforts to achieve consistency in data management and sharing.[12]

8.37 The Committee received limited evidence on this recommendation.

Support for implementers: extending the science

8.38 Ten recommendations were made in this area. The first recommendation advised that the Australian and state/territory governments 'build on existing initiatives to establish a database of interpretive material, scientific research and data' (recommendation 15).

8.39 The Government response reported that this recommendation is being addressed through current data management arrangements. It was noted that the National Land and Water Resources Audit has developed the Australian Natural Resource Atlas. The Atlas provides access to a database of interpretive, scientific research and natural resource data. It was further noted that information is available from the Australian Government Natural Resource Management website, the NDSP website, the CRC for Plant-based Management of Dryland Salinity website, the CRC for Landscape Environments and Mineral Exploration website, Land & Water Australia website, and the Murray-Darling Basin Commission website.[13]

8.40 Whilst this Committee appreciates that all of the above are valuable resources, evidence suggested there is still a need for a 'one-stop-shop' for accessible, up-to-date information. This is discussed later in the chapter.

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12 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 15, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

13 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 16, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf (accessed 31 January 2006).

8.41 The remaining recommendations focused on extension/knowledge brokering services:

- Recommendation 16 – Australian and state/territory governments and industry groups to 'enhance their support for face-to-face extension services'
- Recommendation 17 – that a state-by-state manual of viable salinity management options be published to assist extension staff and land managers
- Recommendation 18 – that the issue of diminshing state extension services be reviewed with a focus on employment conditions and the potential career pathways of extension staff and the adequacy of training
- Recommendation 19 – that an audit of the national, state and regional extensions services available for salinity management be undertaken
- Recommendation 20 – that 'the effectiveness of the National Landcare Program's state and regional resource management facilitator' be reviewed
- Recommendation 21 – that 'the extension services provided to the Australian Government, and participating states and territories, through the NAP and the NHT be reviewed' with a focus on employment conditions, career pathways and training
- Recommendation 22 – that the support of regional bodies be increased through a 'review to assess the effectiveness of providing groups of mobile knowledge brokers' who advise on NRM policies and salinity issues, and the provision of funding for the operations of knowledge broker groups
- Recommendation 23 – that a national annual forum on salinity policy, research and management for government agency staff, regional bodies, private consultants, farmers and other land managers be supported
- Recommendation 24 – that the Australian Government 'remove impediments to the further development of an industry in technical and support services for environmental management', and establish an accreditation process for private sector salinity advisors

8.42 The Australian Government response to the recommendations highlighted the fact that extension services are principally the responsibility of the states and territories. This was re-affirmed in Australian Government departmental evidence to this inquiry. However, it was noted that the Australian government funds a network of 117 facilitators throughout Australia to assist land managers and industry groups. Further, the Government contributes to the funding of over 650 local and regional level facilitators supporting the transition to improved NRM practices.[14]

14 The Australian Government Response to the House of Representatives Standing Committee on Science and Innovation May 2004 Report *Science Overcoming Salinity: Coordinating and extending the science to address the nation's salinity problem*, December 2005, p. 17, www.aph.gov.au/house/committee/scin/salinity/govtresponse/govtresponse.pdf, (accessed 31 January 2006).

8.43 In its response, the Australian Government further reported the following:

- Under the regional delivery model, it is the responsibility of regional bodies to identify and fund their need for extension/knowledge brokering services.
- The employment conditions, career pathways and training of extension staff are the responsibility of the individual employment body (which may be the Australian government, a state government, regional body or local council).
- The Government supports the holding of a national forum and sponsors the Productive Use and Rehabilitation of Saline Lands group.
- In 2003, the Government completed a scoping study into the inclusion of salinity and water quality training in the Conservation and Land Management Training Package under the Vocational Education and Training accreditation system. The Government is currently looking at the development of an operational plan to deliver and support the salinity and water education and training stream under the Conservation and Land Management Training Package.
- Other training/accreditation initiatives for salinity advisers have/are being undertaken by the Rural Industries Research and Development Corporation, the NSW Southern salinity Action Team and the CRC for Plant-Based Management of Dryland Salinity.

8.44 This Committee heard a considerable amount of evidence that argued the need for increased extension services and improved employment conditions for extension workers. The Committee notes that while extension services have predominantly been the responsibility of the states/territories, the move to the regional delivery model requires a different approach with greater Australian Government involvement. Further, it was clear from evidence received that not all regional bodies currently have the capacity to identify and implement their extension needs. This Committee suggests that an examination of the extension needs of regional bodies could show ways in which the national coordination, sourcing and professional development of regional extension officers may add substantial value to the efforts of regional bodies. This is discussed later in the chapter.

Improving salinity management in Australia

8.45 This section outlines the Committee's conclusions and recommendations to improve salinity management in Australia.

National Programs

Funding

> [The NAP] is a major step forward in giving salinity a national focus and getting cooperation between the states and the Commonwealth and getting cooperation between the departments at a federal level. The fact that there is now a joint natural resource management team within the Australian

> government linking together the departments of environment and agriculture is a very promising and very welcome change.[15]

8.46 As discussed in Chapter 3, witnesses were very positive about the heightened attention that the NAP and other national programs have brought to the issue of salinity. Increased public awareness, improved coordination between the Australian and state/territory governments and significant advances in research were some of the benefits conveyed to the Committee. However, some 'teething problems' were brought to the Committee's attention, - most notably, delays in negotiating the bi-lateral agreements – and suggestions were made to streamline and improve the national programs.

8.47 Perhaps the strongest message communicated to the Committee was that the NAP has provided a good start or solid basis from which to continue the task of managing salinity. Many regional bodies are still finding their feet and the salinity problem itself is not conducive to short-term intervention. Substantial ongoing investment is essential.

Recommendation 1

8.48 The Committee recommends that the Australian Government and the state/territory governments extend the National Action Plan for Salinity and Water Quality for a further 10 years, with matched funding at least commensurate (on a per year average basis) with the first stage NAP funding. It is recommended that negotiations over the future of the NAP be expedited to provide certainty to regional bodies and other stakeholders. It is recommended that any further consideration of the prioritisation of NAP funds include consultation with the states/territories and the wider community.

Recommendation 2

8.49 The Committee recommends that the Australian Government extend the Natural Heritage Trust for a further 10 years with funding at least commensurate (on a per year average basis) with existing funding levels.

8.50 Short-term funding cycles for regional bodies results in uncertainty at both a planning and staffing level. As outlined in Chapter 3, the Committee heard that regional bodies on short-term (12-18 month) funding were finding it difficult to attract and retain experienced staff. Lack of continuity between funding rounds exacerbated the problem. In turn, this has resulted in a loss of corporate knowledge and, coextensively, decreased capacity in some regional bodies. The Committee appreciates that short-term funding cycles were temporarily introduced for regional bodies lacking the capacity to manage large funds. The Committee further understands that the Australian Government Departments of Agriculture, Fisheries and Forestry

15 Mr Corey Watts, Acting Manager, Land and Water Program, Australian Conservation Foundation, *Committee Hansard*, 28 February 2006, pp 25-26.

and the Environment and Heritage are working with relevant state/territory agencies to support regions in longer-term (3-year) planning.

Recommendation 3

8.51 The Committee recommends that the Australian Government in cooperation with the states and territories continues to give priority to longer-term funding cycles and measures to ensure the continuity of funding so that where existing staff are likely to be continuing in a role there is no break in wages and the organisation's intellectual capital is not lost.

The Governance Framework

8.52 A principal design feature of the NAP is clearly articulated roles for the Australian, state/territory and local governments and the community. The Committee heard that roles and responsibilities between local government and regional bodies were not always clearly demarcated and duplication occurred.

8.53 The principal area of concern raised from a local government perspective was the granting of legislative powers to regional bodies. However, with some notable exceptions, there was also significant concern that many local governments are not across salinity and other NRM issues or using their planning powers to support salinity management.

8.54 The Committee believes that achieving clarity of roles between regional bodies and local government will require the following: improved education of local government in NRM matters, tighter requirements on local government to incorporate NRM principles in their planning decisions, and greater communication between local government and regional bodies.

8.55 The Committee acknowledges the valuable role that local governments can (and often do) play in the management of salinity. In particular, the Committee's site inspection in Wagga Wagga, NSW, highlighted the influential role that local government can take in managing salinity. The work undertaken by Wagga Wagga City Council (discussed in Chapter 6) provides an excellent example of good practice that could assist other councils as they take on the task of salinity education and management. However, as discussed later in this chapter, the Committee heard that local governments are not adequately funded to undertake this role. The recommendations below should be implemented in conjunction with recommendations 20 and 21.

Recommendation 4

8.56 The Committee recommends that the Australian Government work with the state/territory governments and local government peak bodies to ensure that all local governments are adequately educated in, and have access to, salinity management information relevant to their locality. This will include the development of mechanisms to help local governments build and share capacity, knowledge and experience.

Recommendation 5

8.57 The Committee recommends that the Australian Government work with the state/territory governments to encourage reform of local government legislation to place a requirement on all local municipalities to align planning decisions with natural resource management principles and priorities.

8.58 As discussed in Chapter 4, the legislative arrangements for regional bodies vary across the country: some have statutory powers while others do not. The legislative status of regional bodies has led to confusion between local government and regional bodies over roles, responsibilities and powers in some states/territories. Whilst not applicable to all jurisdictions, the Committee believes there is room to improve the situation and reduce the current level of confusion.

Recommendation 6

8.59 The Committee recommends that, where applicable, the Australian and relevant state/territory governments examine the issue of statutory powers for regional bodies to address the current level of confusion between local government and regional bodies.

8.60 Control of land clearing is essential to the management of salinity. The Committee was particularly troubled to hear that land clearing is still not being regulated effectively in some areas. In some cases, local government is failing to exercise its regulatory powers in the decision-making process. At the same time, concerns were raised that some state governments are not adequately monitoring compliance with land-clearing regulations.

8.61 The Committee notes that in the Council of Australian Government's publication *A National Action Plan for Salinity and Water Quality* it states:

> Recognising the fact that land clearing in salinity risk areas is a primary cause of dryland salinity, effective controls on land clearing are required in each jurisdiction:
>
> - any Commonwealth investment in catchment/region plans will be contingent upon land clearing being prohibited in areas where it would lead to unacceptable land or water degradation; and
> - the Commonwealth will require agreement from relevant States/Territories (particularly Queensland, New South Wales and Tasmania) that their vegetation management regulations are effectively used or, where necessary, amended to combat salinity and water quality issues.[16]

8.62 Whilst the regulation of land-clearing is primarily the responsibility of the state/territories and local governments, the National Action Plan is clear that

16 Council of Australian Governments, *A National Action Plan for Salinity and Water Quality*, 2000, p. 9.

Australian Government investment is contingent on appropriate land-clearing controls being in place and enforced. While the Committee recognises that the Australian Government is trialling market-based instruments (MBIs) as a means of influencing land-use behaviour, the Committee believes that greater national leadership on the issue of regulatory compliance is required. There is definitely scope for greater insistence by the Australian Government that land clearing is being adequately controlled in each state and territory before Australian Government funds are provided to that jurisdiction.

Recommendation 7

8.63 The Committee recommends that the Australian Government, through the Natural Resource Management Ministerial Council, seek greater assurance from the states/territories that land-clearing is being effectively regulated. It is recommended that extensions to the NAP funding be conditional on the states/territories meeting more rigorous accountability measures.

Enhancing the capacity of regional bodies

> The success of Federal Programs hinges to a large extent on the level of knowledge and expertise of the agencies and individuals charged with the development and implementation of catchment management strategies and plans. Currently, the level of expertise across catchment management authorities and agencies varies considerably across Australia.[17]

8.64 While there was strong support for the regional delivery model, the Committee heard that the performance of regional bodies was uneven: some organisations performed well, while others struggled. As discussed in Chapter 4, the major obstacles identified were:

- inadequate standards of corporate governance and local capacity
- an inadequate accreditation process
- limited access to local current data
- limited ability to apply research at a catchment scale

8.65 The last two of these four points is dealt with in the sections on research later in this chapter.

Corporate Governance Guidance

8.66 The Committee recognises that regional bodies have not commenced from an equal starting point under the new regional delivery arrangements. Establishing sound corporate governance arrangements will provide a stable basis from which to build the capacity of regional bodies.

17 CSIRO, *Submission 15*, p. 5.

8.67 The Committee notes that the ANAO report recommended that the Australian and state/territory governments work together to:

> [develop] appropriate corporate governance templates and core training/information to enhance the capacity of regional bodies to meet sound corporate governance practices.[18]

8.68 Further, the NRMMC Regional Implementation Working Group proposed that guidelines on best practice in governance and accountability be established by the states/territories.[19]

Recommendation 8

8.69 The Committee recommends that the Australian Government, as a matter of urgency, work in cooperation with the states/territories to implement the Australian National Audit Office's recommendation to develop corporate governance templates and core training.

The accreditation process

8.70 The Committee heard that there was a need to improve the accreditation process to provide quality assurance and consistency in regional investment planning. As a number of witnesses attested, the performance of regional bodies has, to-date, been varied. The CRC for Plant-Based Management of Dryland Salinity explained that a stronger accreditation process, which focused on a much more rigorous approach to investment decision-making, is required.[20] The following recommendation should be read in conjunction with recommendation 22.

Recommendation 9

8.71 The Committee recommends that the Australian Government, in cooperation with the states and territories, strengthen the accreditation process for regional bodies. The improved process will ensure that funding is conditional on rigorous investment planning, where decisions are:

- **Based in sound, up-to-date science**
- **Outcome-focused**
- **Subject to a cost-benefit analysis**

Coordinating and communicating research

> One of the overarching issues identified by the House of Representatives' inquiry was the lack of coordination of salinity research across the country

18 Australian National Audit Office, *The Administration of the National Action Plan for Salinity and Water Quality*, Audit Report No. 17 2004-2005, p. 84.

19 Department of Agriculture, Fisheries and Forestry and Department of the Environment and Heritage, *Submission 24*, Attachment I, p. 5.

20 CRC for Plant-Based Management of Dryland Salinity, *Submission 18*, p. 1.

> following the demise of the National Dryland Salinity Program. This was highlighted by the fact that 11 out of 24 of their recommendations relied on the existence of an overarching coordinating entity to guide investment, planning and extension. Such a governing structure has yet to be developed as only part of the science coordination and brokering issues are addressed by the recent Executive Steering Committee for Australian Salinity Information (ESCASI) initiative but it provides a starting point.[21]

8.72 As discussed in Chapter 5, it was clear from evidence received that the National Dryland Salinity Program (NDSP) was strongly regarded and influential in its time. It provided a platform for key partners to work together, a forum for information and knowledge exchange, and enabled the development of a suite of accessible products for use by landholders, regional and industry groups, and researchers. It was also clear that there is an ongoing and urgent need for a similar vehicle.

8.73 Some witnesses supported the re-instatement of the NDSP as recommended in the House of Representatives Report. However not all former NDSP partners were convinced the NDSP was the appropriate vehicle and argued that a new vehicle was needed that could play a similar role in the changed NAP environment.

8.74 The Committee believes there is a critical need for a body that can undertake 'big picture' analysis of research gaps and ensure that research is coordinated to avoid duplication and capture all national research priorities.

8.75 There is a need for this national coordinating body to be able to leverage or commission research to meet these R&D priorities and ensure research management processes and protocols are in place so that research delivers useful outputs that meet the needs of research users. This means having some funding and research management capacity, but it would be expected that the actual R&D would be undertaken collaboratively by existing research providers.

8.76 A central one-stop-shop is required to meet the information needs of regional bodies, producer groups, and community organisations. This means there is a need for national R&D protocols to ensure that data from different projects or regions is transferable and interpretable. Along with this, the coordinating body must have some leverage with R&D providers to ensure compliance. A central database alone is of limited use in the absence of a capacity to interpret and make effective use of the data. There is a strong argument for a pool of knowledge brokers with expertise in particular areas, who are able to find and interpret relevant information for particular target groups (catchment managers, producers, local government etc).

8.77 This new organisation is likely to be made more effective if there is a clear articulation of the research, development and extension (RD&E) process, which

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21 CSIRO, *Submission 15*, p. 9.

outlines the roles, responsibilities and relevance of the players at different levels to ensure clear communication pathways and expectations.

8.78 As recommended in the House of Representatives Report (recommendation 2), the Committee believes there is a need for an audit of all salinity research and development activities in which the Australian Government invests. This will be an integral step in identifying critical research gaps and modifying research priorities.

8.79 An audit of ongoing R&D and an analysis of existing and future R&D gaps could also develop a clear process for mapping the extent of the problem across target landscapes against current and emerging salinity mitigation measures to prioritise future R&D investment. The aim would be to perform a cost-benefit analysis of the extent of particular landform and land use types, the relative value of assets at risk, and the cost, timeframe and likelihood of success of R&D efforts to develop targeted solutions.

Research scale

8.80 Evidence suggests there is a need for a mix of 'big picture' research and a need for collaborative research at the regional level, which takes the 'big picture' research outcomes and delivers R&D that provides solutions relevant to regional conditions, needs and production systems. The Committee recognises that there is significant 'big picture' work being undertaken through organisations and initiatives in which the Australian Government invests. However, the Committee believes that there is an unfulfilled role to undertake or commission research not currently covered through existing channels. Further, there is also a requirement to ensure effective coordination of salinity R&D at the national and regional levels.

8.81 This would allow regional bodies and producer groups to pick up the outputs of national research projects and apply them to their local conditions to provide the kind of information that meets their planning and extension needs (adapting to local conditions, demonstrating to local producers etc). Regional bodies would not be expected to have the R&D or research management capacity to commission or undertake these projects themselves. Rather, they would need to have the funding leverage to partner existing R&D providers in these projects to ensure that their needs and priorities are met.

Recommendation 10

8.82 The Committee recommends that the Australian Government establish an independent body to coordinate salinity research. This body will:

- **Maintain a focus on dryland, irrigation and urban salinity**
- **Identify and prioritise gaps in research across all research scales**
- **Leverage research from existing providers where priority gaps are identified**
- **Provide a 'one-stop-shop' for salinity research and information**

- **Develop and maintain a website that provides a gateway to all relevant research, policy and practice**
- **Ensure that research is able to be connected up and used at different scales**

Recommendation 11

8.83 The Committee recommends that the newly established coordinating body undertake, as one of its first pieces of work, a comprehensive audit of all salinity research and development activities in which the Australian Government invests. This will include:

- **National programs**
- **Agencies within government departments**
- **Cooperative Research Centres**
- **Research and Development Corporations**
- **National science agencies**
- **Universities**
- **Independent research centres**
- **Industry initiatives**
- **R&D needs for the development of new large-scale sustainable industries**

8.84 Research at a regional scale is currently largely unfunded or carried out on an ad hoc basis, with funding to regional bodies dedicated to on-ground works. The Committee believes that for regional bodies to establish and maximise partnerships with researchers and industry bodies for regional-scale research, discrete research funding is required. Further, research funding for regional bodies will facilitate the incorporation of regional needs and priorities into research priority-setting at a national level.

Recommendation 12

8.85 The Committee recommends that discrete funding be allocated in the new (post-2008) NAP funding for regional bodies to partner in regional scale research to deliver R&D outcomes that are more relevant to their regional priorities and needs. It is recommended that all research proposals be assessed by the newly created coordination body to avoid duplication of research efforts.

NDSP Products

8.86 The National Dryland Salinity Program (NDSP) products, compiled in the final stage of the NDSP, are invaluable resources for the broad range of stakeholders involved in salinity management. The Committee was concerned to hear that these products are not currently widely known of or used and there is no capacity to update them.

Recommendation 13

8.87 The Committee recommends, as a matter of urgency, that specific funds be allocated by the Australian Government for the promotion and distribution of the NDSP products – in particular, to regional bodies across Australia. It is further recommended that the newly established coordination body (see recommendation 10) take on the role of updating these products.

Extension services

8.88 A major theme in this inquiry was the decline in extension services and employment opportunities for extension workers. This was also given considerable attention in the House of Representatives Report. The Committee is disappointed that in spite of the emphasis on extension services in the House of Representatives inquiry, this issue continues to be neglected. Extension officers and knowledge brokers play a vital role in ensuring that science is communicated to on-ground workers in an accessible, user-friendly manner. In turn, the capacity for regional bodies to effectively deliver useful and targeted information will be crucial to their ability to impact on salinity.

8.89 The Committee recognises that extension services, in the past, have primarily been the responsibility of the states and territories. However, as noted earlier in the chapter, evidence suggests that state extension services do not adequately fit the regional delivery model. In its response to the House of Representatives recommendations, the Australian Government noted that regional bodies are required to identify and fund their need for extensions services within the context of their regional plans and investment strategies. As this requirement is part of the Australian Government and states/territories jointly agreed regional model, the Committee believes the Australian Government has a responsibility to ensure that appropriate extensions services are available.

8.90 Further, the Committee notes that not all regional bodies are well placed to identify and manage their extension needs and some support is required. To this end, the Committee believes the Australian Government should take a lead in identifying extension service issues and developing options for addressing these issues. Specifically, the role for the Australian Government is in improving employment and training for extension workers to meet the needs of regional groups.

8.91 The most effective means of delivering different kinds of information to different target groups to ensure they have the knowledge, capacity and support to undertake land use change must be determined. To achieve this, there is a need to articulate the relative roles and capacity of state, regional and private extension services and to look at how to encourage the most effective and constructive relationship between these three groups, R&D providers and R&D users (including regional bodies, land managers and local government).

8.92 Given the extension needs of regional groups and mindful of the range of demands placed on them and variation in their management capacity, there is much to

be gained by the national coordination of the professional development of regional extension officers. Relatively minor activities, such as helping regional groups to appoint extension officers and articulate their job descriptions, to providing a national forum for communication and knowledge exchange, could greatly increase the effectiveness of regional extension personnel.

8.93 There is a role for using the existing level of extension experience within state agencies to contribute to the education and professional development of both regional and private extension providers. This has been demonstrated in the CRC for Plant-Based Management of Dryland Salinity's collaborative project with Landmark private agronomists.[22] A network has been developed in which private agronomists provide one-on-one support to their clients in adopting sustainable new farming systems, with support and referral from state extension staff.

Recommendation 14

8.94 The Committee recommends that the Australian Government establish a working group to identify extension service issues and options for addressing these. Particular attention should be paid to:

- **The relationship between state, regional and private extension services**
- **The employment conditions, professional development and career pathways of regional extension staff**
- **Achieving nationally consistent and relevant training of extension staff, including the development of accredited courses for private extension staff that provide knowledge and skills in NRM and increase their awareness of, and engagement with, relevant regional plans**
- **Ensuring that extension services meet the needs of regional groups**

Research gaps

Viable salinity solutions and new industry development

8.95 On-ground action by regional bodies can only succeed if there are regionally suitable, viable solutions for salinity mitigation or prevention. The Committee appreciates the frustration of some stakeholders that on-ground action has been delayed by the regional planning process and, as discussed above, recommends greater support and guidance to regional bodies in this regard. However, of equal concern was evidence suggesting that on-ground action is going ahead before viable management options are available or have been properly targeted and developed to meet regional needs.

22 CRC for Plant-Based Management of Dryland Salinity website, http://www.crcsalinity.com/programs/index.php?disptype=projects&id=22 (accessed 22 march 2006).

8.96 Whilst the role of the regional bodies in engaging their local communities is vital, the Committee believes that education and capacity building of local communities won't achieve widespread change if there are negative economic drivers. The call from witnesses for more investment in R&D for commercially viable salinity solutions is supported by the Committee. Without further research in this area and correspondingly, the development of new industries, many current land management uses will continue to exacerbate the salinity problem.

8.97 The Committee believes that more needs to be done to attract industry to invest in salinity research and development, and to support the development of new, sustainable and profitable industries. While good progress is being made on improving the sustainability of existing industries, this activity may not be sufficient to achieve substantial changes needed in recharge rates. Similarly, undertaking revegetation using public funds will not be enough to slow down and reverse rising groundwater. To make significant reductions in recharge rates will also require new industries that can be rolled out at landscape scale. New land-use systems that make much more efficient use of rainfall and where profitability of new industries is the driver for land-use change are required. In short, developing new industries is vital.

8.98 This is a major long-term undertaking, which will require a combination of big R&D projects along with measures to provide incentives and certainty for serious private investment in developing infrastructure. New industry development will require a considerable commitment from Government and a review of existing policy mechanisms that support industry development. Three factors will need to be addressed: the policy mechanisms available to encourage development of new industries, existing mechanisms that may unfairly advantage industry competitors; and the carefully targeted funding of key parts of the R&D process.

The recommendation below should be implemented in conjunction with recommendation 23.

Recommendation 15

8.99 The Committee recommends that the Australian Government review existing policy mechanisms (tax incentives, MBIs etc) in order to provide a policy environment that encourages and supports the development of new, large-scale sustainable industries that meet NRM priorities.

Mapping

8.100 The Committee was encouraged to hear that advances in mapping technologies enable a more targeted and detailed mapping of salinity. The recently published guide and book, *Salinity Mapping Methods in the Australian Context*, provide a valuable resource for mapping dryland salinity in Australia.

8.101 The Committee would like to see updated assessments of the salinity risk across the states and territories expedited, followed by more detailed mapping of high-

risk areas. Particular attention should be directed to urban areas at risk of salinity and rural lands being considered for urban development.

Recommendation 16

8.102 The Committee recommends that updated assessments of salinity risks be undertaken across the states/territories, followed by detailed mapping of high risk areas with particular attention paid to urban environments. It is recommended that priority areas under the NAP be re-assessed in light of the updated assessments.

Recommendation 17

8.103 The Committee recommends that mapping is conducted in areas in which salinity is known to be a potential hazard before further urban development is approved in those areas.

Urban salinity – meeting the challenge

8.104 As discussed in Chapter 6, urban salinity is of particular concern to the Committee. Evidence to this inquiry echoed concerns raised in the House of Representatives Report that insufficient attention is being directed to this problem. A range of infrastructure can be affected by salinity - roads, bridges, buildings, footpaths, pipes, sewerage systems, railway lines and power lines. Some submitters predicted that that the financial impact on infrastructure could exceed impacts on agriculture.

8.105 The Committee believes that greater national leadership on urban salinity is required. Along with this, more attention needs to be paid to urban salinity in the regional investment planning process.

8.106 The role of local government in urban salinity management is critical. Local government is responsible for a range of civic infrastructure at risk of salinity. The Committee heard that local government is often under-resourced to deal with urban salinity and, in some cases, lacking in information and knowledge. Access to information and education was dealt with in recommendation 4.

8.107 Recommendations 18 and 19 should be implemented in conjunction with recommendations 4 and 5.

Recommendation 18

8.108 The Committee recommends that the Australian Government give greater emphasis to urban salinity at a national level by:

- **building links between the administering departments and relevant agencies such as the Department of Transport and Regional Services and the Australian Transport Council**
- **supporting research into the development of technologies for managing urban salinity**

- **allocating funding to urban salinity in the next salinity program**

Recommendation 19

8.109 The Committee recommends that the Australian Government in cooperation with the state/territory governments use the accreditation process to ensure that urban salinity is adequately accommodated in regional investment strategies.

Recommendation 20

8.110 The Committee recommends that the Australian Government establish a pool of special grants to be made available for local governments to address urban salinity issues. Access to grants will be contingent on a demonstrated willingness to align planning policies and decisions with sustainable natural resource management principles.

Recommendation 21

8.111 The Committee recommends that a suitable body such as the Productivity Commission or the Australian Bureau of Agricultural and Resource Economics (ABARE) undertakes a study into the future impacts and costs of salinity on infrastructure in urban and rural environments, and develop a long-term strategy that includes consideration of federal, state and local government funding levels.

Streamlining regional investments

8.112 The Committee heard that a more rigorous and systematic approach to investment is required. As discussed in Chapter 7, evidence was received on the development of the Salinity Investment Framework 3 (SIF3), which is a decision-making framework for the selection of appropriate salinity investment options. SIF3 provides a framework for undertaking risk and cost/benefit analyses coupled with assessment of the various regulatory and policy mechanisms available to manage salinity. The framework can be applied at the national, state and local levels.

8.113 The Committee believes that a national investment framework would provide a sound process for making informed, objective and transparent investment decisions. The benefits of such a framework are that it would:

- achieve consistency in decision-making
- enable an objective assessment of competing interests
- facilitate the effective targeting and allocation of limited resources

Recommendation 22

8.114 The Committee recommends that the Australian Government in cooperation with the states and territories keep a watching brief on the development of the Salinity Investment Framework 3 (SIF3), with a view to potentially implementing it (or a modified version of it) across the country. It is

recommended that the framework be applied within the context of the new (post-2008) program(s).

Securing private investment

> The absence of an institutional framework for leveraging large-scale private investment in commercially viable and environmentally beneficial ventures remains a gaping hole in the national NRM programmes.[23]

8.115 As discussed in Chapter 5, evidence showed a need for much greater research and development into viable and profitable salinity solutions. Without the development of new industries, current sustainable farming options will not be enough to meet the challenge of salinity in some areas. That is, they will not be sufficient to reduce the amount of recharge required to manage the salinity problem.

8.116 The importance of Government commitment to support the development of new industries was discussed above. Along with this, the Committee believes that substantial private investment will be critical in getting new ventures up and running. The recommendation below should be implemented in conjunction with recommendation 15.

Recommendation 23

8.117 The Committee recommends that the Australian Government develops a national policy package to leverage large-scale private sector investment in new, sustainable and profitable solutions.

Senator Andrew Bartlett
Chair

23 The Australian Conservation Foundation, *Submission 19*, p. 55.

Appendix 1

Submissions

1. Australian Academy of Technological Sciences and Engineering
2. Hunter-Central Rivers Catchment Management Authority
3. Mr Rob Cordover
4. Pastoralists and Graziers Association
5. Grains Research and Development Corporation
6. Northern Agricultural Catchments Council

6A. Northern Agricultural Catchments Council (Supplementary Submission)

7. Glenelg Hopkins Catchment Management Authority
8. Local Government Association of Queensland Inc
9. Central West Catchment Management Authority
10. Mr Robert Vincin

10A. Mr Robert Vincin (Supplementary Submission)

11. Conservation Council of WA
12. Hawkesbury-Nepean Catchment Management Authority
13. Australian Local Government Association
14. ACT Legislative Assembly
15. CSIRO
16. Greening Australia
17. Centre for Salinity Assessment and Management, Faculty of Agriculture, Food and Natural Resources, University of Sydney
18. CRC for Plant-based Management of Dryland Salinity, University of Western Australia
19. Australian Conservation Foundation
20. Government of South Australia

20A. Government of South Australia (Supplementary Submission)

20B. Government of South Australia (Supplementary Submission)

21. Murray-Darling Basin Commission

22. Department of Infrastructure, Planning and Natural Resources, New South Wales

23. Water for Australia

23A. Water for Australia (Supplementary Submission)

23B. Water for Australia (Supplementary Submission)

24. Department of Agriculture, Fisheries and Forestry and Department of Environment and Heritage

24A. Department of Agriculture, Fisheries and Forestry and Department of Environment and Heritage (Supplementary Submission)

25. Namoi Catchment Management Authority

25A. Namoi Catchment Management Authority (Supplementary Submission)

26. Land & Water Australia

27. South Coast Regional Initiative Planning Team Inc

28. Mr Rod Johnson

29. NRM South

30. Burnett Mary Regional Group for Natural Resource Management

31. Vogelsang & Partners

32. Ms Josie Jackson

33. Mrs Susan Prosser

33A. Mrs Susan Prosser (Supplementary Submission)

34. Mr W (Bill) Hayward

34A. Mr W (Bill) Hayward (Supplementary Submission)

35. Mr Patrick Ross and Ms Pip Rasenberg

36. Goulburn Broken Catchment Management Authority

37. Western Sydney Regional Organisation of Councils Ltd

37A. Western Sydney Regional Organisation of Councils Ltd (Supplementary Submission)

38. Mr Frank Burden

39. North Central Catchment Management Authority

40. Saltland Pastures Association

41. The Western Australian Farmers Federation

42. Avon Catchment Council

43. Coalition of Concerned Landholders

44. Wheatbelt Catchment Alliance of Western Australia

45. River Murray Catchment Water Management Board

46. Centre for National Resource Management

47. Australian Building Codes Board

48. Central Riverina Landcare Network & Murrumbidgee Landcare Association

49. Environmental Research and Information Consortium

50. Lachlan Catchment Management Authority

Appendix 2

Public Hearings

Tuesday, 6 September 2006 – Canberra

Department of Agriculture, Fisheries and Forestry & Department of Environment and Heritage

Mr Peter Baker, Program Leader, Integrated Water Sciences, Bureau of Rural Sciences

Mr Mike Lee, General Manager, Australian Government Natural Resource Management Team, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry

Dr Mirko Stauffacher, Scientific Adviser, Australian Government Natural Resource Management Team, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry

Mr Simon Veitch, Manager, Landcare and Invasive Species, natural Resource Management Division, Department of Agriculture, Fisheries and Forestry

Mr Charles Willcocks, General Manager, Landcare and Sustainable Industries, Natural Resource Management Division, Department of Agriculture, Fisheries and Forestry

Mr Malcolm Forbes, First Assistant Secretary, Natural Resources Management Programmes Division, Department of the Environment and Heritage

Land & Water Australia

Mr Andrew Campbell, Executive Director

Ms Lisa Robins, Consultant

Commonwealth Scientific and Industrial Research Organisation Land and Water

Dr Ian Prosser, Theme Leader, Water Resources

Murray-Darling Basin Commission

Mr Leslie Roberts, General Manager, Natural Resource Management

Mr Matthew Kendall, Salinity Manager

Mr Anthony Meissner, Project Officer, Irrigation Salinity Impacts

Friday, 14 October 2005 – Sydney

Department of Natural Resources

Mr Geoff Fishburn, Executive Director, Coastal, Rural and Regional Implementation and Catchment Management Authority Support

Dr Natasha Herron, Senior Natural Resource Officer

Ms Sian McGhie, Senior Natural Resource Officer, Urban Salinity

Western Sydney Regional Organisation of Councils Ltd

Mrs Sharon Fingland, Assistant Director

Councillor George Campbell, Spokesperson on Natural Environment and Resources

Namoi Catchment Management Authority

Mr George Truman, Catchment Officer, Projects (Salinity)

University of Sydney

Professor Les Copeland, Dean of Faculty, Agriculture, Food and Natural Resources and Director, Centre for Salinity Assessment and Management

Dr Dhia Al Bakri, Senior Lecturer in Environmental Management

Dr Rutger Vervoort, McCaughey Senior Lecturer, Hydrology and Catchment Management, Faculty of Agriculture, Food and Natural Resources

Water for Australia Pty Ltd

Mr Barry Dunn, Director

Mr Robin Gaskell, Support Team Member

Hunter-Central Rivers Catchment Management Authority

Ms Sharon Vernon, Program Manager

Hawkesbury-Nepean Catchment Management Authority

Mr Neville Pavan, Catchment Coordinator, Implementation

Wednesday, 16 November 2005 – Adelaide

Department of Water, Land and Biodiversity Conservation, South Australia

Mr Roger Wickes, Executive Director, Natural Resources Management (Policy, Information and Infrastructure)

Mr Phil Cole, Program Leader, Salinity

Mr Glenn Gale, Senior Project Officer, Dryland Salinity

Mr Michael Leak, Upper South East Program

Mr Frank Burden (Private Capacity)

Mr William Hayward (Private Capacity)

Mr Dean Prosser (Private Capacity)

Mrs Susan Prosser (Private Capacity)

Miss Karyn Prosser (Private Capacity)

River Murray Catchment Water Management Board

Mr Daniel Meldrum, Senior Project Officer, Salinity and Water Use

Dr Bruce Munday (Private Capacity)

Mr Patrick Ross (Private Capacity)

Friday 18 November 2005 – Perth

Department of Environment

Mr Fred Tromp, Director, NRM and Salinity

Mr John Ruprecht, Manager, Salinity and Land Use Impacts

Cooperative Research Centre for Plant-Based Management of Dry Salinity

Mr Alex Campbell, Chairman

Mr Kevin Goss, Chief Executive Officer

Dr David Masters, Program Leader

Avon Catchment Council Inc

Mr Peter Sullivan, Chief Executive Officer

Mrs Merrilyn Temby, Acting Chair

Mr Donald Cummins, Program Manager

Northern Agriculture Catchments Council

Mrs Elizabeth Eaton, Chair

Mr Alan Bradley, Chief Executive Officer

Saltland Pastures Association Inc

Mr Michael Lloyd, Chairman

Ms Sally Phelan, Project Manager

Western Australian Farmers Federation Inc

Mr Trevor De Landgrafft, President

Mr Andrew McMillan, Director of Policy

Conservation Council of Western Australia

Mr Christopher Tallentire, Director

Ms Anna-Marie Penna, Salinity and Rural Liaison Officer

Wheatbelt Catchment Alliance of Western Australia

Mr John Dunne, Chairman

Mr Greg Richard, Member, Executive

Western Australian Local Government Association

Mr Nathan Malin, Acting Policy Manager (Environment)

Councillor Clive Robartson, State Councillor

Friday, 10 February 2006 – Wagga Wagga

Community Panel

Mrs Paula Charnock, President, Wagga Wagga Urban Landcare

Mr Robert (Dick) Green, Owner-Manager, Go Green Services

Mr James Phillips, Private Capacity

Dr Petrina Quinn, Secretary/Treasurer, Central Riverina Landcare Network and Murrumbidgee Landcare Association

Sister Carmel Wallis, Administrator, Erin Earth

Murrumbidgee Catchment Management Authority

Mr Gregory Bugden, Business Manager (Investment)

Mr John Francis, Program Manager, Sustainable Ecosystems

Lachlan Catchment Management Authority

Mr Robert Gledhill, Chairman

Mr Christopher Glennon, General Manager

Wagga Wagga City Council

Mr Bryan Short, Director, Asset Management

Mr Tony Hepworth, Natural Resource Management Facilitator

Mr Paul Kimble, Environmental Audit Officer

Tuesday, 28 February 2006 – Canberra

Grains Research and Development Corporation

Mr Gregory Fraser, Executive Manager, Practices

Dr Martin Blumenthal, Manager, Agronomy, Soil and Environment

Arts, Heritage and Environment, Chief Minister's Department, ACT

Dr Maxine Cooper, Executive Director

Mr John Foster, Senior Policy Officer

Greening Australia

Mr Carl Binning, Chief Executive Officer

Mr Bruno Yvanovich, Business Development Manager

Australian Conservation Foundation

Mr Corey Watts, Acting Manager, Land and Water Program

Department of the Environment and Heritage and Department of Agriculture, Fisheries and Forestry

Mr Malcolm Forbes, First Assistant Secretary, Australian Government Natural Resource Management Program Division, Department of the Environment and Heritage

Mr David Calvert, Acting General Manager, Australian Government Natural Resource Management Team, Department of Agriculture, Fisheries and Forestry

Mr Tom Aldred, Executive Manager, Natural Resource Management, Department of Agriculture, Fisheries and Forestry

Dr Mirko Stauffacher, Science Communications Adviser, Department of Agriculture, Fisheries and Forestry

Appendix 3

Tabled Documents and Additional Information

Tabled Documents

Salinity Mapping Methods in the Australian Context, Brian Spies and Peter Woodgate, tabled by Mr Malcolm Forbes, Department of Environment and Heritage, 6 September 2005

Salinity Mapping Methods in the Australian Context, Brian Spies and Peter Woodgate, tabled by Mr Malcolm Forbes, Department of Environment and Heritage, 6 September 2005 - CD of book and user guide

Salinity Mapping Methods in the Australian Context, Brian Spies and Peter Woodgate, tabled by Mr Malcolm Forbes, Department of Environment and Heritage, 6 September 2005 – user guide

NAP and NHT2 Regional Approved Projects, Totals by State and Year tabled by Mr Malcolm Forbes, Department of Environment and Heritage, 6 September 2005

Copy of Joint Media Release on Salinity mapping made easy by Senator Ian Campbell, Australian Minister for the Environment and Heritage and Mr Peter McGauran, Australian Minister for Agriculture, Fisheries and Forestry tabled by Mr Malcolm Forbes, Department of Environment and Heritage, 6 September 2005

Natural Resource Management Research & Development Report 2005, prepared by Joint RDCs NRM Working Group, tabled by Mr Andrew Campbell, Land & Water Australia, 6 September 2005

Rural R&D Corporations generating Natural Resource Management Benefits, tabled by Mr Andrew Campbell, Land & Water Australia, 6 September 2005

The Namoi Catchment - Time for Action, tabled by Mr George Truman, Namoi Catchment Management Authority, 14 October 2005

Three Year Investment Strategy 2004 – 2007, tabled by Mr George Truman, Namoi Catchment Management Authority, 14 October 2005

Booklets on Costs of Urban Salinity, Salinity Indicator Plants, Introduction to Urban Salinity, Roads and Salinity, Groundwater Basics for Understanding Urban Salinity, Waterwise Parks and Gardens, Broad Scale Resources for Urban Salinity Assessment, Building in a Saline Environment, Site Investigations for Urban Salinity, Indicators of Urban Salinity and Land Use Planning and Urban Salinity, tabled by the NSW Department of Natural Resources, 14 October 2005

Native Vegetation Reform Implementation Group – Final Report, tabled by NSW Department of Natural Resources, 14 October 2005

Catchment Management Authorities – Local people working with their communities to protect and restore catchments in NSW, tabled by NSW Department of Natural Resources, 14 October 2005

A new approach to natural resource management, tabled by NSW Department of Natural Resources, 14 October 2005

Figure of Water for Australia Plan, tabled by Mr Robin Gaskell, Water for Australia, 14 October 2005

Information in Support of submission from Hunter-Central Rivers Catchment Management Authority, tabled by Ms Sharon Vernon, Hunter-Central Rivers Catchment Management Authority, 14 October 2005

Package of: CD of Urban Salt 2005 Conference, 8 & 9 February 2005, Proceedings and Resources; CD of Western Sydney Regional State of the Environment Report 2000; pamphlet on Urban Salinity in Western Sydney; Good Housekeeping to Manage Urban Salinity for residents in Western Sydney; Greater Western Sydney Regional Planning & Management Framework; Building in Sale Environments, Fairfield City Council December 2004; WSROC – Advocating for the people of Western Sydney; Salinity Potential in Western Sydney – Map and Guidelines; WSROC News; Delegate Workbook, Urban Salt 2005 Conference; Broad Scale Resources for Urban Salinity Assessment and Costs of Urban Salinity, tabled by Sharon Fingland, WSROC, 14 October 2005

Photographs of Upper South East Drains, SA, tabled by Mr Frank Burden, 16 November 2005

Avon Investment Plan 2005-2006, tabled by Mr Peter Sullivan, Avon Catchment Council, 18 November 2005

Avon Natural Resource Management Strategy, tabled by Mr Peter Sullivan, Avon Catchment Council, 18 November 2005

Natural Resource Management Core Business for Local Government 'A Framework for Success', tabled by Cr Clive Robartson, 18 November 2005

Environmental Case Studies, Western Australian Local Government Association, tabled by Cr Clive Robartson, 18 November 2005

Statement by Cr Clive Robartson, Western Australian Local Government Association, tabled by Cr Clive Robartson, 18 November 2005

Yarra Yarra Project Plan for 12,000 Hectare Sub Catchment – On ground works – tabled by Western Australian Local Government Association, 18 November 2005

An Investment Plan for Natural Resource Management in the Northern Agricultural Region, tabled by Mr Alan Bradley, Northern Agricultural Catchments Council

Natural Resource Management Strategy for the Northern Agricultural Region - A Summary, tabled by Mr Alan Bradley, Northern Agricultural Catchments Council, 18 November 2005

'Naturally', Northern Agricultural Catchments Council newsletter, tabled by Mr Alan Bradley, Northern Agricultural Catchments Council, 18 November 2005

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Appendix 4

House of Representatives Report on Science Overcoming Salinity – Recommendations

2 - The nation's programs to combat salinity

Recommendation 1

The Committee recommends that mechanisms be developed to ensure that validated salinity research findings are considered in regional planning processes, and specifically that Australian Government agencies in cooperation with state and territory governments:

(a) develop systems to ensure that the best science is made available to state government agencies, catchment management organisations (CMOs) and land managers on an on-going basis;

(b) provide CMOs and land managers with adequate support and resources to use and incorporate science into their regional plans, investment strategies and on-ground works; and

(c) provide guidelines for CMOs and land managers, making them aware of pertinent salinity research findings, detailing their implications for the broad types of investments that may be undertaken, and enforcing the guidelines through the accreditation process for regional plans.

For implementation, this recommendation should be read in conjunction with recommendations 3 and 15.

4 - The salinity science base

Recommendation 2

(a) The Committee recommends that the Australian Government, in cooperation with state agencies, conduct an audit of the totality of salinity research and development activities undertaken by all agencies and programs in which the Australian Government invests, including:

(i) national programs that address salinity, such as the *National Action Plan for Salinity and Water Quality* and *Natural Heritage Trust*;

(ii) programs such as the *National Dryland Salinity Program* and National Land and Water Resources Audit;
(iii) agencies within Australian Government departments, including the Bureau of Rural Sciences;
(iv) Cooperative Research Centres;
(v) Research and Development Corporations;
(vi) national science agencies, including the Commonwealth Scientific and Industrial Research Organisation;
(vii) universities; and
(viii) where possible, the private sector.

(b) The Committee further recommends that the audit:
(i) map the state of salinity research findings and the tools currently available for salinity management;
(ii) identify all critical research gaps;
(iii) suggest directions for future salinity research and development activities; and
(iv) identify steps that might be taken to bring greater coherence to salinity research efforts across all Australian Government funded agencies and programs, and to improve coordination with state and regional research activities.

5 - The coordination of salinity research

Recommendation 3

The Committee recommends that the Australian Government ensure the continuation of the *National Dryland Salinity Program* (NDSP) as a matter of urgency, and that:

(a) the role of the NDSP be expanded to address irrigation and urban salinity, with the Program renamed the *National Salinity Program* (NSP) or similar;

(b) the NSP be managed within Land and Water Australia (LWA);

(c) the NSP adopt research, coordination and communication strategies that assist the regional delivery of natural resource management programs and the requirements of the *National Action Plan for Salinity and Water Quality* specifically;

(d) the functions of the NSP have regard for those identified in this report;

(e) the NSP/LWA be adequately resourced to perform its functions by the Australian and state governments;

(f) relevant Research and Development Corporations, Cooperative Research Centres, national science agencies, universities, state agencies and the private sector be strongly encouraged to partner the NSP; and

(g) there be a continuing role for an Operations Committee, or equivalent, in providing independent scientific advice with that advice coming from a broad cross-section of scientific personnel from both the government and non-government sectors.

This recommendation should be read in conjunction with recommendations 1 and 15.

6 - The adequacy of the science base, research needs and funding

Recommendation 4

The Committee recommends that the Australian Government give greater emphasis through its investments in salinity science to develop new, economically viable land and water use systems.

Recommendation 5

The Committee recommends that the Australian Government encourage catchment management organisations to introduce industry development planning into their natural resource management planning and funding prioritisation process.

Recommendation 6

The Committee recommends that the Australian Government emphasise, though its investments in salinity science, the development of technologies to address urban salinity, including:

(a) salinity assessment and risk evaluation methods; and

(b) options for treatment and management.

Recommendation 7

The Committee recommends that the Australian Government:

(a) foster greater cooperation amongst scientists addressing salinity and, specifically, sponsor an annual multidisciplinary salinity conference, research showcase or science roundtable; and

(b) examine ways to foster interdisciplinary research in natural resource management more generally.

Recommendation 8

(a) The Committee recommends that the Australian and state governments make provision within the *National Action Plan for Salinity and Water Quality* for the establishment of a salinity research and development fund, to finance research that:

(i) is of national or statewide significance, and beyond the scope of individual catchment management organisations (CMOs);
(ii) pertains to the development of new technologies and industries for salinity management; and
(iii) is otherwise of a long-term, strategic or generic nature.

(b) The Committee further recommends that the allocation of the pooled research funds:

(i) be as agreed between the Australian and state governments, but that CMOs be consulted for research needs; and
(ii) have regard for the research priorities identified in this report.

Recommendation 9

The Committee recommends that the Australian Government encourage Research and Development Corporations to:

(a) invest more substantially in research for sustainable land use systems and in the development of new salinity technologies; and

(b) conduct projects that forge links across commodities in farming systems.

Recommendation 10

The Committee recommends that, in cooperation with the states, the Australian Government:

(a) identify and remove impediments for catchment management organisations (CMOs) to undertake or commission research, and encourage CMOs to support research activity as part of their investment strategies;

(b) provide incentives for greater collaboration between CMOs to support research of cross-catchment benefit; and

(c) provide an appropriate degree of support to evaluate tenders and contracts let at the regional level.

Recommendation 11

The Committee recommends that the Australian Government examine ways to encourage private sector investment in research and development for commercial measures to arrest salinity and other forms of natural resource degradation.

Recommendation 12

The Committee recommends that the Australian Government, in cooperation with state governments, encourage development of industry capacity in salinity research and development, by adopting measures that include:

(a) ensuring tender specifications provide genuine opportunities for industry to compete for public research funds, particularly for small to medium sized enterprises at the regional level; and

(b) ensuring tendering processes are transparent, so that industry can compete effectively against publicly funded organisations.

7 - Data management and mapping technologies

Recommendation 13

The Committee recommends that the Australian and state government agencies holding natural resource management datasets, accelerate the development of data collection, management and retrieval systems that are standardised, integrated and accessible.

Recommendation 14

The Committee recommends that ANZLIC – the Spatial Information Council, in collaboration with the National Land and Water Resources Audit, be

resourced to support managers of regional projects to develop and implement best practice data management policies. Emphasis should be placed on developing:

(a) consistent data collection, management and retrieval systems;
(b) mechanisms to encourage data sharing between catchment management organisations, research institutions, industry bodies and government agencies; and
(c) quality assurance processes to ensure standards are attained.

8 - Support for implementers: extending the science

Recommendation 15

The Committee recommends that the Australian Government in cooperation with the states and territories build on existing initiatives to establish a database of interpretive material, scientific research and data, related to salinity and its management. The three levels of the database should be:

(a) a ready reference salinity component, containing concise, integrated, accurate, and easy to understand information to assist land managers, particular farmers, catchment management organisation staff and natural resource management extension officers;

(b) links to salinity related research papers, endorsed by the *National Dryland Salinity Program* or its successor body;

(c) a meta-data component identifying the location of available salinity data and, where possible, the capacity for a storage and retrieval system for salinity related data particularly that collected for the *National Action Plan for Salinity and WaterQuality*.

For implementation, this recommendation should be read in conjunction with recommendations 1 and 3.

Recommendation 16

The Committee urges relevant Australian, state and territory government agencies and industry groups to enhance their support for face-to-face extension services by ensuring that there are adequate numbers of qualified extension staff available to assist land managers, particularly farmers.

Recommendation 17

The Committee recommends that the Australian Government, in partnership with the relevant state agencies, compile and publish a state by state manual of viable salinity management options, to assist extension staff and land managers. This manual should be updated regularly, and survey current best practice approaches to salinity management. It should also be available free of charge in both hard copy and on the internet to extension staff and land managers dealing with salinity problems.

Recommendation 18

The Committee recommends that the relevant Australian Government agencies in consultation with state and territory governments review the issue of diminishing state extension services, with a particular focus on:

(a) the employment conditions of extension staff;

(b) the potential career pathways of extension staff; and

(c) the adequacy of the training provided for extension staff to ensure their knowledge of technical, scientific and policy issues, relating to natural resource management and in particular salinity, is both current and comprehensive.

Recommendation 19

The Committee recommends that the Australian Government, in cooperation with the states, undertake an audit of the national, state and regional extension services available for salinity management, and natural resource management more generally.

Recommendation 20

The Committee recommends that the Australian Government review the effectiveness of the *National Landcare Program's* state and regional natural resource management facilitators, with a particular focus on ensuring that:

(a) their roles and responsibilities are delineated clearly to avoid duplication with other extension services and are consistent with other national programs designed to address salinity issues; and

(b) they receive the training and access to current information, necessary to perform their duties.

Recommendation 21

The Committee recommends that the extension services provided by the Australian Government, and participating states and territories, through the *National Action Plan for Salinity and Water Quality* and the *Natural Heritage Trust* be reviewed in due course, with a particular focus on:

(a) the employment conditions of extension staff;

(b) the potential career pathways of extension staff; and

(c) the adequacy of the training provided for extension staff to ensure their knowledge of technical, scientific and policy issues, relating to natural resource management and in particular salinity, is both current and comprehensive.

Recommendation 22

The Committee recommends that the Australian, state and territory governments increase their support of catchment management organisations by:

(a) undertaking a review to assess the effectiveness of providing groups of mobile knowledge brokers, directed to advise on national natural resource management policies and provide integrated, current and relevant scientific and technical support on salinity issues to individuals and organisations managing salinity;

(b) providing funding for the operations of any such groups as are recommended to be formed;

(c) enabling the secondment of such knowledge brokers from relevant research agencies, such as the *National Dryland Salinity Program*, the Cooperative Research Centre for Plant- Based Management of Dryland Salinity and the Commonwealth Scientific and Industrial Research Organisation's Land and Water Division.

Recommendation 23

The Committee recommends that the Australian Government support the establishment of a national annual forum on salinity policy, research and management, associated with the *National Action Plan for Salinity and Water Quality*, for government agency staff, catchment management organisations, private consultants, farmers, and other land managers.

Recommendation 24

The Committee recommends the Australian Government:

(a) examine and remove any impediments to the further development of an industry in technical and support services for environmental management; and

(b) establish and coordinate, with the cooperation of the states and territories, a national accreditation process for private sector salinity advisors to ensure that salinity advice and implementation services meet best practice standards.