



**Australian Government**

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**Department of Agriculture,  
Fisheries and Forestry**

**Submission to the Senate Rural and Regional Affairs  
and Transport Committee Inquiry into the  
Impact on Rural Water Usage of Recent Policy  
Initiatives.**

**December 2005**

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# 1 - Introduction

Australia is the world's second driest continent, after Antarctica, and 75 percent of its land is arid, including 40 percent which is desert. Australia's annual water use is 24,000GL (Sydney Harbour holds 500GL) and 16,800 GL is used for irrigation. Approximately 70% of water is used in irrigated agriculture, 21% for urban and industrial uses and around 9 % for other uses such as stock and domestic needs.

Water is important to Australia's economy and has a major impact on agriculture. For example, irrigated agriculture uses 0.5% of agricultural land in Australia and it accounts for 25% of the gross value of agriculture. Agriculture accounts for 22%<sup>1</sup> of total exports (\$33.6 billion), although in 2003-04 just 4% of GDP. Products derived from irrigation, such as dairy, wine and fruit, attract investment in value-adding infrastructure, providing jobs and wealth for rural communities.

Cities and towns also depend on water supply from surface and groundwater resources. In most instances water supply for urban areas is sourced from supplies also providing water for agriculture. Increasing demand from small and large urban centres will impact on the water that is available for rural Australia.

Increased knowledge of climate variability, climate change, the role and importance of environmental flows and the recent large scale drought have all meant that the national awareness of water related issues is high. Water restrictions in large metropolitan areas have meant that more Australians are aware of the limitations to Australia's water resources. Effective management of our water resources is therefore vital to ensure that the demands from urban and rural water users and the environment are balanced to ensure the sustainability of our rivers and protect our future water supplies. Recent policy initiatives, such as the National Water Initiative (NWI), demonstrate Australian Government leadership in driving forward reform in water resource management.

This shift in the role of the Australian Government is described in further detail in Section 2 of this submission, along with an outline of the role of the Department of Agriculture, Fisheries and Forestry (the Department) in water resources management. Section 3 of the submission describes recent policy initiatives and how they are impacting, or will impact on rural water usage and how these relate to the Terms of Reference for the Inquiry. Section 4 then describes some projects and tools that aid the Department in water resources management and future policy development.

The Terms of Reference for the Inquiry are stated below:

The impact on rural water usage of recent water policy initiatives and the possible role for Commonwealth agencies, with particular reference to:

- a. the development of water property titles;
- b. methods of protection for rivers and aquifers;
- c. farming innovation;
- d. monitoring drought and predicting farm water demand; and
- e. the implications for agriculture of predicted changes in patterns of precipitation and temperature.

## **2 - Role of the Australian Government and the Department in Water Resource Management**

Under Australia's system of government, the management of water and other natural resources is the responsibility of the state and territory governments. However, river basins, groundwater aquifers and biophysical regions are not restricted by state and territory boundaries. As a result, the Australian Government has a role in providing a national overview and leadership on water resource management.

In the past the Australian Government has made significant investments in the development of water resources and regional development through provision of financial assistance to the states for water resource infrastructure. This development led to a high utilisation of water resources for production over time, particularly in the Murray-Darling Basin.

However, since the 1980's there has been an increasing awareness of issues such as environmental health, sustainability, water availability and water quality issues.

Recognising these recent imperatives, the Australian Government has take a leadership role to facilitate the sustainable management of water resources by states and territories through initiatives developed by the Council of Australian Governments (COAG), the Natural Resource Management (NRM) Ministerial Council (made up of Australia's environment, natural resource and agriculture ministers) and the Murray-Darling Basin Ministerial Council (comprising environment, natural resource and agriculture ministers from New South Wales, Victoria, South Australia, Queensland, Australian Capital Territory and the Commonwealth).

Examples of recent water policy initiatives are the National Water Initiative which was agreed by COAG in June 2004 and the decision to invest \$500 million in measures to reduce the level of water overallocation and achieve specific environmental objectives in the Murray-Darling Basin Agreement. A description of these and other significant policy initiatives and their impact on rural water use is provided in Section 3 of this submission.

The Australian Government has also developed a \$2 billion Australian Government Water Fund to support the National Water Initiative. The Australian Government Water Fund will be invested in water infrastructure projects and better practices in the stewardship of Australia's water resources. This investment will complement ongoing investment through the \$1.4 billion National Action Plan for Salinity and Water Quality and the \$3 billion Natural Heritage Trust.

## ***The Australian Government Department of Agriculture, Fisheries and Forestry***

The Department of Agriculture, Fisheries and Forestry (the Department) is responsible for natural resource management and water issues within the Australian Government. The role of the Department is to help the Government to achieve its policy objectives and administer legislation and programmes in these areas. The Department's responsibilities include activities which enhance the natural resource base on which portfolio industries rely. In particular:

*To advance the sustainable use and management of Australia's natural resources – land, water, fisheries and forestry – and security of access to them by providing high quality and timely policy advice and services, by delivering effective programmes and by consulting and working with stakeholders.*

The Department has the Australian Government lead on general water matters. It delivers core policies and programmes such as the Murray Darling Basin Initiative, National Landcare Programme and the Great Artesian Basin Sustainability Initiative. The Department also develops frameworks for sustainable agriculture, particularly in the context of management in drought and adapting to climate change. This is supported by research through the Bureau of Rural Science (BRS), the Australian Bureau of Agricultural and Resource Economics (ABARE), Land and Water Australia, and information provided by the National Land and Water Resources Audit and collaboration with other Departmental divisions.

Key areas of activity in natural resource management for the Department include:

- developing national policy frameworks, such as strategies and agreements, for achieving sustainable resource management and use;
- providing a suite of information products, tools and data bases to enhance the management of Australia's natural resources and to support Australian objectives in international climate change negotiations;
- ensuring portfolio and Commonwealth priorities and perspectives are taken into account in policies and strategies related to natural resources that are developed outside the portfolio both domestically and internationally;
- promoting and facilitating the adoption of sustainable natural resources management by administering programs; and
- developing initiatives to ensure reasonable and secure access to resources for resource based industries in particular forestry, fisheries and irrigated agriculture.

The Department takes a whole-of-government approach to developing policy on water resource management and works particularly closely with the following agencies.

- The Department of the Environment and Heritage (DEH) which provides the Australian Government lead on environment protection and conservation matters, including climate change. DEH provides the secretariat for the Environment Protection and Heritage Council (EPHC) and administers the Australian Government Water Fund (AGWF) Community Water Grants in conjunction with the Department. The Department also has joint responsibilities with DEH for managing the implementation of the Natural Heritage Trust (NHT) and the National Action Plan for Salinity and Water Quality (NAP).
- The Department of the Prime Minister and Cabinet (PM&C) which provides a whole of government water policy coordination and policy advice to the Prime Minister. It also provides the secretariat to the COAG and deals with the administrative matters in relation to the National Water Commission (NWC).
- The Department of Transport and Regional Development (DOTARS) to deliver reforms consistent with their responsibilities and through cooperative action.

The Department also works with state and territory governments through Natural Resource Management (NRM) Ministerial Council, the Primary Industries Ministerial Council and the Murray-Darling Basin (MDB) Ministerial Council processes.

The NRM Ministerial Council consists of the Australian/state/territory and New Zealand government ministers responsible for primary industries, natural resources, environment and water policy and is the peak government forum for consultation, coordination and, where appropriate, integration of action by governments on natural resource management issues.

The NRM Ministerial Council is supported by the NRM Standing Committee and associated sub-committees. Of particular relevance to this Inquiry is the National Water Initiative Committee, which is chaired by the Australian Government, with secretariat support provided by the Department. The NWI Committee is tasked with supporting the NRM Ministerial Council to deliver its NWI responsibilities.

The Minister for Agriculture, Fisheries and Forestry is the Chairman of the MDB Ministerial Council. The role of the MDB Ministerial Council is set out in the Murray-Darling Basin Agreement. The role includes considering and determining major policy issues concerning the effective planning and management for the equitable efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin. A key responsibility is overseeing implementation of the joint \$500 million investment to address overallocation and achieve environmental objectives in the Murray-Darling Basin.

The Department also works closely with research and development organisations such as CSIRO and Land and Water Australia (LWA). For example, LWA receives direct appropriation funding from the Australian Government of \$11 million for investment in broad public interest and

environmental issues. LWA also leverages further funding for individual programs from a range of organisations. Key programs addressing the sustainable management and use of water resources include:

- National Program for Sustainable Irrigation – aimed at enhancing the sustainability of irrigation; exploring future visions and values; informing public policy development;
- A range of other programs under the “Rivers Arena”;
- The Social and Institutional Research Program – specifically focused on the social, economic, commercial, legal, policy and institutional dimensions of natural resource management; and
- The ‘Redesigning Agriculture for Australian Landscapes Program’ – to design agricultural systems which ensure economic production and ecosystem and landscape function, by matching these systems to the unique biophysical characteristics of the Australian environment.

The Department and Australian Government is also involved in Cooperative Research Centres, generally known as CRCs, that bring together researchers from universities, CSIRO and other government laboratories, and private industry or public sector agencies, in long-term collaborative arrangements which support research and development and education activities that achieve real outcomes of national economic and social significance.

- The Australian Government has recently announced the establishment of a CRC for Irrigation Futures (CRCIF) which will address the sustainability of irrigated agriculture.
- The eWater CRC builds on the successes of two existing CRCs – Catchment Hydrology and Freshwater Ecology. This CRC will develop products that will allow both governments and private companies to deliver water of a higher quality, more efficiently and at vastly reduced costs. The CRC will take an integrated approach to water cycle management across urban and rural catchments, with a strong market orientation and commercial focus. The CRC will strive to be an international leader in the development, application and commercialisation of products for integrated water cycle management.
- The CRC for Waste Management and Pollution Control has a strong focus on waste water issues from waste treatment process design through to detection of contaminants and minimisation of waste in all stages of material production.
- The CRC for Water Quality and Treatment will provide an essential research and knowledge management capability to support the Australian water industry in its role of providing safe and aesthetically pleasing water supplies to Australian communities.
- The CRC for Rice Production and the CRC for Sustainable Sugar Production include a focus on improvements in soil and water management.

### **Australian Bureau of Agricultural and Resource Economics**

The Australian Bureau of Agricultural and Resource Economics (ABARE) is an agency within the Department. ABARE provides ongoing economic advice to the Department on a range of water policy issues relating to the



implementation of the National Water Initiative and its impacts on rural water users. ABARE plans to make a separate submission to the Committee covering ABARE's recent work in areas including the unbundling of water entitlements, approaches for minimising third-party effects of trade, methods for dealing with asset fixity and methods for managers to cost-effectively purchase flows for the environment. In addition to making research regularly available in the form of publications, ABARE also contributes regularly to briefings, presentations and meetings.

## **Bureau of Rural Sciences – Science for decision makers**

The Bureau of Rural Sciences (BRS) is a scientific agency within the Department. It provides scientific assessments, tools and advice to decision makers in the areas of agriculture, fisheries, forestry, natural resource management and social sciences.

At the interface between science and policy, BRS is an essential part of the Government's capacity for integrated evidence-based policy development and implementation. In the area of water research and policy BRS works closely with the Department, the National Water Commission, state agencies and catchment management authorities and other regional bodies in delivering the Australian Government objectives on sustainable water resources.

In the context of the terms of reference for this inquiry, BRS has made significant contributions to improving our understanding of the rural landscape, and in particular the utilisation of water within that landscape. Some key examples include the following.

### Monitoring and managing our natural resources

BRS is the authoritative source of information for national and regional monitoring and reporting on landuse, fisheries, forest and vegetation resources and the interaction of management practises. BRS has partnered with state government agencies and others to collaboratively produce major datasets for use at national, state and regional levels. BRS is currently working with state and territory agencies to facilitate nationally accessible datasets across a number of natural resource areas, including water.

### Innovative application of technology

BRS is at the forefront of salt mapping technology – an innovative multidisciplinary approach to assessing the hazard posed by salinity. This powerful technology is providing new insights into how salt is stored and moves through the landscape. It is a crucial input to land use planning and policy development and to identifying options for on-ground solutions.

Working with Meat and Livestock Australia (MLA), BRS has developed an innovative web-based tool to show accumulated rainfall, its effect on pasture growth potential and soil moisture across southern Australia. This information is linked to a national seasonal forecasting system to extend the present situation thirteen weeks into the future. This tool is being used by livestock producers to improve climate risk management.

### Providing advice to guide investment

BRS science has enabled effective targeting of the Commonwealth's investment in the Great Artesian Basin Sustainability Initiative. This initiative includes essential bore rehabilitation and drain replacement works in the Basin. BRS has compiled the evidence for recharge of this valuable resource and produces maps showing the recovery of aquifer pressure to provide a better understanding of the benefits of remediation on this resource.

### Plantations and water use

The National Water Initiative calls for the implementation of specific measures to address the potential for land use change activities to intercept significant volumes of water. Some jurisdictions are developing regulatory processes that may potentially require water licences for large scale plantation development. While the interaction between trees and water in catchments is complex, it is accepted that trees reduce catchment water yield in greater measure than other agricultural crops, particularly in high rainfall areas. Converting cleared agricultural land to plantations may reduce stream flow and the effect depends on the proportion of the catchment converted.

BRS produced a report for the Forest and Wood Products Research and Development Corporation in March 2004 titled ***Plantations and water use: a review*** (Keenan et al. (2004a)). The report provides a review of scientific literature relating to forest plantations' water use and reviews management options to reduce the impact of plantations on stream flow. It includes tables showing the catchment areas under different types of land cover in five significant plantation regions covering two thirds of Australia's plantations.

Key points from the review are summarised in a second publication - a *Science for Decision Makers Brief* titled ***Plantations and Water*** produced by BRS in June 2004 (Keenan et al. (2004b)). Spatial analysis by the BRS shows that in the major plantation regions, plantations cover between one and six per cent of catchments. Changes to other land uses that dominate the catchment need to be considered as well as plantations when determining the overall effects on streamflow. One of the key findings of the report was that properly planned and managed, plantation development can contribute to more sustainable land use in rural areas by providing substantial environmental, social and economic benefits with little impact on overall water availability for other users.

Further examples of current BRS work addressing national water priorities, relevant to this inquiry are included later in this submission. These reports and more information on the range of work undertaken by BRS can be found on the web site at <http://www.brs.gov.au>

### **3 - Policy Initiatives and Impact on Rural Water Use**

The Department has a major role in implementing Australian Government responsibilities for a range of significant policy initiatives that impact on water resource management and use. This section briefly outlines the role of the Department in these initiatives and discusses their impact on rural water use.

#### ***The National Water Initiative***

In 1994, the Council of Australian Governments (COAG) developed a national policy for the efficient and sustainable reform of Australia's rural and urban water industries. Governments called this the *COAG Framework for the Strategic Reform of the Water Industry*, or simply the COAG Water Reform Framework. The COAG Water Reform Framework recognised the unique characteristics of water resources and their important contribution to the economic, social and environmental life of Australia. The reforms aimed to ensure that water resources are used sustainably in the long-term.

As state and territory governments are responsible for the management of natural resources under the Australian Constitution, the responsibility for implementing the COAG Water Reform Framework lay with them. However, COAG recognised the importance of a consistent approach to water reform throughout Australia and as such the Australian Government took on a role of national leadership, facilitation and coordination in water resource management issues.

While substantial progress was made in implementing the COAG Water Reform Framework, it became clear that further action was still needed. In June 2004, COAG (with the exception of Tasmania and Western Australia) continued its commitment to reform by agreeing to an *Intergovernmental Agreement on a National Water Initiative* (the National Water Initiative). Tasmania signed on to the National Water Initiative on 2 June 2005.

The National Water Initiative is a comprehensive water reform strategy driven by the Australian Government. It sets the water policy agenda for the next ten years and beyond. It builds on the COAG 1994 water reform agenda and sets out actions to increase the productivity and efficiency of water use, sustain rural and urban communities, and ensure the health of river and groundwater systems. A full copy of the *Intergovernmental Agreement for a National Water Initiative* is at [www.coag.gov.au](http://www.coag.gov.au).

A key commitment under the National Water Initiative was the establishment of a National Water Commission (NWC) as an independent statutory body under the *National Water Commission Act 2004*. The Commission will help drive the national reform agenda by assisting to effectively implement the National Water Initiative and by providing advice to COAG and the Australian Government on national water issues. It will also undertake the 2005 National

Competition Policy assessment and a baseline assessment of water resources and governance arrangements.

The Commission will undertake biennial assessments of progress with the National Water Initiative including state and territory implementation plans. The third biennial assessment in 2010-2011 will involve a review of the National Water Initiative against a set of performance indicators developed by the Natural Resource Management (NRM) Ministerial Council.

The NRM Ministerial Council is tasked with overseeing implementation of the National Water Initiative and addressing ongoing implementation issues as they arise. This role is to be undertaken in consultation with other Ministerial Councils as necessary and with reference to advice from COAG. In line with the overseeing role, the NRM Ministerial Council will provide annual reports to COAG on progress with the actions being taken by jurisdictions in implementing the National Water Initiative.

The NRM Ministerial Council has developed a work plan to guide its role in overseeing the National Water Initiative. The work plan identifies those actions that will be implemented by the relevant state and territory governments and those that require national consistency or compatibility and will therefore be implemented jointly. The Australian Government will be actively involved in helping deliver those activities that require joint implementation.

The Department provides the Chair and secretariat support for a multi-jurisdictional National Water Initiative Committee that has been established to assist the NRM Ministerial Council to deliver its National Water Initiative responsibilities. The Committee is made up of senior government nominees from each jurisdiction that is signatory to the NWI, along with up to two representatives from each of the Environment Protection and Heritage Standing Committee and the Primary Industries Standing Committee. The Committee includes representatives from the National Water Commission. Western Australia is able to participate as an observer.

The specific actions which are assigned to the Australian Government in the National Water Initiative, or in which the Australian Government may play a part, will be set out in the Australian Government Implementation Plan for the National Water Initiative. The Australian Government Implementation Plan is currently being finalised for further consideration by the National Water Commission.

#### Australian Government Water Fund

To support the National Water Initiative, the Australian Government has established the \$2 billion Australian Government Water Fund to be invested in water infrastructure and improved management and understanding of Australia's scarce water resources.

State and territory governments that are implementing the National Water Initiative are eligible for assistance under the Australian Government Water Fund. Local businesses, local governments and communities can also seek assistance.

The National Water Commission has responsibility for administering the \$1.6 billion Water Smart Australia and \$200 million Raising National Water Standards Programmes of the Australian Government Water Fund.

The Department of Environment and Heritage (DEH), together with the Department of Agriculture Fisheries & Forestry, has responsibility for administering the \$200 million Community Water Grants.

The Community Water Grants funding over five years to help communities make a real difference to the way water is used. Under the Programme, grants of up to \$50 000 will be provided to eligible community organisations to encourage wise water use and reduce demand pressures on surface and groundwater systems. In some instances the grants can be combined to provide larger grants to community based non-government organisations.

The specific aims of the Community Water Grants are to:

- promote a culture of wise water use through community engagement and awareness about saving and conserving water;
- encourage best practice measures and demonstrate water wise solutions adapted to tackle local needs and problems; and
- provide the support and means for community groups to undertake on-ground projects under the three areas of activity: water savings-efficiency, water reuse-recycling and surface and groundwater health such as protecting or enhancing the health of rivers, wetlands and groundwater resources.

### **Impact on Rural Water Use**

When implemented, the National Water Initiative is expected to deliver substantial benefits for rural and urban water users and the environment. Some of the key outcomes from the National Water Initiative will be:

1. more confidence for those investing in the water industry as a result of secure water access entitlements and transparent and comprehensive water planning arrangements;
2. environmental benefits and improved security of water access entitlements through addressing overallocation and allocating water for environmental needs;
3. more profitable and efficient use of water through the expansion of water trading across and between districts and states (where water systems are physically shared); and
4. more efficient use of water in our cities, including better use of stormwater and recycled water.

The National Water Initiative will help clarify or address each of the issues that are included in the terms of reference for this Inquiry. A brief discussion of the actions relevant to the terms of reference is provided below.

### The Development of Water Property Titles

The National Water Initiative requires water access entitlements to be clearly specified so that water users have the confidence to make investment decisions. The consumptive use of water will generally require a water access entitlement. The water access entitlement should be separate from land and be described as a perpetual or open-ended share of the consumptive portion of a water resource. A share-based approach means that water users are entitled to receive a proportion of the water that is available for consumptive use in the system at any particular time. The perpetual nature of the entitlement will give water users the confidence that their entitlement cannot be removed unilaterally.

Clear definitions for water access entitlements will be complemented by more transparent and comprehensive water planning arrangements as well as a clear assignment of risk of changes in water availability. Robust water accounting systems and reliable registers of water entitlements under the National Water Initiative will provide greater certainty for all water users. Together, these actions will ensure confidence in the water planning framework and the certainty of water access entitlements.

### Methods of Protection for Rivers and Aquifers

A sustainable water industry needs healthy surface and groundwater systems. To meet this need, the National Water Initiative requires governments to specify the environmental outcomes for surface and groundwater systems and to provide water to deliver those outcomes. Environmental water must be given statutory recognition and at least the same degree of certainty as consumptive water. Water planning must provide for secure ecological outcomes by describing the environmental benefit outcomes for water systems and defining the appropriate water management arrangements to achieve those outcomes. The National Water Initiative will also establish effective and efficient management and institutional arrangements that will ensure that high conservation value rivers, reaches and groundwater areas are sustained.

Overallocation of water is a threat to the environment and to the security of water access entitlements. The National Water Initiative requires substantial progress to be made towards addressing overallocation and/or overuse in water systems by 2010. Significant adjustment issues may arise for water users as a result of addressing overallocation. The National Water Initiative makes provision to address these adjustment issues.

In addition to specification of environmental outcomes and addressing overallocation, the National Water Initiative puts in place institutional arrangements such as water accounting and national water reporting to ensure that there is transparency in the way that water is being used and managed.

## Farming Innovation

The National Water Initiative will encourage farming innovation and adoption of new technologies in a number of ways. Most importantly, the Initiative will result in an environment which gives water users the confidence to invest in new technologies. As outlined above, this will be achieved through secure water access entitlements, transparent and comprehensive water planning and addressing overallocation of water resources. To support the enhanced environment for investment will be better water accounting and metering, which will improve our knowledge about water usage and areas for water savings. In addition, the National Water Initiative will result in a water market where water users are able to trade water relatively quickly, resulting in more efficient and profitable and efficient use of water.

The Australian Government will also be supporting farming innovation through the Australian Government Water Fund. The Raising National Water Standards programme under the Australian Government Water Fund, is administered by the NWC, and will invest \$200 million over six years to lift Australia's national capacity to measure, monitor and manage its water resources. Examples of areas of activity to which investment will be directed under the Raising National Water Standards Programme include:

- facilitating a nationally-consistent system for water data;
- developing and implementing necessary framework for good water management;
- strategic assessment of groundwater resources;
- working with local communities to improve conservation of water systems;
- facilitating more harmonised national approaches to water management;
- improving the quality of public information about water; and
- implementation of the Smart Water Mark regime for household gardens.

The Water Smart Australia programme, also part of the Australian Government Water Fund, and administered by the NWC is targeted at large-scale projects that will make a significant contribution to the sustainable and efficient management of Australia's water resources. Projects are expected to encourage innovation in water management leading to substantial improvements in areas such as:

- water resource management
- water supply and delivery
- efficiency of water use
- water for the environment, or
- water quality and the general health of water systems.

Projects that are eligible for funding under the Program include those that will:

- improve river flows for better environmental outcomes
- return groundwater aquifers to sustainable levels
- lead to water savings through improvements in irrigation infrastructure
- encourage or advance efficiency improvements in on-farm water use
- desalinate water for use in cities and towns
- recycle and reuse stormwater, 'grey' water and waste water from sewage

- provide more efficient storage facilities, such as underground aquifers
- provide alternatives to ocean outfalls and the better management of sewage in our coastal cities, or
- develop water efficient housing design.

#### Monitoring Drought and Predicting Farm Water Demand

The National Water Initiative will enhance our capacity to monitor water availability in a number of ways. Accounting systems will be benchmarked, with the information from that process used to develop national standards for water accounting, reporting and metering. Accounting for water in a transparent and compatible way across jurisdictions will allow improvements in hydrological monitoring of water resources and improved decision making by governments and water users. Water information will also be supplemented by a 'baseline assessment' of water resources to be conducted by the National Water Commission. Further information on programmes to address issues impacting future water use and management in Australia, such as Water 2010, is provided in Section 4.

The National Water Initiative also establishes a framework for assigning the risks of future reductions in water availability. The framework differentiates between reductions arising from natural events such as climate change, drought or bushfire (where the risks are to be borne by water users) and reductions arising from bone fide improvements in knowledge about water system's capacity to sustain particular levels of extraction. In this latter case, the reduction is borne by water users up to 2014, after which a sharing arrangement between water users and the relevant state/territory government and Australian Government would apply. In addition, there is provision for a different risk assignment to be developed between relevant state and territory governments and key stakeholders.

Adjusting to changing water availability will also be enhanced by the expansion of permanent water trade, bringing about more profitable and efficient use of water.

As detailed above, the Raising National Water Standards programme under the Australian Government Water Fund will invest \$200 million over six years to lift Australia's national capacity to measure, monitor and manage its water resources.

#### ***The Living Murray Initiative***

Addressing the health of the River Murray system is fundamental to the purpose of the *Murray-Darling Basin Agreement 1992* (MDB Agreement) between the Australian Government and New South Wales (NSW), Victorian, South Australian, Queensland and the Australian Capital Territory (ACT) governments. The purpose of the MDB Agreement is to promote and co-ordinate effective planning and management for the equitable, efficient and sustainable use of the water, land and other environmental resources of the Murray-Darling Basin.



In November 2003 the Murray-Darling Basin (MDB) Ministerial Council established the Living Murray Initiative in response to substantial evidence that the health of the River Murray system was in decline and threatened the Basin's industries, communities and natural and cultural values.

The Living Murray Initiative seeks to implement the objectives of the *Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray-Darling Basin* (Basin Intergovernmental Agreement) which was agreed to by Southern Murray-Darling Basin jurisdictions in June 2004. The parties to the Basin Intergovernmental Agreement agree to implement it consistent with the National Water Initiative.

The Minister for Agriculture, Fisheries and Forestry, the Minister for the Environment and Heritage and the Minister for Fisheries, Forestry and Conservation have joint responsibility for the Living Murray Initiative as Australian Government members on the MDB Ministerial Council.

There are two roles for the Australian Government in implementing the Living Murray Initiative. The first is as a participant in the joint oversighting of the programme through the MDB Ministerial Council. The second is as an investor in water recovery proposals.

The Australian Government is investing \$200 million towards a total \$500 million commitment under the Living Murray Initiative to address water overallocation in the Murray-Darling Basin and achieve specific environmental outcomes for six significant ecological assets along the River Murray. The six assets are the Barmah-Millewa Forest, Gunbower and Koondrook-Perricoota Forests, Hattah Lakes, Chowilla Floodplain (including Lindsay-Wallpolla), the Murray Mouth, Coorong and Lower Lakes, and the River Murray Channel.

The Living Murray Initiative investments will be over five years and will recover up to 500 gigalitres of water that will be available on average annually by the end of the programme.

In November 2004, the MDB Ministerial Council approved the Living Murray Business Plan (the Business Plan) which sets out the arrangements for water recovery and application to the significant ecological assets, including community consultation. The Business Plan was activated on 1 April 2005 following the recommitment of jurisdictions to the National Water Initiative. The Business Plan sets out how the actions and milestones of the Basin Intergovernmental Agreement are to be achieved, including agreed indicative volumetric water recovery targets and financial commitments for each jurisdiction.

Four water recovery proposals were also approved by the MDB Ministerial Council in November 2004 (two from Victoria and two from NSW). These proposals will potentially recover up to 240 gigalitres of water each year at a cost of approximately \$179 million. The Australian Government has indicated an interest in investing up to its maximum investment level of 40% of the costs of these projects, equating to potentially \$71.6 million, with \$42.7 million to be spent in Victoria and \$28.9 million in NSW.

The two proposals in Victoria will provide a total of 169 gigalitres in long-term cap equivalent water savings. The two proposals in NSW will recover 71 gigalitres of long-term diversion cap equivalent. The projects will encourage long-term sustainable agriculture, with the recovered water to be used to help provide environmental water for the ecological assets.

Further information on the Living Murray Initiative can be found at [www.thelivingmurray.mdbc.gov.au](http://www.thelivingmurray.mdbc.gov.au).

### **Impact on Rural Water Use**

The Living Murray Initiative will have positive outcomes for rural water users. Water recovered under the Living Murray Initiative will be used to address overallocation in the Murray-Darling Basin and to improve the health of the River Murray system. As outlined earlier in this submission, addressing overallocation is an important element of creating security in water access entitlements. In addition, improvement in the health of the River Murray system will contribute to a sustainable water industry in the Murray-Darling Basin.

The Australian Government's strong preference is that most of the water for the Living Murray Initiative will be recovered through projects that deliver more efficient water use, transport and storage. These projects include improvements to infrastructure or on-farm efficiencies. As a result, the direct impact on rural water use will therefore be relatively small as much of the water being recovered would otherwise be lost through processes such as evaporation and leakage.

It should also be noted that the Basin Intergovernmental Agreement (Clause 23) and the Business Plan (Paragraph 61-64) allow for market-based mechanisms, including the purchase of water. In September 2005 the MDB Ministerial Council agreed to explore the use of market-based measures to complement existing infrastructure projects. The Council directed the MDB Commission to develop options for Council to consider at its April 2006 meeting.

The Living Murray Initiative seeks to minimise social and economic impacts in the following ways.

- The Basin Intergovernmental Agreement states that water recovery measures under the Living Murray Initiative must take into account social and economic impacts, salinity and water quality outcomes, additional environmental benefits and third party impacts (Clause 33).
- The Business Plan further outlines social and environmental considerations for assessing potential water recovery measures. Social considerations include the impact on irrigators both directly involved and indirectly through the irrigation system, and also the impact on local, Basin-wide and Indigenous communities. Environmental considerations include salinity and water quality impacts and additional environmental benefits associated with a change to flow regimes (Paragraph 58 and in particular Annex C).

A number of community forums on the Living Murray Initiative have been held throughout the Murray-Darling Basin during mid-2005. A community leader's forum was held in Mildura to explain the Business Plan, followed by asset-based forums to explain both the Business Plan and Asset Environmental Management Plans. These forums were held in Renmark (Chowilla component of Chowilla Lindsay Wallpolla asset); Murray Bridge (Murray Mouth Coorong and Lower Lakes asset); and Moama (Barmah-Millewa Forest and Gunbower-Koondrook/Perricoota assets). The forums have generally been viewed as successful in providing a structured overview of the Living Murray Business Plan and the Asset Environmental Management Plans.

### Monitoring & Evaluation

The Australian Government recognises that accountability and transparency is required in the management of environmental water and investments to maintain the confidence of the Basin community and stakeholders.

- Clauses 78 – 82 of the Basin Intergovernmental Agreement and paragraphs 148 – 159 of the Business Plan outline the monitoring and audit requirements for the Living Murray Initiative.

The MDB Commission is developing a monitoring and evaluation plan for the Living Murray Initiative. The monitoring and evaluation plan will report on the environmental objectives identified in the *Asset Environmental Management Plans*, (one for each ecological asset and the *Environmental Watering Plan*) and will provide a consistent approach to monitoring and reporting across the six ecological assets.

The outcomes of monitoring and evaluation will inform the annual review of investments and water recovery targets and a review of the Basin Intergovernmental Agreement in 2007.

- In August each year jurisdictions will jointly report to the MDB Ministerial Council on progress in implementing the Basin Intergovernmental Agreement. The report will be prepared by the MDB Commission Office.
- An Independent Audit Group will audit each jurisdiction annually in relation to its Living Murray Initiative activities, commencing in 2005. Financial records will be subject to standard audit practice, with the audit report provided to the MDB Ministerial Council.

### ***The Joint Government Enterprise***

The Joint Government Enterprise, trading as *Water for Rivers*, is a ten year (2002-2012), \$375 million initiative of the Australian, Victorian, and New South Wales Governments. The Joint Government Enterprise is a commitment under the corporatisation of the Snowy Mountains Hydro-electric Authority in June 2002 and reflects the agreement of all three governments to deliver water for environmental flows in the Snowy River and the River Murray.

The broad mission of the Joint Government Enterprise is to recover water through investigating, facilitating, partnering, acquiring, funding or commissioning of water efficiency projects and water entitlement purchases, and through the commissioning of environmental and riverine works. The

location of water efficiency works is restricted to the Murrumbidgee River System, the Goulburn River System and diversions from the River Murray System. The water recovered is in addition to up to 500 gigalitres to be recovered under The Living Murray Initiative.

The Australian Government's contribution to the Joint Government Enterprise is \$75 million over 10 years towards obtaining up to 70 gigalitres of flows for the River Murray. New South Wales and Victoria are each contributing \$150 million over the same period towards obtaining environmental flows of up to 212 gigalitres for the Snowy River. The target volumes of water are to be achieved by the year 2012.

### **Impact on Rural Water Use**

The Joint Government Enterprise will secure most of its 282 gigalitres through projects which result in more efficient use of water. Impacts on rural water use will therefore be relatively minimal as much of the water being recovered would otherwise be lost through processes such as evaporation and leakage.

The use of water recovered by the Joint Government Enterprise will result in significant benefits to the environmental health of both the Snowy River and River Murray. The additional water for the Snowy River will be used to mimic seasonal natural flows, and will increase the average flows below Jindabyne from around 1% to 28% of the pre-regulation flows. The additional water for the River Murray will be utilised to enhance a range of significant ecological assets, as set out in The Living Murray Environmental Watering Plan.

### ***The National Action Plan for Salinity and Water Quality and the Natural Heritage Trust***

The Australian Government is making significant investments in natural resources, including water, through the National Action Plan for Salinity and Water Quality (NAP) and the National Heritage Trust (NHT). Investment under the NAP and NHT touches on all elements of the terms of reference for this Inquiry, as the case studies provided below will illustrate.

#### The National Action Plan for Salinity and Water Quality

The NAP was endorsed by the Council of Australian Governments on 3 November 2000. The Australian, state and territory governments agreed to jointly invest a total of \$1.4 billion in the programme through to 2007-08. Since that time all jurisdictions have signed an Intergovernmental Agreement and bilateral agreements developed and signed to provide details of implementation in each state and territory.

The specific goals of the NAP are to:

- 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; and
- improve water quality and secure reliable allocations for human uses, industry and the environment.

Under the NAP Intergovernmental Agreement, state and territory governments reconfirmed their commitment to particular elements of the 1994 COAG Water Reform Framework. For example, jurisdictions agreed to undertake the following reforms:

- put in place management arrangements to cap extractive use of water from all surface and groundwater systems that are over-allocated or approaching full allocation and a strategy and timetable for meeting the caps;
- outline the milestones for implementing the caps in the Bilateral Agreements;
- the catchment / regional plan is required to give effect to the strategy to meet these agreed caps, including an agreed timetable for implementation; and
- removal of impediments to the effective operation of trading markets in, and the integrated management of, both surface and groundwater systems.

The Australian Government has developed a Bilateral Agreement for the NAP with each jurisdiction. Case Study 1 provides one example of how rural water usage is being addressed in the Bilateral Agreement with Victoria. This example particularly addresses the issue of protection for rivers and aquifers.

## Case Study 1 – Water and the Victorian Bilateral Agreement

A core component of the Victorian Bilateral Agreement is improved water management. In accordance with Victoria's commitments under the 1994 COAG Water Reform agenda to implement caps for extractive use on all surface and groundwater systems that are over allocated, the Bilateral Agreement states that Victoria will undertake to:

- a) specify bulk water entitlements for the remaining NAP rivers;
- b) development of streamflow management plans on high priority un-regulated waterways in NAP investment regions;
- c) develop markets, particularly in upper catchment and groundwater areas;
- d) establish groundwater management plans in currently stressed aquifer systems;
- e) implement of regulation of farm dams; and
- f) improve environmental flow regimes in high priority rivers as part of the bulk entitlement and stream flow management plan processes.

Victoria has undertaken to progress the development of the proposed regional planning framework for river management and restoration. This process has led to the development and release of the Victorian Healthy Rivers Strategy and associated regional River Health Strategies.

Victoria will ensure that direct linkages are established between the accredited Regional Catchment Strategies and relevant waterway health, surface and ground water management plans so that all plans are mutually supportive of the sustainable management of water resources.

The National Action Plan has provided substantial funding towards farm innovation and adoption of water efficiency measures across the 21 priority regions. Case Study 2, in the Shepparton Irrigation Region, provides an example of investment in sustainable irrigation practices. The Shepparton Irrigation Region is a major user of Murray Darling Basin water resources.

## Case Study 2 - Sustainable Irrigation – Farm/ Environment project

Under the Sustainable Irrigation – Farm/ Environment project, incentives are provided to farmers within the Shepparton Irrigation Region , under appropriate cost sharing arrangements, to install water re-use systems on irrigated blocks and also to install automatic irrigation systems. These are important measures that result in finite water resources being used more efficiently by irrigators.

Using incentives provided through a Whole Farm Planning process, over 300 water re-use systems have now been installed under this programme, servicing over 21,000 hectares of irrigated land in the Shepparton Irrigation Region. The incentives represent around 50% of the cost of the works.

Similarly, 95 automatic irrigation systems have now been installed, servicing over 6,000 hectares of irrigated land in the Shepparton Irrigation Region. The incentives represent around 45% of the cost of works.

Since 2001, \$16m has been provided to the Shepparton Irrigation Region under the National Action Plan to progress the drainage, irrigation and river health programs in the sub catchment, including the water efficiency measures delivered through farmer incentives.

The National Action Plan has also provided funding for national or multi-jurisdictional activities such as the National Market Based Instruments Pilot Program. Case Study 3 provides some detail on the Program and how it is demonstrating that well-designed market-based instruments can deliver environmental outcomes lower costs, and with strong landholder engagement. The findings from this Program will contribute new knowledge on the range of tools that are available for protecting natural resources, including water resources.

### Case Study 3 - National Market Based Instruments Pilot Program

Market Based Instruments (MBIs) are mechanisms that harness market forces, particularly prices and quantities, to positively influence the behaviour of resource users to help achieve environmental outcomes. MBIs achieve this by either creating new markets or changing the way existing markets function. For instance, auction mechanisms can be used to purchase single or multiple environmental outcomes, thereby creating a new market. Similarly, taxes or subsidies can be used to affect the functioning of existing markets.

Many different MBIs are being trialled across Australia including auctions, tradable permits, offsets, leveraging and risk management mechanisms. As part of the National Action Plan for Salinity and Water Quality the National MBI Pilots Program has funded 11 pilots, many with a significant water focus. Some examples of research relating to water management include:

- Cap and trade: Exploring the potential to cap salinity recharge through voluntary contracts with land managers and allowing trading to help landholders reach a level of recharge that suits their situation (VIC DPI = \$133,000 and CSIRO Sustainable Ecosystems = \$344,649);
- Offsets: Improving water management by offsetting negative impacts in one area with positive actions in another (NSW EPA = \$400,000 and Central Queensland University = \$120,000); and
- Auctions: Contracts for better river catchment management by landholders to reduce salinity and better river bank management to improve water quality (VIC DPI = \$636,000, WWF = \$495,000 and Onkaparinga Catchment Water Management Board = \$185,000).

The results from Round One of the National MBI Pilots Program has demonstrated that well designed MBIs can deliver environmental outcomes at lower costs with strong landholder engagement in voluntary natural resource management activities. A second round of pilots will be funded to pursue further knowledge gaps and ground truth mechanisms explored under Round One of the Market Based Instruments Pilots Program.

### The Natural Heritage Trust

The NHT was established in 1996 with the Australian Government committing \$1.3 billion over five years to the programme. A further \$1.7 billion has been committed to the programme for investment through to 2007-08. The NHT has a broader coverage than the NAP and includes the protection and sustainable use of Australia's land, water and marine resources. The objectives of the NHT are increasing to include:

- 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; and
- 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.

The NHT utilises the regional delivery framework of the NAP to provide targeted investments to meet its objectives across 56 regions across Australia. Each region is required to develop a natural resource management



(NRM) Plan in consultation with its communities. The Plan is accredited against key criteria before investments are made against an investment strategy. 52 regions across Australia now have accredited Plans and investment strategies in place. Projects identified in investment strategies work towards shorter-term management action targets (1-5 years) and longer-term resource condition targets (10-15 years) that are applied to activities funded under the NAP and the NHT.

In addition to regional investments, the NHT also provides investments to address natural resource problems occurring at a state-wide and national level. For example, funding has been provided to the National Land and Water Resources Audit for baseline information to assess the effectiveness of land and water policies and programs.

The goals of the NAP and NHT are long-term. Resource condition changes will occur beyond the funding timelines of the programs. This is as a result of the slowly responding natural systems and the high climate variability of the Australian continent. The Australian National Audit Office Report Number 17 2004-05 on the NAP recognised the long lead times inherent in addressing resource condition changes in the Australian landscape. This report stated that the NAP monitoring and reporting framework is sound and provides the basis to measure progress against long term outcomes.

The Australian Government and state/territory governments are implementing strategic, national and coordinated approaches to the nation's environmental issues through the NAP and the NHT. The summary provided in Table 1 provides information on the progress of water issues addressed through the NAP and the regional component of the Trust to June 2005.

Table 1: Progress of water related issues addressed by the NAP and the Trust to June 2005

Standard Output	Total to date (as at 30 June 2005)		
	NAP	Trust	Joint NAP/NHT
<b>Water and the Environment</b>			
Length (km) of streambank enhanced or rehabilitated	120		
Length (km) of streambank revegetated	80	20,208	
Length (km) of streambank protected	1,771	2,644	62
Length (km) of stream bank or stream bed stabilised	6,799	606	127
Number of stream bank or stream bed structures installed	172	432	100
Length (km) of in-stream habitat established	95	134	20
Number of fish barriers addressed	4	728	24
Length (km) of stream opened up to fish passage	32	55	
Number of off-stream (alternative) watering sites installed	3,092	1436	396
Area (hectares) of wetland protected or enhanced	2,205	411,824	1,782
<b>Sustainable Farming</b>			
Area (hectares) of land using improved irrigation practices	29,340		45,432
Number of land managers using improved irrigation practices	1,684		
Volume (ML) of water saved by drainage diversion	13,052		1,088
Number of on-farms reuse systems	2,328		

## ***Adapting to Climate Change***

Strong scientific evidence indicates that agriculture and natural resource industries are vulnerable to the potential impacts of climate change, because of the integrated nature of agricultural systems, water resources and biodiversity which are heavily reliant on climate.

The key point is that there is uncertainty about how climate change will impact on agriculture, for example, it is unclear how the distribution of weeds, pest and diseases will be affected; how pasture growth and carrying capacity will change; or, how irrigated agriculture will be affected. The interaction of temperature, rainfall, wind and other aspects of the climate system is complex and there is much work needed to better understand the likely effects on our farming systems.

Improved risk management, including drought preparedness will become increasingly important for agricultural industries because of the high level of uncertainty in relation to how climate change will evolve and how it will impact on different industries in different regions. It is likely there will be winners and losers.

Individuals, businesses, industries and governments will need to consider the risk posed by climate change and develop appropriate responses. The Department of Agriculture, Fisheries and Forestry recognises that climate change is one risk in the scope of risks managed on a day to day basis and is focussing on programs that increase the resilience of the farming sector as part of a broader focus on risk management. For example, the Department's Policy Divisions actively manage programs addressing capacity building, research and information for industries that are exposed to climate change risks including in agricultural, natural resource management, forestry, plant and animal health, and trade.

### National Agricultural and Climate Change Action Plan

The Department is leading the development of a strategic document for release by the NRM Ministerial Council, "The National Agriculture and Climate Change Action Plan". This will complement the National Biodiversity and Climate Change Action Plan already in place, and provide an overarching national approach, to guide activities by the Government in managing agriculture, biodiversity and climate change. The implementation of the actions contained in these two plans will have a significant influence on managing Australia's rural water resources in the context of the uncertainties provided by a changing climate. In particular, it will relate to items c, d and e of the terms of reference of this inquiry.

In many of these activities we are working closely with the Australian Greenhouse Office of DEH. BRS are partners in the CRC for Greenhouse Accounting and we are actively working with the Agriculture sector in developing a risk management framework for adaptation to climate change that we call "Farming profitably in a changing climate".

## Managing Climate Variability Programme

The Department places a high priority in developing the capacity of farmers and resource managers to make informed decisions in managing the risks presented by climate change.

The Managing Climate Variability Programme (MCVP), which receives core funding from the Department through the Natural Heritage Trust, develops tools to assist farmers to better manage the risks and opportunities arising from climate variability. The development of timely and accurate analysis and practical advice on the scale and timing of climate events will increase management choices available to farmers, reduce the impact of poor decisions on the resource base and has the potential to significantly reduce the fluctuation in incomes and the cost of government income support programmes in future climate events.

A key objective of the MCVP investment by the government is to facilitate knowledge brokering/capacity building. Government's funding over 2005-07 will build on the research already undertaken through MCVP. It will particularly focus on improving existing climate science knowledge and tools, particularly in deriving learning from the recent drought. Awareness raising of climate risk management concepts and tools will also be a focus. Partnerships with a wide range of Research and Development organisations will ensure efficiencies in both research and development with a particular emphasis on delivering results to a wide range of stakeholders, including farming industries and natural resource managers.

## ***Drought Policy Reform***

Australian farmers are expected to prepare for and manage the impact climatic variability (including drought) as a part of their normal operations. It has been agreed, however, that the Australian Government and state and territory governments will assist producers during those once in a lifetime events that farmers could not reasonably be expected to prepare for and are beyond normal levels of risk management.

The current drought has been unprecedented in its geographic extent and severity, with many farmers enduring the worst drought in a century. Unlike previous droughts where the impact was mostly on broadacre agriculture, this drought has affected most forms of agriculture including those irrigated industries that have made significant investments to secure water entitlements.

Under the National Drought Policy, the responsibility rests with individual producers to prepare for drought and appropriately manage their resources, including water, during periods of climatic stress.

During the consultations undertaken by the Drought Review Panel over the summer of 2003/04, a number of stakeholders indicated that producers' ability to make adequate preparation for drought had been impeded by state and territory legislation, particularly where such legislation limited producers' ability

to construct on-farm water storage infrastructure. These stakeholder comments may be symptomatic of a limited understanding among producers of the options that are still available to them to better manage their existing resources. A targeted information and knowledge building strategy to producers may increase their capability to adjust their enterprises within the bounds of those arrangements in order to better prepare for and manage drought events.

### **Impact on Rural Water Use**

The work of the Department's Drought Taskforce is particularly relevant to (d) and (e) of the terms of reference for this Inquiry.

#### *Monitoring drought and predicting farm water demand.*

It is currently the responsibility of the state governments to monitor drought within their respective jurisdictions. When the state consider the conditions warrant intervention, they can request assistance from the Australian Government through the Exceptional Circumstances (EC) arrangements on the basis that the majority of producers in a defined area have experienced a rare and severe drought event (one in 20-25 year event) resulting in a severe and prolonged impact on farm incomes.

The responsibility of monitoring drought lying with the states has given rise to varying approaches between the states on what constitutes a drought event and the types of assistance measures (if any) should be provided. The Primary Industries Ministerial Council (PIMC) has recently agreed that a sub-committee of key stakeholders be formed to develop options on harmonising state and territory processes on drought declaration and assistance measures.

In addition, PIMC agreed in 2004 that in order to help streamline the EC application and assessment process, a system be developed to monitor the impact of drought on agricultural production nationally. Subsequently, a multi-jurisdictional steering committee was formed to guide the development of a National Agricultural Monitoring System (NAMS).

The NAMS, a web-based application, will aid EC decision-making rather than being a decision-making tool in its own right. The NAMS will contain elements such as rainfall and temperature data, modelled livestock and crop production potential, and historical production data. The NAMS will be made widely available to a range of stakeholders including Australian Government agencies, producers, industry bodies and local and state and territory government agencies, via the internet.

The NAMS is being developed for release in mid 2006 for dryland/broadacre industries. Its application for intensive and irrigated industries will be investigated in 2006/07.

The NAMS may become an important tool in giving farmers access to detailed climatic and resource information for their local area. This may assist

producers to better manage the implications for agriculture of any change that may occur in patterns of precipitation and temperature.

*The implications for agriculture of predicted changes in patterns of precipitation and temperature.*

The current drought policy arrangements are undergoing a reform process as a result of the wide geographic extent and severity of the current drought which has challenged existing Australian Government and state and territory government drought support mechanisms.

In light of the experiences gained during this drought, a Drought Review Panel was convened in late 2003 that recommended a series of significant changes. In particular, the Panel recommended that greater emphasis be given to drought preparedness at the expense of business support measures currently provided. These findings were endorsed by the National Drought Roundtable in April 2004 and have been further explored by the Primary Industries Ministerial Council. Details are yet to be agreed on the type and form of assistance that would be provided if there is a shift to drought preparedness and how any transition to such an approach would be managed.

A shift towards increased preparedness may mean that in the future, Governments and farmers are likely to be able to better manage climate variability including an exceptional drought event. In the future, the NAMS may enhance the ability of Government and farmers to predict and manage the impact of climatic variability on agricultural production.

In addition to any changes that climate variability will bring, farmers are likely to face a general increase in adjustment pressures. The impact of changes in patterns of precipitation and temperature may be one such pressure. Should this eventuate, there are a number of existing Government programmes to assist farmers manage the adjustment to such changes, including the Farm Help, FarmBis and Rural Financial Counselling Service programmes.

### ***Great Artesian Basin Sustainability Initiative***

The Great Artesian Basin extends under 22 per cent of Australia including parts of South Australia, New South Wales, the Northern Territory and the major part of Queensland. It supplies water to an extensive pastoral industry, key mining and extractive industries, unique aquatic ecosystems, an emerging tourism industry, townships and homesteads in and around the Basin.

The current network of uncontrolled bores and inefficient open earthen bore drain reticulation systems result in both a waste of water (it is estimated that between 85 to 95 per cent of water from stock bores is evaporated) and falling artesian pressure across much of the Basin. In some cases, this fall in pressure has led to water either ceasing to rise to the surface, or rising at reduced pressure.

Open bore drain reticulation systems also cause land degradation and represent habitat for woody weeds and feral animals.

Continuing the work commenced in 1999, the Australian Government has committed \$42.7 million over five years 2004-2009 to accelerate the repair of uncontrolled artesian bores and the replacement of wasteful open earthen bore drains with piped water reticulation systems through the Great Artesian Basin Sustainability Initiative. The Australian Government makes its contributions jointly with other key stakeholders, state governments and pastoral bore owners.

### **Impact on Rural Water Use**

The goal of the Great Artesian Basin Sustainability Initiative is to promote and facilitate the establishment of sustainable on-going groundwater management systems for the Basin through strategic investments in groundwater infrastructure renewal and related activities in natural resource management.

The Initiative provides funding to cap uncontrolled bores with headworks to control water flow, and to pipe water to specific watering points. It is anticipated that at least 200,000 megalitres of water will be saved annually as a result of the programme.

While the volume of water available within the Basin is not under threat, the focus of the Great Artesian Basin Sustainability Initiative is on reduced water consumption from uncontrolled bores and inefficient open earthen bore drain reticulation systems as a means of maintaining or restoring artesian pressure in the Basin. A reduction in artesian pressure can necessitate the installation of costly pumps by landholders and townships in order to access water that once may have flowed unassisted to the surface.

In conjunction with the efforts under the Initiative to reduce water wastage, and in accordance with a Strategic Management Plan for the whole of the Great Artesian Basin, state governments are formulating water plans for their part of the Basin to ensure sustainable management of the resource and protection of the groundwater systems that depend on it.

## 4 - Projects and Resource Tools

There are a number of projects and resource tools that the Australian Government is investing in that inform water policy development and water resource management. Whilst the information provided below does not specifically address the Terms of Reference they will provide the Inquiry with an idea of the range of work being carried out by the Department that will influence rural water use.

### ***National Land and Water Resources Audit***

The National Land & Water Resources Audit collates data and information on the status of Australia's natural resources including water and contextual social and economic information. The information is used to assist in identifying Australia's natural resource management priorities and will support the evaluation of current and future natural resource management investments.

The Audit is working with all states and territories and the Australian Government. This collaborative partnership provides considerable opportunity to share information about the state of the natural resources and lays the foundation for resource monitoring to become part of the essential information needs of the nation. The Audit reports to the Natural Heritage Trust Ministerial Council and is an independent national program funded by the Natural Heritage Trust.

The Audit has six key areas of activity that include: developing a consistent national reporting mechanism for collating natural resource information collected under the *National Natural Resource Monitoring and Evaluation Framework* and developing nationally consistent, integrated resource condition reports — linking biophysical, social and economic information.

The Audit is working with jurisdictions through national coordination committees to define the national information needs for each Natural Resource Theme /Issue or 'Matter for Target' under the *National Natural Monitoring & Evaluation Framework*. The Audit uses this advice to progressively update information about the status of the natural resources. This information will form the basis of a report on the Status of Australia's Natural Resources, available in 2006.

The three water 'Matters for Target' under the *National Natural Monitoring & Evaluation Framework* are:

- Nutrients in Aquatic Environments;
- Turbidity/Suspended Particulate Matter in Aquatic Environments; and
- Surface Water Salinity in Freshwater Aquatic Environments.

## ***Water 2010***

Water 2010 is a Bureau of Rural Sciences (BRS) led project integrating the work of scientists and several external agencies to address issues impacting future water use and management in Australia. The project aims to, via the web and other means, deliver client-oriented water balance information for policy development and strategic planning, particularly in support of the National Water Initiative objectives. The analysis and reporting tools being developed under Water 2010 are designed to address information needs in areas such as total water resource assessment, water interception, integrated management of surface and groundwater, shared resource risk assessment and social impact assessment. The Australian Water Availability Project is also a key source of data, along with the Australian Water Data Infrastructure Project.

The socio-economic component of this project has potential applicability in:

- helping to provide social context and understanding of the socio-economic situations of communities, stakeholders and industries who may be affected by water reforms; and
- providing input to social impact assessments, including assessments of community dependency on water, and community capacity or resilience to adapt to changed access to water.

Data from this and related research could also contribute to developing water policy, including frameworks for water property rights, protecting rivers and aquifers and examining landholder capacity to adopt innovations.

## ***Australian Water Data Infrastructure Project***

The Australian Water Data Infrastructure Project (AWDIP) builds on work of the Australian Water Resources Assessment 2000 and links with other natural resource management data themes (e.g. vegetation, land use, biodiversity, dryland salinity, rangelands) developed through the National Land & Water Resources Audit.

The objective of AWDIP is to facilitate Australia-wide assessments of water resources through ongoing development of a comprehensive and accessible water information framework. The project, when operational will provide access to water resource information (surface and groundwater) held within the water and natural resource agencies around Australia through a single web portal.

It is intended that the products and information developed through the AWDIP will:

- assist resource managers and water users make improved decisions on water resource allocation, and management policy and practice;
- facilitate cross-border water resource management and support regional planning through improved data accessibility;



- improve targeting of public investments in water resource management through better identification of stressed resources; and
- facilitate ready access to data to support periodic national assessments of Australia's water resources.

The true strength of the network developed through AWDIP is in delivering data to support modelling tools such as those being developed through the Water 2010 project described above, and also systems such as the Water Resource Observation Network being developed by the CSIRO. AWDIP will provide streamlined access to the data used to underpin model assessments allowing continual refinement of predictive capabilities and ultimately better information on which users can make decisions.

Although the genesis of this project preceded the National Water Initiative and the establishment of the National Water Commission, the Commission is interested in the capabilities of AWDIP to allow jurisdictions to deliver up water data for reporting and assessment purposes. It is expected that the initial AWDIP system will be accessible by mid-2006, although the system will be continually refined as jurisdictions capacity to deliver data is improved and expanded.

### ***Australian Water Availability Project***

The Australian Water Availability Project involves personnel from CSIRO, the Bureau of Meteorology, and the BRS. The aim of the project is to implement a new, satellite-based approach to monitoring and predicting soil moisture and other components of the water balance (including runoff) at a 1km x 1km resolution, and to deliver this information fortnightly across the web. The project will help communicate crucial linkages between climate and water availability and contribute to improved management of the Australian landscape by industry sectors and individuals.

### ***Connected Water Research & Groundwater/Surface Water Interaction***

Under the National Water Initiative, governments have agreed that where surface and groundwater systems are connected they are managed as a single resource. The Department has funded several research projects through the Natural Heritage Trust to support the implementation of this policy. One of the projects is producing a discussion paper that is working towards a national framework for managing tools for managing the connection between surface and groundwater.

The BRS Managing Connected Water Resources project examines the connectivity between surface water and groundwater. The project focuses on the key information gap of how rivers and aquifers interact (their connectivity) and how best to assess and manage these interactions. The project will also investigate linkages between biophysical and economic components of conjunctive water management and policy options to achieve sustainable use

of connected water resources. The objective of the project is to help change the management paradigm to one that views surface water and groundwater as a single resource. In this way, surface water reservoirs, rivers and aquifers can be managed in a combined way to address issues such as water security, efficient water storage, salinity, and delivering environmental flows.

The project will support on-ground investment in conjunctive management such as artificial recharge and aquifer storage and recovery technologies. This project directly supports the National Water Initiative objective of implementing a nationally-compatible system for managing connected water systems.

The Managing Connected Water Resources project has a significant information and adoption strategy aimed at highlighting how connected resources interact, how these interactions impact on land and water management, and making tools available to assess and incorporate these interactions into management decisions. This strategy is aimed at stakeholders such as catchment management agencies, regional water managers and water policy groups across Australia. Hence the project is part of the capacity building objectives of the Australian Government.

Australian Government leadership in a national approach on management of connected water resources will:

- facilitate the progression of conjunctive water use and management across all jurisdictions;
- provide for improvement and consistency in methodology and approaches, subject to the nature of jurisdictional data;
- combine the resources and technical expertise of several jurisdictions. The project includes partnership arrangements with NSW and Queensland; and
- ensure Australia is building on, contributing to, and leading international expertise in this area.

### ***Water Banking***

Aquifer storage and recovery technology, or 'water banking', is a conjunctive-use water management technique that utilises suitable aquifers to store water for later use. As the name suggests, water banking can act like a bank, whereby you make deposits when times are good (floods or periods of above average rainfall) and then withdraw the water when needed (irrigation season or periods of drought). Harvesting water from rivers and storing it underground is like moving money between accounts, the balance does not go down, it just changes location. In addition, like a bank, accounts can be overdrawn during times of need (drought), with the understanding that the loan needs to be repaid with interest.

The major advantages of using water banking for farming over traditional surface water are:

- surety of supply - as users are not reliant on natural groundwater recharge, water levels in an aquifer can be temporarily drawdown during drought to maintain supply with the proviso that the water is replaced within the management cycle;
- water storage close to users - transport of water from storage to the end users necessitates a large amount of infrastructure and potential losses of water from the system. Water stored near users can decrease such losses and also allow for more efficient use of water in response to local rainfall events; and
- increased water availability - significant amounts of water are lost to evaporation from large dams across the country. Water banking stores water underground, which greatly reduces the amount of evaporation water loss. This water can then be invested in environmental flows or increased allocation.

BRS is currently investigating whether this innovative approach to rural water management is feasible in the Australian context. Previous studies have identified areas in the Murrumbidgee Irrigation Area that are technically suited for underground water storage. The current project will examine:

- if the type and location of on ground infrastructure is suitable for installing a water banking scheme;
- the institutional barriers to storing water underground;
- water quality issues that may be an impediment to water banking;
- costs and profitability of water banking; and
- potential adverse/beneficial environmental outcomes.

### ***The National Programme for Sustainable Irrigation***

The National Programme for Sustainable Irrigation focuses on the development and adoption of sustainable irrigation practices in Australian agriculture. The Programme aims to address critical emerging environmental management issues for the irrigation industry, while generating long-term economic and social benefits to ensure a viable future.

The Programme is managed by Land and Water Australia and has 14 funding partners including irrigators, water authorities, research agencies, commodity groups and state and Australian Government Departments. The Programme commissions research that is innovative and has a focus on the development and adoption of sustainable irrigation practices in Australia and one of the research projects funded is the Northern Australia Irrigation Futures project (see below).

### **Northern Australian Irrigation Futures**

The Northern Australia Irrigation Futures project has been established to help address the likely future role of irrigation in northern Australia. The types of questions it is addressing are whether irrigation should occur in northern

Australia, and if so, where should it be located and how should it be designed and managed?

The Northern Australia Irrigation Futures project has three components:

- a Sustainability Framework to support more robust debate and improved decision making regarding if and where to irrigate in tropical Australia;
- Tropical Groundwater Systems research that focuses on developing improved understanding of water in the tropics, particularly tropical groundwater systems and likely risks to groundwater and connected surface water systems if used for irrigation; and
- Irrigation Mosaics research into developing a conceptual understanding of the differences between traditional large scale irrigation systems and mosaics involving irrigation of smaller discrete patches of land dispersed across tropical landscapes.

More information on the Northern Australia Irrigation Futures can be found [www.clw.csiro.au/naif/](http://www.clw.csiro.au/naif/).

### ***Innovation in Irrigation***

The 2005 Innovation in Irrigation showcase was launched by the Minister for Agriculture, Fisheries and Forestry, Hon Peter McGauran MP, at the Australian National Committee on Irrigation and Drainage (ANCID) Conference on 24 October 2005. The showcase is funded from the Natural Heritage Trust. It provides examples of innovation in the irrigation industry and the ways in which industry is responding to the need for improved efficiencies in irrigation management. The 2005 Innovation in Irrigation showcase includes a booklet and video and features six irrigators from Queensland, New South Wales and Victoria.

The six case studies feature individual farmers, cooperative partnerships, corporate farms, and town resources managers who have employed creative strategies to manage regional inland city effluent, and to combine water savings and productivity increases.

The 2005 Innovation in Irrigation showcase was developed following good interest in the 2004 Innovation in Irrigation showcase that featured twelve irrigators from across Australia. Both showcases were developed to promote the contribution the irrigation industry is making to sustainable management of Australia's water resources. It was also designed to inspire and encourage other irrigators to follow the lead of those featured in the showcase, and to further promote efficient and sustainable production and efficient use of water resources.

### ***Landholder Adoption of Innovations***

BRS has undertaken several projects on the issue of understanding landholders' capacity to adopt innovations and, in particular, understanding their capacity to change to more sustainable land management practices (see

for example Cary, Webb & Barr, 2002; Cary et al., 2001). The findings of these projects are particularly relevant to the third term of reference for this Inquiry. These projects build on extensive bodies of literature examining decision-making and adoption practices, particularly among farmers.

Previous work provides a number of models and frameworks to apply in examining these practices and the broad groups of factors influencing them, which can be summarised as:

- individual and social characteristics – for example age, education, other personal and family characteristics;
- institutional characteristics – formal structures relevant to the decision, including the government regulatory environment; and
- locality and environmental characteristics – specific attributes of landholders' locations.

Among the individual and social characteristics whose influence has been systematically examined are age, training or education, level of farm business income and farm business characteristics, participation in landcare and property management planning, and farm size. Knowledge of these characteristics among farmers or landholders in particular areas of interest, derived from social survey work, in some cases can help predict the likely uptake of innovations in these areas.

Previous research also reviews the attributes of innovations in sustainable agriculture that make them more likely to be adopted by farmers. These attributes include:

- relative advantage – whether or not the innovation is perceived as providing a financial advantage. These perceptions are likely to vary greatly by location, and few innovations have universal applicability;
- risk – risk perceptions and the differing risk implications of innovations are an important consideration in adoption. Innovations perceived as risky are unlikely to be adopted;
- complexity – complexity increases the risk of failure and the amount of knowledge needed, and makes it less likely that the innovation will be adopted;
- compatibility – if a new idea fits in with existing knowledge and practice it is likely to be adopted more readily;
- trialability – innovations that can be trialled on a small scale before full implementation are more likely to be adopted, as this minimises the financial risk; and
- observability – land management innovations whose advantages are observable are more likely to be adopted. This is a principle underpinning the use of demonstration projects and reflects farmers' preferred learning styles.

Understanding the significance of landholder characteristics and circumstances on one hand, and the characteristics of innovations designed to achieve water policy objectives on the other, can help improve the

likelihood that these innovations will be adopted and policy objectives achieved.

### ***Farm Innovation – Pratt Water Report***

The Pratt Water Report has identified many innovative technologies and tools to improve water use efficiency at farm, irrigation district, and catchment scales. One of the innovations highlighted in the report is the use of flexible fabric pipes as a more cost effective option when converting irrigation channels to piped systems. A copy of the report can be found at: <http://www.napswq.gov.au/publications/pratt-water.html>

The Australian Government is using Pratt Water's report, *The Business of Saving Water*, to identify practical ways of incorporating the findings from the report into the current policy and programme environment.

Over the past year a significant amount of work has built on, and promoted, the Pratt Water report. Two examples are:

- ABARE has further developed and promoted the concept of environmental managers temporarily purchasing water from irrigators in wet years through options contracts; and
- CSIRO Water for a Healthy Country programme has committed to apply the Pratt Water methodology for prioritising areas within irrigation systems for improving water-use efficiency to all irrigation areas in the Murray.

The Australian and New South Wales Governments are currently finalising their response to the Pratt Water's report.

### ***Pratt Water Timber Plantation Project Social Assessment***

This project, one of a suite of projects conducted as part of the Pratt Water Timber Plantations Feasibility Study, examined the attitudes of communities near timber plantations in the upper Murrumbidgee Valley towards water management and plantation development. While the report of the social assessment has not been formally released, some general points arising from it can be made:

- social values as well as economic and environmental values need to be taken into account when major land use changes are being considered as part of achieving policy objectives – this means that the attitudes, values and issues of concern to local landholders likely to be affected need to be assessed
- the distributional and equity implications of changed land uses and changed resource access need to be considered – some landholders are likely to benefit and others to lose, even if overall economic or environmental benefits are considered to be positive
- local communities need to be engaged in decision-making about future land use and resource access issues, and have the opportunity to have a real influence on these decisions.

## ***Water Savings Project***

The Water Savings Project was funded from the Natural Heritage Trust and ran from 2003 to 2005. Seven projects, all with the potential to impact positively on rural water use, were initiated. The projects are described below.

*Domestic water savings ideas* – a website was developed to highlight around 80 ideas and products on how to save water in rural and regional Australia. The ideas related to savings under the categories of farm, business, home, garden and public place. The website can be viewed at [www.savewater.com.au](http://www.savewater.com.au).

*Water reuse and recycling* – based on surveys of producers and consumers, the booklet 'Guidelines for Developing Recycled Water Schemes in Horticulture' was published. The Guidelines should assist innovative farmers to introduce irrigation schemes using recycled water. Such recycling schemes should lead to a reduction in the direct demand for both river and/or ground water, freeing up resources for other uses such as environmental flows. The Guidelines are available at [www.daff.gov.au/waterguidelines\\_hort](http://www.daff.gov.au/waterguidelines_hort).

*Rivers and Aquifers: towards conjunctive water management* – this project funded the report of the Rivers and Aquifers Workshop (Adelaide, May 2004). The report made several high-level policy recommendations which are now reflected in the target outputs and outcomes of the National Water Initiative. The workshop report is available at <http://affashop.gov.au/product.asp?prodid=1312l>.

*Assessment of water purification technology* – this desktop study drew on two case studies which examine a range water purification technologies. Results suggested that where intensive farming areas are relatively close to large urban centres and sewage treatment plants, irrigation of high value crops should be profitable. The study is available from the BRS website.

*Innovation in irrigation forum* – Described earlier, this Forum highlighted the progress that Australian irrigators have achieved in recent years in innovative practices and water efficiency. The case studies can be viewed at [www.nht.gov.au/irrigation](http://www.nht.gov.au/irrigation).

*Additional industry case studies in irrigation efficiency* – this project collated further information on irrigation efficiency in the cotton, rice and dairy industries. The material provides 'whole of sector' information, proffers practical advice, identifies related programmes and provides other websites on related information and resources. The additional case studies can be viewed at [www.savewater.com.au](http://www.savewater.com.au).

*Irrigation into the future: Shepparton Irrigation Region on-ground works* – this project is using strategic whole-farm planning to assist irrigators adopt best

management practices in areas of high adverse irrigation impact. The project is assisting in the installation of farm drainage systems to recycle and reuse irrigation water and will demonstrate to other farmers the benefits of adopting automated irrigation systems. The project is due for completion around the end of 2005.

### ***Australian Government Water Research Coalition***

The recently formed Australian Government Water Research Coalition will take a coordinated whole-of-government approach to the preparation of high quality, targeted and timely water research. The Coalition will provide a coordination mechanism that enhances capacity, improves the efficiency and access to water research expertise and services across the Coalition research partners. The partners will work with the National Water Commission to provide advice on water resources issues and research needed to underpin their activities. The Coalition will also provide a forum for consolidation of technical and scientific advice on research matters of concern to the National Water Commission.

Foundation members of the Coalition are:

- Australian Bureau of Agricultural and Resources Economics, Department of Agriculture, Fisheries and Forestry;
- Australian Bureau of Statistics;
- Bureau of Meteorology;
- Bureau of Rural Sciences, Department of Agriculture, Fisheries and Forestry;
- Commonwealth Scientific and Industrial Research Organisation (Secretariat);
- Cooperative Research Centre Irrigation Futures;;
- eWater Cooperative Research Centre; and
- Geoscience Australia.

### ***Great Barrier Reef Water Quality Protection Plan***

The Great Barrier Reef Water Quality Protection Plan (the Reef Plan) was released by the Prime Minister and Premier of Queensland in October 2003 to address water quality entering the Great Barrier Reef lagoon. The Reef Plan is available at <http://www.deh.gov.au/coasts/pollution/reef/index.html/Reef>.

The Department of the Environment and Heritage and the Department have been working in conjunction with Queensland agencies and non-government organisations to implement nine main strategies and over 60 actions and sub-actions within the Reef Plan.

Many of the actions within the Reef Plan relate to waterway protection and innovations on farms. In broad terms these strategies include: self-management approaches for farmers; education and extension support; economic incentives to promote sustainable practices; planning for resource management and the development of water quality targets; and monitoring



and reporting to ensure the Plan is achieving its objectives. More specifically, farming innovation is being addressed through conservation agreements and reports into agricultural initiatives. The protection of rivers and aquifers is being addressed through the development of water quality targets, values and objectives or water quality improvement plans. Some of the specific actions completed or currently underway include:

- the piloting of auction programs that target the conservation of wetlands, riparian and other remnant vegetation;
- the completion through NRM Plans and Investment strategies of water quality targets for the Reef catchment waterways with a major focus on improving water quality. Investment through these Plans/Strategies in remedial action that ensures adequate protection and rehabilitation of wetlands, riparian and other vegetation important to water quality;
- ongoing implementation of programs to establish conservation agreements and covenants to ensure protection and management of remnant bushland, riparian vegetation and wetlands that can produce water quality outcomes for the Reef;
- the promotion of Local Water Quality Improvement Plans (WQIPs) to local governments and Regional NRM Bodies (established in the Douglas Shire and Mackay) in high-risk high-priority catchments and give priority to their development and implementation where catchment communities have an interest and capacity to develop plans of a suitable standard. Commence the preparation of WQIPs consistent with the Framework for Marine and Estuarine Water Quality Protection, and where accredited, implement those plans consistent with program requirements of the Australian Government's Coastal Catchments Initiative. Pursue interim water quality projects where WQIPs are being developed;
- a review of the effectiveness of regulatory and non-regulatory measures to managing agricultural activities impacting on the reef;
- ongoing work with Regional NRM bodies to determine water quality environmental values and objectives to develop resource management targets; and
- a report on agricultural industries initiatives seeking to improve natural resource management and minimise environmental impacts on the GBR catchments. The report is available at <http://www.deh.gov.au/coasts/publications/annual-report/04-05/index.html>.

### ***The National Water Quality Management Strategy***

The National Water Quality Management Strategy (NWQMS) is a part of the COAG Water Reform Framework and consists of 21 national water quality guideline documents. The Strategy provides guidance on many aspects of the water quality cycle including ambient and drinking water quality, planning and monitoring surface and groundwater, rural land and water use, urban stormwater, sewerage systems and effluent management for specific industries. For example, there are guidelines for managing effluent from rural industries such as guidelines for dairy sheds and for dairy processing, tanneries, wineries, wool scouring and piggeries and guidelines for managing

diffuse sources of pollution. These guidelines assist these industries to minimise water pollution and recycle water when practical. There are also two NWQMS guidelines, which are designed to improve water quality management by assisting resource planners and communities to plan, manage, monitor and report on water quality for initiatives such as NAP/NHT. These are the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* and *Australian Guidelines for Water Quality Monitoring and Reporting*.

In the 2004/05 Financial Year the Department commissioned the CRC for Coastal Zone Management to undertake a series of water quality workshops in catchments across Australia. The aim of the workshops was to provide advice and guidance on the use of NWQMS guidelines to assist water quality planning, monitoring and reporting. The report into the workshops, based on participant surveys, indicates the workshops met their primary objective to increase the capacity of workshop attendees to use the NWQMS and the water quality tools within it. A copy of the report is available at [http://www.daff.gov.au/naturalresource management/water/NWQMS](http://www.daff.gov.au/naturalresource%20management/water/NWQMS).

### ***Urban related projects***

In the 2004/05 the Department commissioned ACIL Tasman to examine access to recycled water and impediments to recycled water schemes. The research paper, available at <http://www.daff.gov.au/recycledwater>, identifies impediments and provides an evaluation of their importance according to surveys and in-depth interviews of key stakeholders in the recycling water industry. Two of the aims of the research are to provide governments with information that will assist in encouraging greater use of recycled water for industries, such as agriculture and augment the supply of water from surface and groundwater systems.

BRS has completed or is currently undertaking several projects investigating the characteristics, attitudes, values and practices of rural landholders in different Australian regions. Relevant projects include a scoping study of peri-urban landholders (Aslin, Kelson, Smith & Lesslie, 2004); case studies of peri-urban landholders in WA, Vic. and Qld (Aslin & Mazur, in press, 2005); and a range of social data projects funded by catchment management organisations and the NAP/NHT (Byron, Curtis & MacKay 2004a, b; in press, 2005). Major points to be drawn from these projects' findings are that:

- rural landholders in many regions are diverse in occupations, attitudes, knowledge and socio-economic circumstances; and
- in particular, many rural landholders in the more densely-populated regions surrounding capital cities and major regional centres are not primarily farmers by occupation and rely on non-farm income sources.

For example, in a survey of landholders with properties larger than 10 ha in the Glenelg-Hopkins Catchment of western Victoria, 36% of landholders indicated that farming was not their primary occupation. This percentage is likely to be even higher in catchments surrounding the larger cities where

'hobby', 'lifestyle' or 'small' farming may be the major land use. In Victoria as a whole, properties less than 100 ha in size with an estimated value of agricultural production of less than \$75,000 per year make up approximately 37% of all rural holdings, and dominate on the slopes of the Great Dividing Range, and around Melbourne and the major regional centres (Barr & Karunaratne, 2001).

This kind of information has important implications for the Inquiry – recognising the diversity of rural landholders is fundamental in designing appropriate water policy, communicating with and engaging landholders in relevant policy initiatives, and investigating actual or potential social, economic or environmental impacts. This diversity is relevant to most of the specific points to be addressed in the Inquiry's terms of reference, particularly if a whole of landscape approach is taken. It highlights the need to consider the role of non-agricultural land uses and non-farmer landowners in achieving water policy objectives.

## **5 - Conclusion**

Rural water usage is likely to change more significantly when the actions of the National Water Initiative are implemented and water use efficiencies realised. These actions will offer a future environment that provides confidence for those investing in irrigation and the water industry. This will be achieved through more secure water access entitlements, better and more compatible registry arrangements, better monitoring, reporting and accounting of water use, improved public access to information and use of the open market to get the best economic value from water.

The Australian Government also has a significant role in developing and implementing programmes and policies that impact on rural water quality and quantity such as the Joint Government Enterprise, the Great Artesian Basin Sustainability Initiative, the National Action Plan for Salinity and Water Quality, the Natural Heritage Trust and drought policy reform.

The Department and Australian Government is also investing in a range of projects and tools such as the Innovation in Irrigation showcases, the National Land and Water Resources Audit and Northern Australian Irrigation Futures Programme to help provide the information needed to make informed policy decisions about sustainable water management in both rural and urban Australia.

## 6 - References and Further Reading

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