The Senate

Rural and Regional Affairs and Transport References Committee

Rural water resource usage

August 2004

ISBN 0 642 71437 1

This document was prepared by the Senate Rural and Regional Affairs and Transport Legislation Committee, and printed by the Senate Printing Unit, Department of the Senate, Parliament House, Canberra.

Membership of the Committee

Members

Senator Aden Ridgeway	AD, New South Wales	Chair
Senator the Hon Bill Heffernan	LP, NSW	Deputy Chair
Senator Geoffrey Buckland	ALP, South Australia	
Senator Kerry O'Brien	ALP, Tasmania	
Senator Julian McGauran	NPA, Victoria	
Senator Ursula Stephens	ALP, NSW	

Participating Members

Senator Abetz	Senator Ferguson	Senator Murphy
Senator Boswell	Senator Ferris	Senator Payne
Senator Brown	Senator Harradine	Senator Santoro
Senator Carr	Senator Harris	Senator Tchen
Senator Chapman	Senator Hutchins	Senator Tierney
Senator Colbeck	Senator Knowles	Senator Watson
Senator Crossin	Senator Lees	
Senator Coonan	Senator Lightfoot	
Senator Eggleston	Senator Mason	
Senator Evans	Senator S Macdonald	
Senator Faulkner	Senator Mackay	

Senator Allison for matters relating to the Transport Portfolio
Senator Greig for matters relating to the Fisheries Portfolio
Senator Lees for matters relating to Air Safety

Committee Secretariat

Ms Maureen Weeks, Secretary
Mr Geoff Dawson, Principal Research Officer
Mr Alex Olah, Research Officer
Ms Rosalind McMahon, Executive Assistant

Parliament House, Canberra
Telephone: (02) 6277 3511
Facsimile (02) 6277 5811

Internet: www.aph.gov.au/senate
Email: rrat.sen@aph.gov.au

TABLE OF CONTENTS

Recommendations

Recommendation 1 (paragraph 2.7)

A cap for water extractions in the Queensland part of the Murray-Darling Basin should be decided by the beginning of 2005.

Recommendation 2 (paragraph 3.36)

COAG should negotiate an ongoing shared program for funding the reforms in the Intergovernmental Agreement on a National Water Initiative.

Recommendation 3 (paragraph 4.29)

COAG should develop a policy on rules to control the water market to prevent profiteering or speculation by non-users, including foreign interests, to the detriment of water users or the environment.

Recommendation 4 (paragraph 4.36)

COAG should commit to a jointly funded program of structural adjustment assistance to communities whose economies are contracting because of water trading, and agree to provide adequate financial support for projects to promote environmental recovery in degraded areas.

Recommendation 5 (paragraph 5.16)

Water management authorities should take steps to properly assess in all catchments the amount of water necessary to maintain environmental health and the amount available for trade.

Recommendation 6 (paragraph 5.52)

Water management authorities should give priority to establishing the systems necessary to account for the total water balance of catchments to allow better management of water-intercepting activities.

Recommendation 7 (paragraph 5.55)

Relevant Commonwealth funded research programs should give priority to researching the total water balance of catchments to allow better management of water-intercepting activities, with particular reference to the effects of large scale plantation forestry on runoff.

Recommendation 8 (paragraph 5.82)

The Commonwealth should, as a matter of urgency, address the impact of Commonwealth-licensed oil drilling on the Latrobe aquifer and propose solutions which respect the rights of groundwater users.

Chapter 1

Introduction

Conduct of the inquiry

1.1 The Senate referred the inquiry on 21 October 2002. The terms of reference are:

- current rural industry based water resource usage;
- options for optimising water resource usage for sustainable agriculture;
- other matters of relevance that the committee may wish to inquire into and comment on that may arise during the course of the inquiry, including the findings and recommendations from other inquiries relevant to any of the issues in these terms of reference.

1.2 The Committee advertised the inquiry in *The Australian* and invited submissions from peak bodies. The Committee received 78 submissions (see Appendix 1) and held 11 public hearings (see Appendix 2). The Committee thanks submitters and witnesses for their contribution. Submissions and transcripts of the Committee's hearings are available on the Parliament's internet site at www.aph.gov.au

1.3 During the inquiry period there has been significant action on water reform, both by individual states, who are responsible for detailed water planning, and through the Council of Australian Governments (COAG). This culminated in an Intergovernmental Agreement on a National Water Initiative, agreed by COAG on 25 June 2004.

1.4 These developments have advanced the water reform agenda considerably from that referred to in submissions and Committee evidence from 2003. The focus of interest is now the detailed implementation of the Intergovernmental Agreement.

1.5 As well, the House of Representatives Standing Committee on Agriculture, Fisheries and Forestry has recently issued a comprehensive report on water reform questions as they stood just before the Intergovernmental Agreement was signed.[1]

1.6 In light of this the Committee prefers not to attempt another detailed report at this time, but rather to focus on discussing some outstanding concerns and likely problems in implementing the Intergovernmental Agreement.

---

1 House of Representatives Standing Committee on Agriculture, Fisheries and Forestry, *Getting Water Right(s) - the future of rural Australia*, 21 June 2004.

1.7 The Committee advises its continuing interest in the implementation of the Intergovernmental Agreement on a National Water Initiative and related issues, and may wish to review progress during the next parliament.

Summary background

1.8 Irrigated agriculture accounts for about three quarters of total consumptive water use in Australia. From 1983-84 to 1996-97 extractions for irrigation increased by 76 percent, a much faster rate of increase than domestic and industrial use. This reflected the continuing rapid expansion of the area of irrigated land, especially in New South Wales and Queensland.[2] Initiatives that would see expansion of irrigation are also evident in Northern Australia.

1.9 At the same time there has been increasing concern about the effects of these developments on the health of rivers and ecosystems. According to the National Land and Water Resources Audit 26 per cent of Australia's river systems are either overused or close to over use, including most of the rivers in the Murray-Darling Basin. Sixty nine per cent of total surface water extraction comes from these stressed rivers.[3]

1.10 In this context COAG in 1994 agreed to a national water reform framework with the aim of improving efficiency of water use and improving environmental outcomes. Expert opinion seems to be that there has been progress on some items of the agenda, but others have proved difficult, and much more needs to be done.

1.11 The severe drought of 2002-03 brought renewed focus on water issues. On 29 August 2003 COAG agreed to a 'National Water Initiative', including a commitment to spend $500 million over 5 years on recovering environmental water for the Murray-Darling. On 25 June 2004 COAG agreed to an 'Intergovernmental Agreement on a National Water Initiative', with detailed arrangements for progressing the matters foreshadowed in 2003. The Commonwealth and the Murray-Darling Basin governments (except Queensland) also agreed on detailed arrangements for spending the $500 million (in the 'Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray-Darling Basin').

Structure of the report

1.12 Chapter 2 gives background on rural water management and describes the recent Intergovernmental Agreement on a National Water Initiative, which is the focus of the discussion.

1.13 Chapter 3 discusses issues to do with water access entitlements.

---

2 See Appendix 5: select statistics on Australian water use.

3 *Australia State of the Environment 2001 - Inland Waters*, Department of the Environment and Heritage 2001, p.19, 27.

1.14 Chapter 4 discusses issues to do with water trading.

1.15 Chapter 5 discusses a number of other issues, including:

- ways of encouraging more efficient water use;
- ways of recovering environmental water;
- the need to account for water interception by landuse changes.

Chapter 2

Water Policy in Australia

2.1 Under the Constitution the states have prime responsibility for managing water resources. However as agriculture and industrial development spread, the states were forced to negotiate over shared resources and the Commonwealth became increasingly involved. The first major agreement on water, the River Murray Waters Agreement, was signed by NSW, Victoria, South Australia and the Commonwealth in 1915. That evolved into the 1992 Murray-Darling Basin Agreement (Queensland joined in 1996 and the Australian Capital Territory in 1998).

2.2 The 1980s saw a growing awareness of environmental problems such as salinity and river health. The need for national solutions was recognised. The Council of Australian Governments (COAG) became the key policy forum on natural resource issues, including management of water. In 1992 COAG adopted the National Strategy for Ecologically Sustainable Development which established general principles of sustainable natural resource development and management on a national basis.

COAG's Water Reform Framework, 1994

2.3 In 1994 COAG announced a Water Reform Framework which set out the key strategies to achieve efficient and sustainable urban and rural water use. The principles included pricing for full cost recovery, separation of water access rights from land title, trading of water rights to allow water to move to more efficient uses, and the need for specific provision of water for the environment.

2.4 In 1995 COAG adopted a wide-ranging package of microeconomic reforms under the title 'National Competition Policy'. A National Competition Council (NCC) was created, responsible for tracking and reporting on the implementation of agreed reforms, including the Water Reform Framework, by the states and territories. If the NCC assesses that states and territories have made acceptable progress in implementing the agreed reforms, they become eligible for special payments under the National Competition Policy.[1]

The Murray-Darling Basin Agreement and the cap

2.5 The 1992 Murray Darling Basin Agreement established the Murray Darling Basin Ministerial Council and the Murray Darling Basin Commission to promote cooperative management of the basin. In 1995 the Ministerial Council agreed to cap

---

1 Under the National Water Initiative, from 2005 a new National Water Commission will have responsibility for future assessments of water-related reform commitments by States and Territories under the National Competition Policy— see the Intergovernmental Agreement on a National Water Initiative, 25 June 2004, p. 2.

diversions from the basin's rivers at 1994 levels to protect the environment. There were special conditions for South Australia, and a cap for Queensland was left for future decision.

2.6 It is a matter of concern that a cap for Queensland has still not been decided, and in the interim irrigation developments in the Queensland part of the basin have increased greatly. The Committee recommends that a cap for Queensland be decided by the beginning of 2005.

Recommendation 1

2.7 A cap for water extractions in the Queensland part of the Murray-Darling Basin should be decided by the beginning of 2005.

Related initiatives during the 1990s

2.8 The National Water Quality Management Strategy was introduced in 1992 and included in the COAG Water Reform agenda in 1994. It is a joint initiative of the Commonwealth and the States/Territories, and consists of 21 guideline documents for managing key elements of the water cycle.

2.9 The Commonwealth in 1997 established the Natural Heritage Trust, a funding program for environmental works. In 2002 COAG agreed to a National Action Plan on Salinity and Water Quality, with joint Commonwealth and State funding of $1.4 billion over seven years. The National Action Plan and the Natural Heritage Trust are delivered jointly at regional level. They are supervised by the Natural Resource Management Ministerial Council.

2.10 The National Land and Water Resources Audit is a program funded by the Natural Heritage Trust to progress collection of primary information about Australia's natural resource management. It ran initially from 1997 to 2002, and has been extended to 2007.

The Living Murray Initiative and the 'First Step' water recovery project

2.11 An independent review in 2001 found that imposition of the Murray-Darling cap had been an essential first step and recommended further research to determine the sustainable level of diversion. That prompted the Murray Darling Basin Ministerial Council to establish the *Living Murray* Initiative, which involves a thorough re-assessment of the condition of the River Murray.

2.12 Following a number of expert reports the Ministerial Council concluded that additional environmental flows were required to ensure a sustainable river system. It convened a Scientific Reference Panel to undertake a cost/benefit analysis of the impact of three 'reference points' of additional water — 350, 750 and 1,500 GL. The Panel's interim report of October 2003 found:

- A further 350GL environmental allocation, however operationalised, will provide little 'whole of river' benefit.

- If fully optimised from an operational perspective, a further 750 GL may provide some 'whole of river' ecological benefits.
- A further 1,500GL can provide considerable 'whole of river' and local ecological habitat benefits.[2]

2.13 On the strength of this COAG in August 2003 committed $500 million to address over-allocation of water in the Murray-Darling Basin (the Commonwealth contributing $200 million, Victoria and New South Wales $115 million each, South Australia $65 million and the ACT $5 m).[3] It was estimated this would translate into about 500 gigalitres of additional environmental flows. It was seen as a very positive 'first step' in the rehabilitation of the River Murray system.[4]

2.14 On 25 June 2004 the Commonwealth and the Murray-Darling Basin states (except Queensland), agreed the 'Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray-Darling Basin'. This has detailed protocols for spending the $500 million. Measures which could be funded include investment in water-saving infrastructure and purchase of water on the market. Recovered water will be used for environmental improvements in the Murray River channel and six key ecological sites—the Barmah-Millewa Forest, Gunbower and Koondrook-Perricoota Forests, Hattah Lakes, Chowilla floodplain (including Lindsay-Wallpolla), the Murray Mouth, Coorong and Lower Lakes.

Comment

2.15 The Committee notes some recent arguments that the Murray-Darling is not really as stressed as is widely thought, and the 'First Step' $500 million expenditure is not necessary.[5]

2.16 The Committee does not accept this. The Committee supports the First Step project. The Committee rejects suggestions that more scientific evidence is needed before action is justified. The weight of scientific evidence clearly indicates that the Murray Darling is stressed, and corrective action needs to be taken now.

2.17 In particular, the Committee notes worrying evidence that even on present - capped - policy settings, flow will probably continue to decline. For example, Prof. Young suggested that with some plausible assumptions about likely trends, total loss

---

2 *Ecological Assessment of Environmental Flow Reference Points for the River Murray System,* interim report by Scientific Reference Panel for MDBC, October 2003, p.12.

3 Council of Australian Governments Communiqué, 29 August 2003.

4 Murray-Darling Basin Ministerial Council Communiqué, 14 November 2003.

5 House of Representatives Standing Committee on Agriculture, Fisheries and Forestry, *Inquiry into Future Water Supplies for Australia's Rural Industries and Communities - interim report*, March 2004. Dr J. Marohasy, *Myth and the Murray*, Institute of Public Affairs, December 2003.

could be 2000 gigalitres per year, additional to existing extractions, in 20 years. The main elements of this are:

- If average water use efficiency increases by 10 per cent, this could reduce river flow by 723 gigalitres per year by reducing return flows and drainage to groundwater;
- Projected plantation forestry developments, by intercepting water before it reaches a watercourse, could reduce flow by 600 gigalitres per year.[6]

2.18 In light of these figures the aim to recover 500 gigalitres for the environment seems too little rather than too much. The 'First Step' really is just the first step.

The National Water Initiative, 2003

2.19 From 1994 to 2002 there was progress on some items of the water reform agenda, but much remained to be done. Prof. Cullen commented:

> The economic benefits have been substantially achieved but the environmental benefits have not been achieved…. the three big challenges in front of us are to reallocate water to efficient high-value irrigation, to continue growing the wealth-creating agricultural industries that we have and to stop using water in the low-value industries. The market was supposed to have achieved that, and it has started to achieve it, but it has made remarkably modest steps in reality…
>
> [Charging the full cost] is one of the commitments that the states made in 1994 when they signed the COAG agreement, and it is still not done.
>
> The idea of taking the environmental requirements out of that market and specifying them as environmental needs is also a very clear statement from 1994, but it has been remarkably difficult for the state jurisdictions to do it.[7]

2.20 To re-energise water reform, in August 2003 COAG agreed to a National Water Initiative. Its key objectives are to:

- improve the security of water access entitlements, including by clear assignment of risks of reductions in future water availability, and by returning over-allocated systems to sustainable allocation levels;
- ensure ecosystem health by implementing regimes to protect environmental assets at a whole of basin, aquifer or catchment scale;
- ensure water is put to best use by encouraging the expansion of water markets, involving clear rules for trading, robust water accounting and pricing based on full cost recovery; and

---

6 M.D. Young & J.C. McColl, 'Robust Reform: the case for a new water entitlement system for Australia', *The Australian Economic Review*, Vol. 36, No. 2, pp. 226-227.

7 Prof. P. Cullen, *Committee Hansard* 11 December 2002, p.4, 8, 20.

- encourage water conservation in Australia's cities, including better use of stormwater and recycled water.[8]

2.21 Details of implementation are in the 'Intergovernmental Agreement on a National Water Initiative', which COAG (except Western Australia and Tasmania) agreed on 25 June 2004.

Intergovernmental Agreement on a National Water Initiative, 2004

2.22 The key elements of the 2004 Intergovernmental Agreement are:

- water access entitlements to generally be defined as perpetual access to a share of the water resource that is available for consumption;
- statutory recognition for water that is provided to ensure environmental outcomes are met;
- overallocated water systems to be returned to sustainable levels of use (with substantial progress by 2010);
- a formula that assigns the risk of future reductions in water availability between water users and governments;
- more efficient administrative arrangements to facilitate water trade in connected systems;
- removal of institutional barriers to trade in water;
- new land use activities expected to intercept significant volumes of water to hold a water access entitlement;
- continued implementation of full-cost recovery pricing for water in both urban and rural sectors;
- national standards for water accounting, reporting and metering; and
- actions to better manage the demand for water in urban areas. [9]

2.23 Key provisions of the agreement relevant to the following discussion are summarised below.

Water access entitlements

2.24 Consumptive use of water will require a water access entitlement, separate from land, to be described as a perpetual or open-ended share of the consumptive pool of a specified water resource, as determined by the relevant water plan (s28). Entitlements will be tradeable like real property and will be recorded in public register (s31). They may be cancelled only where the responsibilities and obligations of the holder have clearly been breached (s32(ii)).

---

8 Council of Australian Governments Communiqué, 29 August 2003.

9 Council of Australian Governments Communiqué, 25 June 2004

Water planning

2.25 Water planning by states and territories will provide for secure ecological outcomes and resource security outcomes (s37). The relevant state or territory will determine whether a plan is prepared, what area it should cover, the level of detail required, and its duration or frequency of review (s38).

2.26 Allocation of water to a water access entitlement will be made consistent with a water plan (s29).

2.27 Environmental water as defined in a water plan should be given statutory recognition and have at least the same degree of security as water access entitlements for consumptive use, and should be fully accounted for (s35).

2.28 Arrangements to address situations of overallocation or overuse should be in place by 2005 and substantial progress should be made in adjusting use by 2010 (s41-44).

2.29 Actions to recover water for the environment should consider all available options, including investing in more efficient water infrastructure and buying water. Selection of measures should be primarily on the basis of cost-effectiveness, and with a view to managing socio-economic impacts (s79(ii)).

Assigning risk for changes in allocation

2.30 Users will bear the risk of reduced allocations resulting from seasonal or long term changes in climate or natural events such as fire or drought. Users will bear the risk of reductions required by 'bona fide improvements in the knowledge of water systems' capacity to sustain particular extraction levels', up to 2014. Therafter, users will bear the risk of up to 3% reduction in allocations per 10 years; government will bear the risk beyond that. Government will bear the risk of reductions required by changes in government policy (for example, new environmental objectives). These rules apply to recovering water additional to that needed to address known overallocation or overuse (s46ff).

Water-intercepting landuse changes

2.31 Landuses which have the potential to intercept significant volumes of surface water and groundwater should be identified. After 2011 any new interception activities which exceed agreed threshold levels, in water systems that are fully allocated or approaching full allocation, will require a water access entitlement (s55-57).

Water markets and trading

2.32 The parties will establish by 2007 compatible institutional and regulatory arrangements that facilitate intra and interstate trade (principles for trading rules are given in Schedule G of the agreement). There should be immediate removal of

barriers to temporary trade. There should be immediate removal of barriers to permanent trade out of irrigation areas up to an annual threshold limit of four percent of the total water entitlement of that area, subject to a review by 2009 with a move to full and open trade by 2014. There are special provisions concerning irrigation areas in the southern Murray-Darling Basin (s60ff, schedule G).

2.33 There should be measures to facilitate rationalisation of inefficient infrastructure or unsustainable irrigation supply schemes, including consideration of the need for any structural adjustment assistance (s60(vi), s97).

Water pricing

2.34 Pricing should be based on full cost recovery for water services (s65). Any necessary subsidies should be publicly reported (s66(v)).

Water accounts

2.35 By 2006 there should be water resource accounts that can be aggregated to produce a national water balance (s82). By 2008 there should be accounts that integrate surface water and groundwater systems (s83). Nationally consistent guidelines for metering water use should be developed by 2005 and applied by 2007 (s89).

2.36 By the end of 2006 there should be nationally compatible water accounting systems (which include accounting for environmental water). By the end of 2007 there should be a system of nationally compatible metering and measuring standards.

National Water Commission

2.37 A National Water Commission will be established provide advice to COAG on water issues and help with the implementation of the agreement (s10, schedule C).

General comment on the Intergovernmental Agreement

2.38 The Intergovernmental Agreement is essentially a restatement of the political commitment to water reform. Some important contentious points are resolved in the Agreement, for example:

- the principle that entitlements will be defined as a perpetual share of the consumptive pool;
- the principles concerning the allocation of risk between government and users.

2.39 However other important elements still depend on the details of implementation. Progress on difficult elements will depend on continuing political motivation. For example:

- standardising categories of entitlement so they can be traded interstate;
- harmonising water pricing and principles of allocation interstate;

- designing rules for trading which reflect hydrological realities and ecological needs without unduly restricting trade (how big trading zones should be; details of exchange rates or retail tagging of water; rules for water use licences);
- deciding what water-intercepting landuses should be controlled, and how;
- harmonising water planning interstate, including timing of reviews;
- improving scientific knowledge about environmental requirements; and
- means of recovering overallocated water; how this will be funded; design of structural adjustment assistance.

2.40 Continuing progress will depend on having clear milestones and timing points. The Intergovernmental Agreement has quite detailed goals in this regard. The National Water Commission's role of monitoring progress will be important, as would its regular and transparent reporting of the status of Australia's water resources.

Chapter 3

Issues to do with water access entitlements

3.1 A long standing item of the water reform agenda has been the perceived need for more secure rights to water. This contrasts with the historical situation where water has been granted by periodic licence, and government could refuse to renew the licence, for whatever reason, without compensation.

3.2 Secure title is necessary to encourage investment in efficiencies of water use: farmers must have confidence that if they invest in efficiencies, the water they save will not be taken away without compensation. Secure title, with separation of water rights from land, is a prerequisite to wider trading: it must be clear what the property is that is being traded.

3.3 The IGA commits the States to create a system of 'water access entitlements' separate from land. An entitlement is to be a 'perpetual or open-ended share of the consumptive pool of a specified water resource, as determined by the relevant water plan' . Water access entitlements will be:

- exclusive;
- able to be traded, given, bequeathed or leased;
- able to be subdivided or amalgamated;
- mortgageable;
- enforceable; and
- recorded in a publicly accessible reliable water register. (IGA, s28ff)

3.4 The last point is important to expedite informed trading. Prof. Young commented that actions so far to separate water rights from land have had the unfortunate effect of recreating 'old systems title' for the water, with all the costs and uncertainties that this creates for transfers. He recommended, and the Committee agrees, that a Torrens title system is preferable.[1] The Committee notes that the NSW government wishes to have this in place within three years.[2]

3.5 Submitters to this inquiry, who were mostly rural interest groups, approved the move to more secure title (although some did have concerns about the related

---

1 Prof. M. Young, *Committee Hansard* 11 December 2002, p.27. Torrens title: a system in which the law declares that ownership of land is as shown in a register maintained by the state. This removes the need for buyers to check the entire previous chain of transactions in order to be sure that the seller has good title.

2 Mr P. Sutherland (NSW Department of Infrastructure, Planning & Natural Resources), *Committee Hansard* 15 July 2004, p.789.

matter of water trading, considered in chapter 4). The Committee comments on some concerns that have been raised elsewhere:

- whether secure title will impede environmental management needs;
- concerns about giving public property to farmers.

Whether secure title will impede environmental management needs

3.6 Some environmentalists have criticised the scheme of water access entitlements from a fear that it will lock in a certain amount of irrigation water use, and this will make it harder to reclaim water for the environment in future.[3]

3.7 The concern appears to rest on a misconception that the proposed entitlement is to a certain fixed amount of water. This is not the case. There are places in the world where rights are to a fixed volume, but Australia is not one of them.[4] In Australia an entitlement has been, and will continue to be, a right to a certain *share* of the 'consumptive pool'. The consumptive pool is the water allowed for consumptive use, as determined by government decision having regard to the season and the rules in the relevant water sharing plan. The consumptive pool varies from year to year, and the year's *allocation* to entitlement holders varies correspondingly.[5] Security of *entitlement* does not change that principle.

3.8 It is the rules in the water sharing plan which reflect the trade-offs between competing interests, and which ought to take into account environmental needs. These trade-offs will be decided by the normal process of political debate. The Intergovernmental Agreement attempts to codify and harmonise water planning, and it entrenches the principle that the purpose of water planning is to provide for both ecological outcomes and resource security outcomes.[6] However it cannot decide, nor does it try to decide, those detailed debates.

---

3 For example: Greens MP Ian Cohen said… the long term future of rivers remained in jeopardy as long as there were inflexible, perpetual water licences. 'Knowles backs away from water levels', *Sydney Morning Herald*, 18 March 2004, p.2.

4 For example, 'rights (other than riparian) in California and Colorado are defined for access to a specific volume of water. Water is supplied to right holders in order of their date of appropriation — 'first in time' has priority — until all available water is taken.' Productivity Commission, *Water Rights Arrangements in Australia and Overseas*, 2003, p.xviii.

5 'Expressing surface water rights as a share … allows the risks of a shortage to be spread across all users. All right-holders will receive some level of supply in lower than average rainfall years…. For example, an individual who holds a one per cent share of the available flow is guaranteed to receive that one per cent, regardless of whether the one per cent converts to 10 litres or 10 ML.' Productivity Commission, *Water Rights Arrangements in Australia and Overseas*, 2003, p.99.

6 *Intergovernmental Agreement on a National Water Initiative*, 25 June 2004, s37.

Concerns about giving public property to farmers

3.9 The Committee notes concerns that perpetual entitlements are in effect giving public property to farmers.[7] The Committee does not see this as a problem. The consumptive pool, though public property in law, has long been used by farmers under licence. They have made investments in private infrastructure needed to use it, and rural communities have been built up around that use. Giving current users longer term security has no opportunity cost for the state, because there is no other way the state could use the water.[8] Thus it does no injustice to the broader public. It has the overriding purpose of encouraging greater efficiency in water use, which will benefit the economy and the environment.

3.10 A related concern is that making entitlements more secure may give the holders windfall gains - presumably when the value is realised on sale.[9] This is a reasonable concern. It raises the same equity and public interest issues as other situations where an asset appreciates not because of the personal exertion of the owner or the natural working of the economy, but merely because of a government decision.[10] To what extent should the state try to recoup the gain?

3.11 The Committee agrees that in principle there is no reason why individuals deserve windfall gains resulting from the state's administrative decisions. In practice, as in many comparable situations, it may be hard to do much about it. It may be hard to distinguish appreciation resulting from more secure entitlement from appreciation resulting from a more mature water market, or the general long term appreciation resulting from the balance of supply and demand.

3.12 On the other hand, there are situations where the state gives water to users extremely cheaply. For example, the Committee heard that water harvesters of the lower Balonne River in south west Queensland pay $3 per megalitre for water.[11] It would not be right for the state to give entitlements at fees that represent cost recovery pricing, which individuals might then be able to onsell at enormous profits.

3.13 For the state to charge more than cost recovery for water would effectively be appropriating a resource rent. In theory this is detrimental to economic efficiency. However, the water is a community resource, and if rent is going to be made is should

---

7 For example, 'Say NO to water licences in perpetuity. NCC cannot see the sense in offering $6.8 billion worth of water to a private industry…' Nature Conservation Council of NSW at http://www.nccnsw.org.au/ , July 2004.

8 Whether more water should be given to the environment is an *earlier* argument. The consumptive pool is the water left for users *after* allowing for environmental needs to the extent that the community deems adequate.

9 For example, *COAG water test for Carr*, media release, Nature Conservation Council of NSW, 24 June 2004.

10 For example, when land appreciates because of a rezoning decision.

11 Mr J. Grabbe, *Committee Hansard* 25 August 2003, p.48.

belong to the community as a whole, not to individuals who happen to be in the right place at the time when tradeable entitlements are given out.

3.14 The Intergovernmental Agreement is silent on the question of who tradeable water access entitlements should be given to, and at what price.

3.15 Windfall gains would be prevented by auctioning entitlements, rather than giving them out, in the first instance. This idea of course will not win the favour of water users. A more politically acceptable option would be to find some way of clawing back excessive gains when an entitlement is first sold.

3.16 Trade of entitlements will be subject to capital gains tax. However the Committee does not think that this is a sufficient answer to the problem. The problem is not the normal gradual appreciation of an asset, which capital gains tax is directed at. The problem is a transitional problem concerning a possible sudden jump in value when an existing licence is converted to a secure tradeable entitlement. The problem only relates to the first sale of the entitlement.

3.17 The Committee believes that COAG should consider ways of preventing windfall gains on first sale of tradeable water access entitlements.

Conditions under which entitlements may be cancelled

3.18 Under the Intergovernmental Agreement water access entitlements may only be cancelled '…at ministerial and agency discretion where the responsibilities and obligations of the entitlement holder have clearly been breached'. (IGA, s32(i)).

3.19 The Committee has a concern that the concept of 'cancelling' an entitlement seems to run counter to the principle of secure title. In other situations the penalty for prohibited act does not usually include confiscation of property. For example, if a property owner builds an illegal structure, this might result in a fine or an order to demolish the structure. It will not result in the land being confiscated.

3.20 A matter of concern is how the risk of cancellation would affect banks' willingness to use entitlements as security for loans.

3.21 The Committee urges COAG to clarify the intention of this section and the situations in which it might be used. Policies on this point will have to be nationally consistent.

Effects of separate water title on land values and council rates

3.22 The Local Government and Shires Association of NSW raised concerns that if water is separated from land, the land value would be reduced - sometimes dramatically. This would reduce *ad valorem* council rates.[12]

3.23 This is an important issue. Increasing the general percentage rate on land values to compensate could seriously disadvantage those who have land only already. It implies the need to give every parcel of land a notional 'land without water' value (comparable to the unimproved capital value of urban land), to value water entitlements applicable to the land separately, and to levy rates on both.

3.24 This may restore the status quo in respect of land with water, but of course it does not solve the problem of the declining land value and rating base where water is traded out of a district. That is a matter for structural adjustment assistance.[13]

3.25 As well, the Committee has a concern that that water entitlements valued separately may have a value more volatile than the value of land, since the value of entitlements is subject to the uncertainties of future government decisions to do with water plan reviews or allocation decisions. This could make Local Council budgets less reliable.

3.26 The Committee notes the approach to the problem in the recent Victorian White Paper, *Securing Our Water Future Together:*

> After unbundling, the Valuer General intends that valuations take into account the *capacity* of land to be irrigated (covering such matters as the existence of a delivery service, on-farm irrigation works, and access to drainage). This will capture some of the value presently derived from water rights, though not all.
>
> Councils will be able to maintain rate revenue by adjusting rates in the dollar, but without other action the rate burden would shift slight from irrigated properties to dryland farms and towns.

---

12 Cr W. O'Mally (LGSA of NSW), *Committee Hansard* 15 July 2004, pp.734-5. Similarly Mr D. Aber (Moree Plains Shire Council), *Committee Hansard* 26 August 2003, p.110. Mr N. Shillabeer (South Australian Murray Irrigators Inc.), *Committee Hansard* 20 April 2004, p.524.

13 The comment assumes that water would be rated if it is owned by a person who also owns the land it is used on. The problem arises of whether or how to rate water entitlements owned by non-residents. It would be possible, as part of initialising the system, to tag every water entitlement to a local government area. An absentee owner would pay water rates just as an absentee landlord pays land rates. However this implies that every entitlement, no matter where the water is used, carries an obligation to pay rates to the *source* LGA indefinitely. The scenario is comparable to proposals that farmers in irrigation areas wishing to sell out should pay exit fees equivalent to the ongoing levies they would pay to maintain the shared infrastructure. Both scenarios, in the long term, would probably impede the economic efficiency gains from water trading.

> Shire Councils have managed to spread rate burdens equitably by striking differential rates. At present, some councils strike a special, lower rate for irrigated farms. When water rights are not in valuations, they may in some cases decide that a higher rate is fair.[14]

3.27 Logically the 'capacity to be irrigated' approach to valuation should consider not only the *physical* capacity, but also

- whether the use would be environmentally permissible under use licence rules (in the case of already irrigated land, presumably the answer would usually be 'yes'); and
- whether water would be available in the market and at what price.

3.28 In a situation where water can be bought (whether as entitlement or annual allocations), the value of irrigation land without an entitlement would not suddenly drop to the value of dry land (as some witnesses seemed to fear). The value would be expected to reach a level which reflects its irrigation potential, subject to a discount which is the cost of the water that must be paid for separately. The situation is analogous to the situation where the value of urban vacant lots will track the value of developed properties providing it is permissible to build on the land, and subject to a discount which is the cost of the building that must be paid for separately.

3.29 The amount of the discount would still reduce the property value; so if the differential rate approach is not taken, the water would still have to be valued and rated separately if the aim is to preserve the same relative rate burden on irrigation and dryland farmers.

3.30 The Committee draws attention to the urgent need for governments to address this problem and develop a uniform approach.

Effects of review of water plans

Risk sharing rules

3.31 The value of an entitlement, in economic terms, will be the value of the water that can be drawn under it, as decided by government from year to year pursuant to the rules in the relevant water sharing plan.

3.32 The IGA has risk sharing rules to limit the effect on users of uncertainty about future changes to allocations. Users will bear the risk of reduced allocations resulting from seasonal or long term changes in climate, or natural events such as fire or drought. Users will bear the risk of reductions required by 'bona fide improvements in the knowledge of water systems' capacity to sustain particular extraction levels', up to 2014. Therafter, users will bear the risk of up to 3% reduction in allocations per 10 years; government will bear the risk beyond that. Government will bear the risk of

14 *Securing Our Water Future Together*, Victorian Government White Paper, June 2004, p.71.

reductions required by changes in government policy (for example, new environmental objectives) (s46ff).

3.33 These rules do not apply to recovering water in response to cases of known overallocation or overuse. Arrangements for this are either covered by National Competition Council endorsed implementation plans, or left for further consideration (s41ff).

3.34 Recovering water which is at the government's risk will presumably be based on buying entitlements or allocations in the market (IGA, s79(ii)(a)).[15] Thus changing allocation rules in revised water sharing plans may have a direct cost to government. This raises the risk the governments may be tempted to understate environmental needs in order to avoid the cost. It implies the need for a clear budget for recovering environmental water in the longer term. Mr Cosier of the Wentworth Group suggested there needs to be a 20 year investment plan.[16] It has been argued that the current $500 million 5 year 'First Step' project for addressing overallocation in the Murray-Darling Basin is just a start.

3.35 It will be important to provide continuity of action after the 'First Step' program expires, noting that the need is not limited to the Murray-Darling Basin. The Committee recommends that COAG should negotiate an ongoing shared program for funding the IGA reforms.

Recommendation 2

3.36 COAG should negotiate an ongoing shared program for funding the reforms in the Intergovernmental Agreement on a National Water Initiative.

Timing of reviews of water plans

3.37 Review of water sharing plans, if it foreshadows changed (presumably reduced) allocations, may be expected to influence the market value of entitlements. There is a need to coordinate review of plans interstate to prevent speculative trading across borders in the hope of profiting from differently timed changes.

3.38 The IGA has agreed guidelines for water plans, and it says, 'A plan duration should be consistent with the level of knowledge and development of the particular water source' (schedule E). However it does not suggest a standard plan duration or any commitment to coordinate reviews. The NSW Department of Planning, Infrastructure and Natural Resources noted that it is discussing coordination with Queensland and Victoria.

---

15 The IGA also envisages government recovering water by investing in efficiencies (s79(ii)(a)). However governments should not expect to get bargains by this route, since if there were bargains to be had farmers would presumably do the investment themselves to sell the saved water.

16 Mr P. Cosier (Wentworth Group) *Committee Hansard* 11 December 2002, p.3

3.39 The Committee draws attention to the importance of coordinating reviews of plans, as least over areas within which water may be traded.

Chapter 4

Issues to do with water trading

4.1 The purpose of water trading is to allow water, through market forces, to move to more profitable uses. Trade has occurred to some extent for many years, but to date it has been mostly small scale temporary trade (that is, trade of annual allocations, not the underlying entitlement). There are still impediments to interstate trade.

4.2 The Intergovernmental Agreement on a National Water Initiative (IGA) aims to remove impediments to trade. However all trade will still be subject to environmental constraints. For example, if water is sold upstream, the river flow between the selling and buying points will be reduced, with possible environmental consequences. Exchange rates are needed to allow for seepage and evaporation between selling and buying points. Trading rules will be needed to control these and other situations. The IGA lists 11 principles for trading rules (Schedule G).

4.3 Interstate trade will require the categories of entitlement in different states to be redefined so they correspond.

4.4 Most submitters to this inquiry supported water trading. Some are quite used to buying water as needed like any other business input, whether to top up an allocation or because they have no entitlement. Some are looking forward to the greater flexibility, in a more mature market, to sell their entitlement. However most stressed the need for some controls on the market to prevent entitlements accumulating in the hands of large investors who might gain market power.

4.5 The main concerns about water trading are discussed below.

Who should be allowed to buy water?

4.6 This question summarises two somewhat different concerns:

- concerns about possible contraction of rural economies in areas where water is sold away;
- concerns that water entitlements may accumulate in the hands of investors or speculators who may gain market power, to the detriment of farmers who then need to buy the water.

4.7 These concerns overlap but conceptually they should be distinguished. The first concern arises even if water is sold only to other water users. The second concern is additional.

Possible contraction of local economies where water is sold away

4.8 Many witnesses, though they support water trading in principle, were concerned that the economic benefits of water use should remain in the local area. They were concerned that if water is sold away the community loses the economic activity that the water created. For example:

> It [trading] does need to have some parameters to govern it …. we cannot allow free trading to suddenly take all the water out of the Namoi Valley and place it down in the Darling somewhere and leave Gunnedah, Narrabri and Wee Waa as desert towns.[1]

4.9 Such comments imply that water should only be bought by people who will use it in the same area (somehow defined) as the seller; or, if there is a middleman, that the water is tagged in some way so that it can only be resold to someone who will use it in the same area.

4.10 In such comments it seemed to be often implied that 'the local area' means 'the catchment'. However in a large catchment the concern could equally apply if water is sold from one region to another within a catchment.

4.11 The Committee is sympathetic to these concerns. However it must be said that to limit trade in this way would run fundamentally counter to the IGA's policy of allowing the freest possible trade (subject to environmental needs) so that water can move to more profitable uses. If water moves to areas where different natural endowments allow it to be used more profitably, this necessarily implies that the relatively less endowed source area will lose out.

4.12 The IGA does not propose any restrictions on trade based on socio-economic considerations. By negative implication it forbids them, since nothing of the sort is contemplated in the principles for water trading rules, which deal with limits on trade because of environmental requirements or delivery constraints (Schedule G). As well, it says:

> The States and Territories agree to establish by 2007 compatible institutional and regulatory arrangements that facilitate intra and interstate trade…. including:
>
> v)… no imposition of new barriers to trade… (s60)

4.13 In the case of irrigation areas with shared infrastructure, where there are concerns that trading out may leave stranded assets, the IGA allows permanent trade out to be limited to 4 per cent of the total entitlement 'subject to review by 2009 with

---

1 Mr J. Kahl (Lower Namoi Cotton Growers Association), *Committee Hansard* 26 August 2003, p.140. Similarly for example, Mayor J. Stone (Balonne Shire Council), *Committee Hansard* 25 August 2003, p.47. Mr P. Weller (Victorian Farmers Federation), *Committee Hansard* 21 April 2004, p.593.

a move to full and open trade by 2014 at the latest' (with certain other conditions for the southern Murray Darling Basin - s60(iv)(b)).

Comment

4.14 The Committee accepts that the regional adjustment problems caused by trade out could be serious matter in some areas. The Committee suggests that trading rules should take into account socio-economic impacts of trade.

4.15 Investment in water use efficiency measures may help incidentally, by putting a less naturally endowed area in a better position to use water with adequate profitability. However it is important that any public investment in efficiencies is economically disciplined and directed with priority to the highest returns. It should not be allowed to become a backdoor form of structural adjustment assistance.

Concerns about possible manipulation of the market

4.16 There are concerns that water entitlements might accumulate in the hands of major investors who might then exercise market power at the expense of water users. For example:

> Water is for the benefit of the entire region, not just for someone who happens to be in Sydney and is shoving a piece of paper in a drawer to constrict the market and then leasing things out to the highest bidder under desperate circumstances.[2]

4.17 Similar concerns arise at the prospect of entitlements being owned by non-users, whether or not there is market power:

> The Victorian Farmers Federation sees no advantage in someone in Collins Street owning water and trading it. There is no advantage for the environment, and there are no advantages for farmers. All that it will do is put another cost in there.[3]

4.18 A contrary view is that, assuming there are enough buyers and sellers, the discipline of the market will prevent profiteering:

> At the end of the day the water market is a bit like any other market: it is a supply and demand situation, and you can be the biggest water holder in the country but that water is not worth anything to you unless somebody wants to take it up and use it.[4]

---

2 Miss J. Hamparsum (Upper Namoi Water Users Association), *Committee Hansard* 26 August 2003, p.178.

3 Mr P. Weller (Victorian Farmers Federation), *Committee Hansard* 21 April 2004, p.593.

4 Mr N. Shillabeer (South Australian Murray Irrigators Inc.), *Committee Hansard* 20 April 2004, p.527.

4.19 The Committee suggests that while this may be true in the spot market for allocated water, it would be unwise to assume it in relation to the relatively untried market for water access entitlements. There is risk of speculation in hope of growth in the capital value of the limited resource, not merely in relation to the current use value of the water.

4.20 Most witnesses agreed that the possibility of profiteering is a concern, and that the market needs to be regulated. Prof. Cullen said: 'I agree with you that you would not want an unregulated market. I would be very concerned if I thought one or two people were going to own all the water and we were going to have peasant farmers. I hope that we can design a market that will stop that happening.'[5]

4.21 Mr Creighton of CSIRO argued, 'I do not believe we are about a free-form economic open market here, because we are about public good as well… We are not about a willy-nilly open market; we are about some managed trade.'[6]

4.22 Prof. Young suggested, 'If you wanted to stop it, you can simply require that somebody who owns a water right has to own some land as well.'[7]

4.23 Mr Dalton of the Department of Agriculture, Fisheries and Forestry said, 'I think that is an area where we would seek to have further serious analysis and investigation done.' Mr Sutherland of the NSW Department of Infrastructure, Planning and Natural Resources noted that 'There are provisions in the New South Wales legislation whereby the minister must approve the trading regime and can take into account any impacts that trading might have, any concerns about monopolies et cetera. However the basic reliance would normally be on the ACCC and the normal trading regulatory regimes.'[8]

4.24 The IGA has nothing to say about this matter, beyond the possible relevance of the following sections:

- trading arrangements should 'provide adequate protection to third-party interests.' (s58(v));
- in regard to the southern Murray-Darling Basin, the relevant parties agree to 'the National Water Commission monitoring the impacts of interstate trade and advising the relevant parties on any issues arising' (s63(vi)).

4.25 The Committee notes the policy in the recent Victorian White Paper on water, that 'a limit will be placed on the total volume of water than can be held by non-water

---

5 Prof. P. Cullen, *Committee Hansard* 11 December 2002, p.12.

6 Mr C. Creighton (CSIRO), *Committee Hansard* 14 July 2004, p.677.

7 Prof. M. Young, *Committee Hansard* 11 December 2002, p.13.

8 Mr R. Dalton (DAFF), *Committee Hansard* 14 July 2004, p.710. Mr P. Sutherland (NSW DIPNR), *Committee Hansard* 15 July 2004, p.799.

users in each supply system equal to 10 per cent of the system's entitlement'. The White Paper comments:

> It is unlikely that this limit will be reached in the near future. All the permanent trade that has ever taken place in the 12 years since it began has not yet amounted to 10 per cent of entitlement. Moreover, much of the permanent trade will continue to be from one irrigation business to another.[9]

Comment

4.26 The behaviour of a freer water market is hard to predict. The question is whether it will indeed become an efficient market with many buyers and sellers, none of whom can influence the general price level. The probability of a bad outcome is hard to estimate, and possibly low; but the consequences if it happens could be severe. The risk should be taken seriously. The Committee doubts that relying on the competition provisions of the Trade Practices Act would be an adequate remedy in practice.

4.27 The Committee regrets that the IGA does not deal with this matter. The Committee regrets that the IGA has not taken up the suggestion that entitlements should only be bought by people who also own land on which they could be used. This would solve the problem simply. It would not prevent brokers from facilitating trade, and it would not prevent the operation of a water exchange. It would have some administrative cost, but it should not significantly affect the economic efficiency outcomes of trade, since traded water only participates in economic production when it is eventually put on land by a buyer who has land. It would only prevent middlemen from *owning* the entitlement along the way.

4.28 The Committee has a concern that leaving this matter for state level control of trading regimes may lead to divergent policies in different states. In the Committee's view the policy on this matter should be national. The Committee recommends that COAG should develop a policy on rules to control the water market to prevent profiteering. This should be considered separately from the principles for trading rules already agreed in schedule G of the IGA, as the latter are focussed on the different matter of controlling trade to respect environmental requirements.

Recommendation 3

4.29 COAG should develop a policy on rules to control the water market to prevent profiteering or speculation by non-users, including foreign interests, to the detriment of water users or the environment.

9 *Securing Our Water Future Together*, Victorian Government White Paper, June 2004, p.69

Need for structural adjustment assistance

4.30 Most comment in evidence about structural adjustment assistance referred to the need arising from recovery of water for the environment. The concern is that while individual farmers might be paid for recovered water (subject to the risk sharing rules), this would not compensate for the knock-on effects of reduced economic activity on rural communities. The logic is that environmental goals should be paid for by the whole community, not only by farming communities:

> We are advocating the need for major structural adjustment reform in the way we manage the landscape. We are saying that you cannot ask farmers to bear that cost.[10]

4.31 Where a local economy contracts because of water trading out, the moral case for assistance is not the same. It could be argued that economies are not immutable; the chance of economic downturn is one of the risks of life; the community has effectively benefited from a restrictive trade practice in the past and need not be compensated for losing it.

4.32 On balance the Committee is *not* inclined to argue on these lines. In the Committee's view communities affected by water trading out have a fair claim to structural adjustment assistance, since:

- many of the communities concerned are longstanding, and have developed a social infrastructure in reasonable expectation of a stable future;
- the need arises not from the normal evolution of the economy, but from a deliberate, one-off government decision;
- the economic effects of water trading and recovering water for the environment may be hard to separate;
- both activities serve the overarching community goal of improving the health of rivers.

4.33 The IGA commits the parties to 'address adjustment issues' (s94) and the Commonwealth commits to 'discussing with signatories to this Agreement assistance to affected regions on a case by case basis…' (s97). There are no specific proposals.

4.34 It will take time to see the extent of the need, as the water market matures. However the need should not be overlooked simply because the effects may develop gradually. The Committee notes that the Murray Darling Basin Commission is studying the socio-economic effects of the First Step project to recover 500 gigalitres

10 Mr P. Cosier (Wentworth Group), *Committee Hansard* 11 December 2002, p.10.

of environmental water.[11] This could usefully be broadened to cover the effects of water movement generally.

4.35 The Committee suggests that COAG should commit early to a program of jointly funded structural adjustment assistance for affected communities, of similar profile to the Intergovernmental Agreement on addressing overallocation in the Murray Darling Basin. The Committee suggests that this would improve public acceptance of water reform. The exact money involved would not need to be decided early. It would depend on how trade develops. However it is important to set up the framework and to start the necessary research early so there is a baseline for comparison later.

Recommendation 4

4.36 COAG should commit to a jointly funded program of structural adjustment assistance to communities whose economies are contracting because of water trading, and agree to provide adequate financial support for projects to promote environmental recovery in degraded areas.

Problem of stranded assets

4.37 Adjustment problems will probably be most serious in some irrigation areas. This raises the problem of 'stranded assets': if some farmers sell out, the burden on those remaining to pay the maintenance costs of shared infrastructure increases.

4.38 Some irrigation area bulk suppliers have restricted trade out of the area for this reason. For example, in the Central Irrigation Trust (South Australia), 'You can trade your water, but you are allowed to trade only two per cent out of the system at any one time….

> The reason behind that is that, if you have a massive irrigation infrastructure, you do not want everyone trading their water at the same time.[12]

4.39 The Committee notes the argument that shareholders of a company have every right, by majority vote, to manage the company this way:

---

11 Mr K. Goss (MDBC), *Committee Hansard* 30 October 2004, p.312. Murray-Darling Basin Commission, *Scoping of economic issues in the Living Murray, with an emphasis on the irrigation sector,* 2003. Hassall & Associates et al, *Scoping Study: Social Impact Assessment of Possible Increased Environmental Flow Allocations to the River Murray System, Stage 1*, 2003. Hassall & Associates et al, *Profiling - Social and Economic Context: Social Impact Assessment of Possible Increased Environmental Flow Allocations to the River Murray System, Stage 1, Volume 2,* 2003. EBC, *Development of a Framework for Social Impact Assessment in the Living Murray: Water Recovery in the Murray Irrigation Area of NSW,* 2003.

12 Mr T. Mader (Riverland Development Corporation Inc.), *Committee Hansard* 20 April 2004, p.541.

> As a corporation, we went along to the shareholders and said: 'These are the assets you own. How are we going to manage them?' One of the things they said… was that as a group of shareholders and a community they do not want to see water traded out of the area. We take that not as a barrier to trade; it is just the shareholders who own the assets saying that they do not want to sell them.[13]

4.40 The IGA aims to override this behaviour to ensure the freedom of individual end users to trade. As a concession, trade out of irrigation areas may be limited to 4 per cent of entitlement per year for the time being, with the aim of a move to full and open trade by 2014 (s60,63).

4.41 Exit fees have been proposed as a way of maintaining the viability of an irrigation area when water is sold out. These could be calculated as the net present value of the stream of future levies which the seller would have paid for maintenance of shared infrastructure.[14] The IGA has provisions which imply a concern that exit fees could be used as a disguised barrier to trade.[15]

4.42 The Committee draws attention to the need to monitor this matter. The Committee notes that imposing exit fees may have economic efficiency implications in the longer term. At the limit it raises the possibility that many farmers who have sold out are paying to maintain expensive infrastructure indefinitely for a few who remain.[16] This may be regarded as fair to those who remain, but it might not be an efficient use of resources.

Unintended effects of trade: activating sleepers

4.43 The Committee heard that more trade has had the effect of activating 'sleeper' (unused) licences, when the owner of a sleeper sells it to someone who does want to use it. This has increased water use.[17] The implication may be that this is a reason to limit or postpone freer trade.

4.44 Where water needs to be recovered from overallocated systems, it is a vexed question whether sleepers should be given the same treatment as active users, or whether sleepers should be confiscated first, by a 'use it or lose it' policy, on the

---

13 Mr M. Bramston (Coleambally Irrigation Cooperative Ltd), *Committee Hansard* 27 August 2003, p.235-6.

14 [COAG], *National Water Initiative Discussion Paper*, [April 2004], p.16.

15 s60(vi): '…no imposition of new barriers to trade, including in the form of arrangements for addressing stranded assets.' s62: '…the Parties agree to ensure that support mechanisms… such as access and exit fees and retail tagging, do not become an institutional barrier to trade.'

16 'Indefinitely': this is the case where an exit fee is set at the net present value of the stream of future maintenance levies which the departed farmer would have paid.

17 For example, Mr R. Browne (Gwydir Valley Irrigators Association) *Committee Hansard* 26 August 2003, p.134. Similarly House of Representatives Standing Committee on Agriculture, Fisheries and Forestry, *Getting Water Right(s) - the future of rural Australia*, 2004, p.84.

grounds that this minimises economic dislocation. The arguments are considered further from paragraph 5.25.

4.45 The Committee suggests that this problem should not be a reason to limit trade. To do so for this reason would effectively be saying: 'You may activate your sleeper, but you may not trade it, because we know that in practice this makes it less likely that it will be activated.' This seems a rather ad hoc and possibly unfair approach.

4.46 The sleeper problem will need to be worked out by catchment communities and government on a case by case basis. If the answer is to give sleepers equal rights with active licences, increased water use caused by trading sleepers will need to be addressed by the general procedures for recovering overallocated water.

Need for nationally consistent regulation of trade

4.47 Schedule F of the IGA lists guidelines for water registers, and schedule G lists 11 principles which the parties are to follow in setting water trading rules.

4.48 If such rules are not nationally identical, they should at least be nationally equivalent in effect. The Committee sees a risk that without deliberate continuing oversight the rules may diverge in different states, due to the normal vagaries of state politics subject to differing local political pressures. As well, there is a risk that the ongoing interpretation and application of the rules in detailed management of trade could differ.

4.49 The Committee sees a need for ongoing oversight of the water market to ensure national consistency. This could presumably be a role for the National Water Commission.

Chapter 5

Other issues

Encouraging more efficient water use

5.1 The efficiency of water use in different areas, and the profitability of use on different crops, varies greatly. The Committee heard a number of examples of irrigation sectors that have improved their efficiency of water use greatly in recent years or decades. However, overall there is still much potential for improvement.

What should be done with saved water?

5.2 In the case of a textbook firm, efficiencies might allow the firm either to produce more output with the same input, or to produce the same output with less input (or any intermediate combination). The market will show which course is most profitable. In the case of water reform, the implicit aim, overall, is the second: to produce the desired output with less water, so that saved water can be returned to the environment without hurting farming economies.

5.3 The idea that a farmer might use saved water to increase production intuitively seems to run counter to the aim of returning water to the environment. Talk about how the savings from efficiencies should be 'shared' between farmers and the environment may raise concerns that a farmer might be asked to invest in efficiencies, only to see government take the saved water away. This sort of concern seemed to be behind comments by many witnesses who stressed that if farmers are to invest in efficiencies they must be able to reap the benefit:

> If farmers are encouraged to invest on farm and water efficiency projects then they should be able to recognise, use and retain any saving; and similarly for government. Where there are jointly funded projects, you share the benefits.[1]

5.4 The Committee agrees. To encourage farmers to invest in efficiencies, they must obviously be able to use the savings from their own investment as they see fit - whether to sell the saved water or to increase their production. The duty of the community at large, in conjunction with government, to ensure environmental health is a separate matter, which it does by fixing the size of the consumptive pool and by buying water for the environment as necessary:

> The Wentworth Group strongly support water efficiency and we strongly support water efficiency going to increased production, which creates

1 Mr D. Miell (NSW Irrigators Council), *Committee Hansard* 15 July 2004, p.772.

> further wealth. However, it has to be underpinned by securing the environmental health of the river first.[2]

Should government invest in efficiencies directly?

5.5 The question arises as to whether government should be directly involved in subsidising or investing in efficiency infrastructure on private land. The administrative costs will be considerable. It might be argued that providing government has fixed the consumptive pool at a size that adequately protects the environment and set water prices at full cost recovery (allowing for environmental externalities), it is a matter for users to decide the most profitable mix of capital (irrigation systems etc.) and consumables (water) in their production. Whether a possible efficiency investment is attractive (for example, piping channels to avoid seepage and evaporation losses) will depend on the cost of water, the cost of the investment and the amount of water it saves.

5.6 The IGA implies that government may be directly involved in encouraging efficiencies - presumably by funding or subsiding efficiency investments on private property in return for taking the saved water. The justification for government involvement would be that society may take a longer term view than the individual, and may wish to encourage investment whose payback period would be too long to be attractive to the individual:

> It costs money to save this water…. the payback period on this particular graph, which is about 15 years for the best-case scenario, is too long for the farmer. We need to look into investments which can reduce this payback period to less than five years so that farmers will start thinking about conversion and providing this water for other users.[3]

5.7 On the other hand, if government wishes to intervene on the basis that the individual's payback period is too short for society's needs, it can force the pace simply by offering an above market price for water. This would reduce the payback period for the individual's investment in saving water.

5.8 Government will of course need to invest in public infrastructure on its own account:

> There is a big difference in the system between on farm, which is essentially private property; near farm, which is the irrigation area which tends to be a cooperative corporate structure; and then system wide, upstream from the irrigation areas, which is effectively the commons and owned by the government. Different principles need to be applied in each of those zones.[4]

---

2 Mr P. Cosier (Wentworth Group), *Committee Hansard* 30 October 2003, p.275.

3 Prof. S. Khan (CSIRO), *Committee Hansard* 14 July 2004, p.665.

4 Dr W. Hurditch (Pratt Water), *Committee Hansard* 21 April 2004, p.568.

5.9 It will be important that any direct government investment in private efficiency infrastructure is economically disciplined, and does not become a de facto form of structural adjustment assistance. There is no reason for government to be involved in obtaining environmental water by investment if the cost to government is higher than simply buying the water in the market (subject to paragraphs 5.6-5.7).

5.10 Related comments are at paragraph 5.19 below.

Effect of reducing return flows

5.11 More efficient water use will reduce return flows to the river or drainage past the root zone to recharge the aquifer. This will reduce supply to downstream users. If this happens in a fully allocated system which has significant return flows, the system will become overused. The possible effects are important, since the possible savings in this way are often high relative to savings from reduced evaporation or more productive transpiration.

5.12 The response could be either to cut allocations across the board, or to define allocations as net of return flows - which requires better knowledge of what the return flows are. Mr Creighton of CSIRO stressed the need for better water accounting to inform this matter:

> We have come from a system in Australia where you got an entitlement. You may not have used it all—sleepers and dozers and everything else—or, if you did, you allowed much of it to go via ground water or surface run-off back to the system, then someone else picked it up and used it. As we get more precision about our irrigation, our dry land or whatever it is, that is not going to happen. But, unless we have a water account and unless we understand the system, we are not going to be able to put some numbers on the changes.[5]

5.13 Alternatively: 'When cost or technology limitations prevent direct measurement of net use either an attempt should be made to deem the extent of net use or entitlements should specifically make it clear that as net use increases gross allocations will be cut on a one for one basis.'[6]

5.14 A benefit of government buying environmental water in preference to investing directly in efficiencies is that when government buys environmental water the least efficiently used water is likely to be offered first. When this water is returned to the environment the return flow problem does not arise. If government invests in improving the efficiency of the least efficient water, the return flow problem will be greatest.

---

5 Mr C. Creighton (CSIRO), *Committee Hansard* 14 July 2004, p.678.

6 CSIRO Land and Water [M.D. Young & J.C. McColl], *Robust Separation - a search for a generic framework to simplify registration and trading o interests in natural resources*, September 2002, p.9.

5.15 The Committee draws attention to the importance of this issue. The Committee recognises the primary importance of better accounting for all water flows in a catchment, and recommends that steps be taken in all catchment areas to properly assess the amount of water necessary for maintenance of environmental health and the amount available for trade.

Recommendation 5

5.16 Water management authorities should take steps to properly assess in all catchments the amount of water necessary to maintain environmental health and the amount available for trade.

Recovering overallocated water

5.17 The Intergovernmental Agreement sets out principles for recovering water for the environment. Options include:

- investment in more efficient water infrastructure;
- purchase of water on the market, by tender or other market based mechanisms;
- investment in more efficient water management practices, including measurement; or
- investment in behavioural change to reduce urban water consumption. (s79(ii)(a)).

5.18 The selection of measures should be 'primarily on the basis of cost-effectiveness' (s79(ii)(c)). The Intergovernmental Agreement on addressing overallocation in the Murray-Darling Basin has similar points (s23).

Buying back water versus investing in efficiencies

5.19 As to whether government should obtain environmental water by simply buying it in the market, or by investing in efficiencies, the same issues arise as at paragraph 5.5. It would be easier for government simply to buy water as necessary, and leave it to the sellers to decide the best way of finding it - whether by contracting their production, or by investing in efficiencies so they can maintain production and have some water to sell:

> If you go in with a voluntary [buyback] mechanism, you find all of the water and you empower people with the money to upgrade, without having to spend a lot of taxpayers' dollars involved in designing complicated schemes.[7]

5.20 On the other hand, many submitters to this inquiry seemed to prefer the prospect of direct government support. For example:

---

7 Prof. M Young (Wentworth Group), *Committee Hansard* 30 October 2003, p.281-2.

> The way to tackle it in the community is not to say, 'We're going to take away your water resource or your economy is going to go down the tubes,' but to say, 'We can actually show you a way where, if you start at the marketing end of your product and look for overseas markets, if you look for products which you can get paid more for, if you look at your quality assurance, if you look at the way you grow your product and if you look at the way you irrigate and do your business, there is actually a better outcome for your regional community.'[8]

5.21 In such comments there appears to be an underlying assumption that government investment means water will be saved by efficiencies while maintaining rural economies at the same level of output; but if government simply buys water back for the environment it is more likely that rural economies will contract.

5.22 This is not necessarily so. If government buys water, the sellers can use the money to invest in efficiencies to maintain their production, and the end result will be the same as if the government invested in the efficiencies directly and took the saved water. How much this happens will depend on the return on investment at prevailing prices. The basic economic calculus does not depend on who initiates the efficiency investment. It would certainly be easier administratively for government simply to buy water, and leave it to the market to prioritise efficiency investments.

5.23 If government wishes to support private efficiency investment directly for policy reasons (which the IGA allows for), it will be important that this investment is economically disciplined and directed with priority to the best returns. It must also be kept in mind that the primary motivation for the development of the IGA was severe degradation of a significant river system. As such, providing money to support private efficiency investment should be peripheral in light of larger issues to be tackled.

5.24 The comments above refer only to the economics of obtaining environmental water. The quote at paragraph 5.20 also relates to government's role in research, public education and consumer advice. These are indeed vital roles of government. They cannot efficiently be turned over to private enterprise because they have a large 'public good' element.

How to treat sleepers and dozers

5.25 The question arises: should government should tackle overallocation by confiscating sleepers and dozers (unused or little used rights) with priority, on the grounds that this minimises economic dislocation?

5.26 Submitters to the inquiry, however much they regretted the fact that licences may have been given too freely in the past, generally did not favour this. They argued

---

8 Mr T. Mader (Riverland Development Corporation Inc) *Committee Hansard* 20 April 2004, p.549.

that sleeper licences have been treated as property with value, property may have changed hands on that basis, and it would not be fair to withdraw them now:

> Even though they may be a sleeper or dozer, the finance industry has valued that land at a higher value because of that piece of paper. That higher value is not reflected only in the market rate upon selling the property; even the valuer general recognises it when he values your property for shire rates, whether or not you have used it.[9]

5.27 New South Wales has particular problems with over-allocated groundwater systems, such as the Upper Namoi. New water sharing plans for major groundwater systems have been deferred to further consider this problem. It appears that the NSW government is still considering all options:

> The government is looking at the history of use as the focus of how those licences should be amended…. I think you will find that, in areas where for whatever reason there has been a low history of use—whether because of the nature of the aquifer or the level of development of the farm—under the proposed structural adjustment regime the entitlements of those licences will be reduced preferentially before the active licences…[10]

5.28 A related matter is whether some groundwater sleepers are in fact 'ghosts' - licences held by farmers who do not in fact have access to groundwater. The extent of the problem is unclear. The Committee heard that there is a problem on the Gwydir.[11] The Department of Infrastructure, Planning and Natural Resources suggested that it is not so much a problem of no water as of low yield:

> **Senator HEFFERNAN**—But there are people who have bore licences and do not have any bore water.
>
> **Mr Alvarez**—No, there are not any that do not have any bore water….. There are some areas of cracked rock where the amount of water they were granted was greater than the amount they could ever get out of it. There is no doubt about that. But, over all aquifers, it is about the rate at which they can take it.[12]

5.29 NSW is now considering how to deal with these situations:

---

9 Miss J. Hamparsum (Upper Namoi Water Users Association), *Committee Hansard* 26 August 2003, p.163. Similarly Mr N. Shillabeer (South Australian Murray Irrigators Inc.), *Committee Hansard* 20 April 2004, p.523.

10 Mr P. Sutherland (NSW Department of Infrastructure, Planning & Natural Resources), *Committee Hansard* 15 July 2004, p.791,793

11 Mr M. Murray (Gwydir Valley Irrigators Association), *Committee Hansard* 26 August 2004, p.124-5. Mr J. Warnock (Upper Namoi Water Users Association), *Committee Hansard* 26 August 2004, p.163-4.

12 Mr K. Alvarez (NSW Department Infrastructure, Planning & Natural Resources), *Committee Hansard* 15 July 2004, p.792.

> In areas where for whatever reason there has been a low history of use—whether because of the nature of the aquifer or the level of development of the farm—under the proposed structural adjustment regime the entitlements of those licences will be reduced preferentially before the active licences.[13]

5.30 In the Committee's view the question of how to treat sleepers and dozers will have to be worked out by catchment communities and government on a case by case basis. The Committee does not think that the owners of ghost licences should be allowed to profit from them. There is no reason in fairness why a licence to take groundwater if there is any, when in fact there is none (that point being at the licensee's risk) should be upgraded into an entitlement to a share of a *known* water resource.

5.31 Related comment on sleepers is at paragraph 4.43ff.

Allowing for water interception by landuse changes

5.32 Interception of water before it reaches a watercourse is a significant issue. The Intergovernmental Agreement provides that, in water systems that are fully allocated or approaching full allocation, interception activities above an agreed threshold size will require a water access entitlement. Systems not yet near full allocation should be monitored, and water access entitlements will be required when the threshold level of interception is reached or the system approaches full allocation (s57).

5.33 Examples of 'such activities that are of concern, many of which are currently undertaken without a water access entitlement', are:

- farm dams and bores;
- large scale plantation forestry; and
- intercepting and storing of overland flows (s55).

Effects of farm dams

5.34 The National Land and Water Resources Audit estimated that in 1996-97 Australia's several million farm dams accounted for about 9% of total stored water.[14] Farm dams can obviously have a significant impact on downstream water availability.

5.35 The Department of Agriculture, Fisheries and Forestry (DAFF) noted the concern about the growth in numbers of farm dams, particularly in the upper catchments of major rivers. It described the different approaches to farm dams taken by NSW and Victoria:

---

13 Mr P. Sutherland (NSW Department Infrastructure, Planning & Natural Resources), *Committee Hansard* 15 July 2004, p.793.

14 National Land and Water Resources Audit report *'Australian Water Resources Assessment 2000'*, June 2001, p. 27. The report estimated total storage capacity at 79,000GL.

> The NSW farm policy, for example, limits the right of landholders to capture and use runoff for any purpose to 10% of the average yearly rainfall runoff for their property. This is known as a Harvestable Right and is tied to the land - it is intended to satisfy essential farm needs such as for stock watering, house and gardens and may be for any purpose including irrigation. This right will not be licensed and no fees will apply.
>
> In Victoria, the *Water (Irrigation Farm Dams) Act 2002* came into operation on 4 April 2002. It amended the *Water Act 1989* and extends licensing arrangements to cover all irrigation and commercial use in the catchment.[15]

5.36 Mr Weller of the Victorian Farmers Federation gave the rationale for the new regulation of farm dams in Victoria:

> If you have a Murray-Darling Basin cap and farmers in the catchment areas continue to catch water and create new developments on their farms—which they have been able to do, provided they do it off a waterway—you are undermining the reliability of the water supplied to the irrigators who have made investments in laser grading and drip irrigation.[16]

5.37 The contrary view is that landholders should have a basic right to take a share of the water which falls on their own property. Mr Evans described the effect of the new rules on upper Murray farmers:

> Following passage of the [Victorian] Farm Dams legislation, a landowner wishing to store any water resulting from rainfall on his/her land, to use on that land for productive purposes, must first purchase a Water Right from within the relevant catchment, and then build a storage dam – for water which has never left the farm![17]

5.38 Mr Evans suggested that if 20 per cent of sales water was set aside for upper catchment farmers, this would not be a significant risk to water supply to irrigation farmers. He suggested further: 'The right to store water should be proportionate to the average rainfall in the area of land it held, and not be transferable.'[18]

Comment

5.39 The Committee is sympathetic to these concerns, especially in light of the fact that the farm dam controls differ between Victoria and New South Wales. However there is no denying that, in principle, upstream water interception should be integrated into the total water sharing plan for the catchment. That implies controlling it if necessary, along the lines suggested in the Intergovernmental Agreement.

---

15 Submission no. 52, Attachment A, p. 34.

16 Mr P. Weller (Victorian Farmers Federation), *Committee Hansard* 21 April 2004, p.600.

17 Supplementary submission no. 12A, p.1.

18 The Hon D Evans, *Committee Hansard*, 15 July 2004, p. 720,723.

5.40 The Committee could not question the Victorian government on this matter, as the Victorian government declined the Committee's invitation to appear. In relation to the policy, the Committee cannot comment on whether the recent tightened regulation of farm dams is warranted, or an over-reaction, in context of the water balance the whole catchment. The Committee notes the different policies of the New South Wales and Victorian governments, and suggests that the two governments should negotiate a harmonised position.

5.41 On the question of fairness: the situation is similar to any situation where government limits a long held right for policy reasons - for example, new controls on land clearing, or withdrawing a sleeper water licence on 'use it or lose it' policy. Government must be able to make such changes for the longer term common good. Fairness means making reasonable transitional arrangements for the people most affected.

5.42 The Committee notes that the Victorian farm dams legislation provided a subsidy to those who decided to put in dams following the passage of the legislation, although according to Mr Evans this has had a very slow take-up.[19] The suggestion to give the affected farmers a water entitlement raises concerns about how widely eligible landowners should be defined and what the effect would be on demand:

> **ACTING CHAIR**—If we are going to buy back water for the environment—and there is not a lot of water, just a few thousand megalitres—couldn't we buy their water back for them?
>
> **Prof. Cullen**—It might only be a few thousand megalitres at the moment, but I think once you set that precedent there will be quite a big queue.[20]

5.43 The Committee suggests that where a tightening up policy is necessary, in fairness it would at least be reasonable to announce it as a 'use it or lose it' policy, and give farmers a reasonable time to use it.

Effects of plantation forestry

5.44 The issue of water-intercepting landuse changes arises particularly in relation to plantation forestry in higher rainfall areas. A pine forest at the 800mm rainfall isohyet intercepts up to 2 megalitres per hectare per year; at the 1000mm isohyet, up to 3 megalitres - which is about equivalent to the effect of a small farm dam on every hectare.[21] Plantation forestry in the Murray-Darling Basin is growing strongly, with government incentives. On one estimate, the goals for forestry development in the

---

19 The Hon. D. Evans, *Committee Hansard* 15 July 2004, p.723.

20 Prof. P. Cullen, *Committee Hansard* 14 July 2004, p.706.

21 Prof. R. Vertessy (CSIRO), *Committee Hansard* 30 October 2003, p.300-302. R. Vertessy, L. Zhang, W.R. Dawes, *Plantations, River Flows and River Salinity*, Cooperative Research Centre for Catchment Hydrology, n.d., p.3,10.

2020 Vision for plantation forestry would reduce flow in the Murray-Darling by 600 gigalitres per year.[22]

5.45 The plantation forestry industry disputes exactly how serious the problem is;[23] however there can be no disputing the principle that this interception of water should be considered a consumptive use, and should be factored into water planning for a catchment.

5.46 This issue has been slow in being recognised. For example, the Committee was concerned to note that the recent Murrumbidgee water sharing plan made no reference to it.[24] It appears that it is now being addressed. Mr Sutherland of NSW DIPNR advised:

> In high-yielding aquifers with good quality water, there is clearly a threat to the water production potential of those aquifers. So New South Wales, together with other states and the Commonwealth, is certainly exploring this: firstly, getting the scientific knowledge right in terms of how we model that and, secondly, using the best range of policy instruments to provide incentives or disincentives to industry so as not to see plantations established in those high-yield catchments.[25]

5.47 The plantation forestry industry is concerned that forests should not be discriminated against because they are the most visible target. It argues that 'a national approach to water rights and allocations should take into account water use by all irrigated and dryland rural industries in a non-discriminatory manner. There is no scientific basis to suggest that plantation forestry should be regulated in a different manner to any other dryland landuse.'[26]

General comment on water intercepting activities

5.48 The Committee appreciates the difficulty of this issue and the good intentions of this section of the IGA. However it has a concern that the IGA provisions on this depend very much on the interpretation of when a water system is 'approaching full allocation', and what the threshold level of water intercepting activity should be. Progress on this matter will depend on continuing political commitment. The prospect of introducing a wide ranging new suite of rural landuse controls to account for dryland water use is daunting. Alternatively, Prof. Young suggested that better

---

22 M.D. Young & J.C. McColl, 'Robust Reform: the case for a new water entitlement system for Australia', *The Australian Economic Review*, vol.36 no.2, p.227

23 *'Plantations, River Flows and River Salinity' - comments by the National Association of Forest Industries*, n.d. [2003]

24 *Committee Hansard* 27 August 2003, p.260-262.

25 Mr P. Sutherland (NSW Department of Infrastructure, Planning and Natural Resources), *Committee Hansard* 15 July 2004, p.794.

26 Submission 54, National Association of Forest Industries Ltd, p.3.

accounting for impacts, both positive and negative, would allow more market-based solutions:

> You set up robust ways so that people account for water fully and properly; similarly, you set up robust ways of accurately defining salinity impacts and accountability for salinity and giving people credits for when they produce real solutions and giving them debits when they do not—and similarly with issues like greenhouse. If you put the whole suite together and design your pricing, quota and allocation systems, whether for water or salinity or whatever, then you can have optimal allocation through market processes without having to have tighter planning controls. Alternatively, you can use zoning type models where you just prohibit people from doing things at specific locations.[27]

5.49 This raises the question of whether we have enough scientific knowledge to do the necessary accounting. Dr Williams suggested:

> Have we got enough technical and scientific knowledge of our landscapes to be able to do comprehensive water balance and water accounting everywhere? Probably the answer is: we have enough to start, but we will need to refine it as we go along.[28]

5.50 Prof. Young suggested that there is a tradeoff between the cost and complexity of a water accounting system and the accuracy required:

> The systems the work best are those that are quite clunky and have four or five classes and a deeming arrangement, in which it is assumed that, for now, all lucerne, for example, has a recharge of such and such, or a run-off of such and such, or that a certain class of plantation has a factor of so much—you do it on a class-by-class basis. You build your accounting framework on that sort of fairly crude system, which will get it 80 or 90 per cent right.[29]

5.51 The Committee recommends these matters be progressed quickly, so that water authorities can adequately manage the total water balance of the catchment.

Recommendation 6

5.52 Water management authorities should give priority to establishing the systems necessary to account for the total water balance of catchments to allow better management of water-intercepting activities.

5.53 The Committee is sympathetic to the concern of the plantation forestry industry that plantations should not be discriminated against because they are the most visible target. The IGA refers to all water-intercepting activities in the same way, which is appropriate. However it may be a matter of practical necessity to control

---

27 Prof. M. Young (CSIRO), *Committee Hansard* 30 October 2003, p.289.

28 Dr J. Williams (CSIRO), *Committee Hansard* 30 October 2003, p.297

29 Prof. M. Young (CSIRO), *Committee Hansard* 30 October 2003, p.298.

large scale plantation forestry with priority, if the science shows that that is the most important single issue.

5.54 The Committee notes the importance of better scientific knowledge to account for total water movement in catchments. The Committee recommends that this should be a priority for Commonwealth funded programs such as the National Land and Water Resources Audit, the Cooperative Centre for Catchment Hydrology, and the Water for a Healthy Country Flagship.

Recommendation 7

5.55 Relevant Commonwealth funded research programs should give priority to researching the total water balance of catchments to allow better management of water-intercepting activities, with particular reference to the effects of large scale plantation forestry on runoff.

Example of overallocation: the Lower Balonne

5.56 The lower Balonne River in southwest Queensland stands as an example of some problems of water planning which are not solved in the Intergovernmental Agreement. Solving them will require continuing political motivation.

5.57 The lower Balonne is a 'flood pulse' river, whose flows vary enormously from year to year. The downstream floodplain environment (including the important RAMSAR listed Narran Lake Nature Reserve[30]), as well as the productivity of floodplain graziers, depends critically on the regime of flooding.

5.58 During the 1990s water harvesting developments on the lower Balonne (downstream of St George) increased greatly. Total offstream storage is now about 1,500,000 megalitres - five times greater than in 1993/94.[31] Cubbie Station, the biggest cotton farm in the district, has storage capacity of 460,000 megalitres.

5.59 It is now clear that the government of the day was at best shortsighted, at worst reckless and overpowered by self-interest, in allowing this level of development. The enormously increased water harvesting has greatly reduced the reliability of supply to the pre-existing St George irrigation area. Reduction in beneficial flooding has seriously affected the productivity of the downstream floodplain graziers in southwest Queensland and northwest New South Wales.[32] It will probably have serious long term effects on the ecology of the floodplain, mainly by eliminating the more frequent small floods. This is important because the health of

30 RAMSAR list: the list of wetlands of international importance established under the Convention on Wetlands (Ramsar, Iran, 1971)

31 *New South Wales government response to the Consultation Draft Water Resource (Condamine and Balonne) Plan 2003,* May 2004, p.14.

32 Submission 61, Culgoa Balonne Minor Water Users Association.

ecological assets such as the Narran Lakes depends on the frequency of floods. A 2003 scientific review found:

> The Panel supports the contention of the CRC for Freshwater Ecology that there will be significant long term degradation of the Lower Balonne floodplain and of the Narran lakes in particular once the system experiences the water extraction that is possible with the present infrastructure. We see a long period of decline, with the full impacts not necessarily being fully obvious within the 40 year time scale of this assessment, due to the background high flow variability. [33]

5.60 For example, the medium flood in January 2004 delivered far less water to the floodplain than the similar event in 1994. Cubbie harvested about 150,000 megalitres.[34] The NSW government reported later:

> The flow events of February-March 1981, March 1988 and March 1994 all followed long periods of no flow (the 1981 being the longest) and are similar to the January 2004 event. The volume of water entering NSW, as a proportion of the total flow at St George, was 44% for 1981, 45% for 1988 and 48% for 1994. In contrast, the cross-border flow from the Jan 2004 was only 20% of the total at St George. Preliminary Landsat 5 image analyses, comparing the 1988 and 2004 events, indicate that this 50% reduction in total flow and greater attenuation of flow peaks, resulted in a reduction to floodplain inundation of 73% in Queensland and 88% in NSW.[35]

5.61 Against this background the Queensland government has been conducting a contentious and long-drawn-out water planning exercise for the Condamine-Balonne. The draft Condamine-Balonne Water Resource Plan issued in December 2003 proposes that Lower Balonne water users would reduce their daily extractions by up to 10% during specified flow events (the water will be paid back by allowing higher extraction during bigger floods).[36] However it also formalises existing practices for taking overland flows, by building levees to redirect flow, or by 'bunding' - excluding water from an area in order to harvest the water that would have soaked into the ground over that area. These developments have taken place apparently without adequate regulation or assessment of environmental impacts. In fact some evidence points to environmental evasion.

---

33 P. Cullen, R. Marchant & R. Mein, *Review of Science Underpinning the Assessment of the Ecological Condition of the Lower Balonne System*, January 2003, p.31,34.

34 Mr O. Betts (Culgoa Balonne Minor Water Users Association), *Committee Hansard* 14 July 2004, p.639.

35 *New South Wales government response to the Consultation Draft Water Resource (Condamine and Balonne) Plan 2003,* May 2004, p.5.

36 The Hon. Stephen Robertson, *Condamine-Balonne Draft Water Resource Plan Released*, media release 3 December 2003.

5.62 The floodplain graziers regard the 10% provision as inadequate. Mr Betts, using the example of the January 2004 flood, showed that a 10 per cent reduction in water harvesting over 5 days would only have added 3.5 per cent to the total downstream flow over the whole event: 'It may put a couple of inches in the river but would be insufficient to produce any beneficial flooding':[37]

> Our big problem is that the extractions were already very high—over 100 per cent in some flow rates down to about 70 per cent…. When you reduce it by 10 per cent, it makes a minuscule difference. This reduction period is only for up to five days. In this last flow event it would have only made 3,500 megalitres extra per day to be spread over five rivers, which would make no difference to the flood plain.[38]

5.63 They also stress that there is no change proposed to harvesting large flows, which means 'there will be very little chance of getting a large flood until the 1,200 gigalitres of storage is filled':

> At a peak of 200,000 Ml/day the extraction rate is 99,917 Ml/day (49.9%). The 10% reduction for up to 5 days is only for low and medium flows, so there would be no reduction for these large flows. As it is the height and duration of the peak that is essential for beneficial flooding these large extraction levels will mean there will be very little chance of getting a large flood until the 1,200 gigalitres of storage is filled.[39]

5.64 The floodplain graziers oppose the proposals to legitimise existing harvesting of overland flows:

> We are largely prepared to accept what has been given in the original river licences. Our main problem is all the overland flow extraction, bunding and rediverting; it has been the law of the jungle out on the flood plain….
>
> The water-harvesting licences are basically capped at a flow rate out of St George of 60,000 megalitres a day. So, once you reach 60,000, there is no increase in the amount of water that can be taken under the water-harvesting licences. If you have a big flood of in excess of 100,000 or up to 150,000 megalitres a day, there is sufficient water then to service the flood plain down below. But, if the extractions from the flood plains are allowed to continue, they go on right up to flows of 200,000 megalitres per day and basically permit up to at least 50 per cent of that water to be diverted. The problem is that some of that water is not actually extracted by pumps but by gravity diversion, which means that it can be done at an enormous rate.[40]

---

37 Submission 77, O & K Betts, p.2.

38 Mr O. Betts (Culgoa Balonne Minor Water Users Association), *Committee Hansard* 14 July, p.634.

39 Submission 77, O & K Betts, p.2. According to the NSW government 'the total on-farm storage capacity in the Lower Balonne is 1,513 gigalitres.' *New South Wales government response to the Consultation Draft Water Resource (Condamine and Balonne) Plan 2003,* May 2004, p.14.

40 Mr O. Betts & Mr R. Treweeke, (Culgoa Balonne Minor Water Users Association), *Committee Hansard* 14 July, p.636.

5.65 The practice of bunding also raises serious concerns about the environmental consequences for land which is no longer wetted. Prof. Cullen commented:

> The logic … was that if people put up bunds to create a farm dam they should be given an extra licence for the water that would have flooded their land. This was the type A licence. You can see the logic for that, but the logical extension of it was that people started to put up bunds just to create type A licences and that seems to be a scandalous way to manage water on a flood plain….
>
> I think they have quite a good water planning framework in place, but in that situation they are dealing with the mistakes of past governments, when water planning was almost nonexistent as far as I can see….
>
> **ACTING CHAIR**—Anyhow, you would like to knock A and B on the head?
>
> **Prof. Cullen**—Certainly.
>
> **ACTING CHAIR**—I am amazed that there has been no environmental work done on what happens to a piece of flood country when you peg it off from water for all time.
>
> **Prof. Cullen**—It certainly does not stay as flood country, does it?[41]

5.66 The NSW Government has criticised the draft Condamine-Balonne Water Resource Plan strongly. The New South Wales submission is mostly focussed on ecological rather than economic effects, but it corroborates the concerns of the floodplain graziers. The main criticisms are:

- The plan fails to address the cautionary statements about possible future environmental damage in Cullen et al's 2003 scientific review;
- It is doubtful that the environmental flows rules will be enough to prevent degradation of Narran Lakes;
- The proposed 10% cuts to harvesting during specified flood events will do little to reduce the impact on beneficial flooding;
- There will be a total loss of minor to small floods;
- Paying back reduced harvesting in small floods with increased harvesting in bigger floods will decrease the ecological value of large floods in NSW;
- It is unacceptable that the plan defers any significant clawback of current extractions for 5 years.

5.67 In summary, 'the draft WRP is completely unacceptable to New South Wales.'

---

41 Prof. P. Cullen, *Committee Hansard* 14 July 2004, p.701,703.

5.68 NSW considers that significant clawback is essential to avert ecological collapse. NSW believes that Queensland must set a volumetric cap for the Condamine-Balonne, and specify an acceptable timeframe to bring diversions back to this level.[42] The Committee's recommendation at paragraph 2.7 above also deals with the issue of overallocation in Queensland systems.

Comment

5.69 The Lower Balonne problem shows the difficulty of trying to repair matters following the shortsighted decisions of the past. The Committee agrees with NSW that the draft Water Resource Plan is a weak response to the problem. The Committee also agrees with New South Wales that Queensland must set a volumetric cap for the Condamine-Balonne, and specify an acceptable timeframe to bring diversions back to this level.

5.70 In the Committee's view the principle of bunded water licences should be banned. If proper science shows that this practice has more damaging environmental consequences than harvesting from the river (which seems likely), it logically suggests that water harvested in this way should be clawed back with priority.

5.71 The Committee suggests that if necessary the Commonwealth should take a stronger role in progressing this issue. For example, the Commonwealth could attach conditions to future financial assistance for water reform, comparable to the conditions attached to national competition payments.

5.72 Another possibility is that, because the Narran Lake Nature Reserve is listed under an international treaty (the RAMSAR Convention), the Commonwealth could legislate to control its management using the external affairs power (section 51(xxix) of the Constitution).

5.73 The Committee notes with concern that large proposals to divert overland flows with levees are now under consideration in New South Wales (for example, at Carbucky near Goondiwindi).[43] The Committee urges New South Wales to treat such proposals with extreme caution and not to repeat the past mistakes of Queensland.

Example of groundwater management problems: the Latrobe aquifer

5.74 Many witnesses stressed the need for better knowledge and more consistent management of the whole water system, integrating surface water and ground water.

> We have put the emphasis on the surface water flow and regulating the surface extraction. If you look at the ground water extraction, you will find that we have put a cap on one and increased the other. We really need to

42 *New South Wales government response to the Consultation Draft Water Resource (Condamine and Balonne) Plan 2003,* May 2004, p.6,7,9,10,14.

43 'Giant irrigator's great wall "danger"', *Sydney Morning Herald,* 2 December 2002.

> treat the whole hydrological system as one and to understand the interactions within it.[44]
>
> There are very important links between ground water and surface water ecosystems and that, if you are trying to manage a ground water resource, you have to take into account environmental ground water flows, which are basically discharges of ground water. Trying to find a rational way of doing that has been exercising most state agencies.[45]

5.75 This issue is particularly important in relation to groundwater because the effects of extraction may be longer appearing and harder to reverse:

> Ground water is very different in its nature from surface water in that there are long timelags associated with changing recharge and the response we see in stream systems. If we focused upon end-of-valley targets and the control of stream salinity as part of those targets then timelags typically range between 10 years and 200 years. So in some of our ground water systems we are still seeing a response to the initial European clearing.[46]

5.76 In some cases in the past governments have knowingly overallocated groundwater - an effective policy of mining the aquifer. This is of course unacceptable. The long term damage could be severe, both for the environment and for rural communities who find the resource they depend on gradually disappearing.

5.77 Better accounting for the total water balance is important in relation to the problems of return flows and water-intercepting landuse changes, mentioned above.

5.78 As an example of the problems that can arise, the Committee notes the plight of groundwater users of South Gippsland, where there is a strong correlation between offshore oil drilling and dropping groundwater levels. This causes expense to farmers who must deepen or replace bores, and creates a risk of land subsidence. The Victorian Farmers Federation (VFF) explained the situation:

> Approximately 100,000 megalitres of fluid is extracted annually with water being brought to the surface, separately from the oil and gas component and then dumped back into the sea... As a result of these activities, groundwater levels in the La Trobe aquifer have been declining by around 1 meter per year across the whole Gippsland Basin.[47]

5.79 Mr Greenaway of the VFF argued that 'that water really should be reinjected into the aquifer, which happens in most oilfields around the world.'[48]

---

44 Dr J. Williams (CSIRO), *Committee Hansard* 11 December 2002, p.14.

45 Dr C. Barber (Centre for Groundwater Studies), *Committee Hansard* 20 April 2004, p.510.

46 Dr P. Hairsine (CSIRO), *Committee Hansard* 30 October 2004, p.291.

47 Submission 45, Victorian Farmers Federation, p.1-2.

48 Mr E. Greenaway (Victorian Farmers Federation), *Committee Hansard* 21 April 2004, p.597.

5.80 According to the VFF the Commonwealth, which licences the oil wells, has refused to acknowledge the cause of the problem:

> To date, the Commonwealth Government has rejected our request for financial assistance to be made available to farmers whose groundwater irrigation bores have been impact upon by the extraction of oil and gas off shore. This action of the Commonwealth in relation to this matter is unfair particularly when it is assessed against the one billion dollars in resource rent tax that it receives annually from the oil and gas fields in Bass Strait….
>
> The VFF feels frustrated with the way the Commonwealth is unwilling to fully engage on this matter, especially since all the published research in this area clearly indicates that the problems arises from the off shore fluid extraction.[49]

5.81 The Committee shares the VFF's concerns. Quite apart from the need to do justice to the affected farmers, the long term effect on the aquifer, and the risk of land subsidence, is severe. The Committee recommends that the Commonwealth should acknowledge this problem and propose solutions as a matter of urgency. The Committee notes the Federal Government has commissioned an investigation by Dr Tom Hatton of CSIRO into all aspects of the Latrobe aquifer.[50]

Recommendation 8

5.82 The Commonwealth should, as a matter of urgency, address the impact of Commonwealth-licensed oil drilling on the Latrobe aquifer and propose solutions which respect the rights of groundwater users.

Coordination of research on water

5.83 Many of the policies in the National Water Initiative imply a need for better scientific knowledge.

5.84 The Commonwealth supports water research through the Commonwealth Scientific and Industrial Research Organisation (CSIRO) (including the recently established Water for a Healthy Country Flagship), the Bureau of Meteorology, the Australian Bureau of Agricultural and Resource Economics, the Bureau of Rural Sciences, Land and Water Australia and the National Land and Water Resources Audit (part of the Natural Heritage Trust program).

5.85 For example, the recently established CSIRO Water for a Healthy Country Flagship aims to achieve the following outcomes:

- information at regional and Australia-wide scales to support improved water and natural resources policy ;

---

49 Submission 45, Victorian Farmers Federation, p.2-3. Mr E. Greenaway (Victorian Farmers Federation), *Committee Hansard* 21 April 2004, p.598.

50 Mr P. Weller (Victorian Farmers Federation), *Committee Hansard* 21 April 2004, p.589.

- rational water allocation decisions, based on water use benefits and opportunities, and providing input to water trading and market arrangements;
- best practice farming and urban water uses that increase productivity, improve water quality, re-use resources and reduce input costs;
- investment strategies that build on a systems understanding of our catchments, rivers and estuaries; and
- inclusion of climate variability and climate change as a component of all water resource use management decisions.[51]

5.86 A number of Cooperative Research Centres deal with water, including the CRC for Catchment Hydrology, the CRC for Freshwater Ecology, the CRC for Water Quality and Treatment, the CRC for Irrigation Futures, and crop-specific CRCs such as the CRCs for cotton and rice. The CRC program involves a combination of public and private sector funding, and is administered by the Department of Education, Science and Training. The Committee, noting recent cuts to government funding to some CRCs, urges that the government should be mindful of the importance of the CRCs' work on water issues when allocating funding for their operation.

5.87 The Committee has a concern that the number of research bodies involved could lead to a lack of coordination of the water research effort. The Committee is pleased to note that the Intergovernmental Agreement commits to the research needed to implement the agreement, and to 'more effectively coordinate the national water knowledge effort' (s101(ii)).

5.88 Mr Creighton of CSIRO described arrangements in the USA and the Netherlands for integrating research and policy-making:

> They have a strong link between the science, the management and the policy. The science does scenarios, the science collects information—yes, we need more information about water and so on… but the science does not play the policy game. It gives the information. The scenarios then go forward to the managers, the bureaucrats, the people in government and so on, and they look through which lever is to be pulled and which opportunities we have got. That comes forward every five years as a report to their parliaments… and they actually get in there and debate the future of the natural resources or their public health.
>
> That rigour in the way we pick up science knowledge, we understand the progress we are making and then we finetune, move forward, implement changes in management policy is not quite there yet in Australia, but we are a long, long way towards that. I think it is just putting the final touches on it that is important….

51 *About us - Water for a Healthy Country Flagship*, at www.cmis.csiro.au/healthycountry/about.htm [August 2004]

> I am looking for a closer link between science and policy, and I am saying to you that the [CSIRO Water for a Healthy Country] Flagship is an opportunity to move forward on that right now. [52]

5.89 The Committee suggests that coordinating research to best inform implementation of the Intergovernmental Agreement could be a responsibility of the National Water Commission. It would have to consult the interested bodies as to how to delegate effective management of the coordination role in the scientific community.

Aden Ridgeway, Senator for New South Wales
Chair

52 Mr C. Creighton (CSIRO), *Committee Hansard*, 14 July 2004, pp. 660-661.

DISSENTING REPORT

I dissent from the majority of the Committee in both tenor and fact in two key areas.

1. **The Living Murray Initiative and the 'First Step' water recovery project**

The Committee has favoured the "Wentworth Group" view of the state of the Murray. That is, the Murray is near death. This view has been promoted in order to justify huge increases in environmental flows.

In paragraph 2.16-2.17, the Committee confirms their view that the river is stressed and supports the view of Wentworth Group scientist, Professor Young, that river flows will probably continue to decline over the next 20 years.

I dissent from the weight given by the Committee report to only one point of view regarding the health of the Murray. The Committee Report only gives a passing reference to other points of view that the Murray-Darling is not really so stressed as widely thought and a great deal more science is required to make informed views.

There are equally prominent public figures with different points of view to the Wentworth Group that do not appear prominently in the report. For example:

Paul Weller, President of the Victorian Farmers Federation, who said "The Worldwide Fund for Nature is funding the Wentworth Group, who have unashamedly promoted the view the Murray River is dying in order to justify huge increases in environmental flows"; and

Dr J Marohasy from the Institute of Public Affairs, who stated that her basic position is that the quality of water in the Murray is not in decline, and that claimed rises in salinity levels are not true.

Given the above, it follows I cannot concur with the Committee's statement at paragraph 2.18, which states: "In light of these figures the aim to recover 500 gigalitres for the environment seems too little rather than too much…"

While the Government acknowledges the release of 500 gigalitres as a first step, it is by no means a small amount. To the contrary it is a historic step and a major step towards achieving significant environmental benefits for six key ecological assets:

- Barmah – Millewa Forest
- Gunbower and Perricoota-Koondrook Forests
- The Hattah Lakes
- Chowilla Floodplain (including Lindsay-Wallpolla)
- The Murray Mouth, Coorong and Lower Lakes; and
- The River Murray channel

The water for the environmental flows required under this first stage is expected to come from a combination of engineering works, better management of river flows, on-farm water efficiency savings and some purchase of water from willing sellers.

While the Committee begrudges this significant policy announcement, I praise it.

2. **Example of over allocation: the Lower Balonne**

I dissent from the Committee's report and conclusions regarding the lower Balonne River if for no other reason the Committee takes an unbalanced view of this vexed issue. It takes a particular New South Wales point of view and does not consider properly the Queensland point of view. It is incumbent upon the Committee to report both sides the case.

Moreover, the Committee should have deferred its report by a few days until it could have received the final report of the Condamine-Balonne Water Resource Plan by the Queensland Government. This would have allowed the Committee a chance to incorporate Queensland's position.

The following points present a more balanced case:

Firstly that the Lower Balonne irrigation community support the creation of proper concise and accurate science, which stands the test of peer review. The irrigation community would be first to make changes to practices, with compensation, if the science showed there were unsuitable impacts.

As well as the irrigation community, the businesses who are supported by irrigation, totally oppose the use of emotive untested claims and assumptions, that do not have the backing of accurate science that stands the test of peer review.

The second issue to note is that Professor Peter Cullen and his scientific committee assessed the river system to be ecologically sustainable at this time and the irrigation community are committed to undertaking reviews into the future to monitor and ensure that they maintain ecological sustainability.

The third issue to note is that the Queensland and New South Wales Governments established a Ministerial Council Forum to manage issues associated with the sharing of water resources in the Border Rivers region. This

would seem to be the primary Forum for addressing water sharing in the Border Rivers region.

Fourthly, the Federal Government has announced a $195,000 Natural Heritage Trust funded scoping study into the Lower Balonne Floodplain to provide ecological, social and economic information for determining the sustainable flow needs for the Floodplain and the needs of stakeholders in the region. The New South Wales and Queensland Governments have agreed to provide two government representatives for the Project Steering Committee overseeing the study. There will also be one Australian Government representative on the Committee.

The abrasive approach taken by the majority report towards the Queensland situation is counter-productive to finding a resolution. Furthermore it creates a situation of those in glass houses should not throw stones. It is common knowledge that many of the New South Wales rivers and underground water resources are overallocated. As one Queensland farmer put it "the more water that New South Wales can ensure runs over the border from Queensland the less pain New South Wales has to endure in any clawback of overallocation."

The Committee report relies too much on personal opinion and assumptions. For example, I reject outright the following statement at paragraph 5.59:

"It is now clear that the government of the day was at best shortsighted, at worst reckless and overpowered by self-interest, in allowing this level of development…."

It is critical that future strategies be undertaken according to the science of the matter and with the cooperation of the parties and the above comments work against this aim.

There is no doubt the situation between New South Wales and Queensland needs to be resolved and the Federal Government can play an important role in bringing about a resolution. However I further reject the Committee's comment that the Commonwealth could legislate control over the matter using the external power (section 51 (xxix) of the Constitution).

It is a grand over-reaction that would bring about unnecessary political and social division. The signing of the National Water Initiative shows that cooperation between the States and the Federal Government in this area of competing interests can be achieved in the national interest.

Senator Julian McGauran
11 August 2004

APPENDIX 1

List of Submissions

1. Mr Laurie Crouch
2. Mr Christopher Pyne MP
3. Launceston City Council
4. Golden Plains Shire
5. Eyre Peninsula Local Government Association
6. Coleambally Irrigation
7. The Australian Drilling Industry Association Limited
8. PA Victoria
9. Chincilla Shire Council
10. Pioneer Valley Water Board
11. Barwon Water
12. Mr David Evans

12A Mr David Evans

13. Water Corporation WA
14. Mudgegonga & District Landcare Group
15. Ovens Landcare Network
16. Murrumbidgee Private Irrigators Inc.
17. Smartrivers
18. Mr Lester Knutson
19. Mr Graeme Norman
20. Ms Tracy Blackburn
21. Victorian Farmers Federation - Wangaratta and Benalla Branches

22. Ricegrowers' Association of Australia Inc.

23. Hydro Tasmania

24. Mr Adam Menary

25. High Catchment Committee - Wodonga DC Victorian Farmers Federation

26. Macquarie Marshes Management Committee

27. NSW Irrigators' Council

28. National Competition Council

29. CSIRO - Sustainable Ecosystems

30. Hodgson Horsehoe Creeks Landcare Group

31. Ms Megan Clinton

32. Irrigators Inc.

33. Lockyer Valley Irrigators

34. Wimmera Mallee Water

35. Cherry Growers of Aus. Inc. / Apple & Pear Growers Association. of SA Inc.

36. Bureau of Meteorology

37. Department of Primary Industries, Water & Environment

38. Mr Pat Larkin

39. Southern Riverina Irrigation Districts Council (SRIDC)

40. The Institution of Engineers, Australia

41. North East Catchment Management Authority

42. Queensland Government

43. Cooperative Research Centre for Water Quality and Treatment

44. Richmond Shire Council

45. Victorian Farmers Federation

46. Ms Marea Capell

47. Burgoigee Creek Landcare Group Inc.

48. Australian Bureau of Agricultural and Resource Economics (ABARE)

49. Commonwealth Parliament of Australia

50. Queensland Farmers Federation

51. Winemakers' Federation of Australia

52. Department of Agriculture, Fisheries & Forestry Australia

53. Land & Water Australia

53A Land & Water Australia

54. National Association of Forest Industries

55. Murrumbidgee Irrigation

56. Mr Reg Betts

57. Balonne Shire Council & Wider General Community

58. St George Irrigation Area Pty Ltd

59. Riverina Regional Organisation of Councils

60. Mineral Policy Institute

61. Culgoa Balonne Minor Water Users Association

62. Snowy River Interstate Landcare Committee

63. Charles Darwin University

64. Katherine Region Tourist Association

65. Leaman Geophysics

66. Rural & Regional Council

67. Gwydir Valley Irrigators Association Inc

68. Upper Namoi Water Users Association Inc.

69 Wangamaty Landcare Group

70. Mungindi Water Users

71. Leaman Geophysics

72. Queensland Government

73. Centre for Groundwater Studies

74. Ms Geraldine de Burgh-Day

75. South Australian Farmers Federation

76. Mr JW Frost

77. Owen & Karen Betts

78. Darling River Food and Fibre

79 Kimberley Land Council

APPENDIX 2

Witnesses at Public Hearings

Wednesday, 11 December 2002
Parliament House, Canberra

Wentworth Group
Mrs Leith Boully
Mr Peter Cosier
Professor Peter Cullen
Dr Stephen Morton
Dr John Williams
Professor Michael Young

Monday, 25 August 200
St George, Qld

Balonne Shire Council
Mayor John Stone
Mr John Barrett, Deputy Mayor

Culgoa-Balonne Minor Water Users Association
Mr Reginald Betts, Vice-President
Mr Owen Betts, Honorary Vice-Secretary
Mr Richard Bucknell, Member
Mrs Margaret Petersen, Members representative

Smartrivers
Mr David Carson, Co-Chair
Mr Richard Lomman, Co-Chair
Mr Chad Prescott, Member
Mr Tom Siddins, Member

Lower Balonne Community Reference Group
Mr John Grabbe, Member
Mr Glenn Rogan
Mr Ian Todd, Member

Brewarrina Shire Council
Mr Maurice Hagarty, Special Representative

St George Irrigation Area Pty Ltd

Mr Raymond Kidd, Chairman
Mr John Knights, Member
Mr Ian Thomas, Member

Balonne Indigenous Progress Group
Mr Ronald Waters, Chairman

Tuesday, 26 August 2003
Moree, NSW

Moree Plains Shire Council
Mr David Aber, General Manager

Gwydir Valley Irrigators Association Inc.
Mr Richard Browne, Chair
Mr Leslie Boland, Vice Chairman
Mr Michael Murray, Executive Officer
Mr William Kirkby, Delegate

Lower Namoi Groundwater Association
Mr Jeffrey Carolan, Chairman

Mrs Meryl Dillon, (Private capacity)

Lower Namoi Cotton Growers Association
Mr Andrw Greste, Chairman of Executive Committee
Mr James Kahl, Executive Committee Member

Upper Namoi Water Users Association
Mr John Warnock, Former President
Miss Juanita Hamparsum, Secretary

Namoi Valley Water Users Associations Inc.
Mr Jeremy Killen, President, Coordinating Committee

Gwydir Valley Cotton Growers Association
Mr John Robinson, Acting Chairman
Mr Troy Smith, Member

Wednesday, 27 August 2003
Griffith, NSW

Riverina Regional Organisation of Councils
Councillor Michael Neville, Chairperson and Mayor, Griffith City Council
Mr Bob Laing, General Manager, Griffith City Council and delegate

Mr John Blackwell, Scientist, Commonwealth Scientific and Industrial Research Organisation and delegate

Coleambally Irrigation Cooperative Ltd
Mr Robert Black, Chairman
Mr Mark Bramston, Chief Executive Officer

Riverina Regional Development Board
Mr John Dal Broi, Chairman

Department of Infrastructure Planning and Natural Resources, NSW
Mr Warwick Ford, Regional Director, Murrumbidgee Region

Murrumbidgee Ground Water Preservation Association
Mr Bruce Gowrie Smith, Trustee and Deputy Chairman
Mr Murray Shaw, Trustee

Murrumbidgee Private Irrigators
Mr Rel Heckendorf, Chairman
Mr Murray Shaw, Vice-Chairman

Murrumbidgee Irrigation
Mr John Howe, Water Policy Manager

Ricegrowers Association of Australia Incorporated
Mr Matthew Linnegar, Executive Director

Murrumbidgee River Mangement Committee
Mr John Ernest, Mayor, Murrumbidgee Shire, Delegate, Riverina Regional Organisation of Councils and member

Thursday, 30 October 2003
Parliament House, Canberra

Commonwealth Scientific and Industrial Research Organisation
Dr Paul Cotterill, Chief, Forestry and Forest Products
Dr Peter Hairsine, Research Director, Integrated Catchment Management, Land and Water
Dr John Williams, Chief, Land and Water
Mr Michael Young, Director, Policy and Economic Research Unit, Land and Water
Mr Michael Young, Member, Wentworth Group, Director, Policy and Economic Research Unit, Land and Water

Wentworth Group
Mr Peter Cosier, Member
Professor Peter Cullen, Member

Murray-Darling Basin Commission
Mr Scott Keyworth, Director, Rivers and Industries Unit
Mr Kevin Goss, general Manager, Natural Resources Management Branch

Cooperative Research Centre for Catchment Hydrology
Professor Robert Vertessy, Chief Executive Officer

Monday, 17 November 2003
Kununurra, WA

Department of Environmental Protection
Mr Leith Bowyer, District Manager

Kimberley Primary Industries Association Inc
Mr Bruce Carey, Deputy Chair
Mr David McKerrell, Executive Officer

Ord Irrigation Cooperative
Mrs Elaine Gardiner, Chairman
Mr Lindsay Innes, Vice Chair
Mr Andrew Kelly, Chief Executive Officer

Ord Land and Water
Mr Richard Pasfield, Coordinator

Department of Agriculture, Western Australia
Dr Joseph Sherrard, Research Officer

World Wide Fund for Nature
Ms Tanya Vernes, Kimberley Wetlands Project Officer

Tuesday, 18 November 2003
Darwin, NT

Environment Centre of the Northern Territory
Mr Henry Boer, Northern Woodlands Campaigner

Nauiyu Nambiyu Community Government Council
Mr Mark Casey

Daly River Community Development Association
Mr Harold Sinclair, Vice President
Mrs Valerie Cowan, Secretary

Katherine Region Tourist Association
Mr William Daw, General Manager

Wangamaty (Lower Daly) Landcare Group
Mr Paul Donohoe, Landcare Coordinator

Northern Territory Horticultural Association
Mr Tom Harris, President

Northern Territory Agricultural Association
Mr Philip Hausler, Vice-President

Commonwealth Scientific and Industrial Research Organisation
Dr Sue Jackson, Research Scientist

Northern Territory Cattlemen's Association
Mr Stuart Kenny, Executive Director

Charles Darwin University
Dr Naomi Rea, Associate Dean, Research and Postgraduate Studies, and Lecturer, Resource Management

Department of Infrastucture, Planning and Environment, Northern Territory
Mr Ian Smith, Controller of Water Resources, Director, Natural Resource Policy

Tuesday, 20 April 2004
Berri, SA

Centre for Groundwater Studies
Dr Chris Barber, Executive Director
Mr Trevor Pillar, Manager, Industry Education and Training

River Murray Catchment Water Management Board
Ms Amy Goodman, Manager
Mr Noel Johnston, Coordinator, Water Use Efficiency Project, and Irrigation Field Officer
Mr Daniel Meldrum, Senior Project Officer, Salinity and Water Use

Riverland Development Corporation Inc.
Mr Trent Mader, Executive Director

Meningie and Narrung Lakes Irrigators Inc.
Mr Neil Shillaber, Committee Member, South Australian Murray Irrigators Inc.; and Chairperson
South Australian Farmers Federation
Mrs Sharon Starick, Deputy Chair, Natural Resources

South Australian Murray Irrigators Inc.
Mr Ian Zadow, Vice-President

Wednesday, 21 April 2004
Melbourne, Vic

Victorian Farmers Federation
Mr Paul Weller, President
Mr Christopher Hewitt, Chairman, Community Steering Committee, Wimmera Mallee Piping Project
Mr Paul McGowan, Executive Officer, Wodonga District Committee
Mr William Bodman, Chair, Joint Committee, Yarram and Stradbroke Branches
Mr Eric Greenaway, Member, Joint Committee, Yarram and Stradbroke Branches

National Competition Council
Mr John Feil, Executive Director
Mr Ross Campbell, Director, Water Reform

Ovens Lancare Network
Mr Jack Jones, President and Secretary, Mudgegonga Landcare Group
Mr Craig Hearson, President, Hodson Horseshoe Landcare Inc.
Mr Ken Gaudion, Member, Warby Ranges Landcare
Mr James Neary, Member, Burgoigee Creek Group

Bureau of Meteorology
Mr Bruce Stewart, Assistant Director, National Operations
Mr Ross James, Acting Superintendent, Hydrology
Mr Neil Plummer, Acting Superintendent, National Climate Centre

Visy Industries
Mr Anthony Gray, Group Public Affairs Manager

Pratt Water
Dr William Hurditch, Project Adviser

Wednesday, 14 July 2004
Parliament House Canberra, Act

Culgoa Balonne Minor Water Users Association
Mr Rory Treweeks, Chair
Mr Owen Betts, Member
Ms Pop Petersen, Member

Australian Bureau of Agricultural and Resource Economics
Dr Stephen Beare, Research Director

Land and Water Australia
Mr Colin Campbell, Executive Director

Commonwealth Scientific and Industrial Research Organisation
Mr Colin Creighton, Flagship Director, Water for a Healthy Country
Mr Michael Dunlop, Research Scientist
Professor Shahbaz Khan, Research Director, Sustainable Irrigation Systems

Darling River Food and Fibre
Mr Ian Cole, Chair (by teleconference)

St George Irrigation Area Pty Ltd
Mr Ray Kidd, Chairman (by teleconference)

Department of Environment and Heritage
Mr Tony Slatyer, First Assistant Secretary, Land Water & Coasts Division
Mr Theo Hooy, Assistant Secretary, Coasts and Water Branch

Professor Peter Cullen (Private capacity)

Department of Agriculture, Fisheries and Forestry
Mr Ross Dalton, General Manager, Water and Murray-Darling Basin
Mrs Dianne Deane, Manager, Water Policy and Reform

Thursday, 15 July 2004
Sydney, NSW

The Hon David Evans (Private capacity) (by teleconference)

Local Government and Shires Association of New South Wales
Councillor Wayne O'Mally, Member, Executive of the Shires Association

Australian Water Association
Mr Christopher Davis, Chief Executive Officer

Cotton Australia Ltd
Mr Ralph Leutton, Program Manager, Policy and Legislation

New South Wales Irrigators Council
Mr Doug Miell, Chief Executive Director

New South Wales Farmers Association
Mr Jonathan Streat, Policy Manager, Conservation and Resource Management
Mr Andrew Huckel, Senior Analyst

NSW Department of Infrastructure, Planning and Natural Resources
Mr Peter Sutherland, Deputy Director-General
Mr Kim Alvarez, Director, Water Management

Appendix 3

Documents Tabled at Public Hearings

Documents submitted at hearings and accepted as public evidence of the inquiry.
Excludes documents listed as submissions (see Appendix 2).

hearing date	Lodged By	Title/Subject
11/12/02	Prof. Mike Young	*Robust Separation: A search for a generic framework to simplify registration and trading of interests in natural resources*, CSIRO, September 2002
25/8/03	Mr I. Todd, Lower Balonne Community Reference Group	'Figure 1: Growth in Water Use in the Murray Darling Basin'
25/8/03	Mr C. Prescott, Smartrivers	- speaking notes - Wentworth Group, *Blueprint for a National Water Plan*, 18p - CEO's Group on Water, *Report to COAG*, April 2003, 17p - Mike Carroll address to National Australian Cotton Trade Show, 29/5/03, 7p - Lower Balonne Community Reference Group, Draft Proposal [for Condamine-Balonne Water Resource Plan] version 30/7/03, 14p - National Farmers Federation & Australian Conservation Foundation, *Principles for a Long Term Australian Water Resource Policy Framework and Action Plan*, 3p
26/8/03	Mr D. Aber, Moree Plains Shire Council	speaking notes
26/8/03	Mr J. Killen, Coordinating Committee of Namoi Valley Water User Associations Inc	- speaking notes - *Climate Change - Our Legacy for the Future*, Qld Dept of Natural Resources & Mines
27/8/03	Mr M. Linnegar, Ricegrowers Association of Australia	Billabong High School Presentation
27/8/03	Mr M. Bramston, Coleambally Irrigation	slides
27/8/03	Murrumbidgee Groundwater Preservation	submission notes and map

	Association	
27/8/03	Mr W. Ford, NSW Dept of Infrastructure, Planning & Natural Resources Murrumbidgee region	- 2 maps - *Murrumbidgee Catchment Blueprint*, 2 vols - *Watersharing Plan for the Murrumbidgee Regulated Water Source*, *2003 Order* - *Murrumbidgee Valley (Regulated System) Water Allocation Plan*, 2003 - graph: Total Storage Volume - Burrinjuck & Blowering Dams
30/10/03	Dr J. Williams, CSIRO Land and Water	- *A Revolution in Land Use: Emerging Land Use Systems for Managing Dryland Salinity*, CSIRO, n.d. - *The contribution of mid to low rainfall forestry and agroforestry to greenhouse and natural resource management outcomes: overview and analysis of opportunities*, CSIRO, October 2001 - Vertessy, Zhang and Dawes ,'Plantations, river flows and river salinity', *Australian Forestry*, Vol. 66, No. 1, pp55-61 - *Maximising the benefits of new tree plantations in Australia*, joint statement by CSIRO Forestry and Forest Products and CSIRO Land and Water, October 2003
17/11/03	Kimberly Primary Industries Association	WA Agriculture Department information booklet: *Ord River Irrigation Area*
18/11/03	Mr H. Boer, The Environment Centre (NT)	- Extract from Cooperative Research Centre for Freshwater Ecology, *Independent Assessment of Jurisdictional Reports on the Environmental Achievements of the COAG Water Reforms*, pp 52-55 - Advertisement from *The Kimberly Echo*, 6 June 2002
18/11/03	Mr W. Daw, Katherine Region Tourist Association	- Extracts from *Australian Recreational Fishing Survey 2000*: Appendix 2 State Recreational Fish Catch, 9p - Australian Anglers (Participation Tables), 3p - Table 2 State Expenditure on Fishing Related Items and Activities, 3p - Northern Territory Tourist Commission, *Territory Tourism Selected Statistics 2001/2002* - Supervising Scientist, *Recommended Environmental Water Requirements for the Daly River, Northern Territory, based on ecological, hydrological and biological principles*, March 2003
20/4/04	Ms A. Goodman, River Murray Catchment Water Management Board	- *Catchment Water Management Plan for the River Murray in South Australia*, River Murray Catchment Water Management Board, 2003 - *Water Allocation Plan for the River Murray Prescribed Watercourse (as amended 12 January 2004)*
20/4/04	Mr T. Pillar, Centre for Groundwater Studies	- Centre for Groundwater Studies- information kit - Centre for Groundwater Studies, *ABCs of Groundwater*, August 2003
20/4/04	Mr T. Mader, Riverland	- Bureau of Transport and Regional Economics, *Investment Trends in the Lower Murray-Darling Basin,*

	Development Corporation	*Working Paper 58* [CD] - Riverland Rural Partnership Program, *Tomorrow's Success for Today - Final Report for activities to 30 June 2003*, August 2003
21/4/04	Mr B. Stewart, Bureau of Meteorology	*The Bureau of Meteorology,* Bureau of Meteorology, 2003
21/4/04	Dr W. Hurditch, Pratt Water	Murrumbidgee Valley Water Efficiency Feasibility Project, Project Delivery Structure, 15 April 2004
21/4/04	Mr J. Feil, National Competition Council	- National Competition Council, *Assessment of government's progress in implementing the National Competition Policy and related reforms: 2003*, *Vol 3 Water Reform*, August 2003 - *National Competition Policy, Water Reform Assessment Framework 2004*, December 2003.
21/4/04	Mr E. Greenway, Victorian Farmers Federation	- information on Latrobe aquifer - Department of Natural Resources and Environment, *Yarram Subregional Model*, March 1999: extracts - letter from Mr Ray Evans, Bureau of Resource Sciences to Department of Natural Resources and Environment, Victoria, 23 December 1999.
21/4/04	Mr W. Bodman Victorian Farmers Federation	Gippsland Basin Groundwater Issues, notes 2pp.
14/7/04	Dr S. Beare, ABARE	T. Goetsch & S. Beare, 'Water Rights and Trade: Meeting the Water Reform Agenda', *Australian Commodities*, Vol 11, No. 1, March Quarter 2004
14/7/04	Mr C. Campbell, Land and Water Australia	- supplementary submission - Land and Water Australia, *Australia's Tropical Rivers - Data Audit*, 2004 National Dryland Salinity Program documents: - *Manaing Dryland Salinity in Australia* [CD] - *Breaking Ground – Key Findings and Research Outcomes from 10 Years of Australia's National Dryland Salinity Program: An Overview* - *Breaking Ground – Key Findings from 10 Years of Australia's National Dryland Salinity Program* - *Dryland Salinity and Catchment Management: A Resource Directory and Action Manual for Catchment Managers* - *Dryland Salinity: On-Farm Decisions and Catchment Outcomes: A Guide for Leading Producers and Advisors*
14/7/04	Mr C. Creighton, CSIRO	- *Opportunities for Australian Government Leadership in Urban Water Conservation and Reuse*, draft, CSIRO, May 2004 - *Water for a Healthy Country National Research Flagship*, information package
14/7/04	Prof. P. Cullen	- extracts from ABS *Water Account Australia 200-2001*, 1p - P. Cullen, R. Marchant & R. Mein, *Review of Science Underpinning the Assessment of the Ecological Condition*

		of the Lower Balonne System, January 2003
15/7/04	Mr C. Davis, Australian Water Association	- *Water Recycling in Australia: A review undertaken by the Australian Academy of Technological Sciences and Engineering*, 2004 - *The Australian Water Directory*, Australian Water Association, 2004 - *Water* (Journal of the Australian Water Association), March 2004, June 2004
15/7/04	Mr R. Leutton, Cotton Australia	information package
15/7/04	Mr K. Alvarez, NSW Dept of Infrastructure, Planning & Natural Resources	*NSW Water Reforms: A secure and sustainable future*, ministerial statement, NSW Department of Infrastructure, Planning and Natural Resources, June 2004

Appendix 4

Additional Information

Additional information accepted as evidence of the inquiry. Excludes -
- documents listed as submissions (see Appendix 2)
- documents listed as tabled at committee hearings (see Appendix 3)

Type:
A. answers to questions put by the Committee
C. miscellaneous further comment
D. miscellaneous documents

dated	type	from	topic
30/4/03	A	Murrumbidgee Irrigation	correspondence with MDBC re science behind E-flows for the Murray & the MFAT model, 4p
28/4/03	D	Murrumbidgee Irrigation	letter to AFFA re water property rights consultation, & notes on report to COAG from the Water CEOs Group, 7p
29/8/03	A	NSW DIPNR (Murrumbidgee Region)	end of system flows; monthly flows at Wagga
3/9/03	A	NSW DIPNR (Murrumbidgee Region)	Murrumbidgee Catchment Management Board
23/9/03	A,D	Upper & Lower Namoi Groundwater Users Association	Final Report of the Namoi Groundwater Taskforce, October 2000
17/11/03	C	The Kimberley Primary Industries Association	Water Use in the Ord River Irrigation Area, 3p
17/11/03	C	Ord Irrigation Cooperative	speaking notes, 2p
17/11/03	D	WWF Australia	background, discussion points, 2p
18/11/03	A,D	Ord Irrigation Cooperative	answers to questions: ord dam statistics
18/11/03	D	Dr Sue Jackson	draft submission, 8p
18/11/03	D	Northern Land Council	Agricultural Developments on the Douglas-Daly Rivers
18/11/03	D	Northern Territory Agricultural Association	speaking notes, 3p
18/11/03	D	Daly River Community Development Association	submission, 4p
18/11/03	D	Daly River Community Development Association	Wangamaty (Lower Daly River) Management Plan
25/11/03	A	Murray Darling Basin Commission	answers to questions at hearing 30/10/03

APPENDIX 5

Sources and statistics on water use

Sources

A first comprehensive national survey of water in Australia (quality, availability and use) was conducted as part of the National Land and Water Resources Audit, which took place between 1997 and 2002. The Audit derived its raw data from a range of sources, primarily State and Commonwealth Departments and agencies.

At about the same time the Australian Bureau of Statistics (ABS) conducted its first '*Water Account Australia 1993-94 to 1996-97*' survey, which was published in May 2000. The next survey in the series, covering the years 1997-8 to 2000-1, was published in May 2004.

While the general order of magnitude of the figures was similar, there were differences between the Audit and ABS figures. For example, the Audit's estimate of total water use in 1996/7 was 24,058 GL and the ABS figure was 22,186 GL.

It is likely that the ABS figures will, over time, create the most reliable series as their regular two-yearly and five-yearly surveys take place in the future.

National Land and Water Resources Audit (NLWRA)

The National Land and Water Resources Audit (the Audit) was set up in 1997 as a partnership between the States, Territories and Commonwealth and funded under the Natural Heritage Trust. The aim of the Audit was to provide better information to resource managers which in turn would improve land, water and vegetation management. [1]

The NLWRA, also known as 'Audit 1', took place from 1997 to 2002 at a cost of about $34 million.

Audit 1 represented the most comprehensive review ever undertaken of Australia's natural resources. A number of detailed reports were published setting out the state of Australia's farming systems and natural environment. An online atlas and data library of the nation's resources were created.

---

[1] NLWRA home page http://www.nlwra.gov.au/

The Australian Natural Resources Atlas provides an extensive range of information across seven key areas: agriculture; coasts; land; people; rangelands; vegetation and biodiversity; and water.[2]

Audit 1, in its report '*Australian Water Resources Assessment 2000',* made the following comment in relation to the availability of data on Australia's water resources:

> Overall, data completeness and quality remain issues for comprehensive reporting of Australia's water resources. On average only 77% of the groundwater management units have information on aquifer characteristics, allocation, use and extraction. Similarly 78% of all surface water management areas have information on water availability, allocation, use and water trading. However the reliability of this data is extremely variable…water quality and trend information is even further limited.[3]

In discussing data content, quality, and comparability, the Audit noted:

> Data are extremely variable….There is a mismatch between data availability and quality, and the requirements of decision makers.[4]

The Audit found a great diversity of procedures, methodologies, and definitions between the States and Territories in relation to water issues, which had evolved over the last 150 years or so. This made it very difficult to compare methods and processes in different States and the results achieved.

The Audit recommended that:

> Australia requires a systematic, and Australia-wide approach for water resource data collection to provide a foundation for improved water resources management. Data analysis and access need to be compatible and comparable.[5]

Following a review of the results of Audit 1, the Commonwealth decided to continue the project. Audit 2 is a five year program, 2003 – 2007, with a budget of up to $3 million per annum.

Audit 2 collects data and information to enable an evaluation of natural resource management initiatives such as the National Action Plan for Salinity and Water Quality, and the Natural Heritage Trust.

---

2 The web site for the Atlas is at http://audit.ea.gov.au/ANRA/atlas_home.cfm

3 National Land and Water Resources Audit '*Australian Water Resources Assessment 2000', p. 83.*

4 National Land and Water Resources Audit '*Australian Water Resources Assessment 2000', p. 84.*

5 National Land and Water Resources Audit '*Australian Water Resources Assessment 2000', p. 84.*

Australian Water Data Infrastructure Project

In response to the Audit recommendation, the Australian Water Data Infrastructure Project (AWDIP) was established to develop a comprehensive national water information framework.

This project is managed by the Executive Steering Committee for Australian Water Resources Information. The Steering Committee comprises representatives of: the Commonwealth Departments of Agriculture, Fisheries and Forestry (Chair) and Environment and Heritage; representatives from each State and Territory government; and representatives from the Australian Bureau of Statistics, the National Land and Water Resources Audit, the CSIRO, the Bureau of Meteorology, the Bureau of Rural Sciences, and the Murray-Darling Basin Commission. This project is funded under the National Heritage Trust.

The Steering Committee met for the first time in May 2003, and meets two or there times a year. It reports to the Audit Advisory Council of the National Land and Water Resources Audit on data coordination issues.

Australian Bureau of Statistics

The ABS's first '*Water Account Australia 1993-94 to 1996-97*', published in May 2000, contains detailed water supply and water use tables. This survey was based primarily on data collected by State-based departments and agencies, such as bulk water suppliers. The ABS published the next in the series, *Water Account Australia 1997-98 to 2000-01,* in May 2004.

In October 2003 the ABS distributed to a large sample of irrigators (7,000 out of an estimated total population of about 38,000 irrigators) a *Water Survey - Agriculture* (WSA) questionnaire to gather information on water availability and use in irrigated agriculture in 2002-03. The information being collected on the WSA covers:

- Water entitlements and allocations
- Trading of water (buying and selling)
- Area of pastures and crops irrigated
- Volumes of water applied to pastures and crops
- Irrigation methods
- Irrigation scheduling tools
- Sources of irrigation water
- On-farm water storage
- On-farm water recycling
- Areas of laser levelling for irrigation
- Changes to irrigation practices
- Irrigation expenses
- Basic farm financials - value of agricultural and irrigated production, and net profit/loss from agricultural production

The *Water Survey – Agriculture 2002-03* represents the first time that the ABS has collected detailed information on water direct from farmers themselves. This report is expected to be published in late 2004.

The ABS is planning to undertake a *Water Survey – Agriculture* report every two years, and the more extensive *Water Account for Australia* every four years. To complete the water picture, in 2005 the ABS is planning to also commence two yearly *Water Surveys* to cover urban and industrial water use, and stock and domestic rural water use.

Statistical overview

Information is drawn from the National Land and Water Resources Audit and the State of the Environment Report 2001.[6]

Water Availability

Surface water

On average, only 12 % of Australia's rainfall runs off to collect in rivers and streams. The remaining 88% of rainfall is accounted for by evaporation, water used by vegetation, and water held in storages including natural lakes, wetlands and groundwater aquifers.

Table 1 shows that most run-off occurs in the northern parts of the continent, with three drainage divisions, North East Coast, Timor Sea and Gulf of Carpentaria, representing about two-thirds of total mean annual run-off.

Mean annual run-off totals 387 184 GL, of which 18 147 GL (4%) is presently diverted for consumptive use.

Table 1. Run-off, outflows and diversion from each drainage division

Drainage division	**Mean annual run-off** (GL)	**Percent mean annual run-off** (%)	**Mean annual outflow** (GL)	**Volume diverted** (GL)
North-East Coast	73 411	19.0	69 580	3 182
South-East Coast	42 390	10.9	40 366	1 825
Tasmania	45 582	11.8	45 336	451
Murray–Darling	23 850	6.2	5 750	12 051
South Aust. Gulf	952	0.2	787	144
South-West Coast	6 785	1.8	5 925	373
Indian Ocean	4 609	1.2	3 481	12
Timor Sea	83 320	21.5	81 461	48
Gulf of Carpentaria	95 615	24.7	96 066	52
Lake Eyre	8 638	2.2	n/a	7
Bulloo–Bancannia	546	0.1	–	<1
Western Plateau	1 486	0.4	n/a	1
Total	**387 184**	**100%**		**18 147**

Source: National Land and Water Resources Audit, Australian Water Resources Assessment 2000, p. 25.

6 In May 2004 the ABS published *Water Accounts Australia 1997-98 to 2000-01*, which contains the latest figures on water use.

Australia has 447 large dams with a combined capacity of 79,000 GL, developed mainly for urban, irrigation and hydroelectric power uses. Australia's several million farm dams account for an estimated 9% of the total water stored.

Groundwater

Australia has 25,789 GL of groundwater that can be extracted sustainably each year and is suitable for potable, stock and domestic use, and irrigated agriculture. Ten percent (2489 GL) is used. Australia has one of the world's largest aquifer systems: the Great Artesian Basin is an estimated 1.7 million km^2 and stores 8.7 million GL. Each year the Great Artesian Basin supplies 570 GL of water for a variety of uses—mainly grazing and mining.

Water Use

There is a great variation in water use. Some areas of the country such as the northern coastline make little use of divertible water resources. Other areas make significant use, notably the Murray–Darling Basin. Table 1 shows that 51% of runoff in the Basin is diverted for use.

Approximately 73% of the water used in Australia (~24,000 GL in total) is supplied by rivers, 21% by groundwater aquifers, and the remaining 9% by harvest of overland flows. Surface water predominates in all States and Territories except Western Australia and the Northern Territory.

Surface water use

Table 2 shows that surface water use in Australia increased by 59% between 1983/4 and 1996/7. An estimated 26% of Australia's 325 surface water management areas are either close to or overused compared with their sustainable flow regimes.

Table 2. Change in mean annual surface water use (GL),1983/84–1996/97

	Total use 1983/84 (GL)	**Total use 1996/97** (GL)	**Percent increase**
NSW	5 932	9 000	52
Victoria	3 714	5 166	39
Queensland	1 209	2 969	145
WA	461	658	43
SA	498	746	50
Tasmania	165	451	173
NT	29	51	76
ACT	n/a	68	–
Total	**12 008**	**19 109**	**59**

Source: National Land and Water Resources Audit

Groundwater use

Table 3 shows that groundwater use across Australia increased 88% between 1983/4 and 1996/7. Overall, 32% of groundwater extracted is for urban-industrial use, 51% for irrigation and 17% for stock watering and rural use. It is estimated that 30% of Australia's groundwater management units are close to or overused compared with their sustainable yield.

Table 3. Change in mean annual groundwater use (GL), 1983/84–1996/97

	1983/84 (GL)	**1996/97** (GL)	**Percent increase**
NSW	318	1 008	217
Victoria	206	622	202
Queensland	1 121	1 622	45
WA	373	1 138	205
SA	542	419	-22
Tasmania	9	20	122
NT	65	128	97
ACT	n/a	5	–
Total	**2 634**	**4 962**	**88**

Source: National Land and Water Resources Audit, Australian Water Resources Assessment 2000, p. 65

Uses of water

Approximately 75% of the water used in Australia is for irrigated agriculture. NSW (48%), Victoria (25%) and Queensland (16%) account for 90% of Australian irrigation. Half of the profit in 1996/97 from Australian agriculture, when measured as profit at full equity, was generated from irrigated production systems. These occupy less than 0.5% of Australia's land area. About 20% of total water use is for urban and industrial purposes, the rest for other rural uses such as stock and domestic needs.

Table 4. Australia's mean annual water use (GL) by use category (1996/97)

	Irrigation	**Urban/industrial**	**Rural**	**Total use**
NSW	8 643	1 060	305	10 008
Victoria	4 451	987	339	5 777
Queensland	2 978	1 052	561	4 591
WA	710	1 027	59	1 796
SA	819	292	53	1 164
Tasmania	276	186	9	471
NT	53	87	39	179
ACT	5	63	4	72
Total	**17 935**	**4 754**	**1 369**	**24 058**

Source: National Land and Water Resources Audit, Australian Water Resources Assessment 2000, p. 56

Australian water use increased by 65% between 1983/84 and 1996/97. This was mostly due to increases in irrigated agriculture. Urban centres have shown either low increases or net decreases in water consumption per person over the same period.

Table 5. Change in mean annual water use (GL) in Australia between 1983/84 and 1996/97 by water use category			
	1983/84	**1996/97**	**Percent change%**
Irrigation	10 200	17 935	76
Urban/industrial	3 060	4 754	55
Rural	1 340	1 369	2
Total	**14 600**	**24 058**	**65**
Source: National Land and Water Resources Audit, Australian Water Resources Assessment 2000, p. 57			

There are great variations in the efficiency of delivery systems used to supply irrigation water. On average, only 77% of water reaches users' properties, although supply efficiency can be as low as 45% in some irrigation areas.

Financial return

Different irrigation enterprises and the intensity of water use in those enterprises leads to a wide range in the economic benefits achieved from irrigation. There is scope for further rationalisation of water use and increases in returns as water use moves to higher value products. The gross value from irrigated agriculture for 1996/97 was $7,254 million. The highest financial return in agriculture per hectare of irrigation comes from vegetables, closely followed by fruit. Financial return on net water use is similarly highest for vegetables followed by fruit.

Table 6. Water use and gross value for irrigated agriculture (1996/97)					
	Gross value ($m)	**Net water use** (GL)	**Irrigated area** (ha)	**Value/ha** $/ha	**Value/GL** $m/GL
Livestock, pasture, grains, etc.	2 540	8 795	1 174 687	2 162	0.3
Vegetables	1 119	635	88 782	12 604	1.8
Sugar	517	1 236	173 224	2 985	0.4
Fruit	1 027	704	82 316	12 476	1.5
Grapes	613	649	70 248	8 726	0.9
Cotton	1 128	1 841	314 957	3 581	0.6
Rice	310	1 643	152 367	2 035	0.2
Total	**7 254**	**15 503**	**2 056 581**		
Source: National Land and Water Resources Audit					

International comparisons

Australia has a variable climate with high levels of evapotranspiration, resulting in a low proportion of rainfall converted to runoff. Table 7 shows that Australia is relatively dry in terms of overall rainfall and runoff. Australia has about 5% of the world's land and about 1% of its water resources.

Table 7. Continents by: land area; % of world water resources; rainfall; and runoff

Region	Land Area Millions of sq. kms	Estimated % of world's total water resources (a) %	Average annual rainfall (b) mm	Estimated runoff as % of average annual rainfall (b) %
Africa	30.3	9	690	38
America, North	24.7	16	660	52
America, South	17.8	27	1,630	57
Asia	44.9	33	600	48
Australia	**7.7**	**1**	**465**	**12**
Europe	9.9	14	640	39

Source(a) Food & Agricultural Organisation, Water Report No. 23 – Review of Water Resources by Country 2003, p. 127
Source (b) Year Book Australia 2003, p. 30.
Percentages have been rounded to nearest whole number.

Australian rivers have comparatively low and variable flows. Table 8 compares some of the major rivers around the world with three of Australia's major rivers.

Table 8. Ratio of maximum to minimum annual flow for selected rivers

Country	River	Ratio of maximum to minimum annual flows
Brazil	Amazon	1.3
Switzerland	Rhine	1.9
China	Yangtze	2.0
Sudan	White Nile	2.4
USA	Potomac	3.9
Australia	**Murray**	**15.5**
Australia	**Hunter**	**54.3**
Australia	**Darling**	**4705.2**

Source: Murray Darling Basin Commission presentation

A recent study estimated water availability and use in fourteen selected countries (see Table 9). Australia ranked fourth in Estimated Per Capita Water Withdrawal in 2000. The study noted that the data should be viewed with caution, as it comes from different sources and over different periods. As well, international comparisons of water availability and water use must be highly qualified because circumstances vary so greatly.

Table 9. Water resources and withdrawals, selected countries

Country	**Annual Renewable Water Resource km3/yr (year of estimate)**	**Total Freshwater Withdrawal kms3/yr (year of estimate)**	**Estimated per capita withdrawal in 2000 m3/p/yr**	**Agriculture as % of total water usage %**
Argentina	814 (2000)	28.6 (1995)	772	75
Australia	**398 (1995)**	**17.8 (1995)**	**945**	**75**
Canada	2901 (1980)	43.9 (1990)	1,431	8
Chile	922 (2000)	20.3 (1987)	1,334	84
Germany	182 (2001)	58.9 (1990)	712	18
Indonesia	2,838 (1999)	74.4 (1990)	350	93
Mexico	457 (2000)	77.8 (1998)	787	78
New Zealand	397 (1995)	2.0 (1991)	532	44
South Africa	50 (1990)	13.3 (1990)	288	72
Spain	111 (1985)	33.3 (1994)	837	62
Thailand	410 (1999)	33.1 (1990)	548	91
Turkey	201 (1997)	31.6 (1992)	481	72
United Kingdom	120 (1980)	11.8 (1994)	201	3
USA	2,478 (1985)	469 (1995)	1,688	42

Source: The World's Water 2002-03 - The Biennial Report on Freshwater Resources, p. 237 & 243. Pacific Institute for Studies in Development, Environment, and Security, Oakland California.

Australia has about 1% percent of the world's water resources, and about 0.3% of its people. On this basis Australia could be regarded as 'water rich' per person. However, other considerations need to be taken into account. For example, almost half of Australia's water resources are in the far north, remote from the major population and agricultural centres. Australia's relatively high rate of per capita water usage reflects its large agricultural production, much of which is exported, and the amount of water used in irrigation.