

Squandering the future – climate change, policy failure and the water crisis in Australia

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Abstract

Since European arrival (1788), statist developmentalism¹ has driven natural resource use in Australia. Despite evidence of a systematic decline in the quality of Australia's ecosystems, policy-making still reflects the exploitative paradigm upon which statist developmentalism relies. This paper will draw on recent policy changes within the water sector in Australia as a case-study, allowing the authors to consider the types of social, economic and ecological consequences that can come from statist developmentalism. Fuelled by climate change, water availability is looming as an extremely serious problem for Australia. Despite this, recent policy changes within the water sector are not likely to achieve sustainable water use in the short-term, and may do little to subvert statist developmentalism as the dominant paradigm within natural resource use in Australia in the foreseeable future.

Keywords: futures; governance; natural resource use; statist developmentalism; water reform

1. Speculating on Australia's future

If we look back 150 years, to the paradigms and practices of that time, we are likely to smile indulgently. Many of us can see clearly that the belief systems then operating

¹ Refers to government-led promotion of extensive use and development of 'natural capital'.

were inadequate to explain events, and have been overtaken. But too many of us lack a capacity to learn from that observation about our current paradigms. If we go forward 150 years in our imagination and then look back it seems likely that practitioners of that day will smile again at our belief systems [6, p.3].

Since European settlement, authors have pondered Australia's place in the world and what the future might hold for this nation. Recent examples by non-Indigenous scholars have included Kasper *et al's* (1980) *Australia at the Crossroads* [42], Khan and Pepper's, *Will She Be Right?* (1980) [44], Birrell *et al's* *Populate and Perish?* (1984) [12], Cocks' *Future Makers, Future Takers* (1999) [18] and Yencken and Wilkinson's, *Resetting the Compass* (2000) [78]. Behrendt's more recent *Achieving Social Justice: Indigenous Rights and Australia's Future* is the latest in an increasing number of books that are also starting to present an alternative vision, one penned by Indigenous Australians [9]. All such works have their own particular 'flavour'; and, as Natasha Cica [16, p. 7] has reminded us, 'depending on what you read and to whom you listen, we Australians at the beginning of the twenty-first century live in either the best or the worst of times'.

Cica [16] concludes that the 'best of times' discourse is generally promoted in Australia by neo-liberal, conservative groups, many of whom shape the content of mainstream media. Moreover, it has been suggested that a coalition of ruling (conservative) government and corporate forces work tirelessly to 'shut down debate on the state and direction of the society in question' [16, p.9]. This finding is strongly endorsed by Sharon Beder [7, p.216] in her analysis of the linkages between news reporting, media ownership and the reporting of 'ecological' stories in the Australian media:

Reporting of environmental problems tends to be superficial, narrowing the focus to specific events in isolation rather than looking at systemic problems that caused them such as the international monetary system or the unregulated power of corporations.

With a population of 20 million people, Australians represent less than 1% of the global population, yet have stewardship over almost 20% of the world's landmass. Australia is an affluent, industrialised nation, with much of its

wealth reliant on the continued export of competitively-priced, unprocessed raw materials [20]. With 25% of the country's exports coming from minerals and fuels² and 16% from agriculture, the 'rocks and crops' economy has always been highly vulnerable to international commodity price fluctuations. As a consequence, conservative governments in particular have taken a strong stand against such international agreements as the Kyoto Protocol, in part driven by the belief that such agreements would do enormous damage to the economy.

The key tension in this debate occurs between preserving the economic base of natural resource use in Australia, whilst not seriously undermining the environment's ability to provide those resources into the future. For example, much political debate has occurred over the issue of whether or not the Australian government³ should ratify the US-Australia Free Trade Agreement (AUSFTA).⁴ Whilst the economic benefits of AUSFTA are predicted to be significant, many groups believe the agreement could subject Australian agriculture to a heightened level of threat from potentially devastating exotic pests and diseases.

Despite agreements like AUSFTA, which in part reflect the current national government's desire to continue historical patterns of natural resource use, public opinion reflects a strengthening of community environmental consciousness, particularly since 1990 [47]. Despite the growing public support for environmental issues, the 'best of times' discourse highlighted above has the potential to delegitimise those groups that have expressed concern over the ongoing exploitation of Australia's fossil fuels, soils, forests and water supplies.

² Australia is the world's largest exporter of coal. Earnings from coal exports alone are predicted to be around \$AUS16 million in 2004-5, up from \$AUS11 million the previous year. China is emerging as a huge market for Australian minerals and fuels with 25-year LNG contracts worth \$AUS25 billion having been signed in 2002 [62].

³ The conservative national government that has been in power since 1996.

⁴ While AUSFTA is currently receiving a great deal of media attention, it should not be forgotten that Australia also has similar agreements in place with New Zealand and Singapore. A free trade agreement with Thailand appears

Examples can be found within many natural resource policies in Australia, most of which have been shaped by influential lobby groups that promote the interests of agriculture and mining. Such groups often question the validity of scientific claims about biodiversity decline, the need for increased environmental flows in rivers and climate change projections [11]. The difference in views that can be found between pro-environment and pro-development groups in Australia is illustrative of a paradigmatic conflict that has yet been irresolvable in a policy context.

It is now generally accepted within the scientific community that increasing human impacts on the environment will result in a suite of effects, many of which will be difficult to predict. Also widely accepted is the belief that an adequate response will require radical changes in the way governments and industries operate. Further complicating the issue is the recent shift in thinking towards a more dynamic world view, where human-environment systems are characterised by complex non-linear relations [33]. This more dynamic approach utilises complex systems theory [37] and the concepts of resilience, uncertainty and integration to model and predict changes within human-environment interactions.

The development of more adequate policy responses will in part rely on administrative systems that reflect a more detailed understanding of the complexity inherent within human-environment interactions. Carl Folke *et.al.* [33] argue that flexible, open institutions which foster adaptive capacity and resilience are required if we are to respond effectively to changes within ecological systems. Despite this basic need, much of the policy being developed in response to ecological change relies primarily on market-based instruments which on their own, may not adequately encapsulate the flexibility and adaptive capacity deemed necessary to solve complex environmental problems.

likely to be ratified soon and discussions are underway for similar links with ASEAN, China and Japan [36]. For a critique of AUSFTA, see: "No to the US Free Trade Agreement": www.greens.org.au/hotissues/usfta

Economic instruments do not have a well-recorded history of success. For example, as part of the water reform process that has taken place in Australia since 1995, the key policy instrument adopted by national and state governments is increased water-trading through the establishment of a nation-wide water market. Anecdotal evidence suggests that water markets on their own may not adequately address the complexity of water-use decision-making in Australia and, as such, may not successfully avert the ‘water crisis’ that has been predicted.

From a wide range of possible environmental concerns, this article focuses specifically on the related issues of climate change and water policy, two pressing environmental problems that are currently being debated in Australia. Section 2 introduces the concepts of adaptive management and statist developmentalism and then outlines the conflicts inherent within the federal structure of Australian government, a structure that has further complicated environmental decision-making. Section 3 focuses on the issue of climate change as this provides essential background to the subsequent sections which introduce and discuss recent changes in water policy in Australia.

2. An evolving experiment

For approximately 40,000 years the Australian continent has played host to an extended experiment in ‘adaptive management’. Generations of Australians have struggled with how best to manage the ecosystems they existed within [49]. It is now generally accepted that Indigenous Australians brought about continent-wide environmental transformations, primarily through the use of fire. This transformation of the environment prompted Geoffrey Blainey [14, p.11] to comment that for many Indigenous Australians at the time of European settlement: ‘...the standard of living in a normal year was high; higher than that of at least 70% of the population of Europe in 1788...’.

Evidence suggests that serious mistakes in environmental management have been made over the last two centuries, primarily due to the direct transfer of

European principles of land and water management to a completely different geographical setting. Whilst in some cases where European principles do not 'fit' science has been willing to change, there are few examples of governments adopting new institutional frameworks or environmental management paradigms in similar situations [63]⁵. In addition, rarely have governments been willing to commit to a truly national, and hence more uniform approach to dealing with environmental problems, as most administrative bodies are reluctant to submit to a higher power.

This reluctance to agree to a national approach for dealing with environmental issues has driven each state government in Australia to push for their own set of targets to reduce greenhouse gas emissions. In this case, most state governments chose to implement a much higher target than the one adopted by the Commonwealth government in its *Energy Blueprint* [43]. Whilst this outcome could be deemed positive – particularly within those states that have chosen to go beyond compliance - the key problem here is that if each state is operating independently, then it becomes much harder to reach agreement between such disparate groups when it comes to problems that transcend political boundaries.

A uniform, flexible and adaptive approach is needed to effectively cope with future environmental change. The environmental situation is so serious that Australia now sits at a crossroads [3]. Governments can either start redesigning their agricultural and urban production systems and repaying their longstanding ecological debts, or resource-use can keep going down the same technological and developmental path towards a world of cascading and irreversible environmental problems. What concerns many authors [3], is that very few governments – Australia included – are willing to develop the type of administrative structures that are needed to bring about the required

⁵ Isolated examples can be found of farming families who, for generations and against the mainstream trend, have been actively working to preserve tracts of native vegetation on their properties. Examples from the sheep and wheat belt of central western New South Wales are discussed in Chris Williams' recent book, *Old Land New Landscapes* [75].

changes. In addition, some political parties are more likely to take these issues seriously, whilst others will push to maintain the status quo.

The Howard government's approach to natural resource management has been heavily criticised, with authors such as Ian Lowe [48, p. 245] claiming that this administration 'has presided over the steady and systematic decline of the Australian environment' and 'will leave a legacy of degradation'. This government's approach to the environment has been driven largely by a policy regime imported from Europe in the eighteenth and nineteenth centuries, known 'statist developmentalism' [71]. Australia shares this persistent policy agenda with other settler capitalist societies such as Argentina, Canada, Brazil and New Zealand.

Statist developmentalism is shaped by narrow definitions of progress and development [28] which are applied uncritically to: 'ecological system[s] in which climate, soils, flora and fauna were all incompatible with the implicit model of development' [71, p.23]. Another characteristic is the central role accorded the state in guiding and controlling development. For example, in the Australian state of Victoria, a Water Act released in 1905 declared that the state had 'the right to the use and ... control of ... water at any time in any river, creek, stream or water-course' [17, p.16]. This vesting of power in the state, in principle, provided the basis for balanced water allocations which recognised the environment as a public good. However, it also provided legislative support for a number of large 'nation-building' water projects that the state was able to establish without opposition [13]. At this time, many ambitious schemes were proposed, in part driven by the belief that intense development of the nation's natural resources would support increased population growth. Population projections of anywhere between 100 and 480 million were not uncommon [59]. In fact, the most recent book on this topic, written largely from a cornucopian perspective⁶, has argued for a population target of at least 40 million by 2050 [26].

⁶ For a recent critique of long-established arguments that deal simplistically with population size alone in the population/environment debate see the excellent chapter by Natalie Jackson in *Controversies in Environmental Sociology* [41].

Environmental realism was not well received in a country driven by statist developmentalism, and desperate to increase its Anglo-Celtic population following the First World War. Despite this, the perceived benefits of large scale irrigation schemes were starting to be questioned, especially in terms of the economic benefits that such projects were claimed to bring, which were often exaggerated. For example, Bruce Davidson [21] has argued that the cost of irrigation schemes outweighs their value of production.

Robyn Eckersley [29] has criticised the limits of the liberal state to deal effectively with environmental problems, reproducing the famous Adorno and Horkheimer insight: 'the fully enlightened Earth radiates disaster triumphant'. Eckersley [29] asserts that these limitations primarily stem from: the prioritisation of private property rights in land and water; short-term policy-making based on electoral cycles; and a lack of national vision with regard to environmental issues.

Historically, in most liberal democracies, natural capital has been considered a free good. As a result, 'products' such as timber or water have been significantly undervalued in the market-place. There is also a tendency to discount the future and underestimate risk [35]. A number of large scale water projects that have been developed in Australia over the last 50 years have reflected this type of thinking, with such projects generally undervaluing the economic cost of water and underestimating the risk of over-allocating such a scarce resource [65].

3. Responding to climate change

Australia's climate is dominated by short-term El Nino events as well as much longer-cycle, Pacific Oscillation episodes, both of which, at different times, can deliver either serious droughts or excessive rainfall [15]. The impact of this has been noted by Tim Flannery [32, p. 81] who comments that 'Australia is the only continent on Earth where the overwhelming influence on climate is a non-annual climatic change'. For example, the total precipitation that fell on

Melbourne's catchments between 2001-2004 was the lowest on record [22]. Further, when averaged across the continent, the rainfall for March to November 2002 was the lowest ever recorded, and temperatures were also significantly higher than in previous drought years.

The Intergovernmental Panel on Climate Change (IPCC) *Third Assessment Report* (TAR) in 2001 allowed policymakers to determine what constituted: 'dangerous anthropogenic interference with the climate system'. This report concluded that the earth's climate system had demonstrably changed and that new evidence indicated that most of the warming over the last 50 years was attributable to human activities [39]. Under all IPCC emissions scenarios, carbon dioxide concentrations, globally averaged surface temperature and sea level are projected to increase during this century. In particular, global, averaged surface temperature is projected to rise by 1.4-5.8 degrees between 1990-2100. This is a rate of warming without precedent during at least the last 10,000 years. Increased climate variability and the incidence of extreme weather events is also projected.

It is almost certain that carbon dioxide emission levels will double or even triple during this century. Even stabilisation of carbon emissions at near current levels will not lead to stabilisation of carbon dioxide atmospheric concentrations. Reduction of concentrations would require at least an 80% reduction of current emission levels and the longer we delay action, the greater the eventual reductions will need to be, assuming that the need for a response is eventually recognized.

CSIRO⁷ has modelled the impacts of climate change for a number of regions across Australia. Their research predicts that annual average temperatures over most of the continent will increase by between 0.4-2.0 degrees by 2030, with increases of 1-6 degrees by 2070. Parts of south-eastern Australia will receive increased summer but lower annual rainfall. Sea level is likely to rise

⁷ The Commonwealth Scientific and Industrial Research Organisation, Australia's national science agency.

at a rate of between 0.8-8.0 cm per decade, reaching 9-88 cm by 2100. An increase in the incidence of extreme weather events is also likely [74].

Under the Kyoto Protocol, developed countries have agreed to reduce their collective greenhouse gas emissions by at least 5% of 1990 levels during the first commitment period (2008-2012). Australia's target required a reduction of emissions to 8% above 1990 levels during this period. The 1999 *National Greenhouse Gas Inventory* showed that Australia's net greenhouse gas emissions for 1999, excluding emissions from land clearing, were 458.2 Mt of carbon dioxide equivalents, compared to 390.3 Mt in 1990, a 17.4% increase. Australian emissions are growing at a rate far beyond the comparatively generous target set by the Kyoto protocol.

Greenhouse policy responses have no basis in law in Australia. For example, the *National Greenhouse Strategy* has no legal or statutory framework. The Australian government has not ratified the *Framework Convention on Climate Change* and has not passed legislation to implement it. As such, greenhouse policy has a very different status to that of some other treaties which have been used by the Australian government to influence decision making over land use, and little research has been undertaken on the possible effects of climate change, particularly the response of complex biological systems [27]. For example, the *World Heritage Convention* was implemented under specific legislation through powers given to the Commonwealth government under the Australian constitution.

4. Water, ecosystem services and natural capital

Historically, runs of years with good rainfall in Australia have been used to set the benchmark for settlement and agricultural production scenarios. For example, following a period of good rains in the 1870s, Goyder's famous 'line' separating those areas in South Australia that he deemed suitable for either agriculture or pastoralism, was first openly ridiculed and then officially abandoned. As a consequence, the wheat frontier pushed north, ultimately with disastrous economic and ecological consequences [50].

Nevertheless, from that time until relatively recently, as a public policy issue across Australia, drought was always considered an abnormality for which farmers were to be compensated, rather than a natural event to be planned for. In 1992, the Commonwealth government insisted that farming be considered a business - a central element of which has to be the on-going management of risk - and subsequently removed farm welfare provisions from agricultural adjustment programmes [4].

This change in thinking is indicative of a general global shift amongst decision-makers towards the recognition of environmental limits to economic growth [10]. In many cases, environmental problems have become so severe that for future economic development to be successful, it must be constrained within the biophysical limits of the ecosystems that support it.⁸ In Australia, tentative steps have been taken by governments towards recognising the importance of protecting natural resources, though in most cases the continuation of economic interests has remained the priority. This represents some movement away from traditional approaches where the aim has been to shape Australia's natural resources into something more useful and productive. Usefulness was generally based on European ideals that 'did not see Australian plants and animals as being first class, and saw Australian landscape as being distinctly second rate' [38, p. 13].

This attitude, combined with a desire to 'rehabilitate the rural economy' post World War II, saw the construction of many government funded dams and irrigation delivery systems across Australia [66, p. 166].⁹ Between 1950 and 1990, almost 90% of Australia's current water storage volume was completed [67]. This approach to water resource development, characterised by the construction of extensive government-funded, large-scale water storage and delivery infrastructure has led to a situation where, in a 2000 audit of

⁸ The Brundtland Commission's *Our Common Future* is often cited as one of the main international documents to officially address this issue, promoting the concept of sustainable development as one possible solution to the problem of environmental limits to growth [77].

Australia's water resources, it was found that 26% of the surface water management areas assessed¹⁰ were either 'close to or overused when compared with sustainable flow requirements' [56, p.iv].

Many of the areas where water is either approaching over-allocation, or is already over-allocated, correspond with the most economically productive irrigated land [56]. This is problematic as the continuing use of water for irrigated agriculture has been identified as necessary to ensure the 'economic health' of many regions across Australia [31]. The area where the majority of irrigated agriculture occurs, and where water is considerably over-allocated is the Murray-Darling Basin. In response to water shortages in this basin, two management approaches have been adopted: 1) the establishment of the Murray-Darling Basin Commission; and 2) the Council of Australian Governments¹¹ (COAG) water reforms.

4.1. The Murray-Darling Basin

The Murray Darling Basin covers an area of over one million square kilometers, extending over much of central and south eastern Australia and overlapping with a number of state and territory boundaries. The basin contains twenty major river systems and 70% of Australia's irrigated area. The value of farm output is \$AUS3 billion a year from the irrigated areas, and \$AUS7 billion a year from dryland areas.

Land clearing has raised saline water tables, and together with water diversions and dam construction, has altered most of the hydrological systems within the basin. Approximately 5.7 million hectares are at risk of being affected by dryland salinity, a figure which could rise to over 17 million hectares by 2050 [55]. Increased salinity in the Murray-Darling is expected to lead to reduced biodiversity, production losses and detrimental impacts to

⁹ Powell [60] has written extensively on the history of water development and management post-European settlement in Victoria, Australia.

¹⁰ Australia was divided into 325 management areas for the purposes of the review.

¹¹ COAG is a body comprised of heads of Commonwealth and State governments in Australia.

infrastructure [52]. These environmental problems are now generating additional, serious economic impacts.

Agreements between the Commonwealth, and State/Territory governments that share the basin's resources were first put in place 1982 through the *Murray Darling Basin Agreement*. This agreement outlines planning and management approaches for the sustainable use of the basin's resources in a cooperative and coordinated way. The agreement has been rewritten a number of times since 1982, primarily to include additional partners.

In 1988, the Murray Darling Basin Commission was established. The Commission comprises officials from government agencies and includes a secretariat that represents stakeholder groups with an interest in the basin's resources. It provides executive support and advice to the Ministerial Council¹² and implements Council decisions. Among its tasks, the Commission develops policy; participates in planning, management and works' proposals; operates the river systems by regulating flows; and manages assets such as dams.

The Council and Commission have historically operated on a consensus basis. Through a series of cooperative arrangements, rules of engagement have been developed that allow governments with responsibility for the basin's resources to implement decisions in their own way. For example, states manage their own water and land legislation and allocate water and land uses within a framework of intergovernmental water sharing arrangements.

The Council and Commission have prepared a salinity and drainage strategy in an attempt to better integrate land and water management in the Murray-Darling Basin. However, intergovernmental arrangements of this type tend to leave land use and management to the discretion of individual states. Such freedom can make it difficult to reach agreement on large-scale issues that

¹² The Council is comprised of Ministers from participating governments who have natural resource management responsibilities.

affect the whole basin. For example, it took approximately ten years for the Commonwealth and State/Territory Governments to agree to a cap on water extractions within the basin, at which time, governments agreed to limit diversions to the 1993-94 level of development. At the time the agreement was reached, most water in New South Wales had already been over-allocated, and a worsening of environmental problems was evident.

Despite the introduction of a cap on surface water extractions, groundwater use has not been considered in any significant detail, even though it has the potential to significantly offset the benefits of any increase in environmental flows. Young [79] estimates that since 1993-94, increased groundwater usage has reduced streamflow in the basin by 349 gigalitres/year. The Murray Darling Basin Commission [51] estimates that further growth in groundwater use would reduce streamflow by between 330 – 550 gigalitres/year. A 50% reduction in stream flow is possible by 2053 through a combination of factors, leading to a reduction in available water of almost 6,000 gigalitres, equivalent to about 80% of water currently extracted from the Murray River [2].

The intergovernmental arrangements developed for the Murray-Darling have not successfully integrated land and water use. Currently, surface water is still overallocated, with insufficient volumes available for environmental purposes. Inappropriate land and water use practices have not changed, and governments are reluctant to take a firm stance on this issue. Decisions which radically alter current practice have been difficult to achieve, in part because current policy does not adequately address the core issues identified above.

4.2. The COAG water reforms

In 1994, COAG adopted: 'a strategic framework for the reform of the Australian water industry' [54, p.99]. The reforms included a shift towards full cost recovery for water delivery; the establishment of water markets in rural areas; and recognition of the environment as a legitimate water user through the introduction of mandatory environmental flows [54].

The key challenge for governments has been determining their role in the structural adjustment of Australia's irrigated industries. COAG has primarily focussed on the best way to help irrigators cope with market fluctuations, climate change and full-cost recovery for water delivery. A recently released report¹³ recommends that the best course of action is to remove impediments to adjustment; expedite rather than impede adjustments; and help irrigators manage adjustments rather than buffer them against change.

The *National Water Reform Framework* was also developed to address concerns about the degradation of environmental systems and the inappropriate pricing of Australia's water resources. Particularly significant was COAG's willingness to address the degradation of the nation's rivers by allocating water to the environment and adopting approaches for integrated natural resources management [58]. Priority was given to the establishment of water markets in many irrigated areas across the country. In order to establish water markets, State/Territory Governments needed to clearly define property rights related to water. This was achieved by separating water entitlements from land and clearly specifying the ownership details of water rights such as volume, reliability, transferability and quality [58]. State/Territory Governments were also required to develop trading systems for water which would enable its transfer from low to high value uses.

COAG highlighted a number of critical environmental issues that needed to be addressed. In order to do this, State/Territory Governments were directed to develop legislative structures and implement institutional reform to ensure that: water would be allocated to the environment; environmental costs would be included in water pricing; and the guidelines of a *National Water Quality Management Strategy* could be effectively implemented [24]. To ensure successful implementation, the Commonwealth government agreed to make annual payments to those State/Territory Governments who were adopting the reforms as required [24]. State/Territory implementation of the water reforms is reviewed annually and payments are based on this review.

¹³ McColl, J. C. and Young, M. D. (2005) *Managing Change: Australian Structural Adjustment Lessons for Water*. CSIRO, rRport No. 16/05, September 2005, available on-line www.csiro.au

4.3. Recent developments

A 2003 review of progress towards the full implementation of the *Water Reform Framework* recommended that a *National Water Initiative* be developed to reaffirm the commitment of Australian governments [25]. The *National Water Initiative* was subsequently agreed to in the same year, specifically addressing some of the key challenges COAG had identified. Many of these challenges related to the provision of water for environmental flows. It was noted that governments were finding it difficult to both determine environmental flow requirements and allocate water to the environment. Governments also needed to develop more effective strategies for the management of tensions between environmental needs and off-stream uses, particularly in over-allocated catchments [24].

On-going tension between environmental needs and off-stream uses has continued to cause concern. A number of authors have questioned the ability of markets and economic instruments to provide the degree of environmental improvement that many Australian rivers need in order to experience improved health. One group that has been particularly outspoken is the Wentworth Group of Concerned Scientists, a coalition of some of Australia's leading environmental scientists who have produced their own *Blueprint for a National Water Plan* [73].

The Wentworth Group believe that an extra 1500 gigalitres of water is needed annually to ensure the health of the Murray River [8]. In order to achieve this goal, Australian governments would need to provide \$AUS1.5 billion as part of a 10 year commitment to reclaim this extra water from current off-stream uses [8]. As a 'first step', over the next 5 years, COAG has agreed to spend \$AUS500 million to return 500 gigalitres of water to a number of significant sites along the Murray River, a move that many believe will not be sufficient to ensure this river's long term health [8]. The possibility of recovering any additional water for environmental flows may prove economically and physically impossible given that 80% of the total flow in the Murray-Darling River system is currently diverted for off-stream use [19].

The Wentworth Group developed a series of proposals in their *Blueprint* [73], which they presented at the August 2003 COAG meeting [1]. According to the group, three national reforms were urgently needed [73]. Firstly, river health was to be more adequately protected through better enforced environmental flows, especially in over-allocated systems. Second, the processes used by governments for water entitlements and trading needed improvement, and these processes needed to be nationally consistent. Finally, communities needed to be more effectively engaged in the reform process [73]. At this meeting, the Wentworth Group also urged COAG to commit immediately to: the provision of an additional 100 gigalitres a year to the Murray River for environmental flow; the development of a *nationally consistent* system of water entitlements; and the development of a series of Environmental Water Trusts¹⁴ to provide water to priority river systems [1, 73].

5. Can the reforms deliver ?

On the surface, the COAG reforms appear to offer a relatively painless solution to Australia's water problems. They also appear to represent a positive policy and management shift that will simultaneously improve the efficiency of water use through the use of market mechanisms, and protect the ecosystems that supply that water [46]. This is a view that Australia's mainstream media have generally supported, with much kudos given to the States and Commonwealth Government for their efforts to save some of the country's major rivers [45, 70].

There is no doubt that Australia's water industry was in need of reform. There is also little argument that many of the changes proposed by COAG - such as mandatory environmental flows - have the *potential* to improve the efficiency and sustainability of water use. In theory, these reforms should also have follow-on benefits for many of the nation's currently over-burdened rivers, many of which supply the bulk of water used in Australia's irrigated agricultural industries. However, it has also been suggested that a degree of

caution is required as these are still relatively new reforms¹⁵ and their success has yet to be proven.¹⁶ In fact, in the 10 years since the COAG reforms were first proposed, a number of doubts have been raised about their ability to deliver on the environmental improvements that have been promised. For example, a 1999 study concluded that [68, p.6]:

Environmental water allocation is accompanied with varying statutory force, and the cap on the Murray Darling Basin¹⁷ diversions is yet to be fully implemented. The 20-volume National Water Quality Management Strategy ... has been a major initiative, but compliance is difficult to assess.

In theory, the COAG reforms promise a future where water use in Australia is sustainable, the use of markets has shifted irrigation water to higher value, more efficient uses, and the ecological systems that provide that water are healthy [68].¹⁸ Supporting this view, most of the high-profile media reports on the process of water reform in Australia have focussed primarily on the 'best of times' discourse described above. Driven by the themes characteristic of this discourse, it would seem that sustainable water use in Australia is just around the corner and the transition will be relatively painless.¹⁹

An alternative view suggests that: 'the natural resource and environmental aspirations of the COAG agenda are far from being realised' [68, p.6]. The Wentworth Group, in particular, have predicted that even if the Murray-Darling Cap is fully implemented, extraction rates will not be low enough to: 'secure the long-term health of the Basin' [72, p.6]. Concern has also been raised about the environmental impact of water markets. For example, John Tisdell [69] found that we have very little understanding of the impact that water markets may have on river health. In his case-study of the Border Rivers

¹⁴ Environmental Water Trusts would be used to buy water for environmental flows for priority river systems.
¹⁵ Particularly within the context of ecological time.

¹⁶ For a detailed consideration of these issues, please see Smith [67].

¹⁷ An intergovernmental agreement to cap water diversions from the Basin at 1994 levels of abstraction.

¹⁸ For an example of a policy document that articulates the COAG reforms in this way, please see the recent Victorian State Government's White Paper on Water, Securing Our Water Future Together [23].

¹⁹ See for example, the media reports about the Victorian State Government's attendance at the COAG meeting in Canberra in June 2004, where Premier Steve Bracks was applauded for his 'war on waste' [34].

region in Queensland, he found that: ‘the trade of water entitlements distorts the flow regime further away from the needs of the environment’ [69, p.119].

Based on these examples, despite COAG recognition that the environment is a legitimate user of water and that the future successful operation of Australia’s water industry must recognise the biophysical limits of the country’s rivers, the reliance on market mechanisms serves only to perpetuate the success of the water market itself and does not adequately address the environmental externalities of water use. Evidence of this also exists within the context of tradable water entitlements [TWEs, 46]. The expectation is that, once traded, water will be directed towards higher-value crops, and will be used in a way that will not significantly compromise ‘environmental amenity’ [76, p.12].

In many of the test cases, however, the limitations of TWEs have become evident. For example, through the activation of sleeper licences²⁰ as part of increased water trading, it is suggested that overall water use in the Murray Darling Basin could actually increase by 15% [66]. In a system that is already over-allocated and showing significant signs of environmental stress [53], it would appear that the reality of the COAG reforms and, in particular, the reliance on water markets to solve Australia’s water problems, has the potential to actually cause increased environmental degradation in certain areas.

Irrigation accounts for approximately 76% of water use in Australia and traditional irrigation practices continue despite claims that greater efficiency is required to achieve sustainable water use. In addition, individual states are further developing their water resources, which is impacting on the availability of water downstream. For example, the volume of water entering New South Wales from key Queensland rivers is estimated to have reduced by over 50% in the last 20 years. This change has in part been attributed to an increase in

²⁰ Sleeper licences refer to licences that are owned by individuals, but who currently aren’t using their water allocation.

on-farm water storages in Queensland, which have risen from 196 gigalitres to 1333 gigalitres between 1993 and 2001 [57].

In addition, the bulk of irrigation water is producing relatively small returns per megalitre. New South Wales rice growers, for example, use around 2000 gigalitres of water to produce a crop valued at \$AUS350 million. Irrigated pastures, wheat paddocks, rice fields and sugar plantations use 70% of irrigation water, whereas high return products such as fruits, vegetables and cotton use only 30%. About 2/3 of the value of irrigated crops comes from about 1/3 of water used [5].

In Australia, irrigated land has expanded by 22% under the current market-based, TWE system [5]. In addition, between 1985 and 1996/7, water used for irrigation increased by 76% [64, 30]. This has impacted on the ability of governments to meet environmental flow requirements, with an assessment of Victoria's progress showing that flow levels remained inadequate in 42 of the 73 systems that were reviewed. Only 4 of the reviewed systems have improved environmental flows.

The potential for increased environmental impact, as illustrated by the examples here, suggests that a reliance on water-markets and regulated flows with patchy rates of enforcement may not be sufficient to stop the squandering of Australia's water resources. The COAG reforms may represent little more than business-as-usual in relation to water use, with communities and water users left with the financial burden of fixing the costly mistakes caused by historical patterns of use.

6. Conclusion

The water reforms described here provide an example of policy and institutional change that appears to offer but does not deliver substantial improvements. There is convincing evidence that, in many areas of natural resource use, a new paradigm is needed which will lead to radical revisions of use and consumption patterns, and that the longer the delay, the more

substantial will be the required eventual changes. This paradigm has profound implications for public and private institutions as well as for public policy.

An Inquiry conducted in 1993 [61] recommended that ‘truly radical policy interventions’ were needed to avoid the drastic deterioration of Australia’s coastal zone. This Inquiry advocated a national approach to natural resource management based on the principles of sustainable development.

Overcoming fragmented management and inadequate coordination, as well as achieving integration between institutions will require altered governance arrangements of three kinds.

First, governments will have to return to governing, and end the non-interventionist, neo-liberal model of governance which has dominated for over ten years. This must involve a radical extension of the time-frames addressed by decisions, the adoption of long-term strategic thinking, and an end to the ‘tyranny’ of small decisions.

Second, national policy responses are needed that avoid the easiest achievable and least effective options, and instead radically change the current practice of environmental exploitation.

Third, integrated cross-sectoral management of natural resources must replace the statist developmentalist mind-set that has dominated natural resource use in Australia for over a century. This will require each sector to: consider the impacts of proposals on other sectors; and base all decisions on the principles of environmental protection and sustainable development. Only then will the natural environment cease to be what the World Conservation Strategy in 1980 [40] called ‘a limited independent sector’.

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