CAN AUSTRALIAN WATER PLANS LEAD COLLECTIVE ACTION TO ACHIEVE INTEGRATION OF THE SEVEN PRINCIPLES OF ECOLOGICALLY SUSTAINABLE DEVELOPMENT

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Abstract
Many countries around the world consider effective water plans as imperative to overcome allocation issues, provide for consumptive, environmental and other purposes, and provide management arrangements, including the establishment of water trading rules. Compared to rest of the world, the Australian approach to water planning is extensive and pervasive and focuses on achieving ecologically sustainable development. Australia is well advanced in a system of water plans that are informed by the best available science, socio-economic analysis and community input and determines how we share valuable water resources between competing uses. These are also part of broader natural resources management schemes which have been sponsored by Council of Australian Government (COAG) reforms. One of the highlights of these policy reforms is the regional delivery model which demands the water users, interest groups and the general community to participate in the planning processes. But this task is complex and achieving it requires among other things, high level of social capital –trust and linkages. In this study, we surveyed water planners across Australia to understand their attitudes and perceptions regarding current water resource management policy and the regulatory processes, particularly achieving integration of the seven principles of ecologically sustainable development.

Keywords: Water planning, ecologically sustainable development (ESD), collective action; trust

1 Introduction

Globally, water resources planning and development has taken different forms and directions over the last few decades and most of these changes are resultant of the changing human demands for water due to various factors such as rapid population growth, changing standard of living, expansion of irrigated agriculture, and climate change. This necessitates better utilisation and efficient use of present water resources to meet future demands and at the same time include the social, environmental and economic components into the planning process. Effective water planning and management procedures are therefore vital to make the optimum use of available water and to meet productive, environmental and social objectives. Compared to rest of the world, the Australian approach to water planning is extensive and pervasive and focuses on achieving ecologically sustainable development (ESD) [Baldwin et al., 2009; McKay, 2005].

Water planning in Australia since 1778 can be distinguished in to five paradigms: (i) state colonial laws; (ii) fiscal federalism; (iii) multistate cooperation; (iv) ESD requirements; and (v) justiciable protocols (McKay & Marsden, 2009). However, the fourth paradigm is of particular importance because two milestones of Australian water reform occurred during this period: first was the signing of the Council of Australian Governments (COAG) framework in1994, and second was signing the National Water Initiative (NWI) in 2004. These agreements, particularly the NWI embodies the Federal, state and territory governments' shared commitment to water reform and places a lot of emphasis on water planning as the mechanism to achieve sustainable and equitable water allocations (Tan et al., 2008; Jackson, 2007). The NWI provides clear direction for water planning by "recognising that settling the trade-offs between competing outcomes for water systems will involve judgments informed by best available science, socio-economic analysis and community input, statutory water plans will be prepared for surface water and groundwater management units in which entitlements are issued (paragraph 36)." The National Water Initiative (NWI) further emphasises the importance of 'regional' model evident in its definition of water plan "statutory plans for surface and/or ground water systems, consistent with the Regional Natural Resource Management Plans, developed in consultation with all relevant stakeholders on the basis of best scientific and socio-economic assessment, to provide secure ecological outcomes and resource security for users" (NWC 2005, p.30). Under the NWI, transparent, statutory-based water plans should be developed for all surface water and groundwater management units in which entitlements to water are issued. Till date a lot of progress has been made in this direction and all States and territories have implemented an agreed water planning processes in their respective jurisdictions. However, the task is complex and requires comprehensive planning systems and involvement of water users, interest groups and the general community in the planning processes. The water planners face significant challenges in implementation of the NWI objectives and

achieving sustainable water management (Grigg, 2008) and according to the National Water Commission's position statement on water allocation planning in Australia (NWC, 2008), "water planning processes have not always been of the necessary high standard and the roll out of completed water plans has been too slow… No jurisdiction can yet claim to have a fully effective water planning system".

This paper is based on an internet survey of water planners conducted across Australia to understand the issues surrounding the regional model of water planning and gain a clearer picture of the challenges faced and the effort put in to the entire planning process. The study also examines the attitudes of the water planners towards, and perceptions of, current water resource management policy and the regulatory processes with respect to achieving ESD.

2 Methods

2.1 Study location

Water planning across Australia is a complex process and the process involves governance at the national, state, river basin (the Murray-Darling Basin) and local government level. The plans differ as they reflect State laws (Hamstead et al., 2008) and Table 1 provides the details about principal water management agencies legislation relating to water management for each jurisdiction along with the actual water planning process and number of plans in the States and territories. In addition to these new plans there are some long standing cross border agreements for example between South Australia and Victoria with regard to a vital aquifer in the South East and between New South Wales, Queensland, South Australia and Northern territory over the Great Artesian Basin.

Table1: Principal water management agencies and laws applicable to each state and territory

State or territory	Lead jurisdictional body for water management / Principal legislation	Name of the Plan	No of plans as on 30 June 2010	Comments
Australian Capital Territory	Environment ACT/ *Water Resources Act 1998*	Water Resources Management Plan	1	Water Resources Management Plan has been repealed and part of it has been replaced by Water Sharing Plan.
New South Wales	Department of Natural Resources/*Water Management Act 2000; Water Act 1912*	Water sharing plan	54	In recent years NSW has developed macro water sharing plans to cover catchments or aquifers where there is less intensive water use compared with the areas that were covered by plans in 2004
Northern Territory	Department of Natural Resources, Environment and the Arts/*Water Act 1992*	Water allocation plan	3	The Act is currently under a review that aims to make it compliant with the NWI by ensuring a consistent methodology for issuing licences and the provision of environmental water
Queensland	Department of Natural Resources, Mines and Water / *Water Act 2000; Wild Rivers Act 2005;Integrated Planning Act 1997*	Water resource plan	21	An Resource Operation Plan is prepared for each water resource plan detailing detail how water resources will be managed to implement the strategies and objectives set out in water resource plans
South Australia	Department of Water/*Natural Resources Management Act 2004; Groundwater (Border Agreement) Act 1985*	Water allocation plans	15	When a water resource is prescribed, the Act requires that a water allocation plan be prepared by one of the eight natural resources management board There are currently 27 prescribed water resources in South Australia and of the 27 water allocation plans, 15 have been completed
Tasmania	Department of Primary Industries and Water/ *Water Management Act 1999*	Water management plans	6	The Act requires water management plans to identify ecosystem water requirements, water management rules and any likely detrimental effects resulting from water extraction. In addition, water management plans include monitoring arrangements to assess the effectiveness of the rules in place.
Victoria	Department of Sustainability and Environment /*Water Act 1989;Groundwater (Border Agreement) Act 1985*	Regional sustainable water strategies	2	In addition to SWS, Victorian Water Planning framework includes other statutory instruments like Bulk entitlement, Environmental entitlement and management tools like Streamflow management plans and Groundwater management plans.
Western Australia	Department of Water /*Rights in Water and Irrigation Act 1914*	Water management plans/Water Allocation	11	Western Australia uses a system of eight macro 'water regions' within which water planning and management services are delivered. Within each of these water regions, a regional water management

	Plans	plan is required which drives the production of water allocation plans, based on sub-regions within the water management plan area.

Note: The plans must be reviewed at least every five years.
Source: National Water Commission, 2010 and Research for NCGRT

Therefore, this study chose to conduct an internet survey of the people involved in the planning processes at all levels - department, operation and ground level- in various water management regions of the Australian States and Territories.

2.2 Survey instrument and the process

The survey instrument was designed keeping in mind the busy schedule of the water planners and therefore was short. Previous research conducted by the authors and other researchers at the Centre for Comparative Water Polices and Law (e.g. McKay, 2007a; 2008; Keremane & McKay, 2006; 2008; Wu et al., 2008) formed the basis of the interview. However, the questions were modified to suit the present study and to make a fair assessment of the respondents' attitude towards, and perceptions of, current water resource management policy and the regulatory processes particularly associated with achieving the ESD principles. The survey included a section on water governance in general, a section on attitudes toward which level of government should have responsibility for water governance and the effort and difficulty of achieving ESD principles and finally a demographics section. Majority of the questions were 5 point Likert-type with some multiple-choice, rank order and open ended questions.

Participation in the survey was voluntary and the recruitment of the participants was done in stages as explained below. In stage 1, a thorough desk research of the information available in print or published on the website of the respective departments in each state and snowballing was done to generate a list of potential participants. In stage 2, an email inviting to participate in the survey was sent out to the potential participants along with the project information sheet. While some responded to the first email sent, in some other cases reminder emails were sent, and 3 follow-up phone calls were made to confirm the participation. This process was done in stages because some states like Queensland and Victoria were battling with floods when this study was initiated and so the participants in these states were contacted later than their counterparts in other states. In final stage (stage 3), only the confirmed participants were sent an email with the link (URL) to the survey placed on the website of *SurveyMonkey*, an online survey software and questionnaire tool used to design the survey.

3 Findings and Discussions

This is a nationwide survey of water planners and is ongoing. The results presented here are preliminary and are based on the responses received from the States of New South wales, Victoria, South Australia and Western Australia.

3.1 Demographics

Our respondents include more females (53.8%) than males (46.2%). The number of respondents at medium age bracket (35-44 years, 38.5%) is more than the number at the other four age brackets (18-24, 0%; 25-34, 23.1%; 45-54, 30.8%; 55 year and older, 7.7%). All respondents have university degrees, more post graduates (53.8%) than graduates (46.2%).

3.2 Attitudes towards water governance and sustainable water resource management

Governance rather than the true scarcity of water, stands at the heart of the world water crisis according to the UN 2nd World Water Development Report 2006 (McKay 2007b). Governance of water resources is a long-term complex affair in which many actors at many different levels have to take responsibilities and account for this to others (Laban, 2007; McKay, 2007b). The system composes of different levels of actors, from households, irrigators, industries to governments. The actors interact through sharing roles, rights and responsibilities but sometimes conflicting interests in water resource governance. These interactions should be considered when promoting local water governance (Laban, 1994; 2007). In the context of sustainability, there is a growing recognition that government alone does not determine the future direction of society's development. Decision-making becomes closer to its source or context and emphasizes on broader consultation with those who are likely to be responsible for, or experience impacts from, decisions (Bellamy et al., 2003).

Even though water institutions in Australia are far more advanced than in many other countries, in the context of ecologically sustainable water resource management there are still some aspects that are to be fully achieved. So, the study went on to ask the respondents what do they think of the major obstacles to achieve sustainable water management and also which sector and factors shape and direct sustainable

water management and allocation in their respective regions. Conflicts between different user groups were considered to be the major obstacle to achieving sustainable water management. Respondents also felt that poor coordination between government agencies and departments and complexity of regulations and compliance regimes also hindered achieving sustainable water management as both were ranked three. Regarding the factors that shape and direct sustainable water resource management in Australia the respondents felt that environmental concerns was identified as the major factor followed by community perceptions about sustainability in general and water management in particular to shape and direct sustainable water management. The results are presented in Table 2 and Table 3.

Table 2 O**bstacles to achieving sustainable water management and allocation**

	1	2	3	4	5	Ranking order
A. Poor coordination between government agencies and departments	25.0% (4)	12.5% (2)	25.0% (4)	31.3% (5)	6.3% (1)	3
B. Complexity of regulations and compliance regimens	6.3% (1)	43.8% (7)	25.0% (4)	12.5% (2)	12.5% (2)	3
C. Limited supply of water	18.8% (3)	25.0% (4)	12.5% (2)	18.8% (3)	25.0% (4)	2
D. Conflict between different user groups	6.3% (1)	25.0% (4)	18.8% (3)	31.3% (5)	18.8% (3)	1
E. Poor economic return on irrigated products	40.0% (6)	20.0% (3)	26.7% (4)	0.0% (0)	13.3% (2)	4

Note: This is a ranking question. Respondents were asked to rate the options in order of importance from 1-5 where 1 is Not at all important and 5 is Extremely important. However, ranking order represents from 1= the most important to 4= the least important.

Table 3 Factors shape and direct sustainable water resource management

	1	2	3	4	Ranking order
A. Community perception	12.5% (2)	37.5% (6)	31.3% (5)	18.8% (3)	2
B. Powerful and influential individuals	26.7% (4)	60.0% (9)	13.3% (2)	0.0% (0)	4
C. Environmental concerns	12.5% (2)	12.5% (2)	31.3% (5)	43.8% (7)	1
D. Financial pressure	20.0% (3)	26.7% (4)	26.7% (4)	26.7% (4)	3

Note: this is a ranking question. Respondents were asked to rate the options in order of importance from 1-5 where 1 is Not at all important and 4 is Extremely important. However, ranking order represents from 1= the most important to 4= the least important.

3.3 Attitudes towards water allocation planning processes

The term 'planning' includes three elements that are interlinked- policy formulation, management, and monitoring. Policy sets the objectives, management attempts to achieve these objectives, and monitoring estimates the results. Water planning in its broader sense can apply to a range of matters, but in the present context while we are discussing water planning in Australia, the focus is more on water allocation/ water sharing planning.

In Australia, the water institutional reforms implemented since 1995 focus on achieving a balance in inter-sectoral water allocation, consistent with the changing economic, environmental and social needs for water (McKay, 2005). Following these reforms, water planning has become one of the most important tools for achieving sustainable use of water (McKay, 2007b, 2008; Hamstead et al., 2008) and the State and Territory water planning authorities have invested many millions of dollars into water planning since the signing of the NWI. Without doubt these reforms have resulted in significant institutional changes and as a result the water institutions in Australia are far more advanced than those in many other countries. But, still some concerns are to be addressed. The study asked the respondents if they think the statutory water plan is the right way to approach sustainable water policy. More than half of respondents (61.5%) agreed with this. However, respondents also indicated that there are some concerns applied in the development of the water plan, for examples, unfairness in the processes for public consultation, lack of knowledge of local, Cost of development and implementation of water plans, and uncertainties in the science. Lack of knowledge of local was considered by respondents as a major concern (66.7%). There were 92.3% of respondents stated that their local region had conflict over water plan(s). The percentage went down to 61.5% when respondents were asked if the other regions near their local region had conflict over water plan(s).

It is well acknowledged that regional water planning requires bottom-up cooperation and it is more likely to be achieved when there is collaborative, multi-stakeholder planning and decision making. In this regard, we asked respondents to indicate their degree of agreement/disagreement with the following statements in Table 4. The understanding among all sectors of the community of the water business was perceived low.

However the level of coordination between or inter-government departments and trust between water planning organization and state government is considered to be comparatively high.

Table 4 Coordination between stakeholders in water planning process

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
A. All sectors of the community of this water business understand the viewpoint of others in the area.	7.7% (1)	61.5% (8)	7.7% (1)	23.1% (3)	0.0% (0)
B. There is a huge amount of trust between this organization and the State government.	8.3% (1)	16.7% (2)	33.3% (4)	8.3% (1)	33.3% (4)
C. There are well established intergovernmental processes to ensure co-ordination between government departments dealing with water issues.	0.0% (0)	23.1% (3)	30.8% (4)	30.8% (4)	15.4% (2)
D. The State government policies disregard complexity of the administrative system.	7.7% (1)	46.2% (6)	30.8% (4)	15.4% (2)	0.0% (0)
E. There is a high degree of coordination between government departments dealing with water issues.	0.0% (0)	30.8% (4)	23.1% (3)	30.8% (4)	15.4% (2)

3.4 Attitudes towards implementing ecologically sustainable development (ESD)

Ecologically Sustainable Development (ESD) represents one of the greatest challenges facing Australia's governments, industry, business and community. The Federal and the State Governments recognize that there is no identifiable point where we can say we have achieved ESD. But some changes in the way we think, act and make decisions, can ensure Australia's economic development is ecologically sustainable and sustainable development laws aim to achieve this objective. However, within the Australian Water industry implementing ESD encounter various internal and external problems and this study wanted to examine if the water plans can lead collective action to achieve integration of the seven principles of ecologically sustainable development. Accordingly the survey asked the respondents about the effort put into and the difficulty in achieving each of the ESD principles separately (Tables 5 and 6). Much effort has been put into achieving principle 6 and 7 while much less effort to be put into achieving principle 3 and 5. Similarly, principle 6 and 7 were considered to be much less difficult to achieve while principle 1 and 3 were considered to be very difficult to achieve.

Table 5 Efforts put in achieving the ESD seven principles

ESD principles	Maximum effort	Much effort	Some effort	Minimum effort	No effort at all
1. Decision making processes should effectively integrate both long and short term economic, environmental, social and equity considerations.	13.3% (2)	53.3% (8)	26.7% (4)	6.7% (1)	0.0% (0)
2. Lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the Precautionary Principle).	13.3% (2)	46.7% (7)	40.0% (6)	0.0% (0)	0.0% (0)
3. The global dimension of environmental impacts of actions should be recognized and considered.	0.0% (0)	13.3% (2)	40.0% (6)	40.0% (6)	6.7% (1)
4. The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognized.	13.3% (2)	40.0% (6)	26.7% (4)	20.0% (3)	0.0% (0)
5. The need to enhance and maintain international competitiveness in an environmentally sound manner should be recognized.	0.0% (0)	33.3% (5)	26.7% (4)	20.0% (3)	20.0% (3)
6. Cost effective and flexible policy instruments should be adopted.	6.7% (1)	66.7%(10)	26.7% (4)	0.0% (0)	0.0% (0)
7. Broad community involvement should be facilitated.	26.7% (4)	53.3% (8)	20.0% (3)	0.0% (0)	0.0% (0)

Table 6 Difficulties in achieving the ESD seven principles

ESD principles	Extremely difficult	Very difficult	Somewhat difficult	Slightly difficult	Not difficult at all
1. Decision making processes should effectively integrate both long and short term economic, environmental, social and equity considerations.	20.0% (3)	46.7% (7)	20.0% (3)	13.3% (2)	0.0% (0)

2. Lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation (the Precautionary Principle).	0.0% (0)	14.3% (2)	50.0% (7)	14.3% (2)	21.4% (3)
3. The global dimension of environmental impacts of actions should be recognized and considered.	13.3% (2)	26.7% (4)	53.3% (8)	6.7% (1)	0.0% (0)
4. The need to develop a strong, growing and diversified economy which can enhance the capacity for environmental protection should be recognized.	0.0% (0)	33.3% (5)	33.3% (5)	26.7% (4)	6.7% (1)
5. The need to enhance and maintain international competitiveness in an environmentally sound manner should be recognized.	13.3% (2)	20.0% (3)	33.3% (5)	26.7% (4)	6.7% (1)
6. Cost effective and flexible policy instruments should be adopted.	0.0% (0)	20.0% (3)	40.0% (6)	13.3% (2)	26.7% (4)
7. Broad community involvement should be facilitated.	6.7% (1)	20.0% (3)	26.7% (4)	26.7% (4)	20.0% (3)

4 Conclusions

In the event of water scarcity and its associated problems, effective water plans are imperative to overcome allocation issues, provide for consumptive, environmental and other purposes. In Australia, urban water reform is governed by the National Water Initiative (NWI) through a series of key water supply, efficiency and pricing innovations and one such innovation is to prepare statutory water plans for all surface water and groundwater resources in which entitlements are issued" (Paragraphs 36-40, NWI, 2004). While there was an agreement among the water planners that statutory water plan is the right way to approach sustainable water policy they also indicated some concerns regarding the development of the water plan, such as unfairness in the processes for public consultation, lack of knowledge of local, and uncertainties in the science. Conflicts between different user groups, poor coordination between government agencies and departments, and complexity of regulations and compliance regimes were considered to be the major obstacles to achieving sustainable water management. It was strongly felt that environmental concerns and community perception about sustainable water management are the factors to shape and direct sustainable water resource management in Australia. This again reflects when the results suggest that "The global dimension of environmental impacts of actions should be recognized and considered" and "Decision making processes should effectively integrate both long and short term economic, environmental, social and equity considerations" were the two principles out of seven ESD principles that were difficult to achieve.

The findings suggest that the main challenge is to respond to the ever-changing environment within which the water planning is occurring. This means responding to uncertainties associated with climate change. While placing importance on environmental sustainability is important, realization on the social, economic or political sustainability is equally important. Since, development and implementation of water plans relies on the collaboration of a number of players to achieve its desired outcomes, collaborative arrangements and/or collective action will be needed to coordinate the actions of multiple parties thereby leading to achieving integration of the seven principles of ecologically sustainable development.

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