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### Multi-Level governance in closed Hydrological systems

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#### Introduction

This paper describes a project being developed through the Australian National University Water Initiative. The project will be a comparative study of key issues affecting the management of eight large hydrological systems - the Murray-Darling Basin and Lake Eyre in Australia, the Orange-Vaal system in south Africa, the lower Colorado Basin and high plains aquifer in the United States, the Guadiana river in Spain/Portugal (within the European Union), the Yellow River in China and the Namada system in India. These eight hydrological systems are all mature over-allocated systems requiring comprehensive management of both demand and supply. All of them also share the important characteristic that they cross jurisdictional borders within a single overarching political system.

The project will be a three year study over the period 2010 to 2012. Potential international research partnerships and funding to support the proposed research are being investigated through 2009. Major themes to be investigated through comparisons across the eight hydrological systems will be:

- large scale catchment-wide basin planning and management
- the potential of water markets and multi-criteria cost benefit assessment of large development projects
- the capacity of the ‘benefit-sharing’ approach advocated by the World Bank to improve the comprehensiveness and quality of agreements across jurisdictional borders (case study Murray-Darling Basin Australia)
- equity, justice, indigenous and gender issues in water planning.

Within the context of the comparative study across the eight systems there will also be two studies undertaken through PhD projects

- (1) cross-border water pollution (case study China),
- (2) community and stakeholder involvement processes

#### Criteria for selection

A major characteristic shared by all the hydrological systems to be studied through this project is that they are all largely contained within single political systems - the United States of America, Australia, South Africa, Europe, India and China. Within all these systems there is the conflict between the competing pressures for centralized coordination and devolution. The management of these large hydrological systems with their internal

divisions between states and provinces has some similarities with hydrological systems shared by two or more nations – the Nile, Tigris/Euphrates, Mekong, Indus etc. They are different, however, in that the existence of a federal system provides a strong framework with the potential to promote significant cooperation. The fact that this potential rarely seems to translate into effective multi level and cross jurisdictional management is one of the major issues that will be investigated through this project.

In addition, all the hydrological systems that will be included in the study are in effect closed systems in that they now no longer carry water to the sea in any significant volumes outside of high flood years. For all practical purposes they are like terminal lakes such as the Aral Sea. Rivers such as the Murray-Darling, the Colorado or the Yellow which once had large and productive estuaries now only flow beyond their systems in unusual wet years or through the deliberate intervention of a central government restraining extractions (Yellow River). All demands must be met from within the range of resources that are already being utilized. Extra capacity can only come from increased efficiency or the reallocation of water from one user to another (be it the environment, irrigation or urban consumers). It cannot be provided by increased extraction.

The hydrological systems selected are also subject to highly active but very different governance regimes. This provides a rich starting point for the study of contrasting policies and management approaches. Australia's National Water Initiative and the role of governments in implementing it, for example, is very different from the approach taken in the United States where litigation plays a major role. Another approach again is that of the European Union. Its Water Directive Framework gives each of the nations subject to it great flexibility in choosing its own approach but provides very tightly defined targets which they must reach with significant penalties for non achievement.

#### Risks created by dysfunctional multi level governance

Rivers and groundwater systems divided between states and provinces provide the essential water supply for much of the population living in Australia, the United States, Europe, China and India (For the purposes of water management Europe now operates as a single united federation with the links between the central and national governments at least as strong as in any of the other federations under discussion.) Most of these large hydrological systems have declining environmental conditions and supply security according to a wide range of criteria. A major cause is incomplete institutional coverage of key issues, in part due to the arbitrary division of catchments into competing jurisdictions within these political systems.

In most nations water management has traditionally been a local or state function with central governments only becoming involved in response to increasing conflict. Even in China, a nation famous for highly centralized water management, the trend over the last two or three decades has, until very recently, been towards decentralization. However there are many water management functions which require central coordination. In all the

political systems under consideration there has been a struggle in recent years to get the balance right between centralization and decentralization.

The first task is to define the principles that should apply when deciding what is appropriate. Second is the need to design institutions that can implement those principles. How can an effective system of devolution based on the principle of subsidiarity be implemented? The challenge is that the geographical and organizational division of roles and responsibilities needed to manage water effectively frequently does not match the established division of roles and responsibilities. This often causes great gaps in the capacity of water governance systems to develop a coordinated response to the issues that threaten their environmental condition and resource security.

Typically the management of large cross-border rivers and groundwater aquifers in federal political systems is characterized by considerable intergovernmental and interagency conflict, low decision making transparency and accountability, high transaction costs and ad hoc deals between competing sub-national governments that undermine best practice water management. When water managers are responsible for only part of a catchment they are under pressure to favour the section for which they are accountable. This encourages them to export the costs of pollution or water shortages across borders wherever possible. Cost benefit analysis are almost invariably conducted from the perspective of each sub-basin and not that of the whole biophysical region. Polluting industries are placed near downstream borders, economic activities of marginal benefit within-border are given preference over economic activities of much greater overall benefit on the other side of borders etc. Within each sub-basin costs and benefits are highlighted but usually minimal information for the overall basin is collected. In these decentralized systems data collection is usually organized by sub-basins, often with different units of measurement and auditing approaches. This makes comparisons and whole-of-basin aggregations to compare different approaches very difficult.

As a result large hydrological systems which cross borders are highly exposed to the risks attached to what are known as open resources. In 1968 Garrett Hardin published a short paper titled *The Tragedy of the Commons* in which he argued that it was difficult to restrain over exploitation of common resources such as shared pastures, fish and water<sup>1</sup>. Critics subsequently nominated many examples of successful management of natural resource systems owned in common and suggested that his thesis was more applicable to open access resources which lack any effective overarching institutional framework able to control and regulate the behaviour of would-be users as a group. In the case of an open access resource it is in the interests of each individual user to expand their own consumption indefinitely because any restraint will only increase the volume available for their competitors. The eventual result is the complete destruction of the resource to the disadvantage of everybody. That is the fate currently being experienced by most large international hydrological systems. This project argues, however, that the containment of the conflicting states and provinces with a single political systems such as Australia,

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<sup>1</sup> Hardin, G., 1968, 'The Tragedy of the Commons'.

Europe or China, should provide opportunities for coordination which are currently not being fully realized.

#### Case Study Murray-Darling Basin (MDB)

The MDB is just over a million square kilometres in size, has a diverse range of landscapes, ecosystems, land uses and climates and includes over 30,000 wetlands, eleven of which are listed under the Ramsar Convention of Wetlands of International Importance. Divided between the southern and eastern Australian states of New South Wales, Victoria, South Australia and Queensland and the Australian Capital Territory – each with their different systems of water entitlements and management - the MDB is home to just under two million people and supplies much of the water used by another million in South Australia. Those three million people and various industrial activities use about 4 percent of the water diverted from the regions rivers. The other 96 percent is used by irrigated agriculture and supports nearly three quarters of that activity conducted nation-wide. From all sources the MDB produces approximately 40 percent of Australia's gross value of agriculture<sup>2</sup>. Despite the existence of a near century old inter-jurisdictional water management framework that brings together six governments, however, environmental degradation of the region's surface and groundwater bodies and their catchments is intensifying. Consequently, the debate about the future of the inter-jurisdictional institutions in the MDB is gathering momentum.

Water management in Australia's Murray-Darling Basin is in crisis due to a combination of inadequate governance and the worst drought since records began to be kept in the late nineteenth century. A central issue is whether water should be used to maintain riverine environments during times of such high stress. The economic impacts of the drought in the southern section of the MDB along the River Murray are increasingly severe and the lower lakes near the outlet to the sea are on the verge of environmental collapse. In response the six governments with responsibilities in the region are attempting to implement the most radical institutional and policy changes since intergovernmental coordination was first attempted nearly a century ago. The reforms include a plan to buy back a large volume of water for environmental flows. Over three billion dollars has been allocated for that purpose by the national government but the method that should be used to purchase the water, the speed with which it should happen and the regime that should be put in place to manage the environmental water fund once it is established are now all matters of intense political controversy. This is a pivotal point in the evolution of Australian water management. For better or worse the decisions made about environmental flows in the MDB over the next two years will have a decisive influence on the campaign to rehabilitate Australia's major river systems for many years to come. However, the focus for efforts to implement more environmentally sustainable water management regimes should be widened to include the institutional frameworks within which they are implemented. Unless a whole-of- hydrological-system approach is taken environmental decline will continue.

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<sup>2</sup> Blackmore, D, 2002, 'Protecting the future', p. 7; Regarding irrigation see Murray-Darling Basin Ministerial Council, June 1995, *An Audit of Water Use*, Table 1, p.7; For additional statistical information about the MDB see Crabb, P., 1996, *Murray-Darling Basin Resources*.

### Institutional reform

In 2007 the national government passed new legislation which substantially changed the approach to water management by giving the national government the primary role in the MDB for the first time. The old system, had been in place since the mid 1980s, was based on equal representation for the four state governments and the national government. By requiring unanimity for all decisions the old system effectively allowed any one government to block proposals of which it disapproved. By the early 2000s this system was clearly unable to deal with the governance challenges that faced the MDB. The new system gives the national government control of policy but implementation is still the task of the states. There are financial rewards for compliance with the national plan but no other inducements or punishments to encourage the states to implement the overall plan. (Whether this is adequate is very doubtful.) To support the new national government role a number of national agencies have been given additional evaluation and monitoring capacities to provide the information needed for overall policy and to make it easier to check on compliance by the states.

The old basin-wide framework was very narrowly defined. Only some issues have been managed from a catchment-wide perspective and even in those cases the policy framework is fractured geographically and institutionally by both state borders and – within states - the division of responsibility between often competing agencies. Consequently the costs and benefits of many policies and actions are not brought together at a central point. Decision makers often incur costs – deliberately or in ignorance – that are manifest across borders in a different jurisdiction or in other policy areas that are not their responsibility. Conversely they often find themselves responding to costs caused by activities undertaken elsewhere by other decision makers reaping the benefits within their own sphere of operations.

Central to the new Water Act 2007/8 passed by the national government is the preparation of a basin plan to promote environmentally sustainable management across the MDB. This new regime is to be implemented through accredited 10 year plans in each state. It can be seen as an attempt to overcome the lack of institutional integration described in the preceding paragraphs. This approach has the advantage of avoiding the political resistance that would be aroused by an attempt to change existing organizational arrangements. It is likely, however, that the transaction costs resulting from the creation of what is yet another layer of policy and management will be high. In addition, even though the new system will be subject to greater national government control the states have retained the right to veto any proposed change to the shares of water that go to each state. In addition the new regime is explicitly excluded from many land and regional planning activities in the wider catchment which indirectly (but often very significantly) affect water quantity and quality. These will remain the jealously guarded preserve of the relevant state.

### National Water Initiative

Behind the recent reforms is the National Water Initiative (NWI) which was approved by the Council of Australian Governments in June 2004. The NWI is a dense but short document whose sections provide a check list of most of the major issues that have shaped the history of water management in the various states over the past century. It has its faults – there is not much discussion about water quality issues or the complexities involved in managing water in combination with the many other aspects of the catchment with which it interacts such as biodiversity – but it is overall a very ambitious and impressive document particularly given that it had to survive the critiques of nine governments and many interest groups.

The National Water Initiative reflects a changing relationship between governments, public water authorities and private water users, principally irrigators after more than a century of relative stability. For many decades the interests of governments and water users were very similar. Governments used water as a tool to promote the growth of communities and there was little concern about environmental issues. During this period even though water entitlements were usually vaguely defined from a legal perspective the reliability of supply was relatively high in light of the biophysical circumstances. Variations were usually the result of administrative decisions made in response to drought and concerns about future supply and the decisions were accepted as sensible and necessary in the communities affected. In more recent times this congruence of interests has broken down. The growth in diversions in the second half of the twentieth century has caused serious environmental problems and intensified competition between water users.

According to the NWI the tensions between the many different demands that are placed on hydrological systems are to be managed through the development of comprehensive water plans. It is through their preparation that the difficult issues involved in balancing the need for sustainability and the ambitions of production interests are to be resolved. The water plans are to include secure water access entitlements, statutory based planning, statutory provision for environmental and public benefit outcomes, plans for the restoration of over-allocated and stressed systems to ‘environmentally sustainable levels of extraction’, the removal of barriers to trade, clear assignment of risk for future changes in available water, comprehensive and public water accounting, policies focused on achieving water efficiency and innovation, capacity to address emerging issues and many more elements<sup>3</sup>. They are to provide for ‘adaptive management of surface and groundwater systems<sup>4</sup>’ with their connectivity recognized where it is significant<sup>5</sup>. In addition, water plans must take account of Indigenous issues by making arrangements for Indigenous representation in water planning ‘wherever possible’ and provision for indigenous social, spiritual and customary objectives ‘wherever they can be developed’. They should also include allowance for ‘the possible existence of native title rights to water in the catchment or aquifer area<sup>6</sup>’.

### Components of the proposed comparative project

- (1) Large scale catchment scale planning across six political systems – **Dr Daniel Connell** (This component will be funded by the Australian National University)

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<sup>3</sup> NWI, 23, 25, Schedule E.

<sup>4</sup> NWI, 25.

<sup>5</sup> NWI, 23, x.

<sup>6</sup> NWI, 52-54.

Different approaches to basin-wide planning are being taken in the different political systems. In the Murray-Darling Basin attention is focused on preparation of the MDB Basin plan due in 2011. In the European Union the Water Framework Directive with its target of restoring rivers to a 'high ecological status' by 2015 provides a similar focus as does the National Water Resource Strategy 2004 for South Africa. In the lower Colorado Basin water planning is happening at a state by state level with very little integration across the catchment.

Key themes are the:-

- relationship between the central national government and the states particularly with regard to developing common goals and processes to ensure compliance by the states and their populations.
  - role of governments vis a vis private individuals/economic interests, NGOs of various sorts etc
  - place of irrigation in a mature water management system (as opposed to the earlier phase where governments acted as the drivers using water to establish new communities)
  - treatment of the environment particularly during times of droughts when competition for scarce water is severe
  - defining and protecting of Indigenous interests
  - treatment of urban stakeholders both in and outside the catchments, and
  - the development of a robust and comprehensive monitoring and evaluation framework that will support policy development.
- (2) Potential of stronger water markets and more systematic cost benefit analysis to improve water management **Professor Quentin Grafton** (to be funded by the Australian National University).

Active water markets are now widely seen as a major mechanism to improve efficiency and management outcomes for water management. Their effectiveness is largely dependent on the governance framework within which they are established. Changing water management objectives and the need to adapt to climate change are also causing a major shift in the priorities shaping investment in new infrastructure. There are many interest groups pushing proposals from the perspective of strong self interest. Better methods for assessing proposals are essential if public funds are to be used to best effect.

- (3) Potential of the 'benefit sharing' approach for strengthening cross jurisdictional agreements **Research officer 50% B level position**

‘Benefit-sharing’ has been strongly promoted by the World Bank, the international NGO Green Cross and the Stockholm International Water Institute<sup>7</sup> as an alternative to the traditional approach to inter-jurisdictional water disputes which see water as a stock to be quantified and divided between would-be users. By contrast a ‘benefit sharing’ framework treats water as a flux capable of multiple and different uses the number of which is only limited by technology, cost and the imaginative capacity of water policy makers and managers. Benefit-sharing focuses on the potential for multiple-use between, say, the environment, hydro-power and irrigation, for example. The conflicts between some of these uses are significant and have to be managed carefully but the proponents of benefit-sharing argue that such a framework focuses attention on a more diverse and richer bundle of potential assets that can be divided between the contending parties than does the traditional water management paradigm. This creates more opportunity to reach agreement.

A case study of the potential of benefit sharing will be conducted in the Murray-Darling Basin which is now undergoing a major re-direction process as a result of the national government Water Act 2007/8. It requires a Basin Plan to be prepared over the next few years based on the imperative to take a whole-of-hydrological system approach and introduce sustainable water management. Inevitably the planners will be lobbied heavily during its preparation by state governments, and federal senators and MPs, pushing for favourable treatment of interests in their particular states. But what would the Basin Plan look like if it could be prepared using a benefit-sharing methodology free from political pressure? This case study would examine that question and use the results to contribute to the literature on benefit sharing.

- (4) Justice, equity Indigenous and gender issues and their incorporation into water planning. **50% research officer position**

Issues related to justice equity etc are key for the implementation of the Millennium Development Goals. Water policy for all eight systems give high emphasis to their importance but they are difficult to incorporate into the practice of water planning and management. These issues often generate highly disruptive political tensions (witness the debates in India re the Namada system and the rise of the environmental movements in Australia, USA and Europe) Unmanaged they can provide a serious threat to water management. This section would identify barriers to implementation and look for examples of success.

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<sup>7</sup> Phillips, D., J., H., et al 2008, *The TWO analysis – introducing a Methodology for the Transboundary Water Opportunity Analysis* SIWI.

Two PhDs are also proposed

1. **Cross-border governance issues involved in water pollution (China)**

After climate change itself it is arguable that this problem threatens more people and economic assets than any other single environmental problem on the planet. While water pollution in China is the product of many interacting factors the fragmented responsibility resulting from provincial borders is highly significant. While the situation may be worst in China a better understanding of the issues involved would be widely relevant to other developing nations. (Given the global importance of Chinese trans-boundary water issues the addition of a Chinese speaking PhD student – essential for this case study – would be a major addition to the research group.)

2. **Community/stakeholder engagement**

Traditional water management has been dominated by technical experts and key stakeholders such as irrigators and industry. In mature closed systems that are over allocated and where water quality is in decline many other groups have to be involved. This includes users wanting benefits and groups whose activities threaten water quantity and quality. Without their active support decline cannot be halted or political conflict contained. The development of robust processes to involve them is critical for successful water management.

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