SOUTH AUSTRALIAN GOVERNMENT SUBMISSION TO THE PRODUCTIVITY COMMISSION RESEARCH STUDY

"RURAL WATER USE AND THE ENVIRONMENT: THE ROLE OF MARKET MECHANISMS"

Government of South Australia

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1 Introduction

The South Australian Government welcomes the opportunity to contribute to the Productivity Commission research study "Rural Water Use and the Environment: The Role of Market Mechanisms." Providing for the environmental needs of our water resources and promoting sustainable development features in the State's key strategic plans.

- *South Australia's Strategic Plan* calls for meeting the State's commitments under the Living Murray First Step through contributing to the increase in environmental flows in the Murray-Darling and major tributaries by 500 GL *per annum* by 2008, with a longer-term target to reach 1500 GL per annum by 2018.[1] The Plan also identifies a range of economic and community building targets that could benefit from the outcomes of the proposal research.
- The *Strategic Infrastructure Plan for South Australia* recognises the "increasing pressure on the long-term viability and sustainability of South Australia's water sources as a result of past poor land and water management practices, which will be strained further by population increases and a projected reduction in rainfall as a result of climate change. For South Australia, the health of the Murray-Darling river system is a top priority."[2]
- South Australia has a strong commitment to sustainable water management in the Murray-Darling Basin Commission's (MDBC) Interstate Water Trading Trial project.
- South Australia also has an ongoing and strong commitment to establishing water markets and trading arrangements according to the guidelines established under the National Water Initiative (NWI).[3]
- South Australia's Onkaparinga Catchment Water Management Board has hosted the auction pilot "Catchment Care" under the Natural Heritage Trust Market-Based Instrument Pilot Project as part of its commitment to investigate market mechanisms as policy tools in water management.

South Australians have long been aware of the need to improve and protect our natural water resources.[4] In this context, the South Australian Government welcomes the research efforts of the Productivity Commission in helping to find creative and efficient solutions to enhancing our natural and agricultural landscapes and to meeting our commitments under the National Water Initiative.

This submission seeks to provide the Productivity Commission with direction in response to questions raise in the Issues Paper "Rural Water Use and the Environment: The Role of Market Mechanisms" from a South Australian Government perspective.

[1] *South Australia's Strategic Plan* (SA Government, 2003) T 3.1 (www.stateplan.sa.gov.au)
[2] *Strategic Infrastructure Plan for South Australia* (SA Government, 2005), p. 23. (www.infrastructure.sa.gov.au)
[3] *National Water Initiative* (2004) clause 58. (www.coag.gov.au/meetings/250604/#nwi)
[4] For an overview of these resources, please see the *State Water Plan 2000* (SA Government, 2000). Please note the *State NRM Plan 2006* will be available soon on www.dwlbc.sa.gov.au and this will provide further information. (www.dwlbc.sa.gov.au/water/publications/state_water_plan.html) It is worth noting that South Australia has eight natural resource management regions. Please refer to the *State NRM Plan 2006*.

2 Farm management decisions

2.1 Policy Drivers of Efficiency

In 1965 the South Australian Government called a halt to the issuing of any further irrigation licenses on the River Murray. This essentially established the boundaries of the market and the value of water licenses. In the 1980s the Government separated water entitlements from the land, which allowed water trading within the State. Furthermore, public investment at the time in research and development through the River Murray Salinity and Irrigation Program paved the way for better water and salinity management. Also in the 1980s the wine industry provided irrigators with certainty in their long-term vineyard investments. Furthermore, the development of the River Murray Water Allocation Plan (under the *Natural Resource Management Act 2004*) specified 85 per cent water use efficiency for all irrigators other than those on the River Murray Reclaimed Irrigation Areas who are required to achieve 65 per cent on-farm efficiencies. These factors drove rural adjustment and on-farm irrigation improvements and as a result the water market is not a major driver of on-farm water use infrastructure efficiencies in South Australia at this time.

Water use efficiencies have been driven by salinity and drainage impacts and by regulatory requirements through Water Allocation Plans. The market facilitates water use efficiency improvements by allowing irrigators to lease some of their entitlements or seasonal allocations to finance efficiency improvements.

Most of the irrigation infrastructure in South Australia is either pumped and piped or in the process of being upgraded to best practice under existing projects, as follows:

- Off-farm, the Highland Irrigation Scheme has converted the Riverland largely to piped irrigation systems. On-farm, Water Allocation Plans require irrigators to meet 85 per cent on-farm efficiencies;
- Off farm, the Lower Murray irrigation area is being rehabilitated to best practice with new delivery structures, laser leveling and reuse of tail water;
- The water resources of the Mount Lofty Ranges and surrounding areas have been or are about to be prescribed and water management plans are under review or are to be developed; and
- The water resources of the South East are primarily groundwater resources. Water management practices are currently under review, in particular the Water Allocation Plan for the region. Water managers are in the process of
    - converting allocations to volumetric measurements;
    - ensuring allocations are within sustainable limits;
    - reviewing policies that might impede water trading in the area; and
    - addressing the impact of forestry on groundwater sustainability and water use.

2.2 Environmental Drivers of Efficiency

South Australia has been working towards improved efficiencies since the 1960s when environmental drivers such as salinity and drainage impacts required land managers to improve water delivery systems. Water management plans have reflected these environmental constraints; for example, along the Murray new irrigation developments require Irrigation Drainage and Management Plans that demonstrate a high level of water efficiency, while Statutory Water Allocation Plans are designed to strike a balance between efficient irrigation and the amount of water needed to flush salt from the soils. The irrigation efficiency changes required to meet these demands now means that there is little further opportunity for South Australian River Murray irrigators to improve on-farm water efficiencies at a cost that is competitive.

2.3 Market Drivers of Efficiency

With respect to trading, the State is already a net importer of water. Since the start of the MDBC's Pilot Interstate Water Trading Trial project in 1998, water trade has resulted in a net movement of water downstream and is linked closely with water being used on high value fruits and grape crops in the Riverland and Lower Murray areas of South Australia[5].

- Water trading within the State has been active for close to 20 years and much water has already moved to high value crops. As mentioned earlier, significant structural adjustment has already taken place, particularly in regions like the Highland Irrigation Area (the Riverland); and
- The expansion of the wine and citrus industries in the mid 1980s provided a further market impetus to move to higher irrigation efficiencies.

The majority of crops in South Australia are 'permanent' plantings (eg vines, citrus fruit and almonds) and hence, irrigators are dependant on permanent water allocations. Unlike NSW and Victoria, few opportunistic crops (such as wheat and rice) are grown and hence there is little opportunity to undertake 'opportunistic' cropping when commodity prices are high. As a result, South Australia irrigators are dependant on high water security with trade in temporary water. This trade occurs predominantly when water allocation restrictions are applied during drought years. South Australian land-managers are experienced water traders and long term farm management planning has come to partially rely on temporary trading. Alterations to water trading rules or environments need to take into account any dependence that has developed on the functioning of the temporary trade in water.

Current returns for grape and citrus crops are so low that South Australian irrigators do not presently have the economic incentive to invest further in on-farm irrigation infrastructure.

2.4 Efficiency Gains

The 85 per cent irrigation efficiency objective in the Riverland strikes a balance between irrigation efficiency and soil salinity. It needs to be recognised that the long-term application of extremely high irrigation efficiencies in low rainfall areas (such as the Riverland) could have a long-term negative impact on agriculture in the region. In communities that are highly dependant on irrigation, any impact on irrigators will impact the entire community. Market instruments designed to promote efficiency gains should take the potential environmental impact of those gains into careful consideration.

To date, any water saved in South Australia through on-farm efficiencies has been used to expand the amount of land under irrigation or has been left as 'sleeper' licences. Generally this water has not been put aside specifically as a contribution towards environmental flows. However, while these allocations act as environmental flows they are not secured on behalf of the environment and any activities that rationalise these allocations without accounting for their use up to the point of abstraction as environmental water, would be to the potential detriment of the health of the resource.

[5] During the period of 1998/99 to 2002/03, South Australia imported 14,407 ML of water entitlements (total net permanent trade) from NSW and Victoria. For more details see Shi, Tian and Young, Mike, "Linking irrigated productivity with the environmental resource base" in: Meyer, Wayne S., *The Irrigation Industry in the Murray and Murrumbidgee Basins* (CSIRO, 2005), pp. 73-88.

Increased efficiencies in upstream States also could have a negative impact on the health of a number of South Australia's water resources, the River Murray in particular. For example, many upstream irrigators currently apply low efficiency irrigation, particularly in areas not affected by salinity and return high volumes of relatively low saline water to the River Murray.[6] If irrigators improved their efficiencies, they would most likely increase land under irrigation to effectively maximise their water allocations, thus denying what was return flows to the river. Unless water created through increased efficiencies is returned as environmental water, the river will lose the current benefit of return flows. Any reduction in flows has a negative impact on the river environment and irrigation industry in South Australia.

3 Water related externalities

3.1 Water Use Decisions Upriver

Storage and allocation decisions made in other States potentially have a large impact on South Australia. Overallocation and increasing allocations have meant that water landowners did not previously use has acted as environmental flows to South Australia. If storage is increased and carryover is allowed before overallocation issues are adequately addressed, these current flows to South Australia could decrease to the detriment of the health of the resource. Any market rules or mechanisms that damage the resource or the security of South Australian water in comparison to other States would not be an acceptable outcome for South Australia. This is particularly applicable to the River Murray.

3.2 Salinity

Due to the hydrology and geography of South Australia the State must manage salt, which comes at a cost. Murray-Darling Basin Commission policies that cover salt management in South Australia include:

- Pre 1988 salt is managed at a shared cost with the Murray-Darling Basin Commission according to protocols developed within the framework of the Commission. Progress towards salt management accountability is recorded on a register and currently South Australia is managing its salinity impacts appropriately.[7]
- Post 1988 salt, which is largely due to expanding irrigation, is the responsibility of the jurisdiction creating the salinity impact.

To help manage salt and the associated costs in the South Australian portion of the Murray-Darling Basin, South Australia has initiated a salinity zoning policy that divides agricultural land into high and low salinity impact zones in the Highland Irrigation Area (Riverland). In the high salinity impact zone, trade is approved once the salinity associated with use is offset according to established rules.[8] While this will act as a cost constraint on trade, it also manages the salinity impact of the area in a way that gives irrigators more options than would pure regulatory alternatives.

Local community involvement has initiated and driven the development of salt interception schemes, particularly in the Riverland and they are now prominent in the high salinity impact zones. The operating cost of these schemes is between $2 and $3 million *per annum*. The operation of salt interception schemes permits the new or expanded operation of irrigation in what would be high salinity impact zones, up to the capacity of the schemes. Areas under the management of salt interception schemes are then reclassified as low salinity impact zones.

[6] This is largely an issue interstate, South Australian irrigation in the high land must first pass through the flood plains, which may take in excess of 50 years and is of high salinity. This is the purpose of the salt interception schemes.
[7] *Basin Salinity Management Strategy - Protocols to Schedule C of the Murray-Darling Basin Agreement* www.mdbc.gov.au/salinity/protocols_to_schedule_c_of_the_murray-darling_basin_agreement
[8] For the established rules, see the *Salinity Operations Manual* (DWLBC, 2005) www.dwlbc.gov.au

There are public and private goods associated with salinity management. Salinity impacts all of the approximate 600 GL *per annum* of consumptive water available to South Australia and therefore salt interception schemes and salinity zoning lessen the impact of salinity on this total volume, not just the water used by irrigators in the zone.

3.3 Salinity Credit Trading

State legislation allows salinity credit trading within South Australia and among landholders. This is now an operational policy, although trading has not yet begun.[9] This trading scheme operates under a "no net impact" rule and will allow between 5:1 and 1:1 trading within the high impact zone. Under the scheme, the Minister will retain ownership of the offset credits but landowners will be able to trade them to suit their water needs. The scheme is not available between high and low impact zones and so areas covered by a salt interception scheme are not eligible.

Salinity management will necessarily interact with an active water market and what those impacts will be for the environment and for consumptive water users needs to be taken into consideration.

4 Market mechanisms

4.1 Role of the Water Market in South Australia

A highly efficient market will provide financial incentives for use-efficient South Australian consumptive water users to expand and will drive further efficiencies, thereby improving economic development outcomes. In addition, in relation to the River Murray, water purchased from other States will act as in-river environmental flows until it reaches its abstraction point, therefore delivering improved environmental outcomes. It is important to South Australia to be able to competitively participate in a national water market.

4.2 Stranded Assets

National Water Initiative commitments are addressing externalities related to stranded assets. For example, South Australian Irrigations Trusts have committed to

- allowing up to 4 per cent *per annum* of entitlements to be permanently traded out of their schemes; and
- determining exit fees according to NWI guidelines so they do not become impediments to trade.

South Australian irrigation consists mainly of high value 'permanent' crops and as a result, community off-farm irrigation infrastructure has been recently rehabilitated and rationalised. Issues regarding stranded assets therefore need to be considered against a different backdrop than those of other States. The impact of market instruments in relation to regional conditions should be taken into consideration in the research study.

4.3 Over-allocation

In South Australia, the Cap set by the Murray-Darling Basin Commission was determined as approximately 90 per cent of all water allocations and therefore total extraction of all water entitlements would exceed this Cap; in that sense South Australia is overallocated in the River Murray. It is possible that South Australia is also overallocated in other water resources across the State. This is a national issue as other States also face issues concerning over-allocation and a collaborative effort to address this under the National Water Initiative is underway. The outcomes and time frames associated with addressing this issue are likely to impact land use, which in turn

[9] *ibid.*

will impact salinity, recharge and other environmental considerations. These environmental factors will then affect river health. All parties intend for these changes to have positive environmental impacts but we need to avoid perverse outcomes to the maximum extent possible.

Over-allocation of groundwater also affects water supplies to South Australia. Reduction in stream flows as a result of increased groundwater use in NSW has already reduced average flows in the River Murray to South Australia by 200 GL *per annum*. This is roughly one third of South Australia's annual consumptive use from the river and almost six times the amount of water that the State needs to fulfill its obligations under the Living Murray initiative.

Global climate change could also result in a need to adjust allocations to account for changing availability of water and for salinity. Addressing over-allocation needs to provide the flexibility to cope with possible over-allocation in the future due to long-term climate change.

4.4 Water Availability

South Australia has significant water resources in the South East and Mount Lofty Ranges regions as well as the River Murray. Many of these resources rely heavily on groundwater. While the River Murray is an important resource, water resources outside the basin are particularly important for mining, horticulture, domestic supply and other commercial enterprises. Consideration of the implications of market mechanisms on the environmental management of groundwater systems both associated with and independent of river systems are important to the State's policy planning.

Additional water from the River Murray for South Australia can only come from increased efficiencies of use or from water trade, temporary or permanent, into South Australia. Irrigation in South Australia is already extremely efficient in major agricultural areas. Therefore, a functional interstate trade in water is essential to South Australia meeting its environmental and sustainable development objectives.

Furthermore, as a downstream State, South Australia is likely to bear the brunt of any negative impacts resulting from inappropriate market rules. A well-designed market is crucial to the State's environmental objectives. It is important for consideration to be given to both market mechanisms and how they work together across State boundaries.

An effective water trading system needs to develop quickly, but not at the cost of damaging Australia's water resources. Mechanisms used must be considered in the various hydrological landscapes and time frames to which it applies. Consideration over 50 years or more needs to be taken on the impact of market rules and regulation options and combinations of options on the environment.[10]

4.5 Market Compatibility

The interaction of water trading systems between States and the flexibility of rules governing compatibility are concerns for South Australia. The State is already committed to administrative compatibility among States under the NWI. Further work has been done demonstrating that the 21 types of irrigation entitlements can be reduced to three.[11] However, altering regional rules and systems to account for the proper administration of trade is only part of the equation. These rules and systems need to primarily be compatible with the needs of the local environment and to take

[10] For an example of perverse outcomes that might not manifest immediately, see Heaney, Anna et al., *Environmental Flows and Water Trade*, (ABARE, 2002).

[11] Shi, Tian, *Simplifying Complexity: a framework for the rationalisation of water entitlements in the Southern Connected River Murray System* (CSIRO, 2005). In addition, the issue of medium security water in South Australia has been raised as the state currently only has high security water. See Young, Mike et al., *License-based options for deepening and extending the water market* (CSIRO, 2004).

into consideration the local hydrology, landscape links and the biodiversity needs of the wider ecosystem. Australia requires a system or a series of connected systems that primarily allow flexibility to suit local environmental management needs while still facilitating water trade.

A further consideration for the State on the issue of compatibility is the cost. The State needs around 600 GL *per annum* out of the River Murray for consumptive use. If the cost of compliance with a compatible trading system far outweighs the gains South Australia would obtain through compliance, it might not be a responsible and efficient investment for the State to make. Given that the NWI requires that all costs be recovered from water users, an expensive compatibility system spread among the State's small pool of users might actually impede trade. This issue will also impact the transaction costs associated with the tradability of excess environmental allocations and could hinder environmental allocations from being traded due to transaction costs potentially higher than the value of the excess water.

4.6 Environmental Flows

Environmental water managers will need a variety of mechanisms for obtaining water to meet their environmental goals. In areas where infrastructure efficiencies on and off farm are high, further improvements in infrastructure might not be economically viable. For example, in some areas it might cost $4,000 per ML to invest in further on-farm improvements in irrigation, while water on the market currently costs around $1,400 per ML. It is also possible that current prices do not reflect the environmental value of water.[12] A range of options for environmental water managers to obtain the necessary environmental flows in financially responsible ways (that balance the needs of the environment and the community) that include transaction costs for all parties and that include an accurate valuation of environmental services in the analysis of the mechanism need to be investigated.

The role of environmental water donations in the context of a water market also needs to be investigated. This would include tax implications and other incentives to encourage permanent donations. Options for gifting water to the environment are being investigated by the South Australian River Murray Environmental Manager and need to be considered in the context of an active water market.

4.7 Effects of Market Mechanisms on the Environment

To move forward with the appropriate establishment of market mechanisms, policy designers will need clarity on how environmental water requirements are going to be addressed within an economic water-use efficiency framework. An appraisal of market mechanisms that takes into consideration the full range of environmental effects, including externalities would be beneficial. This could include:

- how environmental externalities are defined and included into policy design;
- how relevant biodiversity legislation will be factored into the outcomes of market-based mechanisms;
- how management of market policies across the States will ensure that positive outcomes for one State do not create negative outcomes in another State;
- how the effects of climate change will be included in market-based instruments; and
- the likely environmental impacts of market-based mechanisms outside of the Murray-Darling Basin.

[12] As an example see Beare, Stephen and Heaney, Anna, *Irrigation, Water Quality and Water Rights in the Murray Darling Basin, Australia* (ABARE, 2001).

Policy developers will need to identify and avoid market mechanisms that have inadequate environmental considerations or perverse implications and could lead to ongoing degradation of ecosystem resources.

There are also questions as to whether high value use of water is necessarily the most environmentally beneficial. Overall, how this issue is accommodated in designing market mechanisms for a water market will impact on the long-term viability of water resources.

Furthermore, there is concern that market mechanisms could lead to negative environmental externalities outside of the Murray-Darling Basin if adequate consideration is not given to the environmental impacts of market mechanisms on all rural water sources in South Australia. The impact of market mechanisms on groundwater systems, unconnected water catchments and other environmental management issues such as salinity and biodiversity is an important consideration for the State.

5 Other Issues

Trade between rural, urban and industrial use water is outside the terms of the study but it needs to be inside the terms as all consumptive water users could expect to participate on equal terms in the water trading market. Twenty per cent of water used in South Australia goes to uses other than irrigation.[13] Food processors, mining and non-agricultural industries are important to the State's economy. The growth of industries and populations in the State will require water, some of which may be purchased from rural users.[14] These purchases will follow different patterns to irrigators and could affect both environmental flows and the water market in South Australia. Consideration should be given to the potentially different externality impacts (positive and negative) between irrigators and urban water users. The benefits and costs of removing impediments to trade between rural and non-rural sectors taking into account these differences together with the differences in the level of contribution to catchment and environmental management could also be considered.

[13] *State Water Plan 2000* (SA Government, 2000), v.2 p.7.

[14] While the Water Proofing Adelaide Strategy is designed to decrease Adelaide's reliance on water from the River Murray, businesses in rural areas could compete with irrigators for rural water.