

Submission:

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Mr Glen Worthington

The Secretary of the Committee

House Standing Committee on Regional Australia

Parliament House of Australia

Submission Number: 0145

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Dear Mr Worthington,

Re: Inquiry into the impact of the Murray-Darling Basin Plan on Regional Australia

A study of the Federal *Water Act 2007* reveals that detailed economic transition strategies for management of adverse economic and social impacts/risks of the environmental diversion cuts are clearly required by section 22 (Items 5 and 3) which stipulates the mandatory content of the Basin Plan. In doing so Section 22 (Items 5 and 3) gives effect to the purpose of the Act as articulated in section 3 (c).

Section 3 states that the objects of the Federal *Water Act 2007* include:

(c) “in giving effect to those agreements, to promote the use and management of the Basin water resources in a way that optimizes economic, social and environmental outcomes”

Section 22 articulates the mandatory content of the Basin Plan in a table format. Item 3 and Item 5 of section 22 are to be read together to give effect to section 3. Item 3 of section 22 states that the Basin Plan must include:

“An identification of the risks to the condition, or continued availability, of the Basin water resources. The risks dealt with must include the risks to availability of Basin water resources that arise from the following:

- (a) the taking and use of water (including through interception activities);

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(b) the effects of climate change

(c) changes to land use”

Risks identified under Item 3 include socio-economic risks, which have been comprehensively articulated in the Basin Plan by the Murray Darling Basin Authority (MDBA) in the October 2010 guide publication.

Item 5 states that “strategies to be adopted to manage, or address, the risks identified under item 3, including socio-economic risks “must be included in the Basin Plan, and that those “strategies must relate to the management of the Basin Plan. Hence there is a clearly articulated directive contained in the legislation for the provision of a transition economy investment or other strategy within the Basin Plan. Chapter 11 of the MDBA Guide publication does provide reference to the Climate Change Adjustment program, Stengthening Basin Communities Programs and the Exceptional Circumstances Exit Program as transition economy programs. However these transition economy strategies were not articulated in sufficient detail to allay the fears of irrigation communities and immediately reassure the banking industry. The Senate Inquiry into the impact of the Basin Plan in regional Australia has stemmed levels of concern to some extent.

Construction of a detailed transition economy investment strategy as required by Section 22 Item 5 for the final Basin Plan to be adopted by the Minister as a legislative instrument, to mitigate socio-economic risks caused by the environmental need for the imposition of sustainable diversion limits, will require the building of the relevant institutional capacity within the MDBA to engage in preparation of economic management strategies with Treasury, Austrade and the Department of Regional Australia, Regional Development and Local Government.

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Fulfilling the requirements of section 22 Item 5, attached to section 22 Item 3 and section 3, will calm minds and provide hope for irrigation communities. Many irrigators have farmed for three or more generations, forming long lasting social and professional networks. Irrigators are cognisant of the need to protect the environmental water to sustain their farms and provide social benefits. Detailed discussion of re-skilling programs, alternative low water-intensive investment strategies and other transition economy policies articulated in the final Basin Plan would allow farming families to remain on their ancestral lands, within their established communities, and mitigate individual financial risks by giving hope of future diversified employment opportunities. My PhD research reveals that irrigators in the Murray Darling Basin are very receptive to such transition economy programs and are very concerned for the future of irrigation communities in the Basin. My published research also reveals that in the absence of comprehensive transition economy investment, employment and re-skilling strategies, irrigators will prefer to sell to private buyer rather than public environmental buyers in order to sustain the economy of irrigation communities (see attached publications).

Yours sincerely

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Limits to Government Water Buy-Backs for Environmental Flows in the Murray-Darling Basin (Part 1)

by Vinoli Thampapillai*

This article presents the primary historical and operational facts and literature analysis, regarding a programme developed in Australia and until recently widely cited internationally as a model of the efficacy of water-trade-based governance for protecting environmental flow. Part 2 of this article, to be published in EPL, Volume 39, Number 6, will provide an integrated analysis of these indications of the performance concerns and limitations of the Murray-Darling system, enabling some balance with former encomiums, and providing “lessons learnt” for policy and law makers proposing to develop such programmes in other hydrological systems. (Editors)

The Murray-Darling Basin (MDB) is often referred to as the food bowl of Australia, producing 53 percent of cereals grown for grain which include 100 percent of Australian rice, 95 percent of all oranges and 54 percent of all apples (MDBA, 2009a). The basin also holds a significant proportion of Australian livestock.¹ The river basin covers an estimated 14 percent of Australia's land area, spanning five jurisdictions, Queensland, New South Wales (NSW), Australian Capital Territory (ACT), Victoria and South Australia (SA) (MDBC, 2008a). While the Murray-Darling river system is recognised internationally as a major river system in terms of length and land area, the MDB is characterised by a relatively flat landscape which translates into a low rate of flow (Wahlquist, 2008a). It has also been observed that groundwater resources in the basin are characterised by low recharge rates.

Small-scale pumping commenced along the Murray River in the 1850s. Irrigation settlements commenced in Mildura, Victoria and Renmark, South Australia in 1887, with large-scale pumping occurring in Mildura. Over time, irrigation activity expanded across the four states of the MDB leading to the construction of a complex series of government and private dams, locks, weirs and private bores. The regulated system of water storages has kept water running through much of the Murray River during drought periods. Rural economies based on agriculture were created and actively encouraged by successive Australian governments. Following the First and Second World Wars, retired servicemen and their families were granted opportunities to participate in agriculture and settle in new irrigation districts. The soldier settlement scheme aimed to increase both the rural population and agricultural production. A broader network of businesses providing goods and services to support the agricultural sector in the MDB was also established, which led to a period of expansion of rural economies. Many families employed in

the agricultural sector within the MDB today are second or third-generation farmers, while some have invested in agriculture for four generations.

By 1983, water use in the MDB was dominated by irrigation. Water extraction in Australia grew by 65 percent between 1983–84 and 1996–97, most of which has been attributed to agriculture. The resultant environmental flow problems include increased water salinity, rising algal blooms, turbidity, water with high pesticide concentration, water logging, reduced total flow, depletion of groundwater, salinisation of irrigated and dryland soils, and soil erosion. The degradation of the Murray-Darling river system has compromised biodiversity and reduced the amount of productive land available for farming.

Over-allocation of water resources across the four states of the MDB has been recognised as the major cause of the deterioration of the quality and quantity of water flows in the Murray-Darling river system. Over-allocation occurs where the number of water entitlements issued is unsustainable. Climate change is expected to intensify the adverse impacts of over-allocation. Australia has been in drought since 2001 and the Bureau of Meteorology has observed that the current drought is longer and hotter by one degree Celsius compared to previous droughts. The Commonwealth Scientific and Industrial Research Organisation (CSIRO) estimated that an increase in temperature by one degree translates into a 15 percent decline in river flow.

Environmental flow allocations in river systems seek to prevent the drying of surface and groundwater flows, while also sustaining and restoring the ecological processes and biodiversity of water-dependent ecosystems. That is, an environmental flow is the amount of water required to restore surface river and ground water for sustainable use. In determining an environmental flow it is not only the quantity, but also the quality and timing of flows to sustain river health which must be taken into consideration. Environmental flows must balance ecosystem and socio-economic needs, and are to be distinguished from the

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natural flows of untapped water systems. Socio-economic needs include food security and the general survival of rural economies.

As the global food crisis emerged in 2008, the United Nations Department of Economic and Social Affairs raised concerns about the lack of global investment in agriculture. In Australia, prolonged drought and environmental degradation of river systems have subdued agricultural production as a share of total commodity exports from 26.8 percent in 1998–99 to 14.9 percent in 2007–08. The total volume of Australian farm production fell in 2006–07 to 95.2 percent, against the base year 1997–98. With the exception of 2006–07, the total volume of farm production remained slightly above the base year. In discussions held with the UN Food and Agriculture Organization on global food security in August 2008, the Australian Minister for Agriculture observed that despite persistent drought, Australia exported food valued at more than A\$23 billion in 2006–07. Hence, it is possible to infer that continued over-allocation of water resources to agricultural production is contributing to a serious decline in the state of the MDB.

In the Australian context, while the globally recognised problem of under-investment in agriculture is not a matter of concern, it has long been clear that neglecting environmental flows in the MDB will threaten the very existence of the river system. Environmental degradation affecting one of Australia's most important water resources could, in the absence of technological innovation, lead to lower levels of agricultural production (especially for export) in the MDB, as a necessary choice to achieve sustainability over the long term. Thus, the more rapidly the governments act to conserve environmental flows and minimise irreversible damage to the ecosystem, the higher the level of sustainable food production that may be achieved over the long term.

Despite the introduction of various environmental reforms since 1994 targeting the MDB, serious environmental problems in the river basin persist. In 2008, acid sulphate soils were identified in a number of regions as flows to the lower reaches of the river system were compromised. The Murray-Darling Basin Authority reported that inflows to the Murray river system between January and March 2009 were the lowest recorded in 117 years (MDBA, 2009b). Blue-green algae outbreaks have been experienced in the Murray River system as recently as March 2009. Concerns now exist as to whether water in the Murray River system is sufficient to meet critical human needs for 2009–10. Despite recent flooding in Queensland and New South Wales, Darling river system inflows to the Menindee Lakes storage levels are only 15 percent of capacity. It is clear that the viability of the earlier environmental reforms was doubtful, due to the absence of a clear strategy to encourage the introduction of alternative low water-intensive industries to replace unsustainable irrigated agriculture and therefore ensure the survival of existing rural economies.

Market-based water governance has been embraced by successive Australian governments since 1994, as a means of conserving and restoring environmental flows,

with minimal government interference. It was expected that a water market would allow water to move from low-value uses to higher-value uses (including environmental flows) and that, through a water market, decisions on the distribution of entitlements would be determined in part or in whole by market forces. In this way, the distribution of water entitlements between alternative users would no longer be the sole territory of government, but would occur through the "invisible hand" of the competitive market, which is recognised to be a highly idealised state but sometimes discussed as if it is as an institution.

This paper seeks to demonstrate why market-based water governance strategies, namely government buy-backs of water entitlements introduced in 2004, have had limited success in restoring environmental flows in the Murray-Darling Basin. The following section presents an overview of water market reforms for the conservation and recovery of environmental flows in the MDB. The paper charts the slow progress of government buy-backs, and explores the literature which seeks to explain the limited ability of the water market to recover water for environmental flows in the MDB.

Market-based Water Governance Reforms for Environmental Flows in the Murray-Darling Basin

Water trade in Australia is first reported to have occurred between NSW irrigators in the Murray Irrigation Areas during the 1930s. South Australia was the first state to formally introduce permanent and temporary water trade in 1983, following the implementation of a moratorium on the issuance of licences in 1968. While water markets formally commenced in Australia in the 1980s, the first stage of water market reforms specifically aimed at addressing environmental problems was introduced in 1994, led by the Council of Australian Governments (COAG), which comprises the State, Territory and Federal Governments. A cap-and-trade system was formalised in 1997, aiming to cap extractions at 1993–94 levels of development, and permit new water users to obtain water entitlements or allocations via the market. The first permanent interstate trade occurred in 1998 involving the movement of 248 Megalitres (ML) of water from NSW to Victoria. However, the state of Queensland, on the Darling river system in the northernmost part of the MDB, was not party to the agreement on a cap, and restrictions on interstate water trade remained in place in most catchments until 2008. The Federal Government lacked the necessary enforcement powers to secure Queensland's compliance, and unsuccessfully attempted to use Federal competition policy payments to the states through the COAG process, as means of obtaining Queensland's participation in the cap. The intergovernmental Water For Rivers programme, comprising the NSW, Victoria and the Commonwealth governments, was incorporated as a public company in 2003. Part of the company's business activity is stated to include buy-backs from willing sellers on the Murray system upstream of South Australia, the Murrumbidgee River and Goulburn river system, but only "where necessary". The main focus of Water for Rivers has been on

water-saving infrastructure projects for environmental flows. One land and water purchase by Water for Rivers was reported in July 2008.

The second stage of water market reforms for environmental flows was introduced by COAG in June 2004. The reforms are outlined in two documents entitled the “Intergovernmental Agreement on the National Water Initiative (NWI)” and “Addressing Water Over-allocation and Achieving Environmental Objectives in the Murray-Darling Basin Agreement”. The 2004 National Water Initiative (NWI) portrayed water markets as central to the recovery of water in the Murray-Darling Basin. Under the 2004 NWI, the separation of legal title to land and water was encouraged to facilitate water trade under the cap-and-trade system. The NWI promoted government water buy-backs for the environment, making an initial commitment of A\$500 million over a five-year period ending June 2009, to recover 500 Gegalitres (Gl)² under The Living Murray programme (MDBC, 2004a). However, the key study which has driven Australian water reform since 2004, undertaken by the Wentworth Group of Concerned Scientists, stated that the best available science indicates that between 2000 and 4000 Gl is needed to have a “moderate to high chance” of achieving improvements in river health in the MDB.

Between 2004 and 2008, very limited progress was made in recovering environmental flows via the market in the MDB under the NWI. As noted in the introduction, environmental problems worsened in some regions of the MDB, including the emergence of acid sulphate soils. The limited progress in the buy-back of environmental flows was due in part to the structure of Australian public sector water governance. The Australian Constitution grants State governments the power to manage water resources for conservation and irrigation.³ Hence the Federal Government took no initial action to purchase water. In 2006, the NSW State government commenced water buy-backs for environmental flows in the MDB.

The following year, in January 2007, the Federal Government announced a broader A\$10 billion water fund under the National Water Security Plan, of which A\$3 billion was to be devoted to a buy-back programme over ten years. By 2007, there was growing recognition within the Federal Government that the transboundary Murray-Darling River system required more centralised management. A Federal *Water Act* was introduced in August 2007 to enable greater Federal water governance of the Murray-Darling Basin, reducing existing State powers over water granted under the Australian constitution.⁴ There was strong resistance to the 2007 governance reforms from the State of Victoria, and subtle resistance from Queensland demonstrated by attempts to auction new entitlements in the Warrego catchment in 2008. NSW and South Australia supported the reforms. The State government of Queensland has continued to safeguard foreign investment in increasing irrigated agriculture in the Warrego catchment as recently as January 2009.

Following a change in the Federal Government in December 2007, the newly elected Federal Government indicated in April 2008 its intention to proceed with the

A\$3 billion buy-back programme over a decade. This included the announcement of an initial A\$50 million Federal Government purchase programme under its *Water for Future* policy, which now had greater legitimacy under the new centralised governance arrangements formalised in the *Water Act 2007*. The *Water Act* established the Commonwealth Environmental Water Holder responsible for managed all environmental water purchased by the Federal Government.

The new Federal Government committed an additional A\$2.5 billion to the State of Victoria. This enabled an agreement with the State of Victoria to be reached on the issue of Federal water governance of the Murray-Darling Basin. The extra government spending brought the final total devoted to environmental flow recovery to A\$12.9 billion over ten years.

Reforms promoting greater centralised management of the MDB have not yet affected the existence of separate governance institutions for water buy-backs. While it has been argued that a single centralised trading-house model would be able to identify and minimise environmental externalities of water trade such as salinity, at present six separate entities exist for purchasing water for environmental flows. The six institutions are: (i) NSW Riverbank; (ii) Water for Rivers (Victoria, NSW and Commonwealth); (iii) NSW Catchment Management Authorities; (iv) Waterfind – a private water brokerage; (v) South Australia Water; and (vi) the Commonwealth Environment Water Holder. The Murray-Darling Basin Commission has also been involved in government water buy-backs on a smaller scale. The governments of Victoria and Queensland have not established individual water buy-back programmes to date, which may reflect a lack of full support for the buy-back programme.

Progress of Government Water Entitlement Buy-backs in the MDB

Most analyses of the government water buy-back programme, established in June 2004, have been critical of the slow pace at which water is being recovered against the initial target of 500 Gl for the Murray River system by June 2009. Initially, the lack of progress was attributed to conditions imposed on the sale of water to government, which required that all water sold should be obtained via savings made through infrastructure improvements. This condition has since been relaxed, but it undoubtedly served as a major barrier to trade and indirectly increased the purchase price, as government had agreed to pay for the infrastructure improvements made, in addition to the cost of the actual water.

Data on government purchases presented in this paper is for the period June 2004 to September 2008. The level of detail on purchases made varies according to the individual government purchaser. In September 2008, the Federal Government improved the transparency of purchase data, following a critical analysis by the private water brokerage Waterfind in May 2008 which identified a lack of transparency in provision of data with respect to:

- the actual volume of water recovered;
- the level of security attached to water purchased;⁵ ➔

- the exact location of water purchased; and
- whether areas targeted for purchase are fully metered to ensure that contracted volumes are actually delivered via monitoring and enforcement strategies.⁶ (A recent report revealed that 93,000 extraction points in the Murray-Darling Basin require new meters or upgrading at an estimated cost of A\$650 million. Hence the official data presented may not accurately report the actual volume of water recovered).

The Federal Government responded to the first three concerns regarding transparency, publishing data in September 2008 on the catchment location, volume and level of security of water it had purchased earlier in the year. Data provided by the MDBC, which has now been absorbed into the newly created Murray-Darling Basin Authority (MDBA), on State government purchases is yet to include this level of detail. There is some indication that the Federal Government is considering a centralised register that will record and regularly update water entitlement purchases made by all governments to facilitate a more coordinated approach. However, in a review of the Federal Government buy-back programme commissioned by the Department of Environment, Water, Heritage and the Arts (DEWHA) published in September 2008, it was argued that total disclosure could cause unreasonable disadvantage to the Federal Government as a buyer in the water market.

Federal Government Purchases

In May 2008 the Federal Government announced that it had purchased 35 GI in the Murray River system across NSW, Victoria and South Australia, at a cost of A\$50 million (Wong, 2008a). The figures were subsequently revised down to 34.3 GI at a cost of A\$47.2 million, as a number of offers to sell were rejected or withdrawn. The initial purchase of 34.3 GI by the Federal Government has been widely criticised as “paper water”, on the basis that 75 percent of entitlements purchased were general security. Such entitlements are unlikely to deliver any actual water in the immediate term, as allocations were zero or below 10 percent in NSW and Victoria in 2008 due to drought (Table 1).

Reports in early 2008 claimed that one-third of entitlements purchased would not recover any water to the river system, while the remaining two-thirds would take a number of years to deliver water to the MDB system due

to a number of conditions placed on the licences purchased. Concerns grew in August 2008 when it was reported that only 0.01 GI of the 34.3 GI purchased by the Federal Government would be recovered for the Murray River in 2008 (Wahlquist, 2008b).

The review report commissioned by DEWHA observed that the government purchases in 2007–08 had little or no impact on rural economies as a consequence of the fact that the majority of entitlements had low or zero allocation. It was also observed that water for high-value crops (fruit, wine grapes and vegetables) comprised the minority of sales to government, while water for low-value crops (cereals and pasture) dominated water sales to the Federal Government.

The review stated that the DEWHA’s environmental water priorities, established under the 2007–08 Federal Water Purchase Program (WPP), were preliminary. The department acknowledged that further work was required in this area and that external experts would be hired to determine future priorities. Key recommendations articulated in the review included:

- undertaking hydrologic and hydraulic modelling for the purpose of establishing required flow regimes;
- facilitation by the Federal Government of a transition to a more transparent market;
- more competitive sourcing of water for environmental assets, rather than sole reliance on the “expression of interest” process, which relies on buyers making an offer to sell to government.

Two matters of concern are the absence of environmental and socio-economic assessment procedures built into the Federal WPP and the indication that such assessments would not be an important component in the evolution of the WPP. The review observed “*the expected environmental benefits could not be quantified in financial terms at the time of making the purchase decisions, nor was it viewed as critical to the objectives/outcomes of the WPP. It was assumed that the value of the water entitlements was at least as great as the value placed on water by the irrigators*”.

The average price paid in the first round of the Federal Government purchases was A\$1131/MI for general security licences and A\$2125/MI for high security licences (Table 2). The high security water entitlement purchases were mostly made in the state of Victoria, while most of the water purchased in NSW was general security water.

Table 1. Purchase Summary

Details	Amount in GI	Cost (A\$)
High security	8.4	17 906 403
General security	24.5	29 012 897
Victoria low security	1.3	248 457
Total	34.3	47 167 775

Source: Hyder Consulting 2008.

Table 2. Summary of WPP Results According to Number of Offers

	All offers		Accepted offers	
	High security	General security	High security	General security
Number of offers	424	425	52	55
Value (A\$)	228,618,969	354,989,978	17,906,403	29,261,354
Volume offered (ML)	71,834	247,301	8427	25 874
Average asking price (A\$/ML)	3182	1435	2125	1131

Source: Hyder Consulting.

In summary, very little of the 34.3 Gl purchased by the Federal Government was actually recovered. Given zero or very low allocations to 75 percent of the water entitlements purchased, the actual amount of water recovered to the remaining high security water entitlements was only 8.4 Gl.

State Government Water Recovery

In addition to purchases made by the Federal Government, water entitlements were also recovered by State government agencies. As of July 2008, the amount of water listed as recovered on the MDBC Living Murray Water Recovery Register was 133 Gl against the target of 500 Gl. Table 3 is sourced from MDBC data available at July 2008, and summarises the reported progress on recovery of water (MDBC, 2008c). Water entitlements

listed on the register are to be obtained from a combination of buy-back and infrastructure projects. Of the water reported as “recovered” on the water recovery register, the 13 Gl returned in South Australia was obtained through pre-existing government entitlements. The 120 Gl sourced in Victoria was obtained through a deal brokered by the Victorian government with irrigators, to direct 20 percent of water saved from infrastructure improvements to the environment, in return for clear legal entitlements for irrigators to the remaining 80 percent of tradeable low reliability water. However, the 120 Gl “recovered” in Victoria through infrastructure upgrades are general security entitlements, to which allocations were zero in 2008 due to drought. Hence it appears that only 13 Gl has actually been recovered.

Table 3. Living Murray Water Recovery Register (Gl) at July 2008

State/Territory	Projects under investigation	Projects in development	Ready to be implemented	Recovered water *	Recovery target
NSW	30	0.7	237.2	0	249
Victoria	0	0	91	120**	214
SA	17	0	5	13***	35
ACT	2	0	0	0	2
Australian Government	0	0	0.5	0	none
MDBC	0	20	70	0	none
Total	49	20.7	375.7	133	500

Source: Adapted from Murray-Darling Basin Commission at July 2008.

* Measures volume of water entitlements held by government, but not actual water allocations to the entitlement over time

** General security water to which allocations were zero in 2008

*** Security of water supply not specified



Table 4. Other Government Permanent Water Entitlement Purchases to October 2008 not Included on MDBC Living Murray Water Recovery Register

Buyer	Location	Volume of entitlements purchased (Gl)	Price (A\$)	General security (Gl)	High security (Gl)	Supplementary access (Gl)	Actual immediate recovery (Gl)
Federal	NSW/Vic/SA Murray system	34.30	47m	25.25	8.4		8.4****
NSW	NSW Murray and Darling systems	166.94		60.90		106.04	0–6
Total		201.24		86.15	8.4	106.04	8.4–14.4

Source: Adapted from Commonwealth of Australia, 2008 and NSW Riverbank, 2008.

****Revised data indicates actual recovery for 2008 is estimated at between 0.01 Gl and 8.4 Gl

Table 4 records the additional government purchases of water entitlements undertaken in 2008 which are not included on the MDBC water recovery register at September 2008. In December 2008, the NSW Riverbank programme reported general security entitlement purchases totalling 86.2 Gl in the Murray and Darling river systems. As discussed previously, the NSW general security entitlements will not deliver an immediate return of water as these entitlements have had zero or very low allocations in 2008. The New South Wales government has also purchased 106.04 Gl of supplementary access water, which is delivered only during a flood event, as a means of reducing the extent of floodplain harvesting in the State.

The Queensland State government does not have a water buy-back programme. However, in March 2008 the MDBC, an inter-governmental agency, purchased 11 Gl of temporary water in Queensland, for a six-week period to deliver water to the Ramsar-listed Narran Lakes on the Darling system, for the purpose of completing a bird breeding season (MDBC, 2008b). In July 2008 it was reported that the Federal Government was seeking to buy back entitlements from Queensland's largest water extractor, Cubbie Station, following the announcement of a A\$350 million fund to purchase water from Queensland. It was reported that Cubbie Station, in the Balonne catchment of Queensland, with a storage capacity of 450 Gl, had indicated its willingness to sell some entitlements, following annual losses of A\$20 million over the past two years. No government purchases of permanent entitlements in Queensland have been reported as at September 2008. However, in September 2008 the Queensland State government "gifted" the Commonwealth government 10.6 Gl of "unallocated water" from the Nebine, Moonie, Warrego and Border Rivers on the Darling system (Wong, 2008b). The Federal Government observed that 8 Gl of the "gift" comprise water that was due to be auctioned from the Warrego system in 2007. The planned auction was subsequently halted after public protest. However in January 2009 the Queensland State government provided

support for foreign investment in the expansion of irrigation activity in the Warrego catchment. This action has led to concerns that the increased upstream extractions will negate the benefit of Federal Government water purchases during 2008.

As noted above, the State of Victoria does not have a separate buy-back programme under The Living Murray initiative and Victorian water recovery is being obtained through water infrastructure projects. South Australia Water purchases water on behalf of the South Australian Minister for the River Murray. However, no South Australian government purchases were publicly recorded under The Living Murray programme at December 2008.

In conclusion, the total amount of actual water permanently recovered to the Murray river system under The Living Murray programme between June 2004 and September 2008 by both State and Federal Governments is 21.4 Gl, which assumes the entire 13 Gl of South Australian government water entitlements returned to the river system in full and that a further 8.4 Gl was returned through Federal Government purchases in 2008. The water purchases by the NSW government for the period 2006–2008 are general security water entitlements which have delivered zero or very low amounts of actual water. Hence it would appear unlikely that the achievement of actual water recovery of the targeted 500 Gl to the Murray River system will occur by June 2009. There exists a large gap between the quantity of water held by Australian governments on paper and actual water recovery along the Murray-Darling river system. As a result, the ecological crisis in the MDB has worsened.

Water entitlements which offer no immediate water recovery, which can be said to characterise the majority of government water entitlement purchases to date, are often referred to as "paper water". To mitigate the risk of the government purchasing "paper water", Heaney *et al.* (2004, 2005) argue that options contracts against irrigator allocations will provide water at a lower cost than government purchases of general security entitlements. An option

contract is a right, but not an obligation to purchase, when certain conditions such as the level of flow are fulfilled. This would provide the government with the ability to purchase general security water on a temporary basis in seasons when water can actually be returned to the river system. Water option trading has not been recognised in law in all MDB jurisdictions, however Clause 58 of the National Water Initiative permits the development of new trading arrangements over time. Water option markets have been used in the US in Colorado, California and Texas. This form of temporary trading may be preferred by some irrigators. While it may prove a more cost-effective strategy, it is not clear that this form of temporary trade will actually deliver the quantity of environmental flows required on a consistent basis over time.

Permanent purchases of high security water may be more effective in delivering the immediate flows required, albeit at a higher cost. The Federal Government review of its own 2008 pilot purchase programme revealed that 71.8 GJ in high security water entitlements were offered for sale at a total value of A\$0.23 billion. However the government needs to secure an additional 478 GJ in actual water for the Murray River system by June 2009. To achieve the final target of 500 GJ in high security entitlements in the Murray River system at current market prices, the total expenditure would be approximately A\$1.65 billion. This is just over half of the total budget for government water buy-backs. If it is assumed that the Federal Government maintains its budgetary commitment of A\$3 billion to the buy-back programme, then no willingness to pay limitation exists. With less than a year to achieve the 500 GJ, the rate of spending would need to increase. However, the current global financial crisis may constrain the ability of government to release large amounts of funds in the immediate term. A number of other limitations exist to hinder the large-scale government purchase of permanent entitlements required to restore environmental flows at a rate of 100 GJ per year to the Murray system.

Limits to Environmental Flow Recovery via Government Water Buy-backs in the MDB

This section reviews the limits to the effectiveness of water markets and other environmental markets which may explain the slow progress of government buy-backs for environmental flows. The specific factors affecting irrigator willingness to sell to government water buyers are also considered here.

General Limits to Environmental and Water Markets

It has been often argued that environmental degradation is related to poor economic decision making and market distortions which lead to inadequate pricing of environmental assets. However, Gustaffson (1998) warns that this does not imply that the mere application of market mechanisms to an environmental problem will deliver sustainable development.

The two fundamental theorems of welfare economics form the basis for the creation of environmental markets. The first theorem of welfare economics states that competitive markets in equilibrium lead to the maximisation

of social welfare (efficiency), that is, the achievement of a Pareto-optimal equilibrium. It is therefore expected that the introduction of water markets will allow competitive forces to move water from low-value uses to higher-value uses, which include environmental flows.

Ackerman and Gallagher (2000:5) note that general equilibrium theory which describes the “blueprint” of the market solution, is underpinned by unrealistic assumptions about people, firms and technology. For example, it is argued that the first theorem does not apply to externalities, as competition may in fact raise the cost to society of eliminating the externality. Furthermore, perfect competition is rarely observed in reality, as oligopolies and monopolies persist.

The second theorem of welfare economics states that “every Pareto-optimal allocation of resources is an equilibrium for a perfectly competitive economy, provided a redistribution of initial endowments and property rights is permitted”. That is, the theorem observes that the initial assignment of property rights is significant if social welfare is to be maximised (even where transaction costs are zero). It is evident that the initial assignment of property rights has a more pronounced impact on the final outcome where



Courtesy: Wikipedia

there are a large number of parties involved in a social cost problem, such as unsustainable water extractions. The more water resources are vested in the state, where extractions for private consumptive use are unsustainable, the lower the cost to society of purchasing the water for maintenance of environmental flows via government buy-backs in a water market. This is very simply because the government will need to make fewer purchases.

Further underscoring the importance of the initial assignment of property rights are the findings by Kahneman, Knetsch and Thaler (1990) relating to the “endowment effect”. In summary, experimental tests undertaken demonstrated that once individuals were granted full possession of good A, their willingness to part with the good A in exchange for another good B, may decline. This response, termed the “endowment effect”, is a limit to the willingness to sell. When the same number of participants were offered a choice between two goods A and B, but not granted possession of either good, they did not necessarily repeat the same choices as the first group who were initially granted ownership of good A. Repeated experiments lead to the conclusion that the endowment effect can result in under-trading, disputing the Coase theorem which argues that in the presence of low transaction costs, parties will trade to the same point regardless of the initial assignment of property rights.

A further limitation of the water market is the assignment of the same price to each unit of a commodity. For example, 3000 MI of water withdrawn from point X on a river system may impose a far greater impact than expected and may not simply be equivalent to three times the environmental cost of an extraction of 1000 MI at another point Y on the river system. In this case, paying three times the price to extract 3000 MI at point X will not reflect the true associated environmental cost which may be five times greater than a 1000 MI withdrawal at point Y. Government buyers need to ensure that differential impacts are factored into the purchase price to avoid under or over-paying.

On the buyer side, the variability of water supply can lead to difficulties in properly defining property rights attractive to investors. Cox and Warner (2007) observe that water is not a homogenous good as the security of water entitlements varies across catchments and State borders according to differing rainfall patterns, dam capacity and run-off. This variability of water as a product means the Australian government runs the risk of purchasing “dry water” in the Murray-Darling Basin. Grafton *et al.* (2007:6) observed that in 2004–05 there were approximately 76,000 water entitlements totalling 23,000 GI in Australia, of which only 12,000 GI were actually available for use in agriculture. The remaining 11,000 GI had little or no water allocated to the entitlements. As agriculture is the largest water consumer in Australia, Grafton *et al.* (2007) argue that the government could fall into the trap of buying up “dry water” entitlements. This prediction was realised in 2008 when the Federal Government bought, as part of its A\$50 million first step purchase, general security water entitlements in NSW to which water allocated by the State authorities was zero. As previously noted, the

NSW Riverbank buy-back scheme also appears to face a similar problem.

High transaction costs are a key limitation on the recovery of environmental flows via a water market. Gustafsson (1998) identifies the main causes of high transaction costs in environmental markets as being the lack of well defined property rights, the public good nature of environmental goods giving rise to externalities, and the high cost of acquiring information on environmental goods. Water availability varies and information becomes known gradually, creating uncertainty. High transaction costs will require a greater degree of government intervention in the market.

The market mechanism has often served to underestimate the value of environmental services, such as biodiversity. In particular, cultural attitudes to the environment, embedded in the functioning of the market mechanism, may also impact the success of a voluntary purchase scheme. A society which fails to recognise the importance of conserving environmental flows to long-term development may undervalue environmental flows in the market place. Bennett (2005:177) raises concerns that government determinations on levels of environmental flows may be compromised by political processes which place great emphasis on the votes of vested interest groups, rather than actual environmental needs. Hence water may not move from agricultural or other production to higher-value environmental flows. To overcome such obstacles, an important issue, related to the success of government water buy-backs in the MDB, which must be addressed, is the adverse impact on rural economies. This is particularly important where government environmental buy-backs are concentrated in one region.

All constraints discussed above on water markets have been observed in the Murray-Darling Basin. The MDBC (2003) indicated its concern ahead of the formal announcement of a government buy-back programme under the 2004 National Water Initiative, that a voluntary buy-back scheme would be slow and patchy in its delivery of water to the environment with no provision for the consistent management of flows. ACIL Tasman (2003:vi) joined the MDBC in raising early concerns about heavy reliance on market measures, noting that both water markets and regulations have serious limitations, and argued that a balanced hybrid approach was required. The MDBC predicted that delays in water recovery would lead to biodiversity losses, which in some cases may be irreversible. However in 2003, neither the MDBC nor ACIL Tasman articulated in sufficient detail why water recovery would be patchy. Cox and Warner (2007) argued that patchiness of water recovery in the MDB was likely because it was dependent on the presence of willing sellers able to release water to specific environmental target areas. The most immediately obvious limitations to the recovery of environmental flows from willing sellers in a market are physical constraints as water is heavy and expensive to transport, limited by hydrological links and subject to transmission losses.

The performance of water markets in delivering environmental flow outcomes in the MDB is also dependent on a fully functional cap on water extraction. Young and

McColl (2003:226) observe that the MDB cap has been partial and has not been designed to manage climate change. A further concern is the failure to incorporate the impact of plantation forestry into the cap-and-trade model for the MDB. By 2020, government-endorsed plantation forestry is predicted to cause a decline in flows in the Murray-Darling system by 1300 Gl.

While the 2004 National Water Initiative placed great emphasis on the role of water markets in restoring the health of the basin, it has been observed that since 2007 the Federal Government approach to water recovery in the Murray-Darling Basin has placed less emphasis on water markets. A smaller proportion of the total budget for environmental water recovery, approximately 25 percent, is devoted to government water purchases and it was also observed that the 2007 Water Security Plan made reference to markets only twice. It is commonly accepted that natural resource problems need to be addressed by a combination of market and regulatory measures. Through a process of trial and error, the progress of water policy in the Murray-Darling Basin appears to be following the key recommendation made by Gustaffson in 1998. That is, market-based governance, while an important component of the policy mix, should not play a dominant role in environmental management due to the complexity of environmental functions.

Fifteen major impediments to the operation of general water markets have been identified in the literature discussed below. While this literature does not directly address voluntary buy-backs for environmental flows, the impediments listed below assist in understanding why the government buy-back process has been slow.

1. Third-party Effects

There are concerns that water transfers, particularly those which occur outside a district, will result in unintended third-party effects such as delays in downstream delivery and storage; reduced reliability of supply for downstream water users; environmental damage; increased water charges; and adverse impacts on water quality. This is often accompanied by a failure to provide assistance to farmers facing adverse impacts via regulation or direct compensation. In light of these constraints, Heaney *et al.* (2006:278) correctly observe that “the [mere] separation of water entitlements from land is not a sufficient condition to ensure that a water market is complete”.

2. Property Rights

Poorly defined property rights to water have been identified as a key institutional obstacle to trade. Bell and Quiggin (2007:6) argue that Australian water rights cannot be considered full property rights because under Australian State laws, water resources are vested in the Crown. Hence water rights may only be termed “tradeable water access entitlements”.

Many water entitlements may have a weaker status as it has been observed that a number of water supply agreements contain terms and conditions which may vary at the discretion of the irrigation operator. Group-access entitlements held by irrigation operators do not grant in-

dividual irrigators a clear title recorded on state registers, which may limit the ability of irrigators to access finance. Further complicating matters is the presence of more than 438 types of regulated surface water entitlements in the southern MDB states.

The separation of property rights to land and water in order to facilitate water trade and environmental buy-backs has been a major focus of the 2004 National Water Initiative. The tying of legal title of land and water has been cited as a key obstacle to trade. It is clear that in the case of temporary water trade, unbundling of land and water facilitates trade. However this factor is being questioned in the presence of contradictory empirical evidence of permanent water trade. Respondents in the Tisdell (2001) study continued to view water as an inherent farm asset, regardless of the separation of land and water title, suggesting that temporary trade would dominate the market. Similar results were obtained in a survey of 200 landholders by Crase and Jackson (1998) in the Murray Land and Water Management Plan area. The survey revealed that in the early days of the water market only two percent of irrigators would consider selling permanent water separately from land, while only three percent would be prepared to purchase permanent water.

In response to the separation of land and water title under NSW *Water Management Act 2000*, the Australian Bankers Association stated that this change would present a serious challenge to the banking sector, as traditionally mortgages had been granted on the basis of water rights tied to the value of land as security. Concerns were raised that the legislation did not require the consent of the mortgagee before the transfer of a water licence occurs.

3. Transaction Costs

High transactions costs will clearly limit water trade. For example, capital gains tax on permanent water sales may discourage permanent trade.

Transaction costs include the imposition of exit fees and approvals to trade (ACCC, 2008a). Exit fees in NSW have been identified as a major barrier, amounting to 80 percent of the value of the entitlement under Murray Irrigation Limited (MIL) in 2006. Legislative changes forced MIL to reduce exit fees. However they remained substantially above the amounts recommended by the ACCC, and the provision of an option for sellers to continue paying access fees rather than the larger termination fee, as recommended by the ACCC, was not offered by the MIL.

Other transaction costs include costs associated with locating other traders, negotiation of trades, settlement and registration, and enforcement of contracts. These transaction costs are highest in immature water markets where prices are not publicly known and there is no centralised trading location. Significant delays in effecting water transactions have been observed in the MDB. Gardner (2005) notes that preparation of contracts for sale and the government approval process takes significant time, while on-line trading is relatively fast.

Colby (1995) has argued that well structured transaction costs can provide parties with an incentive to internalise the social costs associated with the water transfer

if incorporated into an environmental policy. In this case, transaction costs are defined as costs of collecting general information and hydrological, legal and economic data to efficiently mitigate externalities.

4. Information Constraints

Limited market information serves as another major barrier, which is closely tied to transaction costs. In emerging water markets there is a poor understanding on the part of both buyers and sellers of water market exchange rates. A broader lack of awareness of how the water market functions is also a feature of emerging markets. On the public sector side, the oversimplification of key processes required for a market to operate, such as defining property rights, resolution of conflict, and addressing externalities, may inhibit trade. Essentially this impediment is a human capital constraint, as policy makers fail to understand the need to address complex institutional issues.

In the context of the MDB, concerns have been raised over that lack of transparency in pricing and trading information. The NSW Environmental Defenders Office (2007) highlighted the need to make all trading registers accessible on the internet. Major water brokers, namely, Waterfind, Watermove and SunWater are now filling the information gap to some extent in the MDB. However comprehensive price information is still lacking.

In Australia, registration of ownership and characteristics of water rights are not consistent across the states. It was observed that individual irrigators' shares of an



The confluence of the Darling and Murray Rivers at Wentworth, New South Wales

Courtesy: Wikipedia

operator's water access entitlements are not recorded on state water registers in NSW and South Australia. In these cases each operator maintains separate water registers.

Stoneham *et al.* 2002 also noted that the information known to environmental experts on the importance of on-farm environmental assets may not be shared with farmers in a comprehensible manner. Hence farmers may not be able to enter into contractual arrangements with a full understanding of the implications of government priorities.

5. Other Institutional Barriers

A number of other institutional and legal barriers to water trade have been recognised. How these barriers are maintained is articulated by Easter *et al.* (2002) who identified four types of competing water stakeholders: (i) irrigators who will profit from the sale of water outside the district or to non-agricultural users; (ii) irrigators who will incur damages by increased water sales due to declining return flows or increased infrastructure costs;

(iii) persons concerned by environmental damage caused by water sales; and (iv) local businesses who would oppose the transfer of water outside the local area. It is argued that the latter three groups may form coalitions to promote the continuation of institutions and laws which serve to restrict water trade.

Institutional barriers identified include poor enforcement mechanisms and delays in establishing the necessary legal and institutional frameworks, particularly water accounting, as well as entitlement and allocation frameworks. For example, there has been a failure to regulate return flows where a water market operates, in order to mitigate negative impacts on the downstream environment and other water users. Bell (2002:349) defines return flows as "water associated with an irrigator diversion that returns to the hydrological system as surface run-off from flood irrigation, irrigation drainage, channel seepage or groundwater discharge from irrigation areas".

Water management systems across the transboundary Murray-Darling Basin are not fully integrated. Gardner (2005) observes that incompatible State legislation and government institutions serve to complicate water trade in the MDB. Differing levels of security of licences present in each state contribute to this complexity.

Trade in the MDB can only occur after a Water Sharing Plan enters into force. The ACCC (2008a:13) identified a number of general trading rules restricting water trade, the key restriction being constraints on water exports. These restrictions include limits on the percentage of water that can be traded out of an area. A four percent annual cap on permanent trade out of an area until 2009 is permitted under the National Water Initiative, and has been applied in the state of Victoria.

Other limits include minimum holding requirements placed on sellers, exit fees levied on sellers, other rules/levies to discourage selling, requirements to invest in water-saving infrastructure for the purpose of trading only surplus water saved; reduction in member benefits after trading water outside an area; and requirements to first offer water for sale within an area.

In seeking to explain the weak permanent trading activity in the MDB, Crase (2000) refers to the success of the Colorado Big Thompson (CBT) project, in which a third of all the project water was traded permanently over the period 1970–1993. The high rate of permanent trade is explained by "clearly defined water rights, high reliability of supply, a well developed distribution system, a large number and diversity of market participants, and institutional rules and administrative procedures which minimize restrictions and transaction costs". It was argued that the success of permanent trade in CBT is unlikely to be repeated elsewhere. This is possibly because the high reliability of supply and the presence of diverse

market participants cannot be easily replicated in other jurisdictions, while regulatory and institutional limitations discussed above are capable of being overcome to a greater extent.

6. *Over-reliance on Markets to Resolve Conflicts*

An over-reliance on the market to resolve conflicts between users has been observed, where government regulatory authorities and the court system have effectively failed. Market solutions will not always be equitable, as numerous important factors may not be accounted for by the forces of demand and supply, or profit-maximising behaviour. It was noted earlier that perfect competition is not often observed in reality and that competition can in fact drive up the cost of addressing externalities, such as low environmental flows.

7. *Cultural and Religious Objections*

Cultural or religious objections to the acquisition of water via the markets may serve as a barrier. These objections include the perception of water as a public good essential for life.

8. *Geographical Constraints*

Geographical constraints and unreliable or unstable hydrology can limit water trade. This includes the failure to understand the interconnectivity of ground and surface-water systems. Furthermore, evaporation losses can be large in transporting water along a river system.

9. *Fear of Loss of Government Power*

Fear of change and loss of power on the part of the public sector can limit water trade. Loss of public control makes it difficult for government to curtail water use to protect the environment and manage water trade equitably.

10. *Native Title*

Native title issues pertain to Indigenous claims to land and water, which create uncertainty particularly in NSW, impeding water trade.

11. *Stranded Assets*

Stranded assets pose a major obstacle to water trade. It has been observed that management systems which do not link water entitlements to the distribution infrastructure can lead to a stranded asset problem as a consequence of water trade.

12. *Fear of Contraction of Rural Economies*

Concern over the contraction of rural economies has inhibited permanent trade. It has been argued that in the absence of government buy-backs, permanent trade will remain weak, given these concerns.

13. *Infrastructure Costs*

High costs and consequential failure to construct the necessary infrastructure to move water that could be traded between districts inhibit trade.

14. *High Investment in Permanent Crops*

A survey of 195 irrigators in the Limari Valley, Chile found that high investment in permanent crops tended to reduce permanent trade in water markets.

15. *Endowment Effect*

The endowment effect inhibits trading activity. That is, people are more likely to wish to continue holding property which they own. Hoarding behaviour observed in American water markets has been attributed to a perception of perpetual increasing demand for water. In the Chilean context, Bauer (1997) observes that “centuries of labor to [move] water to dry lands and the constant threat of drought” encourages Chilean farmers to hold water entitlements regardless of the cost.

Having considered the general limitations operating within water and other environmental markets, the following subsections explore the specific factors which may limit the willingness of an irrigator to sell water to government buyers for environmental flows in the MDB.

Survey Analyses of Irrigator Attitudes to Government Water Buy-backs for the Environment in the MDB

As the majority of water entitlements in the MDB are held by irrigators, their attitudes to government buy-backs for environmental flows will determine the success of purchases from willing sellers. To date, analyses have focused on general irrigator attitudes toward government participation in the water market, rather than on the individual factors which impact the willingness of irrigators to sell water to Australian government buyers. The attitudes of MDB irrigators provide some indication of the limits on willingness to sell. In this context, a notable American study undertaken by Ise and Sunding (1998), which directly questions the factors determining irrigator willingness to sell water to government buyers, is considered in the latter half of this sub-section.

Irrigators surveyed in focus groups by the National Water Commission (NWC) in 2007 expressed a fear of government “swamp[ing] the market with large amounts of funds” by causing the buy-back process to drive prices up. The validity of such concerns is questioned by Crase (2007), who observed that increases in water prices are the very point of the government buy-back exercise. The consequential rise in price should reflect a more accurate value of water to society.

Irrigators also expressed lack of certainty regarding how a national buy-back programme would be implemented and how this would impact irrigators, surrounding communities and the financial sector. There was a further fear that government buy-backs would lead to compulsory acquisition. Participants in the NWC forum held the view that individual catchments should be considered separately, particularly for the setting of rules for water markets and government buy-backs. Irrigators requested proper dissemination of market rules. It was argued that in some catchments, over-allocation may be caused by factors other than irrigation, such as interception by plantation

forestry. Hence, the need to undertake sound scientific analysis before buy-backs were pursued was regarded as important. Irrigators were also concerned that the public sector had not fully recognised the interconnectivity of ground and surface-water systems.

While very important issues were raised in the 2007 NWC forum, smaller focus groups or individual interviews may have elicited more detailed information. The location of irrigators surveyed was not stated in the report.

The official review of the Federal Government purchases for 2007–08 undertaken by Hyder Consulting included a survey of 20 of the 109 sellers. Seven irrigators had sold their entire water entitlement, while another seven sold less than 30 percent of their water entitlements. Eleven irrigators stated that the primary motivation for sale was financial, eight sold because water had been unavailable for too long, while four stated that the water was no longer required as their farming business had changed, and one irrigator had decided to leave agriculture entirely. This review presented only very broad findings, without examining more detailed reasons for making the decision to sell available/actual water to government. The study clearly indicated that many sellers were willing to sell water entitlements where allocations were zero or very low for an extended period of time. As it remains unclear whether significant volumes of water will return to these entitlements over time given the impact of climate change, these government purchases may have functioned as exit subsidies or bail-out payments, rather than as actual water buy-backs.

A phone and mail survey of 700 irrigators undertaken by Bjornlund in south-eastern Australia in 2002 revealed that immediately after the introduction of water market reforms between 1994 and 1997, irrigators were less willing to accept further reductions by government in allocations for environmental purposes, while also recognising the need to provide water for the environment. This was largely due to the new pressures irrigators faced via the introduction of the 1997 cap on water extractions, which had led to lower annual allocations, inducing a greater reliance on the market, particularly in NSW. While this study examined receptiveness to compulsory reductions in water allocations rather than government buy-backs, the study provides some indication of irrigator receptiveness to further measures to recover water for the environment immediately after the imposition of a restriction on extractions, such as the cap.

Four key studies on the expected social impacts of the reduction in water entitlements to meet environmental flows have been undertaken under The Living Murray programme. The studies observed that community members were particularly concerned that trade in permanent entitlements would harm water-exporting communities. The predicted adverse on-farm impacts of reduced water entitlements identified in the studies include: increased debt, lower profitability, reduction in the number of farms, reduced farm employment, increases in the prices of water, increases in land values, changes in self-identity, changes in family lifestyle, and fewer young people in farming. The predicted off-farm impacts included: reduced employment

and expenditure in local towns, increased expenditure outside the area, reduction in the number of local businesses, reduced investor confidence, increased migration outside the area, and reduced availability of skills and knowledge in the area. There have also been indications that there is social pressure not to sell water out of areas.

However, Easter *et al.* (2004:2) observe that “how and where the proceeds of water sales are spent” is a crucial factor in determining the on and off-farm impacts in the exporting area. Where the proceeds of sale are spent within the water exporting area, local sales of goods and services could in fact experience a net increase. It is also noted that return flows which decline in one downstream area as a consequence of water trade may appear in another region (Easter *et al.*, 2004). Furthermore, Crase (2007) argues that the belief that environmental buy-backs will lead to a contraction in rural economies, ignores the current decline in rural economies due to changing terms of trade.

Scocimarro and Collins (2006:54) interviewed an unspecified number of irrigators over a one-week period in May 2006 to obtain attitudes and views on government water buy-backs. Irrigator participants were involved in horticulture, dairy, rice, grains, beef and wine grapes. Very few irrigators interviewed were involved in water markets, citing the infancy of the market, stranded assets associated with permanent trade, regulatory uncertainties pertaining to water rights and the attribution of fixed infrastructure costs once water was sold permanently. Irrigators were generally opposed to the practice of counter-cyclical trading via the use of options contracts. Counter-cyclical water trade involves the sale of surplus environmental water by government to irrigators on a temporary basis. The literature in this area is primarily international and is not considered in further detail here, as there is little possibility of surplus environmental flows occurring in the MDB in the near future.

A non-survey analysis of water recovery in the MDB by ACIL Tasman, in May 2008, included discussion of limits to the willingness to sell water to government. To a large extent the analysis mirrored the results obtained in social impact surveys on government water buy-backs. ACIL Tasman (2008:v-vi) argued that willingness to sell was adversely impacted by:

- *substantial uncertainties in the rules of future market arrangements and indications that water access entitlement values will rise above current market values;*
- *major farm business organization and lifestyle implications;*
- *uncertainty as to the interaction between water access entitlements and residual farm (or other enterprise) values;*
- *limited access to good market information on prices at which other sellers are willing to sell.*

The ACIL report also observed that if the large volumes required to restore the health of the Murray-Darling Basin were acquired in rapid succession, the upward pressure on the market price for water would be substantial. Concern was also raised that the current structure of the closed government tender process would only be capable of

acquiring a “modest” amount of water and encourage bidding above the market price. It was also suggested that government needed to provide a clear indication to the market of its willingness to pay higher market prices.

A notable qualitative American study, by Ise and Sunding (1998) directly examined irrigator willingness to sell to government water buy-backs in Lahontan Valley, Nevada, US. The water purchased by government was to be released from upstream storages to dilute a sewage treatment facility’s outflow. This was intended to bring the river’s water quality into compliance with oxygen levels stipulated by the Federal *Clean Water Act* and an intergovernmental agreement reached with the First Nations Paiute tribe.

Data on factors impacting seller decisions were collected from a sample of 30 sellers and 35 non-sellers, using a combination of telephone interviews and mail surveys. The results of the study indicated that the following factors were likely to impede the sale of water to government:

- High annual profits per unit of water applied;
- Long planning time-frame due to presence of an heir willing to take over the farm business and/or irrigator far from retirement age, and/or in excellent health;
- Lack of or low value of off-farm employment/Lack of skills to acquire off-farm employment;
- Close proximity to the nearest town;
- On-farm residence/Appreciation of lifestyle benefits.

Additionally, the following factors impeding sales arose from specific events occurring in the Lahontan Valley, Nevada:

- Mistrust of government expressed by some respondents who were concerned that water purchased for environmental purposes would be re-sold to urban water users due to uncontrolled expansion of cities;
- Simultaneous/earlier government programme of reduction in water allocations;
- Uncertainty over the future of agriculture created by pending lawsuits between the Federal Government and First Nations Paiute tribe;
- Opposition to water trading restrictions which some irrigators believed created a situation where the government was effectively the sole purchaser.

The Australian studies discussed above presented relatively broad findings on why irrigators may be reluctant to sell water to government buyers. The qualitative analysis undertaken by Ise and Sunding (1998) identified and demonstrated that personal characteristics and individual catchment characteristics can drive the pattern of selling to government environmental buyers. Their study indicates that the success of a voluntary buy-back programme is highly dependent on the chance that personal characteristics and/or catchment characteristics favouring the sale of water to government are present in the target region.

Survey Literature on the Willingness to Sell Water to Private Buyers in the MDB

Only a few survey studies in the Murray-Darling Basin have sought to detail the individual factors impacting

willingness to sell water to the government buy-back programme for environmental flows introduced under the 2004 National Water Initiative. However, a number of stakeholder survey studies have been undertaken involving irrigator views on the willingness to sell water to private buyers in the Murray-Darling Basin.

In the early days of water trade, temporary transfers made up a greater proportion of water trade, and this continues to be the case. Producers of permanent crops requiring high security water, such as grapes and citrus, were more likely to purchase permanent water. However, the permanent market is recognised as thin. Approximately 65 percent of irrigators, interviewed by Young *et al.* (2000:12) in a two-year pilot interstate water trade study, indicated that they preferred to sell temporary water to maintain the value of their property, while 65 percent of buyers chose to purchase temporary water due to affordability constraints. It has also been argued that uncertainty over future environmental claims for water may also be responsible for thin permanent markets.

Bjornlund and McKay (1995:32) undertook a mail survey of 188 buyers and 149 sellers involved in permanent water transfers between irrigators in the Goulburn-Murray Irrigation Area, Victoria. The study identified sellers as: (i) those in financial distress, (ii) mainly sheep and cattle farmers releasing dormant sleeper water to other irrigators seeking greater water security, (iii) irrigators selling off the water from the worst affected areas of their farms, and (iv) irrigators wishing to retire and remain on their property. Dairy farmers were the least likely to sell water, unless afflicted by financial problems, dairy farming being generally more profitable.

A second study undertaken by Bjornlund and McKay (1999:559), examining water trading activity between South Australian irrigators and other private buyers, identified two factors leading to a willingness to sell water in the MDB, namely financial distress and a greater dependence on off-farm income. The latter part of the study involved a telephone survey of 400 buyers and sellers in the South Australian water market to investigate the relationship between water trade and farm size. The survey indicated that small lifestyle farms of less than 50 hectares were the least financially viable, and thus potentially more likely to sell.

A 2007 study by Frontier Economics explored the social and economic impacts of water trading involving a survey of 33 irrigators in the Victorian Murray Valley (Frontier Economics *et al.*, 2007). The analysis revealed the reluctance among irrigators engaged in mixed farming, to sell water even during times of financial pressure. The study demonstrated that irrigators who sold water permanently to other irrigators did so in response to serious financial pressures and the inability to rely on off-farm income.

Surveys undertaken in 2005 by Kuehne and Bjornlund in the Namoi catchment, where groundwater irrigator allocation had been reduced under the water-sharing plan, found that irrigators were unlikely to engage in selling activity. These irrigators preferred to use the remaining water more efficiently by implementing water-saving

technology and/or changing the type of agricultural production they were engaged in. The results were based on 130 responses to mail surveys and an unspecified number of in-person interviews. The key finding of this research was the lack of inter-irrigator trade which is likely to occur after a policy of across-the-board reductions in water entitlements, reminiscent of the findings of the Bjornlund (2002a) study pertaining to a second round of government allocation cuts discussed in the previous section.

Kuehne *et al.* (2008) surveyed 70 dairy farmers in the Lower Murray Reclaimed Irrigation Area, dividing the respondents into three categories, namely, “custodians”, “investors” and “lifestylers”. Similar research was undertaken by Bjornlund (2002b) in northern Victoria, where



Cliffs along the Murray River, near Younghusband, South Australia, with a houseboat on the right and an Australian pelican in the foreground
Courtesy: Wikipedia

three similar groups of irrigators were identified: (i) those who use markets to maintain a farming lifestyle; (ii) those who use the market to expand operations to create a more viable enterprise; and (iii) those who use the water market opportunistically. The reasons for selling identified in the Bjornlund (2002b:14) study related to financial stress, while in the Kuehne *et al.* (2008) study only the lifestyle group indicated a possible willingness to sell. Custodians wished to hold the water to secure the wealth of future generations and investors wish to hold the water to benefit from expected future rises in the water price.

The Australian Bureau of Agricultural and Resource Economics (ABARE) surveyed 900 irrigators during 2007 and 2008 across the MDB for the stated purpose of collecting data on the “economic characteristics of the irrigation industry at the farm level”. The survey involved in-person interviews. Approximately 17 percent of irrigators indicated an intention to expand operations, while 11 percent were planning to reduce the size of their operations. Of the 900 irrigators surveyed, four percent intended to sell all their water entitlements permanently, and eight percent indicated they would sell some of their

entitlements. The most common reason provided for not selling water across all irrigation industries was that all the water available had been used. This was followed by: (i) a perception that the water would be needed in the farm business in the future; and (ii) a preference to carry over water into the next year. However these responses provide little detail as to why the decisions to either use all the water on farm or carry over surplus water were taken, and why these decisions were preferable to selling. Other stated reasons included a low or zero allocation and uncertainty over future allocations. The Federal water purchase programme results discussed earlier, indicate that irrigators with low or zero allocations are the most likely to sell. Other reasons cited by irrigators for not selling included water trade restrictions. The reasons accord with the findings in earlier literature. However, the use of multiple interviewers and highly standardised answers in the ABARE 2008 quantitative survey, which were necessary to obtain responses from 900 irrigators, may have limited the depth of information obtained.

All surveys reviewed in this section, with the exception of Frontier Economics *et al.* (2007) and the ABARE quantitative survey (Ashton and Oliver, 2008), relied heavily on mail surveys and telephone surveys. This survey method may also limit the depth of information obtained. The Frontier Economics *et al.* (2007) survey involved 33 in-person qualitative interviews in one Victorian catchment of the MDB. However the Frontier Economics research was focused on the broader social and economic impacts of inter-irrigator trade, and like the ABARE 2008 survey, only provided very brief treatment of the issue of willingness to sell. The results of the Frontier Economics *et al.* (2007), Kuehne and Bjornlund (2008) and Bjornlund and McKay (1995, 1999) studies in the Murray-Darling Basin clearly accord with the findings of Ise and Sunding (1998). Hence it is expected that the factors impacting willingness to sell to government buyers in MDB will be the similar to those factors identified where buyers are irrigators, private businesses or individuals.

Analyses of the Social Impact of Government Buy-backs and General Water Trade

A number of surveys and general analyses have been undertaken on the social impact of government buy-backs and general water trade.

Waterfind (2008) conducted an analysis of the potential impact of the Federal Government A\$50 million water buy-back, observing that the current estimated value of all water in the Murray connected system is A\$12.4 billion. It was observed that total entitlements in the MDB at 2007/08 were 7799 GJ of which 1875 GJ were allocated between high, general and low security water users, given current climatic conditions. A rapid purchase of higher security water entitlements to meet the

accepted target of 1500 GJ water recovery to the MDB, would leave only 378 GJ for irrigation under current climatic conditions.

While the buy-back of 1500 GJ is expected to occur over a 15-year period, allowing for 100 GJ to be purchased each year, Waterfind observed that this scale of the government buy-back will adversely impact the ability of rural communities to create long-term business plans incorporating water markets. It was noted that over a five-year period, an average of 106.2 GJ is traded each year in the Murray system across NSW, Victoria and South Australia. Hence the government would need to purchase nearly all water traded in any given year to meet environmental flow targets. Quiggin (2007) highlights recent analyses of Victorian water markets which revealed that only three of the six trading zones are active for temporary water, with limited permanent trade. Turrall *et al.* (2005) also observed that the total annual volume of permanent trade in NSW and Victoria is less than one percent of all entitlements. This would tend to indicate that government buy-backs at the targeted rate of 100 GJ per year would only be able to avoid major adverse impacts on rural economies, in circumstances where allocations to the remaining high and general security entitlements are at a reasonable level for agricultural consumption. However, given current climatic conditions it is unlikely that allocations will reach the desired levels to support agricultural water consumption if government were to achieve its annual buy-back target. Hence, it is clear that substantial investment in low-water-intensive industries is essential for the survival of rural economies.

Finally Waterfind argues that the government water buy-back scheme is only one of 14 policy options for addressing water over-allocation identified by the National Water Commission, and hence greater reliance should be placed on the other options.⁷ Waterfind proposes an annual 30 percent limit on government market acquisitions for environmental flows, which is approximately equal to 31.80 GJ at current levels of water market activity. This would enable 1500 GJ to be recovered over 47 years, rather than the intended 15 years. The consequence of such a delayed water recovery could be irreversible biodiversity and hydrological losses.

In late September 2008, the Federal Government released its review of water entitlement purchases for the 2007–2008 period, referring to the 35 GJ purchase, which was subsequently revised down to 34.3 GJ. It was observed that as the majority of purchases were general security entitlements with zero or low allocations, the socio-economic impact was minimal. The report also observed the need to undertake closer monitoring of where the proceeds of the sale were invested to assess impacts on the rural economy, consistent with the findings of Easter *et al.* (2004). The future planned expenditure articulated in the review report is as follows:

2007–08: A\$50m
 2008–09: A\$157m
 2009–10: A\$466m
 2010–11: A\$468m
 2011–12: A\$346m

The dollar amounts detailed in this strategy indicate that no rapid purchase plan of large quantities of high security water is expected, and that the social impacts of the buy-back programme on rural economies will be limited. However this also implies that environmental flow recovery will be substantially delayed.

A number of studies have explored the socio-economic impact of general water trade. CSIRO undertook a two-year MDB interstate water trade pilot study for the period 1998–2000, finding no adverse impacts on districts which had sold water. This is because the majority of water sold (99 percent) was obtained from licences which were unused or under-used (herein “sleeper and dozer licences”). However, as the water market in the MDB matures, it is likely that adverse impacts will be experienced. Communities in the CSIRO study were concerned that tax revenue in exporting areas would decline, adversely impacting services in those areas. Concern was also expressed about the possible future impact on maintenance of infrastructure as irrigators in a region exit.

Bjornlund and McKay (2000) analysed the socio-economic impact of water trade on irrigators. The study involved a telephone survey of 300 buyers and sellers for the period 1994–96 in the Goulburn-Murray Irrigation District (GMID), Australia’s largest irrigation district. The area is dominated by dairy farms which are the highest value producers, but also includes mixed cropping, horticulture and viticulture. It was found that buyers were mostly seeking to reduce reliance on low reliability water, indicating the persistence of two classes of irrigators. Bjornlund and McKay (2000:11) termed them the “water rich class” who would continue to produce during droughts and the “water poor class” who would face reduced production during drought. There was no evidence at the early stage (1994–96) that water was moving to large corporate farms, as farm sizes continued to be what is considered a family farm. However, farmers selling water tended to be smaller in size, thereby increasing the size of large farms and diminishing smaller farms.

Edwards *et al.* (2006) surveyed 19 individuals in a Victorian irrigation district to determine the social impact of water markets. Persons surveyed included local business people, health workers, local council staff, irrigators, Indigenous people and environmental groups. Concerns were raised about population decline as the number of farms decreases, adverse impacts on the rural economy, the negative impacts of the growth of managed investment schemes (MIS) and the unfair tax concessions granted to MIS. One example of an MIS, a corporate farm known as Macquarie Agribusiness, has attracted negative attention. Macquarie owned 20 percent of water rights in southwestern NSW in 2007 and also has investments in almond crops in Victoria. Apart from concerns about Macquarie, the majority of respondents were satisfied that the ability to sell water was of benefit to individual farmers, while acknowledging the broader community impact would be negative. Almost all respondents believed water should be tied to land.

Frontier Economics *et al.* (2007) surveyed 33 irrigators and 112 community members in the Victorian

Murray Valley as part of a study of the economic and social impacts of general water trade. The main findings of the study were six-fold:

1. Permanent and temporary trade should be considered together to determine the total impact on a region;
2. Water trade increases irrigator capacity to react to adverse weather and other changes, and allows for flexible risk management (see also Peterson *et al.*, 2005);
3. Drought is the main cause of adverse impacts, while water trade may be considered to be secondary;
4. There is clear movement of water to the environment;
5. Trade in permanent entitlements is assisting the wine industry with the creation of new ventures in Sunraysia;
6. The impacts of water trade are both positive and negative.

As was the case in the Edwards (2006) study, irrigators again expressed concerns that Managed Investment Schemes would erode family farming. Setting limits on trade out of districts was seen as a way to curb the growth of Managed Investment Schemes. The lack of clear water trading rules including exit fees, and stranded assets, as well as the deterioration of farmland after selling water, were also cited as key problems. A survey by Tisdell (2003) of 261 irrigators in the Murrumbidgee catchment in New South Wales delivered similar results to those obtained by the Frontier Economics *et al.* (2007) study.

Conclusion

The separation of land and water title to facilitate water trade in the Murray-Darling Basin was embraced under the 1994 COAG water reforms and under the 2004 National Water Initiative for the improvement of environmental flows. This reform undoubtedly facilitated temporary water trade. Bell and Quiggin (2007) observe that government failure to purchase sleeper and dozer licences early in the reform process, at lower prices, has been a significant missed opportunity to restore environmental flows. It was noted that the trade in sleeper and dozer licences had minimal impact on rural economies, precisely because these types of entitlements are by definition unused or under-used. In fact the activation of sleeper and dozer licences after 1994 under the cap-and-trade system, caused further environmental degradation rather than preserving existing environmental flows, because they were transferred to agriculture. The activation of these licences means that purchasing them back for environmental flows at this stage will now create adverse social impacts.

Four separate studies have indicated that irrigators were unwilling to sell separate title to water on a permanent basis, in order to maintain the value of the entire property. It was also noted that this reform measure caused difficulty for the Australian Bankers Association (ABA). The ABA expressed concerns in NSW that legislation did not require the consent of the mortgagee before the transfer of water title was effected.

The limited success of purchasing permanent separate water entitlements for environmental flows has led the Federal Government to pursue purchases of entire farm properties during 2008. However, as observed in this review, a number of social impact studies have highlighted irrigator and community fears that large-scale government purchases would have a detrimental effect on rural economies.



Lake Victoria has a storage capacity of 677 gigalitres of water and its strategic position in the Murray-Darling River system ensures the Lake plays a key role in managing the flows in the entire River Murray
Courtesy: MDBC

To date, Australian governments have not developed a comprehensive plan for rural communities adversely impacted by government buy-backs for environmental flows, which would facilitate alternative private sector investment in these regions. It is clear that governments entering into large-scale purchases of land and water, or water entitlements, need to assess the impacts of such purchases. Government decision makers are faced with two main alternatives: (i) implement a strategy of rapid purchase and/or compulsorily acquire large volumes of water to recover environmental flows, resulting in significant disruption to rural economies; or (ii) accept the irreversible loss of some environmental flows and preserve rural economic activity in an area. However the two broad alternatives are not absolute, because the long-term sustainability of some rural economies, particularly those downstream, will be dependent on the restoration

and conservation of environmental flows at a certain level. The sooner Australian governments act to recover actual water for environmental flows and secure the future of rural economies via promotion of investment in low-water-intensive industry, the more long-term sustainable agricultural production there will be.

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Notes

- Twenty-eight percent of Australia's cattle, 45 percent of all sheep and 62 percent of all pigs, see MDBA, 2009, "About the Basin", <http://mdba.gov.au>.
- 1000 Megalitres (ML) = 1 Gigalitre (GL).
- Section 100 of the Australian Constitution states: "The Commonwealth shall not, by any law or regulation of trade or commerce, abridge the right of a State or of the residents therein to the reasonable use of the waters of rivers for conservation or irrigation".
- The constitutional basis for the Federal *Water Act*, 2007 is articulated in section 9, which states that the Act relies on the following constitutional provisions: s 51 (i), (v), (viii), (vi), (xv), (xx), (xxix), and (xxxix); s 122 and any implies legislative powers of the Commonwealth, as well referral of powers by any referring State under s 51(xxxvii).
- Irrigators in the Murray-Darling Basin hold water entitlements to which water is allocated by state government or private agencies according to the availability of water in the catchment. Water entitlements are granted different names in each state. Importantly, water entitlements differ according to security of water supply. Higher security entitlements will deliver a higher percentage of water to the entitlement and a more reliable supply over time, compared to low and general security entitlements.
- The positive relationship between strong monitoring institutions, which would ensure metering was complete, and the success of a government water buy-back programme was established in a study: C. Marchiori, 2008, *On the Effectiveness and Implementability of Water Rights Buy-back Schemes*. [Unpublished], <http://ssrn.com/abstract=1093959>. The study, which focused on ground water, found that in the absence of adequate monitoring, a buy-back scheme would transfer funds to irrigators without any significant reduction in water consumption.
- The 14 policy options listed by the National Water Commission are: (i) allocation of less water per entitlement; (ii) revise water plans as they expire and then re-set entitlements; (iii) invest to improve irrigation system efficiency; (iv) invest in improving the efficiency of environmental watering; (v) extract more environmental benefit from consumptive water; (vi) buy back entitlements on the market and re-direct to the environment; (vii) compulsorily acquire some entitlements (e.g., in high salinity or low efficiency irrigation areas); (viii) retire less viable irrigation districts; (ix) abandon certain environmental assets; (x) compulsorily acquire a percentage of entitlements across the board; (xi) reduce target levels of reliability; (xii) suspend water plans and arbitrarily revise entitlements; (xiii) regulate water use to reduce consumption; and/or (xiv) lower our environmental aspirations.



Professor HAN Depei, 1911–2009

In memoriam

by Qin Tianbao*

One of the most famous jurists and the founder of the study and practice of environmental law and private international law in China, Professor Han Depei was one of the first people in China who realised the importance of using legal instruments to prevent and control environment problems. He established the Research Institute of Environmental Law (RIEL) in 1981 and was its first Director. In tribute to his legacy, RIEL serves as a think-tank for China's Parliament, Ministry of Environmental Protection and other ministries.

Prof. Han insisted that environmental law should be an independent branch of law and a compulsory course for law students. These days, environmental law is one of the 16 core courses for law students prescribed by China's Ministry of Education. Additionally, he established the Chinese Association of Environmental Law – where he was elected its first President, and his publication entitled *Textbook on Environmental Protection Law*, is the first and most important textbook in this field in China and has been reprinted five times.

Prof. Han had students all over the country. Among them are the Former Environmental Minister, Xie Zhenhua and the Prof. Wang Xi.

Having received numerous titles, awards and medals, one of his greatest achievements was receiving China's "Earth Prize"; the most prestigious and highest ranking award for environmentalists in the country.



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Italy

Access to Courts – NGOs are Alarmed –

by Deirdre Exell Pirro*

Bill No. 2271, signed by 136 parliamentarians of the major centre-right party governing in Italy, the *Popolo della Libertà* (PDL), was tabled in the Chamber of Deputies.


The declared objective of the Bill is to combat what is labelled as “territorial egoism”. This is perpetrated, the drafters of the Bill argue, by local groups or environmental associations using appeals to the administrative courts to enforce the “NIMBY” (Not In My Back Yard) principle thereby hampering, delaying or even paralysing the construction of important public works, at the expense of the nation’s interests. In fact, according to the preamble of the Bill, statistics prepared by the *Agenzia di Ricerche Informazione e Società* (ARIS) show that in 2007 there was a chronic situation of standstill involving 193 infrastructure projects, subject to protest. These included waste-to-energy plants, railway corridors, biomass power plants, power transmission lines, highways, waste disposal sites and waste incineration plants.

Two short amendments were, consequently, added to Article 18 of Law No. 349 of 8 July 1986 concerning the liability of environmental associations in relation to proceedings which, if enacted, are likely to have a crushing effect on the positive and active role in environmental protection currently played by important Italian environmental NGOs like *Italia Nostra*, *Legambiente*,

WWF, *Verdi Ambiente e Società* as well as countless local organisations. This is because, under Article 5-ter of Bill No. 2271, whenever an appeal to the administrative courts “is dismissed because it is manifestly unfounded, the court shall order the losing association to pay damages as well as legal costs”. Therefore that if, for example, a construction site that defaces the landscape is blocked thanks to an appeal to the Regional Administrative Tribunal for a year or more and then, on appeal, the Council of State overturns the decision, those that have to pay the damages and costs are the NGOs. Therefore, these associations could, in the future, face the threat of paying out thousands of Euros, if not much, much more.

The other not so disquieting amendment (Article 5-bis) relates to the application of rules regarding damages against associations that have acted “in bad faith or with serious misconduct” which would already appear to be covered by the law.

Environmental NGOs and campaigners have not been slow in reacting to the Bill. They have defined it as intimidation, effectively directed towards aiding developers, speculators and the eco-mafia while, in practice and psychologically, shackling NGOs so that they will no longer be able to perform their proper role in society. Others maintain that the Bill is also unconstitutional because Article 24 of the Italian Constitution guarantees that “all persons are entitled to bring cases before a court of law to protect their rights and legitimate interests”.

The Bill is currently before the Justice Commission of the Chamber of Deputies for review. 

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Ratifying Alpine Convention Protocols

by Paolo Angelini*

On 14 May 2009, the *Senato della Repubblica*, the upper chamber of the Italian Parliament, passed a bill to ratify the nine implementation Protocols to the Convention on the Protection of the Alps (the “Alpine Convention”).¹ Under Articles 70 and 72 of the Italian Constitution, the Chamber of Deputies (the lower chamber of the Italian Parliament) must also approve the bill before it can be made into law by the President of the Republic and enter into force.² At the time of writing the bill is under examination by the Foreign Affairs Parliamentary Commission.³

When the Alpine Convention opened for signature on 7 November 1991, Italy was among the signatories. It entered into force on 6 March 1995 and was ratified by Italy in 1999.⁴ The Alpine Convention is an agreement among the States of the Alpine region for the overall protection and sustainable development of the Alps. In order to achieve “...the preservation and protection of the Alps”, article 2 of the Framework Convention envisaged the adoption of a series of implementation Protocols.⁵ As of now, there are substantive Protocols covering a range of issues, including spatial planning and sustainable development, conservation of nature and landscape protection, mountain farming, mountain forests, tourism, energy, soil conservation and transport.⁶ The Framework Convention

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only provides for general obligations, however; it is the Protocols that impose specific obligations on the Parties and create the legal framework necessary for the Convention's implementation. To date, however, Italy has not ratified any of the Convention's Protocols, despite serious efforts of many institutional actors

Italy has not, however, ignored the underlying mandates of the Convention. Regarding the protection and sustainable use of its mountains, which include 27% of the Alpine Convention territory, the Italian Constitution requires the Law to "take measures in favour of mountain areas"⁷, and since the 1950s the country has enacted several laws and regulations in favour of such areas.⁸ With the same instrument that ratified the Alpine Convention the Italian Government established the State-Region Council of the Alpine Arc (*Consulta Stato-Regioni dell'Arco Alpino*), including the central, regional and local authorities. The functions of the *Consulta* include designation of the regional and local structures in charge of implementing of the Convention and its Protocols.⁹ It took many years for the *Consulta* become a functioning body, in view of an ongoing dialogue between the central government and the regional authorities. This delay accounts for Italy's slow process of Protocol ratification.

Another obstacle to the passage of the ratification bill, however, was the Transport Protocol.¹⁰ The Chamber of Deputies gave its approval of an earlier version of the bill in 2002, but the Senate refused to ratify it so long as the Transport Protocol included. The most controversial clause of the Transport Protocol was Art. 11, under which Contracting Parties may not "construct [] any new, large-capacity roads for trans-Alpine transport,"¹¹ absent compliance with Protocol standards for future large-capacity intra-Alpine roads projects. Through many seasons of controversy, the Alpine protocols remained un-adopted in Italy until the current legislature (starting on 7 May 2008) showed the intention of completing the ratification process in a short time. The draft that the Senate approved this 14 May was the product of a governmental initiative by the Ministry of the Environment along with the Ministry for Foreign Affairs, which is led by Franco Frattini, a long-time supporter of the Alpine Convention. (In 2002, along with the Convention's Secretary-General Noël Lebel, M. Frattini had subscribed an agreement establishing an office of the Convention's Permanent Secretariat in Bolzano, Italy).

Then, on 22 April 2009 by the European Parliament ratified the Protocol on Transport, rendering that Protocol *de facto* enforceable in Italy.¹² In addition, in June 2006 the EC had already ratified four other Alpine Convention Protocols (mountain farming, soil protection, tourism and energy), exposing EU Member States within the Alpine region to potential sanctions at the EU level for any breach of the above-mentioned Protocols, regardless of individual national ratification.

The possibility of ECJ intervention in the case of Alpine Protocol violation is not remote, as demonstrated, for example, in 2004 when the European Court of Justice found that France had failed to give full application to

a Protocol of the 1976 Barcelona Convention for the Protection against Pollution in the Mediterranean Sea.¹³ The Italian *relazione al disegno di legge* (an official explanatory report that accompanies the draft law) to the bill passed by the Senate clearly states that the transport Protocol is not susceptible of any interpretation that would be inconsistent with European rules and regulations. Former European Commissioner Loyola de Palacio has frequently underscored the fact that implementation of the Transport Protocol (and others) is fully consistent with the EU strategy of "revitalizing rail transport and infrastructure and fostering a modal shift from road to rail, inland waterway and maritime transport" in the region.¹⁴

Italy is not the only Alpine Convention member to express hesitation concerning interpretation of the Transport Protocol. For example, France only ratified it after annexing an "interpretative declaration";¹⁵ while Switzerland has not yet ratified it at all, maintaining that the Swiss laws and regulations on transports *de facto* provide an adequate if not superior level of environmental protection.

Italy has often played a proactive role in the activities of the Compliance Committee of the Alpine Convention. It has a longstanding tradition in environmental and mountain legislation (described above), and the combination of national and regional laws and regulations on these matters has provided for a level of protection that is essentially consistent with most of the Convention's requirements.

Notes

- 1 See act S.1474 (Senate).
- 2 Art. 72, par. 1, of the Italian Constitution requires bills to be examined by the relevant parliamentary Commission before being brought to the attention of the Chamber. The bill was transmitted by the Senate to the Chamber of Deputies on 19 May 2009. Examination by the Commission started on 15 July (rel. Dep. Dozzo).
- 3 See act C.2451 (Chamber of Deputies).
- 4 See law n. 403/99, of 14 October 1999, Ratifica ed esecuzione della convenzione per la Protezione delle Alpi, con allegati e processo verbale di modifica del 6 aprile 1993, fatta a Salisburgo il 7 novembre 1991.
- 5 "In order to achieve the objective referred to in paragraph 1 the Contracting Parties shall take appropriate measures in particular in the following areas: (...)". Convention for the Protection of the Alps, art. 2, par. 2.
- 6 Although not available on the Convention's website, the substantive protocols may be accessed the "treaty" section of Ecolex, at <http://www.ecolex.org>. Two other Protocols have been adopted on procedural matters: one on the resolution of controversies, and the other on the accession of the Principality of Monaco to the Alpine Convention. In addition to the Protocols, two Ministerial declarations have also been adopted by the Convention in November 2006: the Declaration on Population and Culture and the Declaration on Climate Change.
- 7 Italian Constitution art. 44. "La legge dispone provvedimenti a favore delle zone montane".
- 8 See, e.g., law n° 1102, 1971 introducing the Mountain Communities.
- 9 Law 403/99, art. 3.3: "la Consulta Stato-Regioni dell'Arco Alpino individua le strutture regionali e locali preposte all'attuazione della Convenzione ... e dei relativi specifici Protocolli".
- 10 The protocol, although not generally available online, can be accessed via the "treaty" section of Ecolex, at <http://www.ecolex.org>, as document reference number TRE-001330.
- 11 Transport Protocol, art. 11.1.
- 12 P6-TA (2009)0230 (European Parliament). Previous ratification of the Transport Protocol by neighbouring Austria, France, Germany and Slovenia had already prevented Italy from building new, large-capacity roads for trans-Alpine transport, except between Italy and Switzerland.
- 13 See ECJ case C.213/03 (15 July 2004), *Syndicat professionnel coordination des pecheurs de l'étang de Berre et de la région v. Electricité de France (EDF)*, and ECJ case C.239/03 (7 October 2004), *Commission vs France*.
- 14 See, e.g. the answer given by Mrs. De Palacio on behalf of the Commission, 1 October 2001.
- 15 Law 2005-492, of 20 May 2005.



USA

Richard L. Ottinger Receives 2009 US EPA Award

Member of the International Council of Environmental Law and the International Union for Conservation of Nature Commission on Environmental Law, Richard L. Ottinger was awarded the 2009 Environmental Quality Award in recognition of his many notable contributions to the environment. Elected in 1965, he served 16 years as a member of the US House of Representatives where he authored a substantial body of environmental laws. Later, as chairman of the Energy Conservation and Power Subcommittee, Energy and Commerce Committee, he was instrumental in adopting key energy and environmental legislation. Upon retirement from Congress in 1984, he became professor and later Dean at Pace University Law School where he also co-directed the Centre for Environmental Legal Studies and started the Energy and Climate Centre.



REFERENCES TO OTHER TOPICS

UNCCD COP Meets in Buenos Aires

As this issue goes to press, the UN Convention to Combat Desertification is holding its 9th COP. Its agenda focuses on strategic planning, especially the 10-year strategic plan and framework to enhance the implementation of the Convention (2008–2018), adopted at COP-8, with particular attention to the relevant elements of the recent report of the UN Joint Inspection Unit (*EPL*, 39/3, p. 130). It will also consider matters relative to funding and resource mobilisation. A report on its outcomes and decisions will be included in *EPL*, 39/6.

Beyond the 2010 Targets

As the 2010 deadline set by the World Summit on Sustainable Development (WSSD) looms, many organisations and countries are focusing on evaluation of progress, a daunting task given the delay experienced in identifying indicators to support such evaluation. The UNEP-World Conservation Monitoring Centre, in conjunction with the Convention on Biological Diversity, has already moved beyond the current evaluation questions, holding a meeting “to review the use and effectiveness of the 2010 biodiversity indicators and to consider the implications for the development of post-2010 targets and indicators”. Sponsored by the UK government, the meeting documents are available online at <http://www.cbd.int/doc/?meeting=EMIND-02>.

UNDESA/UNDOALOS Address Ocean Acidification

In September, a combined effort by the UN Department of Economic and Social Affairs (UNDESA), the UN Division for Ocean Affairs and the Law of the Sea (UNDOALOS) and the UN Foundation, brought together an Expert Panel on Ocean Acidification. The meeting focused on awareness raising and identifying options to avoid the adverse impacts of ocean acidification on marine life and ecosystems. Its process and outcomes are reviewable online at <http://www.iisd.ca/ymb/oceans/epoa/>.

Report Now Available from the Commission on the Measurement of Economic Performance and Social Progress

Created on the initiative of the French Government, this international commission began its work in 2008, with the mandate to identify the limits of GDP as an indicator of economic performance and social progress; to consider additional information required for the production of a more relevant picture; to discuss how to present this information in the most appropriate way; and to check the feasibility of measurement tools proposed by the Commission. The Commission was chaired by Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi. Its report, available online at <http://www.stiglitz-sen-fitoussi.fr/en/index.htm>, offers many very useful insights and statistics, including significant recommendations on the development and application of indicators of environmental sustainability.

UNFF Consultations on SFM

Following similar efforts in UNFF-8, the United Nations Forum on Forests (UNFF) held a series of informal consultations on sustainable forest management (SFM) this September. The discussions were facilitated by Chairs Hans Hoogeveen (the Netherlands) and Boen Purnama (Indonesia). The discussions focused on a draft negotiating text that is available online at http://www.un.org/esa/forests/pdf/session_documents/CoFacilitators_negotiating%20text%20on%20MOI-SFM%20informal%20consultations.pdf.

World Energy Forum

Global awareness of energy as a key driver of climate change and other environmental challenges has been aired at the recent World Energy Forum, held at UN Headquarters from 31 August–1 September 2009. The meeting recognised the very different situations of countries regarding energy for everyday functions, noting that while some countries are still focused on universal

Australia

Limits of Market-Based Water Governance for Environmental Flows in the Murray-Darling Basin (Part 2)

by Vinoli Thampapillai*

This article is the second of a two-part investigation into the limited effectiveness of water buy-backs in addressing deterioration of environmental flows in the Murray-Darling Basin and consequent impacts on both environment and agricultural production. Part 1 see EPL Vol. 39 Nr. 4–5, p. 247–265. Editor

In 2004, Australian governments introduced the National Water Initiative (NWI) aimed at restoring environmental flows in the Murray-Darling Basin (MDB), primarily through market-based governance measures. Part 1 of this analysis addressed these matters in detail, and identified the presence of limited literature involving surveys on the specific willingness of irrigators to sell water entitlements to government buyers seeking to improve environmental flows in the MDB. Part 2 seeks to gain a deeper appreciation of the limits of market-based water governance for the recovery of environmental flows, using qualitative data gathered through 41 in-person interviews with irrigators across four catchments in three of the MDB states (Condamine, Queensland; Border Rivers, Queensland/New South Wales; Murrumbidgee, New South Wales; and Goulburn-Broken, Victoria). The interviews considered (i) irrigator willingness to sell water to the government environmental water buy-back programme; (ii) receptiveness to the consistent use of cost-benefit analysis in government decision making on water entitlement buy-backs and other water decisions; and (iii) willingness to relocate agricultural production from the MDB to Northern Australia, a region currently under government investigation for agricultural expansion. It begins by briefly outlining the current ecological crisis in the MDB and then presents a brief analysis of the results of the interviews. The final section provides an overview of directions for future reform.

The Continuing Ecological Crisis in the Murray-Darling Basin

Australian government water buy-backs proceeded at a slow pace for the period June 2004–January 2009, claiming mostly general security entitlements which hold very little or no water during drought. This situation is expected to continue over the long term in light of climate change.¹ It is also clear that water-saving infrastructure projects have delivered little actual water to the Murray-Darling river system to date. The condition of the Murray-Darling Basin has in fact worsened in the four years since the introduction of the NWI, as record low inflows and blue-green algal outbreaks now characterise the river systems. Of specific concern is the emergence of acid sulphate soils, due to a

chemical reaction which occurs when iron pyrite in river and lake beds is exposed to oxygen, due to insufficient environmental flows.²

Acid sulphate soils have been observed in northern Victoria and south-west NSW along the Murray River. Toxicity at car battery levels of sulphuric acid (pH 1.8) has been discovered at Bottle Bend in NSW, which has led to the death of thousands of fish and exposed toxic aluminium and manganese salts.³ A further consequence has been the death of trees. Ministers were also advised in May 2008 that record low inflows to the Lower Lakes in South Australia were exposing acid sulphate soils.⁴ The deteriorating state of the Lower Lakes and the Coorong in South Australia raised alarm in 2008. In the three years up to July 2008, water levels in Lake Alexandrina have fallen from 1600 to 940 Gegalitres (Gl). Lake Albert and Lake Alexandrina are now below sea level at -0.3 m and -0.4 m respectively, while the Coorong has salt loads which are four times that of the ocean.⁵ In response to the crisis, the Federal Government is considering flooding Lake Albert and Lake Alexandrina with sea water to prevent the release of acid sulphate soils.⁶ In March 2008, fresh water was pumped from Lake Alexandrina to Lake Albert after the situation was declared an emergency.

Threats to water systems in Queensland, encompassing the Darling system and including the Condamine, Balonne, Warrego and Border Rivers catchments, are currently being investigated by Australian governments.⁷ Four years after the introduction of the 2004 NWI, government water buy-backs appear to have made little contribution to improving the state of environmental flows and mitigating drought conditions in the Murray River system. However, recent flooding along the Darling River system has improved farming conditions, notably in the Walgett region in north-western New South Wales.⁸ Despite the flood events in recent months, serious concerns have arisen as to the security of water to meet “critical human needs” along the Murray system.⁹

Federal Government Purchases of Land and Water Packages for Environmental Flows

Concern is mounting that the environmental flow target amount of 500 Gl, set in June 2004, will not be returned to the Murray River system by June 2009. By September 2008, approximately 21.4 Gl in actual water

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entitlements, separate from land, had been permanently recovered against the set target. This figure excludes those water entitlements purchased, to which zero or little actual water has been allocated, that are described as "paper water". The Federal Government water buy-back programme has clearly demonstrated that purchasing water entitlements separate from land is difficult due to irrigator fears of a large decline in land values once the water is sold. This finding is consistent with the literature.¹⁰ In response to these concerns the new Federal Government started actively purchasing farmland holding large water entitlements, in the latter half of 2008.

Developments in government land and water package purchases have largely been reported in the print media and documented in government media releases. In August 2008 the Federal Government indicated its willingness to purchase entire farm properties as a means of recovering environmental flows in the MDB. On 7 August 2008 it was reported that the Federal and NSW governments bought a 2436-hectare cotton farm, Pillicawarrina' Station, with all general security entitlements linked to the cotton operation totalling 8.7 Gl. It was hoped that this water would be returned to the Macquarie Marshes. However at present, allocations to the general security water are zero, as the Burrendong dam from which the water is sourced is only 18 percent full.¹¹ Shortly after this purchase the Australian Conservation Foundation (ACF) and the Inland Rivers Network (IRN) presented a report to state and Federal governments in August 2008, identifying six farming properties in NSW and Queensland which could be purchased or leased with an option to purchase in order to immediately recover 300 Gl of water to restore the Lower Lakes and the Coorong in South Australia.¹²

The six properties identified by the ACF/IRN were: (i) Toorale Station, Warrego-Darling system; (ii) Darling Farms, Darling system; (iii) Cubbie Station, Condamine-Balonne system; (iv) Balandool Station, Condamine-Balonne system; (v) Tandou, Lower Darling system; and (vi) Colly Farms, Gwydir system.

However, of the six properties listed it was observed that only three were placed on the market. While the Federal Government indicated that it was available to talk to willing sellers, the MDBC expressed the view that water purchased on the Darling system would not reach South Australia due to transmission losses.¹³ This position was echoed by the South Australian and NSW governments.¹⁴ Nevertheless, in September 2008, the Federal and NSW governments proceeded with a joint purchase of Toorale station located in north-western NSW, ahead of a scheduled auction.¹⁵ The land and associated water entitlements totalling 80 Gl were purchased for A\$23.75 million.¹⁶ The Federal Government's media release stated that an annual average return of 20 Gl into the Darling river system could be expected, "peaking at up to 80 Gl in flood years". However the distribution of general and high security entitlements was not reported and it was stated that only 14 Gl was available for immediate return to the Darling River system.¹⁷ The purchase has also drawn subsequent protests from the affected rural community in the town of Bourke, who fear a decline in the rural economy.¹⁸

On 15 August 2008 the Prime Minister announced that the Federal Government would offer to purchase water entitlements from whole irrigation communities, working within a framework of purchases from willing sellers.¹⁹ A further A\$400 million was approved for government buy-backs of large-scale irrigation in NSW and Queensland in the Darling system, and an additional A\$80 million was approved to buy back water in South Australia.²⁰ No environmental target was specified for the approved A\$400 million fund,²¹ but an audit was to be conducted to identify where water was being held. In response to these announcements, the NSW Irrigators' Council argued that irrigation underpins many rural economies and no action should be taken without proper socio-economic impact studies, calling for a combined emphasis on water efficiency projects to protect the rural economy and food security.²²

On 1 September 2008, the Chairman of the Colleambally Irrigation Area, NSW on the Murray system, offered its entire water supply for A\$3.5 billion, which would include A\$1 billion for the town's 600 people with the remainder for the 364 farm businesses in the area.²³ There was no formal public response from government to the Colleambally proposal.

The Water for Rivers programme, comprising the Commonwealth, NSW and Victorian governments, aims to recover 212 Gl for the Snowy River and 70 Gl for the Murray River by 2012. This recovery project was established in 2003 and is completely separate from the target set under the Living Murray programme. The focus of Water for Rivers is mostly on water recovery through infrastructure programmes. However, in July 2008, Water for Rivers purchased a land and water package in Echuca, Victoria along the Murray River.²⁴ The water entitlements associated with the property total 9.943 Gl. Transparency concerns persist, as the purchase price could not be confirmed by Water for Rivers.²⁵ It was reported that the property had been on the market for A\$25 million.

While the gradual release of public funds to purchase land and water for environmental flows in the MDB was being announced by the Federal Government, on 15 August 2008 it was also reported that the NSW Government had approved a A\$600 million tender granting China's state-owned Shenhua Energy group the right to explore for coal over an area of 190 km² of the Gunnedah Basin in the MDB.²⁶ It was also reported that the State and Federal governments had refused requests from the local community to obtain an independent review of the impact of mining on groundwater reserves.²⁷ The media report also observed that conflict over BHP Billiton's Caroon coal exploration south east of this location was already a source of conflict between farmers and the mining group.²⁸ This inconsistency in government action points to a need for comprehensive reform of government institutions responsible for water management.

As of 20 September 2008, the land and water package purchases publicly announced by the Federal Government totalled 108.64 Gl in permanent entitlements on the Murray and Darling river systems. However, it is unclear whether any more than 14 Gl of this total will be recovered

in the immediate term. Once again the majority of water purchased has been “paper water”.

Analysis of MDB Irrigator Interview Data

To gain a deeper understanding of why Australian governments were unable to make substantial progress in recovering actual water for environmental flows, qualitative data was gathered through interviews with 41 irrigators across three of the MDB states, NSW, Queensland and Victoria. The interviews were held between April and July 2008. In-depth qualitative interviews permit the extraction of detailed information on



Courtesy: MDBA

stakeholder perceptions. Interviews were held in four catchments, in Goulburn-Broken, Victoria (12 irrigators) and Murrumbidgee, NSW (15 irrigators) on the Murray River system; and Border Rivers, NSW and Queensland (5 irrigators) and Condamine, Queensland (9 irrigators) on the Darling River system. The interviews considered factors impacting irrigators' willingness to sell water to the government's environmental water buy-back programme in the MDB.

The empirical research pertaining to irrigator willingness to sell to government buyers for environmental flows presented in this paper explores the following issues across the four MDB catchments in NSW, Queensland and Victoria:

- (i) Confirm whether factors impacting the willingness to sell water to government buyers in the Murray Darling Basin match the factors identified where only private buyers participate in the market, and identify where variations exist;
- (ii) Where the difference between purchase prices offered by government and non-government buyers is minimised, which buyer is preferred by irrigators. That is, to what extent concern for river health and for long-term sustainability of the water resources will drive the

seller's decision to choose a government buyer over a private buyer.

- (iii) Investigate the receptiveness of irrigators to the consistent use of cost-benefit analysis in government decision making on water purchases.
- (iv) Investigate irrigator receptiveness to relocation to more water-abundant regions of Australia, particularly northern Australia, currently under review by the Federal government.

Willingness to Sell to Government Buyers for Environmental Flows

General Factors Impacting Willingness to Sell to Government Environmental Buyers

Irrigators on the Darling system, in the Condamine and Border Rivers catchments were the most content to keep on farming, while a number of irrigators on the Murray River system in the Murrumbidgee and Goulburn-Broken catchments expressed some dissatisfaction with farming. The majority of irrigators interviewed wished to remain in agriculture. Of the 41 irrigators interviewed, one irrigator had already sold the farm business, three stated that they did not wish to continue farming, and two indicated that they were uncertain as to whether to remain in agriculture.

Factors prompting this minority to sell to government buyers for environmental flows mirrored factors identified in previous studies of selling behaviour between private irrigators in the MDB and those identified in the Ise and Sunding study, described in detail in Part 1 of this article. Potential sellers were more likely to be those facing financial hardship, close to retirement, in possession of a reasonable off-farm income and having no other family member willing to take over the farm business.

Additional factors specific to the MDB which may prompt a sale identified in the Murrumbidgee catchment included greater regulatory intervention to meet occupational health and safety requirements which drove up farm costs and the entry of multinational farming operations pushing out family farms. When asked directly whether they would be willing to sell water entitlements to government buyers for environmental flows in the MDB, the majority indicated an unwillingness to sell any permanent water, but were more receptive when discussing temporary water. Many irrigators also viewed their water entitlements as an integral farm asset, although legal separation had occurred, and would not consider selling water separate from land.

One irrigator in the Murrumbidgee catchment who was content to remain in agriculture had already sold surplus water to government buyers for environmental flows in 2007. Some irrigators indicated that they would be willing to sell permanent water at a purchase price of A\$5000 per Megalitre, which is approximately A\$1800 above the current market price for high security water and A\$3600 above the current market price for general security water. One irrigator in the Condamine catchment argued that environmental flows were already accounted for in the State's water resources plan, and therefore there was little need for buy-backs. However he observed that a sale would occur at the right price. ➔

Some of the strongest opposition to selling water to government buyers for environmental flows was articulated in the Goulburn-Broken catchment. A number of irrigators observed the important role they were playing in food production, particularly in light of the current world food crisis. It was observed that government may not have achieved a balanced approach to allocating water between the environment, urban water and agriculture. One irrigator in the Goulburn-Broken catchment expressed concern over inconsistent Victorian government policy:

We are food producers and we are going backwards. The environment might be suffering, but I feel we are doing the country a better service than watching it go down the river. On the one hand they want water for urban centres with a "no new dam" policy, and on the other hand, they will buy water from us for the river – it's hypocritical.

Unwillingness to make permanent sales to government was often related to concern that this would leave a higher cost of maintaining irrigation infrastructure to be borne by a smaller number of irrigators. Several irrigators were also critical of the lack of transparency in the buy-back process, particularly with respect to the location of purchases and the prices paid. As stated earlier, transparency problems have been addressed by the Federal Government to some extent since October 2008. However, irrigators were also not convinced that water purchased by the government for the environment would be well managed and therefore expressed a reluctance to sell to government buyers.

Selling Preferences According to Type of Buyer

Irrigators were asked to consider a hypothetical situation in which they had made a decision to sell water at an acceptable price to them and were confronted with a government buyer from the environment and a private irrigator offering them the same price. The majority of irrigators interviewed indicated that where prices offered by government and private irrigators were similar, they would prefer to transfer water to other irrigators in their area in order to preserve the viability of the rural economy. Second preference would be given to irrigators outside the catchment area.

Two irrigators indicated that in light of the world food crisis they would prefer to sell to food producers. One irrigator stated that he would not wish to sell water to wine producers, but would otherwise prefer to sell to efficient irrigators. Another irrigator indicated that while he would prefer to sell water to the private irrigator, if faced with a choice between a multinational buyer and a government buyer, the government buyer would be preferred. However, if the multinational were to outbid the government, then "price is king". A minority indicated that they were indifferent and would sell on a "first past the post" basis. One farmer in the Border Rivers region articulated a strategic approach to selling water to government for environmental flows consistent with free market theory:²⁹

I would sell temporarily to government to push the price up from a capitalist perspective. Government water goes to the environment, leaving less water in the market.

Irrigators will still want the water and the long-term price will be higher.

However the majority of irrigators consistently preferred to sell water to other irrigators over government buyers on a permanent basis. Only one irrigator indicated a clear preference for selling water to government buyers for environmental flows. In this instance the irrigator was also a state government employee.

Preliminary Findings

The results of this study confirm Ise and Sunding's findings – *i.e.*, that selling behaviour is determined by personal characteristics which may lead to a patchwork of government purchases. This clearly explains why the current Australian government buy-back programme is delivering limited actual water recovery.

Social impact studies cited earlier have highlighted irrigator concern over the impact of water trade and government water buy-backs on the rural economy. This study reveals that in the absence of a significant price differential, irrigators will have a strong preference to sell to other private irrigators over government buyers based on these concerns, in order to prevent rural economic decline.

To date Australian governments have avoided serious competition in the market by mostly purchasing general security water entitlements with low allocations, which are of little value to private irrigators in the medium term. Governments have not released large amounts of funds to buy up high security entitlements above the market price, even though the budget for water purchases is approximately double the market price of the 500 Gl in high security entitlements required. As noted earlier, the emergence of the global financial crisis may limit the ability of governments to pursue a rapid purchase strategy. Furthermore, achieving actual water recovery of an additional 478 Gl for the Murray River system by June 2009 appears unlikely, given that only 71 Gl of high security water was offered for sale in the first Federal Government purchase round. That is, even if the government has the ability to release the necessary funds to secure 478 Gl in a timely manner, willingness to sell remains a serious obstacle.

The implication of the findings of this study with respect to preferential selling, is that governments need to facilitate alternative economic futures for the rural economies targeted for water purchases to stimulate willingness to sell. Many of the major towns in the target catchments, such as Griffith, Shepparton, Inverell and Goondiwindi, are almost entirely dependent on irrigation and many of the families of irrigators have made their home in these regions for several generations. The decision to sell high security water to government buyers on a permanent basis will be easier if irrigators can envision a future for the people resident in the rural towns currently dependent on irrigation activity.

Support for the Consistent Use of Cost-Benefit Analysis in Government Decision Making on Environmental Flow Recovery

Procedures to assess the socio-economic and ecological impact of large-scale purchases on a consistent basis are

yet to be established in law. Irrigators were asked whether they would support a legal requirement for cost-benefit analysis (CBA) to be undertaken prior to government purchases of water entitlements for environmental flows. Twenty-six of the 41 irrigators supported the consistent use of CBA. To a number of these irrigators, establishing this requirement in law was viewed as being critically important, provided the CBA was undertaken in a transparent manner, and with accuracy. Several irrigators stated that they were surprised that CBA was not already established as a procedural requirement.

One irrigator supporting the consistent use of CBA by government stated: "it is wise to invest in a form of accountability, transparency must be considered. It is tax payers' money". Other irrigators provided further qualifications, observing that "economics is a very inexact science", noting that today's values can change dramatically in the future, which may render the analysis highly inaccurate. That is, the application of net present value calculations for alternative options may not yield a true assessment. While supporting the use of CBA, one irrigator noted that it should be the only procedural requirement. Another irrigator supporting the use of CBA expressed doubts as to the presence of institutional capacity in the Murray-Darling Basin to complete this work effectively.

The 15 irrigators who did not favour the use of CBA stated that they did not trust government to carry out an unbiased assessment which would account for all the benefits of irrigation in a balanced manner. One irrigator opposed a CBA that had been undertaken on the assumption that climate change was a reality. Two irrigators stated that they were unfamiliar with CBA and while the process had now been explained to them, remained uncertain. Others doubted that the government currently had the institutional capacity to carry out credible CBAs on a consistent basis. One irrigator was critical of valuation methods used to assess environmental goods and services.

Receptiveness to Relocation to New Irrigation Areas in Northern Australia

In light of the crisis in the Murray-Darling Basin, the Federal Government has been investigating the possibility of undertaking agriculture in Northern Australia. Irrigators were asked to consider the worst-case scenario where water buy-backs and infrastructure-saving measures were unsuccessful. They were asked if faced with such circumstances, whether they would prefer monetary compensation, the option of a land and water relocation package or a combination of both. The majority of irrigators stated that they would prefer monetary compensation over a land and water relocation package. Some irrigators argued that should such a scenario arise, they should be allowed to choose between both options. Irrigators who did not favour the prospect of relocation, observed that the closer an irrigator was to retirement age the more

difficult the prospect of relocation became. Irrigators were concerned about the lack of infrastructure, harsh climate, isolation, and complications caused by native title in Northern Australia. Many stated that they enjoyed the lifestyle benefits of their current location, connection to the local community, family ties in the present location and proximity to major cities. However a number of irrigators also stated that if they were younger and the government invested heavily in infrastructure, schools and hospitals they would consider relocating to Northern Australia.

Conclusions

Cost-benefit analysis is a common method employed in government decision making to assess and rank net benefits across various policy alternatives. The outcome



Courtesy: MDBC

of the analysis allows policy makers to determine which of the possible alternatives is most socially beneficial. The findings also allow legal analysts to create a legal regime which best facilitates the achievement of the most socially beneficial choice. At present there is no legal requirement for government institutions to undertake any socio-economic impact analysis, such as a CBA, on a consistent basis prior to government purchases of land and water or water entitlements. CBA has been built into the Swedish law governing government decision making on water, and to a significant extent into American environmental law.³⁰

Akerman and Heinzerling are recognised as leading critics of the implementation of CBA in environmental regulation.³¹ The major criticisms include:

- (i) current valuation methods for "hard to quantify ethical values of biodiversity, environmental health, social equity, empowerment of politically disadvantaged groups and public well-being" are inadequate and favour easily quantifiable items such as costs and benefits to the private sector.³²
- (ii) "discounting...systematically and improperly downgrades the importance of environmental regulation".³³

For these reasons Ackerman and Heinzerling (2000) argue that CBA fails to deliver the objectivity and transparency promised by its advocates. In response to these criticisms, Carlin (2005) of the US Environmental Protection Agency suggests that CBAs be carried out in all proposed major environmental regulations, for advisory rather than determinative purposes.

As noted earlier the Federal Government announced in August 2008 that it would consider offers to purchase water entitlements from entire irrigation communities. The Chairman of the Colleambally Irrigation Area made an offer in September 2008 to sell its entire water supply in return for compensation of A\$3.5 billion for farm businesses and the entire community dependent on irrigation. The proposal is not one which has been publicly considered by Australian governments. It is unlikely that all residents of the Colleambally proposal would voluntarily sell their property to government buyers. Two months later, in November 2008 reports emerged that the Federal Government would consider buying out entire irrigation districts, noting current negotiations underway in the Wakool district on the Murray River.³⁴ A senior Federal Government official also announced that “where rural buy-backs hurt rural areas structural adjustment will be considered”, but observed that it would be “a very long and difficult task”.³⁵ To improve the progress of the government buy-back programme and promote irrigator willingness to sell, Australian governments must facilitate alternative private-sector development in rural areas for irrigators and the communities dependent on irrigation.

To buy out an entire irrigation district and implement a structural adjustment programme will necessarily involve some level of compulsory acquisition, as it is unlikely that all irrigators and residents will agree to sell. If proposals to retire entire irrigation districts are to be considered seriously by government, the implementation of CBA and other forms of ecological and economic assessment will need to be applied on a consistent basis. These assessment processes should be built into the law as a procedural requirement for governments to use at least on an advisory basis prior to effecting purchases.

The absence of any mandatory analysis of proposed government purchases which may be undertaken and scrutinised by the public in a timely manner, fails to meet the transparency objective. Hence, large losses may be borne by tax payers and irrigators alike if the government’s purchasing strategy is not open to rigorous independent assessment. Structuring water law in respect of preventing bias and promoting transparent assessment processes is essential. The establishment and implementation of effective legal measures to assess the costs and benefits of government action on water decisions is critical to the achievement of sustainable water use in the Murray-Darling Basin.

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