

Buying irrigation water for the environment – lessons from the market in a transboundary program

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Abstract

In 2007, the Murray-Darling Basin Commission ('MDBC') undertook a project to trial the use of the water market to 'recover' water for the environment. This pilot project aimed to purchase up to 20 gigalitres¹ of water from willing sellers along the Murray River system. Developed and implemented as a Living Murray Initiative water recovery measure, the purchased water will be used to improve the environmental health of the Murray River, particularly at six 'icon sites'.

MDBC's first venture into the irrigation water market coincided with a period of significant change in the state legislation governing water entitlements, and considerable growth in the water markets. During the pilot project, rapid developments in water policies, systems and processes created some very interesting challenges for all involved. The MDBC considers that the pilot project not only provided first hand experience of government participation, but also the opportunity to assist in maturing an emerging water market.

1. Introduction

Transboundary river basins are common around the world. Approximately 260 of the world's river basins, with a majority of the world's freshwater flow, cross or create international political boundaries (Bean, 2007). Close to half of the world's population reside in transboundary basins, which are located in about 145 countries (Bean, 2007).

Due to the level of water demand on transboundary rivers relative to water availability, some are amongst the most overallocated and water stressed in the world. For example, the Rio Grande and Indus rivers were nominated by the World Wildlife Fund as being amongst the ten most stressed rivers in the world (Wong *et al.*, 2007). Mechanisms to recover water for the environment are needed in a number of transboundary basins across the world.

This paper discusses one of the initial purchases of water entitlements for environmental use in the Murray-Darling Basin in Australia. Whilst the Murray-Darling Basin is within one country, it is a transboundary river basin in the sense that it spans five state jurisdictions that each have the sovereign right to 'reasonable use' of waters within their borders under the Australian Constitution².

This paper commences with a discussion of the context of the water purchase. Then, the method and results are discussed. Key lessons and conclusions complete the paper. In terms of the relevance of this paper to purchasing in other transboundary river systems, market-based measures are shaped by legal and regulatory settings that vary significantly across countries and

¹ Long term average of water available **in each year** based on 109 years of hydrological records.

² In the near future, Constitutional powers of States with respect to water are expected to be referred to the Australian government under the Federal Water Act 2007.

regions, requiring careful assessment of the exportability of lessons learned in any given context (Garrick *et al.*, 2008).

2. Context

2.1. The Living Murray Initiative

The Living Murray Initiative is being implemented in the Murray-Darling Basin, which is Australia's most important agricultural region. The Basin accounts for more than 40% of the nation's gross value of agricultural production, and about 85% of all irrigation in Australia. Irrigated agriculture uses around 95% of the water diverted (MDBC, 2006). The mean annual flow out of the Murray mouth is about a quarter of what it was under historic natural conditions (Adams, 2000), and climate change is expected to reduce this further.

The Murray River is in the south of the basin, and is 2,530 km long. Over recent decades, there has been an increasing awareness of the decline of the rivers' health. Diversions are a major contributor to this decline (Jones *et al.*, 2003). Initiatives have been established that include market based measures. This is part of a broader international trend where '*environmental water transactions have proliferated across diverse social and ecological contexts, and interest continues to grow*' (Garrick *et al.*, 2008).

The Living Murray Initiative was established in 2002. The cross-jurisdictional implementation framework is provided through several intergovernmental agreements³, and includes adaptive management or 'learning by doing' (MDBMC, 2003). The Living Murray Initiative involves the investment of nearly \$1 billion, a budget of an internationally significant scale. In regard to water recovery, \$700m is being invested and will yield an average of approximately 500 gigalitres for environmental management in each year prior to a target date of June 2009 (MDBC, 2007a).

Types of water recovery projects being implemented within The Living Murray Initiative include investment in on and off-farm water infrastructure, regulatory and urban measures, and purchase of water entitlements from willing sellers. The focus of water recovery for the first three years of the five year program was on large-scale off-farm infrastructure projects. About fifteen feasibility studies were undertaken⁴, few have proceeded to implementation due to very high cost per volume of water recovered.

Water entitlement purchases for the environment had been flagged as a possibility for some time (eg. Young *et al.* 2002; Collins 2003; Heaney *et al.* 2003). Water purchases had been implemented in some northern areas of the Murray-Darling Basin by the New South Wales *RiverBank* program (Garrick *et al.*, 2008). In 2006, about half way through the five year water recovery program in The Living Murray, purchasing of water entitlements to supplement infrastructure-based projects started to be discussed much more in government, academic and community circles (Collins *et al.* 2006; Grafton and Hussey 2006; CAC 2007). The partner governments of the Murray-Darling Basin Commission ('the MDBC') agreed to implement the Pilot Environmental Water Purchase Project ('pilot project') to purchase water entitlements from willing sellers. The pilot project is discussed following an overview of the water market in the southern Murray-Darling Basin.

³ These intergovernmental agreements include the *Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray-Darling Basin* and *The Living Murray Initiative Business Plan*, both of which are available over the internet.

⁴ Many of these feasibility studies are available from the MDBC website, www.mdbc.gov.au.

2.2. Water market in the southern connected Murray-Darling Basin

A water entitlement is defined under the Murray-Darling Basin Agreement 1992 (ref) as ‘*an entitlement to a particular share of water.....pursuant to the law of a State.*’ Under their own legislation, each state within the Murray-Darling Basin has established its own water entitlements for a range of purposes, in different forms, and with different conditions. According to the current policies of each state and the volume of water available in storage, an allocation of water is made against each such entitlement on an annual basis. Within these arrangements, and based on the rules defining the annual allocations, the water entitlements can be divided into several broad classes:

- high reliability – where the full volume of entitlements expected to be available in almost every year, even in most dry years;
- medium reliability – where some water available in almost every year, with full amount of water available in some years); and
- low reliability – where water availability is more opportunistic, usually in wetter years.

The trading of these water entitlements within state boundaries has been possible since the late 1980s (MDBC, undated). In 1995, the Murray-Darling Basin Ministerial Council established a cap on diversions (MDBC, 2004), and subsequently in 1998 the Council established a pilot interstate water trading project that allowed limited trading of high reliability entitlements between states. In 2005, it was argued that the market performs well against most criteria, but that ongoing institutional reform was critical for improved success (Turrall *et al.*, 2005). There is a strong focus on reform of the water market in Australia currently under the National Water Initiative and the Federal Water Act 2007. Justifications to continue to reform the water market include allowing water to be traded to more productive uses and to lessen the impact of restrictions in water availability, and more recently, to recover water for environmental management (Peterson *et al.*, 2004; Collins *et al.* 2006).

In the Murray-Darling Basin, water trade is complex involving many multi-agency processes, both within states and across states. For example, trade involves irrigation companies in New South Wales, irrigation authorities in Victoria, and irrigation trusts in South Australia. Additionally, there are many brokers, agents, and potential buyers and sellers. Water trades can be multi-million dollar transactions, with water a significant farm business asset. Limited information on prices of water entitlements are available at a number of government and private websites, often several months after the price was agreed between the buyer and seller. There was a lot of policy reform underway at the time of implementation of the pilot project – including the separation of water entitlement from land in some areas, and the unbundling of rights to allocated water and delivery.

In recent years there has been considerable growth in trading of water entitlements in the Murray-Darling Basin (MDBC, 2008). The volume of permanent entitlements sold within the entire Murray-Darling Basin was 40.3 gigalitres in 2005/06 and had increased to 139.2 gigalitres in 2006/07 (MDBC 2007d; MDBC 2008). This growth is expected to continue in coming years, and this will be important if the severe drought conditions persist.

3. Pilot Environmental Water Purchase Project

3.1. Background

In May 2007, the Murray-Darling Basin Ministerial Council agreed that the pilot project was ready for implementation. This was a significant policy decision, as there had previously been considerable opposition to governments entering the water entitlement market. The pilot project was the MDBC's first venture into the water entitlement market, and the first significant public purchase for the environment in the southern part of the Murray-Darling Basin. In the pilot project, water entitlement could be purchased from willing sellers in three states⁵, the water entitlement would be owned by one entity (the MDBC) and managed to contribute towards an agreed set of environmental outcomes at six icon sites in those same three states.

There were two objectives of the pilot project. The first objective was to trial the government purchase of water entitlements so as to learn lessons to inform any future water purchasing programs⁶. The second objective was to cost-effectively purchase up to 20 gigalitres at market prices⁷ within existing market rules.

In designing the pilot project, experience from other preceding related programs was important. These programs included the New South Wales *RiverBank* program (DECC 2008) in the north of the Murray-Darling Basin, the *Water Through Efficiency* tender undertaken by the Australian Government, and a tender undertaken by the New South Wales Department of Natural Resources, the latter two which resulted in little purchase of water entitlements compared to the scale of The Living Murray Initiative.

3.2. Pilot design

The design features of the pilot included an expression of interest ('Eol'), an independent market analysis, and significant communication before, during and after.

In the pilot project, potential willing sellers or their agents could submit a non-binding Eol to sell a particular type of entitlement at a specified price. These Eols were to be submitted on a simple standard two page form with two pages of relatively simple standard terms (MDBC, 2007b). Only high and medium reliability entitlements were pursued in the pilot project⁸. The Eol was designed so that the buying government entity (the MDBC) was not negotiating directly with potential willing sellers – the government buyer and seller were at 'arms length' through the Eol process.

Under the examination of an independent probity auditor, the Eols received were compared against an independently assessed market price for the water entitlement. The independent assessment was undertaken by consultants analyzing publicly available information on water entitlement prices from water exchanges and state registers. If the price in the Eol was sufficiently close to the current independently assessed price, then the MDBC advised the potential seller that it would pursue purchase. Subsequently, due diligence commenced, followed by conveyancing. Eols were assessed weekly, and potential willing sellers received feedback within two days, and could re-submit if their Eol was not being pursued.

⁵ New South Wales, Victoria and South Australia

⁶ This is consistent with the philosophy of adaptive management (Walters, 1990), although, as discussed in Gippel (2003) the use of the term 'adaptive management' by managers can be quite different to scientists.

⁷ This volume is approximately 4% of The Living Murray Initiative overall water recovery target of 500 GL/year. Or approximately 0.2% of diversions from the southern Murray-Darling Basin.

⁸ This was because the environmental water entitlement portfolio already contained a significant quantity of low reliability entitlement, and there was a growing awareness in the current drought that the environment may increasingly need more high reliability entitlements than previously thought.

As part of the pilot project, a communications strategy was implemented that included: presentations to brokers, visits of irrigation and state entities involved in processing trades, placing advertisements in newspapers, and the distribution of factsheets and Frequently Asked Questions including on the MDBC website. Two community groups convened by the MDBC, The Living Murray Community Reference Group, and the Community Advisory Committee, performed important roles in designing and implementing the communications strategy, and in encouraging decision makers that it was an appropriate time for governments to enter the water entitlement market.

From the pilot project, lessons would include willingness of potential sellers to offer water entitlements at market price to the government, the degree of acceptance of the government being a buyer, whether the frequency of review (weekly) was appropriate, and the degree of commitment of potential sellers to complete a transaction based on a non-binding Eol.

3.3. Results

The pilot project was implemented during one of the most severe droughts in the Basin in recorded history, immediately following a number of policy and legislative reforms necessitating changes in systems and processes. In a number of cases, the purchases in the pilot project were the first under some of the new market rules, and the MDBC's conveyancing solicitors had to work through many issues in the complex institutional setting of the water market.

There was considerable interest in the pilot project by potential willing sellers. Whilst it was envisaged that the Eol process would be repeated over 11 weeks, there had been enough Eols received in four weeks that the MDBC had made commitments to pursue 20 gigalitres of projects, and hence the Eol process was shutdown. In announcing this shutdown, the Chief Executive of the MDBC said 'we are delighted with the response' and 'we have learnt that people appreciate the opportunity to submit a non-binding expression of interest and they liked receiving feedback rapidly' (MDBC, 2007c).

In regard to the numbers of Eols, in the first week, 30 Eols were received and by the fourth week, 54 Eols were received. The number of Eols received in the first week was several times that expected, indicating that the initial communications and advertising had been successful. The growth in Eols suggested that prospective sellers and brokers developed trust in the project process quite quickly.

In regard to the prices on the Eols, in the first week, 10% of the Eols were pursued for purchase and by the third week, 55% were pursued for purchase. This suggests that the price at which Eols would be pursued became known by many prospective sellers, either through brokers or word of mouth. Several prospective sellers whose initial Eol was above market price subsequently re-submitted and the revised Eol was pursued for purchase, thereby reducing the rent paid to water entitlement sellers to acceptable levels.

The range of volumes of water entitlements offered was diverse, and ranged from 10 megalitres to 6,000 megalitres (or 6 gigalitres). The large volume of entitlement offered in some Eols indicated that some irrigators were seeking to leave irrigation, at least temporarily. Other volumes were quite small, perhaps indicating that the irrigator had made on-farm savings and required less entitlement, or required some additional liquidity during the drought. All of the entitlements pursued were in New South Wales and Victoria – none from South Australia, which is a relatively small (7%) proportion of the Cap on diversions of the southern connected Murray-Darling Basin.

In total, one hundred and sixty nine Eols were received in four weeks. Of the 61 Eols pursued, 33 resulted in transfer of water entitlement. More than half of the Eols pursued that were submitted by agents did not result in transfers. In contrast, of the nine Eols pursued that were submitted directly by water entitlement holders, 8 (or 89%) resulted in water entitlement transfers. Perhaps brokers were more aware of offers from alternative buyers, and felt less committed to a non-binding Eol.

The fastest transfer occurred four months after the Eol was received. The slowest transfer occurred slightly over a year after the Eol was received due to an annual limit of water entitlement that could be traded out of an irrigation area of four percent⁹ being triggered in some irrigation zones in Victoria in 2007/08. The last few transfers were delayed until July 2008.

The communications associated with the pilot involved a considerable amount of work. The Commission office received approximately 300 telephone calls during the four week period when Eols were being received, and also immediately before and after this period. Agents advertised the pilot project on their own accord. Some irrigation companies assisted the pilot project by discussing the pilot in their newsletters at no cost to the MDBC.

Whilst some details of transfers are being finalised at the time of writing, the total water entitlement purchased will be about 19 gigalitres, or 11 gigalitres in terms of the long term average increase in river flows.

4. Lessons

Overall, the pilot project was successful to purchase a limited amount (up to 20 gigalitres) of water entitlement within the southern connected Murray-Darling Basin at the time of implementation. There clearly was a willingness of potential sellers to offer water entitlements at market price to the government. There was high degree of acceptance of the government being a buyer, at least for a pilot project of the scale proposed. Slightly more than half of the water entitlements that were pursued based on the non-binding Eols resulted in a water entitlement purchase.

The key lessons from the pilot project are listed below.

1. Government entities contemplating purchasing water entitlements should take account of the complexity of the water market at the time of implementation, and some of the complexity may be unknown to them. The implementation of the pilot project was complicated by it coinciding with the introduction of new legislation and policy to support expanded trade on 1 July 2007. At times of considerable change, there can be temporary disconnects between policy and implementation practice on the ground. The impact of these changes, and the lack of preparedness in some sectors of the water market to address them, had a significant impact on the timing of delivery and complexity of the pilot project.
2. Government buyers need to think about who they are purchasing from. In the pilot, the conversion of Eols pursued to those completed associated with purchases from agents (and particularly some agents) was considerably less from those submitted directly by individuals (89%). This ought be taken account of whether to pursue more Eols than is required so as to allow for those who withdraw prior to settlement.
3. Governments have a number of regulatory functions in regard to the water entitlement market. Probity issues associated with a government entity purchasing in the water market need to be managed well. In this context, project credibility can stem from designing processes with roles for independent contributors. Therefore, the pilot project included both independent market analysts and independent probity auditors.

⁹ This limit is part of the National Water Initiative agreed by the Council of Australian Governments.

4. The non-binding Eol process was successful in attracting participants, but added time to finalise the settlement because a due diligence process was required to verify the details on the Eol, as well as to ascertain other details needed for the transfer.
5. Managing communications associated with a public purchasing process is a significant issue. It is important to have a well thought out exit strategy prior to entering the market. There was a lot of discussion about the pilot project in the media and in public forums. Governments can only partially 'control' the information flow associated with water purchasing. Brokers have a vested interest to advertise and attract prospective sellers to participate via them. Whilst starting a public purchasing project involves a large amount of communications, stopping it before expected can also involve considerable communication.

The pilot project may have been the catalyst of several other water recovery projects coming forward for implementation in The Living Murray Initiative, including both market based measures, and infrastructure projects from entities that preferred investment in infrastructure.

5. Concluding remarks

Until recently, perhaps like many overseas governments, Australian governments have been reluctant to enter the water entitlement market and purchase water for the environment. Cautiously undertaking a small scale pilot project provided an opportunity to learn a large amount as part of a gradual process of innovation, experimentation, and adaptive management (Garrick *et al.*, 2008).

The MDBC's first venture into the irrigation water market coincided with a period of significant change in the state legislation governing water entitlements, and considerable growth in the water markets. The potential supply of water entitlement was higher than envisaged, as was the complexity and time in completing transactions.

The MDBC considers that the pilot project not only provided first hand experience of government participation, but also the opportunity to assist in maturing an emerging water market. The pilot project is considered by the authors to have been successful at fulfilling both its objectives of learning and purchasing water entitlement from willing sellers along the Murray River system, and was an important project towards addressing the overallocation of the Murray-Darling Basin.

Whilst the pilot project was are shaped by legal and regulatory settings that apply to the southern Murray-Darling Basin and the context of The Living Murray Initiative, following careful assessment there may be some ideas that are exportable to international transboundary basins.

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