Sustainable systems in the face of climate change: water trade alternatives may hold the key

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Abstract: Prolonged drought and climate change uncertainty has made a sustainable balance between uses of water much more urgent. Previous strategies have revolved around regulatory and market-based approaches to reduce the consumptive pool, leaving water in rivers for the environment. These approaches have so far simply maintained the status quo, i.e. the consumptive pool at more or less existing levels. Government intervention to purchase entitlements from irrigators for the environment through water markets is meant to break the status quo, but can that be achieved from a solitary focus upon entitlement recovery?

This paper reviews the policies and events which have driven this process and identifies how the regulatory/market-based approaches have resulted in a status quo situation, to the detriment of achieving sustainable water use. We suggest that both historical approaches offer less reform value, and that appropriate market intervention is warranted. However, entitlement water purchasing alone may limit provision of wet water to key environmental sites during critical periods and perpetuate a continuation of the status quo arrangements. A suggested expansion of the water purchasing programme is therefore provided.

Introduction

The Australian government has recently announced a $12.9 billion Water for the Future Plan (Wong, 2008) to recover, through a variety of means, up to 1,500GLs of water for the environment. Reduction of the consumptive pool by this amount provides a moderate chance of returning the river system to a sustainable working status (Jones et al., 2002). Efforts to reduce the consumptive pool via regulated planning, recognition of environmental water requirements by the states and the establishment of efficient water markets under the National Water Initiative (NWI) has been a continuing focus of the reform process.

How well then does the new market-based water recovery purchasing plan fit into the existing context of consumptive pool reduction? Does it compliment, over-ride or de-emphasise the regulatory and market-based efforts to create sustainable use of water resources? And if either of the latter two options apply, where then does that leave these previous efforts which have had substantial resources and time applied to their outcomes?

This paper explores these questions with an emphasis on identifying where the process might turn next if the interventionist water recovery approach fails to deliver anticipated results.

The regulatory reform approach

The Australian water reform process which began in the 1990s has been building toward a single outcome; the reduction of the consumptive pool to sustainable levels (COAG, 1994). In the Murray-
Darling Basin (MDB) reform has endured the added burden of multiple sovereign states and federal interests in the management, health and use of water.

A variety of strategies have been applied to reduce over-allocation in the MDB. While the states have been charged with addressing over-allocation issues within their own sovereign boundaries, at the Basin-wide level there has also been significant negotiation and action in an effort to reduce the consumptive pool.

Predominantly regulatory approaches have been adopted at the early strategies for water reform. These have included new water resource legislation, altered or newly created water-use regulations, capping water use within the MDB and the creation of water sharing plans (WSPs) to identify system yields, current consumptive use and minimum environmental flow requirements. In some cases, (e.g. Queensland) these WSPs have been able to provide adequate environmental water, but in other cases (e.g. NSW) some of these WSPs have been suspended due to drought, or environmental priorities have been overlooked in favour of consumptive needs (Wallace, 2009).

However, with the introduction of the NWI a broadly consistent approach has been reached towards managing risks associated with failing to achieve consumptive pool reductions, i.e. risk sharing arrangements which affect the parties in different ways. These are detailed in Table 1 below, which divides the risk between the major parties dependent upon the cause of the reduction in reliability and/or the timing.

<table>
<thead>
<tr>
<th>Reduced volumes or reliability via drought or climate change:</th>
<th>Reduced volumes or reliability via improved knowledge (to 2014):</th>
<th>Reduced volumes or reliability imposed after 2014:</th>
<th>Reduced volumes or reliability via changed government policy:</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% borne by the water licence holders without compensation.</td>
<td>100% borne by the water licence holders.</td>
<td>Users bear first 3% of reductions. States (1/3) Commonwealth (2/3) share between 3% and 6% reduction. Above 6% reduction, States and Commonwealth share equally.</td>
<td>Governments bear fully any reduction or loss of reliability.</td>
</tr>
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(COAG, 2004, para's 46-51)

In some instances (e.g. column two and three) there is the potential for irrigator pro rata reductions to take place, i.e. an across the board reduction of the consumptive pool. Elsewhere (e.g. column four) governments must bear fully any decreased reliability. Importantly though, it must be remembered that the consequence of not managing these risks is the continued degradation of MDB environmental health. Although some reform observers have called for mandatory pro-rata reductions to current entitlements in order to achieve a solution to over-allocation and resource degradation (Young & McColl, 2007) this option, like similar strategies in the USA (e.g. Slaughter & Wiener, 2007) remains politically un popular. Furthermore, it can be argued that such strategies simply remove water from efficient and inefficient users alike (Thoyer 2006). Consequently, pressure on governments to act in ways that avoid pro rata reduction approaches has grown alongside recognition of the importance of sustainable ecosystem health and water quality (Ladson & Finlayson, 2004).

A useful definition of sustainable resource use has either been elusive or heavily debated during water reform, often providing an excuse to defer environmental actions. The states have pressed forward though, reacting to the need for sustainable resource use by implementing regulatory measures and water planning arrangements (Environment Australia, 1994). In turn this has led to a myriad of independent systems, often at odds with one another (National Water Commission, 2007). Basin issues that cross state boundaries, however, require collective arrangements. One example of basin-wide negotiation and action to address sustainable use through regulation was the introduction in 1997 of a permanent Cap on MDB water use (MDBMC, 1996). The effect of the Cap was to limit extractions to the level of development present in 1993-94. This regulatory strategy closed the door to the issuing of 2
new water entitlements to irrigation entrants; anyone wishing to begin a new operation would need to purchase a license from existing entitlement holders. While not reducing the level of consumptive use the Cap was aimed at curtailing further resource degradation. Unfortunately the Cap has accelerated groundwater extraction and the trade in sleeper and dozer licenses, sometimes to the detriment of existing irrigators’ rights (Scanlon, 2002).

Another regulatory approach outcome has been the establishment of secure and transferable property rights in water (Moran, 2003). However, while property rights might assist in the reallocation of resources among competing uses, they are not expected to remove disputes over the outcomes of the rationing process (Watson, 2006). In fact, as Thoyer (2006, pg. 6) observes, ‘the necessary reinforcement of water rights, in order to implement efficient water markets, runs contradictory with the necessary attenuation of rights in order to allow states to reduce entitlements in the name of environmental protection’. So the property rights outcome, while positive for consumptive users, might not assist in reducing the consumptive pool of entitlements. This said secure property rights can still be subject to adaptive management approaches since they are defined as a share of the available resource, which can alter from season to season—i.e. the share is secure, but what it is a share of is less defined. Markets then play an important role in the valuation and movements of these shares between users.

An important result of the regulatory approach has been the foundations for water markets in Australia with an emphasis on the transfer of water assets to their highest value uses. An issue with this is that the environment has not represented an obvious high value use for water and, as such, water markets have not automatically addressed the imbalance in the system between consumptive and environmental uses. Like most market transactions, trades in water are based on private benefits and costs (Tisdell & Ward, 2003) not readily accommodating social needs above the individual level. Therefore, water markets left to their own devices will allocate too much to consumptive uses and not enough to environmental flows, providing a _prima facie_ case for government intervention (Freebairn, 2005).

It is perhaps not surprising then that the first biennial assessment of the NWI found water markets had failed to address over-allocation and improve environmental outcomes (Working Group on Climate Change and Water, 2008). Among a set of urgent actions proposed was the coordination of efforts in purchasing water for the environment (National Water Commission, 2008). Such programs are referred to as water recovery or _buy back_ strategies. In Australia it was only a matter of time before a water purchasing strategy was proposed for irrigated agriculture to ameliorate flow-related environmental damage (Watson, 2006). It would seem then that regulatory and voluntary market-based approaches have not delivered the required consumptive reductions sought. To combat this failure the federal government has now implemented an interventionist water recovery strategy that may or may not offer the basis for successfully achieving a sustainable water balance.

**The shift from regulatory to market approaches**

The shift across regulatory and voluntary market-based approaches toward government interventionist water purchasing has occurred over many years. Put simply, regulatory approaches and voluntary market transfers have failed to deliver required environmental water outcomes. The state level contradiction between enforceable property rights and required reductions to provide for the environment, discussed above, has most often emphasised the continuation of the status quo, in this case the protection of consumptive uses at the expense of the environment. Within the regulatory approach we refer to this as the cycle of deferment (see Figure 1 below). This cycle would likely have continued had not prolonged drought and the uncertainty of climate change re-emphasised the urgent need to reduce the consumptive pool and, as discussed above, caused a variety of WSPs to be suspended or ignored in favour of irrigation commitments.

While the regulatory approach set a foundation for water markets, their establishment required further time and resources. Also importantly for later water recovery programs the Cap, as discussed above, set a limit to further diversions which subsequently emphasised the role of markets in adjustment to meet development aspirations or seasonal operating requirements. But the damage inflicted from previous expansionist policy and an increasing recognition by users of the inherent value in their water
assets resulted in irrigators not associating any low value toward water; unfortunate considering that this was whom reformers were counting upon to provide water for redistribution (Productivity Commission, 2003). Instead, most irrigators remain determined to hold onto their entitlements and use the allocation market to sustain themselves in the industry, even when operating inefficient properties (Bjornlund, 2006).

Consequently, the anticipated redistribution via markets has not taken place; something formally recognised and addressed by an intergovernmental agreement (IGA-OA) on over-allocation in 2004. While a free market will normally provide the most efficient means of allocating water between uses, this premise does not hold where a market for one use is absent—such as was the case for environmental water (ABARE, 2008, pg. 272). Efforts to find willing sellers of entitlements have since been promoted (e.g. the MDB Living Murray Initiative and the NSW RiverBank recovery programs), which in the main focus upon entitlement purchases in keeping with the IGA-OA. This framework for water recovery unfortunately has also largely failed to acquire anywhere near the 500GL target set in 2005 (National Water Commission, 2009).

By 2006 a number of key events worked to force the hand of governments in their effort to address over-allocation. These included formal recognition of the volume required to achieve a moderate chance of returning the system to a sustainable working river status—1,950GLs (Jones et al., 2002) later downgraded by the MDBMC to 1,500GLs (Jones et al., 2003), and CSIRO reports that risks such as climate change, farm dams and afforestation could decrease future stream flows between 2,500 and 5,500GLs within 20 years (van Dijk et al., 2006).

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**Figure 1 — The cycle of deferment**

The urgency of these events and continuing drought in the MDB resulted in a hasty decision (Watson, 2007, pg. 1) to intervene in the water market on behalf of the environment. As Holland et al (1999, pg. 67) observed in the fisheries industry, such intervention usually has more to do with politics that the
technical feasibility of addressing actual environmental requirements. Political solutions emerge far quicker than real environmental solutions to these issues it would seem.

In fact debate over environmental solutions for the MDB, while on-going, has at least settled on the adoption of adaptive arrangements aimed at ensuring that maximum benefit is derived from provided flows (DEWHA, 2008). These adaptive strategies aim to recover water for six icon environmental sites along the Murray River, focusing on the purchase of entitlements from willing sellers. But to acquire 1,500GLs will require the purchase of 100% of average entitlement trades for the next 14 years (WaterFind Pty Ltd, 2008)—an arguably unrealistic objective.

Such purchases would have enormous impact upon the ability of the entitlement market to play a role in drought adjustment, but equally the size of this recovery target would suggest that the interventionist market approach now over-rides the regulatory and voluntary market-based approaches in managing the consumptive pool reduction. There is an advantage to this approach in that any water recovered through the markets may allow for a future mitigation of the risks as stated in the WSPs, reducing the scope for risk sharing to take place on either side.

This outcome hinges upon the level of willing entitlement sellers that can be attracted to the recovery process, but unfortunately analyses to this point (e.g. Bjornlund, 2006) would suggest that willing entitlement sellers may be hard to find. Therefore an expansion of the program to include additional allocation trade products such as derivatives, options and contracts may be warranted to improve irrigator willingness to engage in the environmental water recovery program.

The need for an alternative approach

If regulatory and voluntary market-based approaches have diminished in value and the interventionist market-based approach aimed at entitlement purchasing is flawed in terms of attracting willing sellers and in terms of securing wet water for the environmental sites of interest, where might governments turn next if the required consumptive pool reduction outcomes still remain unachieved? Does expansion to alternative allocation trade products offer any advantage?

An examination of license recovery programs in the fisheries industry may offer important support to an allocation trade product expansion strategy. In that industry recovery program, government buyers found that many sellers held out for higher prices which were required to attract willing sellers (Sun, 2004), and that it becomes harder to achieve effective reduced consumption if those users who impact it most remained in the system (Squires 2006). This finding seems to be particularly pertinent to recovery programs with a singular purchasing option focus (English, Brearley, & Coggan, 2004; Scoccimarro & Collins, 2006).

Where the management of key environmental sites involves adaptive strategies around flow requirements, it would seem practical to turn toward an application of similar adaptive strategies to the water recovery process. Part of the problem now facing environmental managers is that the shift to water purchasing has occurred within too limited a framework, and without the appropriate inclusion of alternative trade products other than entitlement purchases to provide environmental water.

The environment requires water to be re-distributed from irrigators towards flow regimes. To achieve this the range of trade products currently utilisable on behalf of the environment should be widened, allowing recovered water volumes to increase, and thereby possibly minimising the current degradation externalities that future generations are required to contend with. Such expanded trade products might include the inclusion of derivative, options and contract style products which have an emphasis on allocation transfers rather than entitlements. A research program to be conducted in 2009-10 will be investigating irrigator perceptions and attitudes toward such products and providing empirical evidence to support the claims made here.

Conclusions

An adaptive water recovery program will therefore work best if it comprises a range of trade products that target the highest proportion of consumptive users, across the broadest possible geographic scale to allow effective matching with environmental sites of interest and provide redistribution of water to those systems, even if only for a season.
Significant regulatory and voluntary market-based effort has been expended in reducing the consumptive pool. These efforts have had limited success and for the most part simply resulted in maintaining the status quo. Market intervention on behalf of the environment may improve these outcomes for Murray River sites but if not, future options appear limited. Adaptive purchasing strategies that include expanded trade options such as derivatives, options and contracts based around the allocation market may provide a useful policy direction to explore further, with likely successful outcomes for the environmental objectives and flow requirements at critical times.

References


Loch, A. et al., Purchasing water to create sustainable systems: Where does that leave the regulatory approach?

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