An intersectoral comparison of Australian water reforms

Lin Crase\textsuperscript{a}, Brian Dollery\textsuperscript{b} and Joel Byrnes\textsuperscript{b}

\textsuperscript{a}Corresponding author. School of Business, La Trobe University, PO Box 821, Wodonga, Victoria, 3689, Australia.
Tel: +61 2 60249834, Fax: +61 2 60249833. E-mail: l.crase@latrobe.edu.au

\textsuperscript{b}Department of Economics, University of New England, Australia.
Received 2 March 2006; accepted in revised form 7 June 2006
Available online October 2007

Abstract

Reformation of the policies for allocating Australia’s water resources has now assumed profound political, economic and social significance. However, there are marked contrasts between urban and agricultural sectors, in the approach to policy reform. Whereas governments have embarked on a range of mandated initiatives to alter or constrain the behaviour of urban dwellers, the approach adopted for irrigated agriculture has been characterised by an emphasis on markets and private property rights. This paper explores the extent of these disparate and potentially incongruous policies by focussing primarily on the states with the largest irrigation sectors, New South Wales and Victoria. Whilst acknowledging the high transaction costs of individual households engaging in a water market, the paper argues for more liberal market participation by urban water authorities on behalf of their constituents. The paper also calls for more rigorous economic assessment of the plethora of water-saving and demand-management strategies being proposed in the urban water setting.

Keywords: Urban water demand management; Water markets; Water reform; Water-sensitive urban design

1. Introduction

Reformation of the policies for allocating Australia’s water resources has now assumed profound political, economic and social significance. Recent and recurrent drought, prospects for global warming and heightened environmental consciousness have combined with the manifest deficiencies of earlier “developmentalist” approaches to engender unprecedented interest in Australia’s water resources. Moreover, water itself is unique insofar as it is consumed by all individuals and is essential for their survival. Thus, almost the entire citizenry would appear to intuitively “know something about water”

doi: 10.2166/wp.2007.031

© IWA Publishing 2008
and have an opinion about appropriate policy resolutions. Indifference about water policy in Australia is no longer the norm!

Notwithstanding this unprecedented interest, the capacity of individuals and governments to identify and pursue rational alternatives appears severely constrained. For instance, widespread support for the use of rainwater tanks in urban contexts can be found regardless of location and rainfall (see, for instance, ACT, 2005). This prosaic appeal obscures the fact that rainwater tanks do not “create new water”; they simply store it in different locales where it would usually be harvested. Thus, in many inland contexts the installation of rainwater tanks amounts to little more than “robbing Peter to pay Paul”, but this has not prevented governments from offering generous subsidies to install such devices. Moreover, in some states rainwater tanks have become quasi-mandatory under the guise of “water-sensitive urban design” or “smart building codes” (see, for example, DIPNR, 2005).

Another important element of water reform in urban contexts is the imposition of water by-laws that deliberately restrict various types of urban water use. Most commonly, these occur in the form of limits on the activities to which water can be applied, constraints on the timing of water applications, or attenuation of the frequency with which a water activity can be pursued. Moreover, the enforcement of these constraints invariably relies on community vigilance and the threat of punitive measures by water authorities (see, for instance, NERWA, 2005a).

Whereas governments embark on a range of mandated initiatives to alter or constrain the behaviour of urban dwellers, the approach adopted for irrigated agriculture has been characterised by an emphasis on markets and private property rights. These arrangements are consistently claimed to deliver the necessary incentives to achieve greater water use efficiency. The argument offered in this context is that water will be used sparingly by irrigators if it has a market value and can be traded to higher value uses (Crase et al., 2000). The upshot of these reforms is that water should be subject to the “invisible hand of the market” in irrigation whilst managed by the “heavy hand of government” elsewhere. Moreover, not only are the approaches taken to water management within each sector diametrically opposed, there has also been considerable effort to partition the two sectors and inhibit trade of the resource from irrigation to urban users.

Elsewhere in the world the use of markets to facilitate intersectoral water transfers has been received with greater enthusiasm. Transfers between agricultural and urban users in the western states of the USA are often cited for the efficiency-enhancing benefits relative to urban water supply augmentation (see, for instance, Chang & Griffin, 1992). Importantly, one of the legacies of the relatively early adoption of water markets in this milieu has been the evolution of a range of imaginative market instruments that have hitherto received only limited attention in the context of intersectoral trade in Australia. For instance, over a decade ago Michelson and Young (1990) noted the potential for options contracts to provide a mechanism for securing urban water supplies without the politically unpalatable consequences of undermining the agricultural production base. In a similar vein, the recently agreed “trade” between the Metropolitan Water District of Southern California and Palo Verde Irrigation District farmers is illustrative of how market mechanisms can be devised to provide security of water resources to underpin urban water demand whilst limiting the costs potentially borne by the water-selling region (MWDSC, 2004).

Unfortunately, transfer of water between agricultural users and urban water authorities has been demonised in Australia, largely on the grounds that it would lead to unacceptable economic and social harm in agriculture districts (see, for instance, DSE, 2004). This stands in stark contrast to the rhetoric about the benefits of clearly defined property rights and trade between individual irrigators.
Explanations for the seemingly contradictory approaches to water management in agriculture and urban settings in Australia can be found in the new institutional economics notion of transaction costs. Here, the differentiation between markets and governments is considered less important and the focus falls on the transaction costs that attend a set of rules or constraints by which individual behaviour is managed. Put simply, in the new institutional economics it does not matter whether the resource is allocated by the market or government per se. What is important is that the resource is allocated to its highest value use at lowest cost (Challen, 2000). Expanding the notion of transaction costs to incorporate the political costs of change also offers insight in this context (see, for instance, Horn, 1995).

Of particular interest is the mechanism by which the perceived political costs of agricultural adjustment constrain the development of policy and market instruments which could potentially offer greater efficiency than the status quo.

Notwithstanding the elegance of the transaction cost approach in explaining the divergent policy approaches in urban and agricultural sectors, several important questions remain unresolved. What are the sources and scope of the costs in each policy setting? And do the differing policy settings in each sector constrain the development of alternative, more efficient institutions? This paper attempts tentatively to address these questions by exploring and contrasting the approach to water reform in the urban and irrigated agriculture sectors in Australia.

The paper itself is divided into five main parts. In Section 2, a synoptic overview of the extent of water resource usage in each sector is provided, to underpin a brief examination of the policy response and the role of markets in the irrigation and household sectors. Section 3 examines the constrained role of markets in urban settings. A range of additional features of water policy are used as the basis for comparisons between the urban and irrigation sectors in Section 4. This section also notes possible ways of improving the connectedness between sectors and examines the prospects for the wider deployment of markets. The paper offers some brief concluding remarks in Section 5.

2. Water usage in urban and irrigated Australia and the policy response to reform

Water resources are vested in the state governments within Australia and there are notable differences in water usage between state jurisdictions. In some instances this has been a function of, and has given rise to, incompatible institutional and allocation mechanisms between jurisdictions—the contrasting definition of water rights between states being a case in point. Some effort has been made at the national level to bring about greater standardisation of water management (see, for instance, DPMC, 2005). Nevertheless, section 100 of the constitution limits the suasive influence of the national government to its (substantial) expenditure powers.

In those states with the most expansive irrigation activities, water usage by the urban sector runs at about one-tenth of that consumed by irrigation. On a national basis irrigation is the largest extractive user, with an estimated consumption of about 16,660 Gt or two-thirds of all water used. Water consumption by the household sector accounted for about 9% of all water consumed in 2000/01, thereafter followed by the manufacturing (4%) and mining sectors (2%). However, there is considerable variation between states and the prominence of competing industries for the use of the resource also differs. For example, the mining industry consumed about 14% of all water used in Western Australia in 2000/01, but only 4% of the water used in the Northern Territory can be attributed to this sector. Significant variations in per capita consumption by households are also apparent between states:
inhabitants of NSW/ACT consumed around 101 kl/capita in 2000/01 whilst residents of the Northern Territory consumed more than twice this amount at 212 kl/capita (ABS, 2004a, b). An overview of these variations is provided in Table 1.

Given the prominent status of the irrigation sector in the data presented in Table 1, it should come as no surprise that most water reforms have aimed to influence the pattern of usage in this sector. One of the primary motivations for focusing on the activities of the irrigation sector was the revelation from a 1994 audit of water use in the Murray–Darling Basin that the current level of extraction was unsustainable in the longer term and most development was occurring in the irrigation sector. This resulted in the imposition of an interim “cap” on water diversions in 1995 that limited extraction in the Basin to 1993/94 levels. In July 1997, the Murray–Darling Basin Ministerial Council (MDBMC) agreed to maintain the cap which restricted future extractive usage of water while allowing for adjustments for annual stream flow and climate change (Crase et al., 2004).

In a broader sense, these actions reflect two major influences over the water debate in Australia that have emerged over the last two decades. First, there has been recognition that the “development” paradigm that typified early water resource policy was environmentally unsustainable. Second,

---

Table 1. Water use variations between Australian jurisdictions

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Total water extracted (GL)</th>
<th>Use by sector (%)</th>
<th>Per capita household consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>72,431</td>
<td>Agriculture 67%</td>
<td>112 kL/capita+</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Electricity and Gas 7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Manufacturing 4%</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mining 2%</td>
<td></td>
</tr>
<tr>
<td>NSW/ACT</td>
<td>9,425</td>
<td>Agriculture 78%</td>
<td>101 kL/capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 7%</td>
<td></td>
</tr>
<tr>
<td>Vic</td>
<td>7,140</td>
<td>Agriculture 77%</td>
<td>102 kL/capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 7%</td>
<td></td>
</tr>
<tr>
<td>Qld</td>
<td>4,711</td>
<td>Agriculture 73%</td>
<td>137 kL/capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 11%</td>
<td></td>
</tr>
<tr>
<td>SA</td>
<td>1,647</td>
<td>Agriculture 79%</td>
<td>87 kL/capita a,b</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 8%</td>
<td></td>
</tr>
<tr>
<td>WA</td>
<td>1,409</td>
<td>Agriculture 40%</td>
<td>132 kL/capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 17%</td>
<td></td>
</tr>
<tr>
<td>Tas</td>
<td>417</td>
<td>Agriculture 53%</td>
<td>130 kL/capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 14%</td>
<td></td>
</tr>
<tr>
<td>NT</td>
<td>160</td>
<td>Agriculture 44%</td>
<td>212 kL/capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Households 28%</td>
<td></td>
</tr>
</tbody>
</table>

a SA has a high proportion of households who use self-extraction sources like rainwater tanks.
b Based on 2002 population estimates.

Source: Adapted from ABS (2004a, b).

---

1 The development paradigm is characterised by a view that water resources are to be harnessed solely to promote agricultural or industrial pursuits. Flows accruing to the environment are treated as “waste” under this scenario. For a more complete analysis, see, for instance, Randall (1981).
community preferences for enhanced environmental amenity have changed sufficiently to warrant a policy response now. The outcome has been the need to develop approaches more sympathetic to managing the competing demands of extractive and non-extractive users, use and non-use benefits, and the public and private good dimensions of water.

In addition to the MDBMC “cap”, other policy initiatives also reflect this axiomatic shift. At the national level, the Council of Australian Governments (CoAG) reached agreement on Water Resource Policy (or Water Reform Framework) in February 1994, and later developed the Competition Principles Agreement in April 1995 which contained a range of significant reforms. These changes encompassed establishing prices to recover costs fully, recognizing that the environment has a legitimate demand on the resource, separation of delivery and resource management functions, and breaking the nexus between land and water rights to foster water trade. Other legislative changes at the state level followed, all generally sympathetic to the themes of the CoAG agreement but predominately focussing on the activities of the irrigation sector. In August 2003, CoAG announced its intention to develop a National Water Initiative (NWI) which, in addition to adding further impetus to irrigation reform, placed greater emphasis on the activities of urban Australians. In June 2004, CoAG announced that it had reached an accord on the NWI, although Western Australia and Tasmania were unable to make a commitment to the agreement at that time. The major ingredients of these latest reforms were the development of nationally compatible water entitlements, the establishment of a national water market, arrangements for integrating management of environmental water, enhanced measures to develop a water accounting framework and accelerated urban water reforms (CoAG, 2004; DPMC, 2005).

Notwithstanding that the water consumption activities of urban Australians have now reached the national policy agenda, the approach advanced by CoAG to manage household water consumption better stands in stark contrast to that which has been adopted for irrigation. In the case of the irrigation sector the emphasis has been on water trade and establishing the mechanisms to promote exchange. For instance, of the ten key reform elements listed by CoAG (2004), four directly relate to mechanisms for improving water trade.

In this context considerable effort has been given to amending the property rights of irrigators. The basic premise of this approach is that a market for water will ensure that the resource is moved to the use most valued by society and efficiency enhancements will ensue. More specifically, CoAG contends that access entitlements should “generally be defined as open-ended or perpetual access to a share of the water resource that is available for consumption as specified in a water plan” (CoAG, 2004: 1). In addition, a framework for the assignment of risks has been devised which significantly enhances the rights of water users, the most expansive of whom are obviously irrigators. More specifically, only access reductions that arise because of “natural events such as climate change” and “bona fide improvements in knowledge about water systems” capacity to sustain particular extraction levels...up to 2014” are to be borne by water users (CoAG, 2004: 1). Thereafter, water users are to bear the first 3% of any reduction owing to bona fide knowledge and the state and federal governments are to bear the residual risk in excess of this amount. Similarly, access reduction arising from policy change is to be carried by government.

In light of the former entitlements systems that existed in each state, these arrangements represent a major enhancement for irrigators as the major extractive users of water. Formerly, access was generally licensed by the state, leaving irrigators to carry the uncertainty of government response to environmental claims. There is little doubt that the reformation of water rights will provide a windfall gain as the value
of entitlements is directly related to the quality of title (Quiggin, 1986). In addition, these actions would appear to ignore the concerns of Gaffney (1997) who observed almost a decade ago that the process of firming property rights had received only modest attention in the USA. Moreover, he argued that “giveaways”, where formerly public property is simply divested to the private sector for the purpose of enhancing the operation of the market, tend to undermine the market process itself and simply encourage rent seeking behaviour (Gaffney, 1997: 487).

In contrast to the efforts to enhance the property rights of irrigators in order to encourage trade, the rights of individual urban water users have received far less attention in the NWI. In addition to the standard requirement of “continued implementation of full-cost recovery pricing for water in both urban and rural sectors” (CoAG, 2004: 1), three core elements of urban water reform have emerged, all focussing on “actions to better manage the demand for water in urban areas”. First, there is to be “a review of temporary water restrictions”, presumably with the aim of amending their status onto a more permanent footing. Second, “minimum water efficiency standards and mandatory labelling of household appliances” are to be applied with the aim of enhancing consumer awareness of water use. Finally, “national guidelines for water sensitive urban design” are to be developed (CoAG, 2004: 1). Once again, this would appear to be aimed at encouraging, or even mandating, households to use water more sparingly.

3. Transaction costs for urban and irrigation constituents in water markets

The contrast between reliance on markets in irrigation on the one hand, and expanded use of regulation in urban settings on the other hand, might be explained on the grounds of the relative transaction costs of market participation in each context. Transaction costs arise from imperfect knowledge on the part of market participants. Buyers need to find sellers, contracts need to be organised and exchange needs to be accomplished in order for the market to function effectively. In the case of water, it also needs to be feasible to exchange the resource/product. In light of the stringent quality parameters applied to potable water, on-selling of water between households is likely to be particularly problematic. All of these activities make exchange costly and ultimately reduce the benefits that accrue to either party from transacting in water.

In the case of irrigation, the volume of water potentially exchanged is more likely to be sufficient to meet these transaction costs and leave residual benefits for market participants. For instance, transacting 100 ML at $A1200 per ML leaves the seller with the potential to carry significantly more costs than an urban household potentially “selling” 100 kL at a price of $A1.00 per kL. Similarly, a water-thrifty industry is unlikely to be able to justify the transaction costs of water market participation. Clearly, the scope for markets at the level of the individual water user in an urban context relative to individual irrigators is significantly constrained. Thus, the major policy initiative to mitigate the extent of transaction costs attendant on the water market has little bearing on individual households or most urban industries per se.

Notwithstanding the limited capacity of individual urban users to operate in a conventional water market, there remains significant scope for urban authorities to act on behalf of constituent households in a market framework. The provision of urban water supplies varies between states. In some cases, local government acts as the entity responsible for the provision of urban supplies, whereas in other instances like Victoria, larger, regional water entities have been established. In addition, metropolitan
water delivery usually differs from the arrangements adopted in rural and regional areas. For instance, in NSW, the Sydney Water Corporation services much of the capital city, while most other areas of the state are administered by local government. In Victoria, several independent water businesses operate on behalf of the government in the metropolitan area, although regional water firms provide urban water in most other domains. A summary of the institutional characteristics of the urban water sector in the eastern mainland states is provided by Byrnes et al. (2006) and is reproduced here for expository convenience as Table 2. In light of the extent of the irrigation sectors in NSW and Victoria, the following discussion focuses primarily on the rights and transaction costs of urban authorities in these two states.

In Victoria, urban water entities have existing rights to access and draw water on behalf of their communities. Many of these rights are defined in similar terms to those held by irrigators, thereby suggesting the potential for trade on behalf of urban constituents. For instance, rural urban water authorities hold bulk entitlements that are broadly equivalent in status to those held in irrigation districts and by some individual irrigators. However, the political context for these authorities makes participating in the Victorian water market problematic.

Following the recently released White Paper entitled Securing Our Water Future Together (DSE, 2004), urban authorities have been assigned notional water saving targets, regardless of the magnitude of the community’s present water consumption. Accordingly, overt purchasing of additional water runs the risk of publicly violating the intent of government policy. Similarly, selling excess entitlements is unlikely to occur. The state’s Office of the Auditor General has recently ruled that water rights held by urban water authorities should be recorded as “expenses” rather than assets in the annual business accounts (see, for instance, NERWA, 2005b). The justification for this decision was that urban water authorities were unlikely to be able to sell any surplus water in a market setting and therefore its accounting value was zero. Put simply, this sends a signal to water authorities that the state will not ratify

<table>
<thead>
<tr>
<th>State/Territory</th>
<th>Water resource management</th>
<th>Service provision</th>
<th>Environmental regulations</th>
<th>Economic regulations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Queensland</td>
<td>Department of Natural Resources and Mines</td>
<td>Local government</td>
<td>Environmental Protection Agency</td>
<td>Queensland Competition Authority</td>
</tr>
<tr>
<td>New South Wales</td>
<td>Department of Planning, Infrastructure and Natural Resources</td>
<td>Sydney Water Corporation; Hunter Water Corporation; Local government</td>
<td>Department of Environment and Conservation</td>
<td>Independent Pricing and Regulatory Tribunal</td>
</tr>
<tr>
<td>Victoria</td>
<td>Department of Sustainability and Environment</td>
<td>Melbourne Water (bulk metropolitan supply); Three GBE retailers; Regional Water Authorities SA water</td>
<td>Department of Sustainability and Environment</td>
<td>Essential Services Commission</td>
</tr>
<tr>
<td>South Australia</td>
<td>Department of Water, Land and Biodiversity Conservation Environment ACT</td>
<td>ACT Energy and Water</td>
<td>Department for Environment and Heritage Environment ACT</td>
<td>Cabinet</td>
</tr>
<tr>
<td>ACT</td>
<td>Environment ACT</td>
<td>ACT Energy and Water</td>
<td>ACT Energy and Water</td>
<td>Independent Competition and Regulatory Commission</td>
</tr>
</tbody>
</table>

Source: Adapted by Byrnes et al. (2005) from Smith (1999, p. 289)
the sale of excess urban water (where it might occasionally exist) and such rights are more likely to be appropriated to build up the proposed environmental reserve. In this context, it is thus unlikely that any urban water authority will willingly signal the existence of surplus water by offering it on the market.

An additional caveat to intersectoral trade in Victoria arises from the proposed constraint on non-irrigators holding water shares. Under the White Paper, water shares can be held separately from land, but the total holding by non-irrigators cannot exceed 10% for any system. This is purported to provide a safeguard against speculation. However, this does not prevent speculation per se; it merely limits those who are able to participate in the water market. The upshot of this restraint on trade is additional infrastructure costs borne by urban authorities, many of whom may have much higher values for future water use than the current values ascribed by the existing cohort of irrigators. In sum, there is some capacity for urban authorities to engage in intersectoral trade in Victoria, but the political, bureaucratic and administrative costs faced by these authorities clearly outstrip those confronting irrigators.

In NSW, water access rights held by urban authorities generally have a higher status than most irrigation rights insofar as they are given priority in drier years. However, there are significant contrasts between the process used to define urban rights and that employed for the irrigation sector. More specifically, under the Water Management Act 2000 (NSW), volumetric entitlements were to be established for each urban authority based either on the existing volume of entitlements, or the estimated current use under “reasonable” demand management scenarios or an estimated yield from existing works. Importantly, where the volume calculated exceeded the estimated current use under assumptions of reasonable demand management, access to any surplus water could only be secured following ministerial consent. Put simply, if an urban authority had an existing entitlement of 1000 Ml but the minister nonetheless felt that 500 Ml was sufficient, the remaining 500 Ml could not be accessed or permanently sold. By way of contrast, irrigators have had all entitlements ratified that lie within the scope of water management plans in regulated rivers, regardless of existing or historical use. In some cases this has resulted in windfall gains for those irrigators who hold sleeper or dozer rights. These rights can now be exchanged in a market for considerable value.

Several additional caveats limit the ability of NSW urban authorities to participate in the water market. Having established a town’s volumetric access rights, upward adjustments are to be achieved only on the basis of ministerial approval, with regard to population growth and associated commercial activities. Towns experiencing rapid growth can seek permission from the minister for an increase in access rights, but this will only be granted if the request accords with all other goals of the Water Management Act itself (DLWC, 2004).

There is some scope for local government to purchase additional water on behalf of industrial or commercial users in NSW, but this is treated separately from the town’s defined supply and has a lower level of security. Similarly, industries are permitted to purchase water, although expansion within the

---

2 Temporary sale of surplus town supplies is possible only after the completion of a satisfactory drought management plan has been submitted to the state government.

3 Sleeper rights occur where an irrigator holds an entitlement which has never been activated. Dozer rights are only intermittently used. The reform process has led to all irrigators’ rights being improved, regardless of the history of use. As Quiggin (2001: 109) observes this approach was in response to concerns that “the uncompensated withdrawal of statutory rights is a violation of the general norm that property rights should be secure, and may be seen as reducing the value of property rights in general”.
town’s water scheme is solely determined by population growth and ministerial approval\textsuperscript{4}. Thus, whilst industrial or commercial development by “water thirsty” industries may be accomplished within the water market, the disproportionate transaction costs borne by water-thrifty industries seems likely to limit their direct involvement in the market. After all, why would an industry buy 2 Ml of water when it can persuade local government of the wider benefits of locating its facilities in their municipality and avoid the direct costs? In this case the urban authority in NSW can enter the market and buy water, but any purchases will have inferior status to the town supply approved by the minister.

In essence, in the two states with the most extensive irrigation sectors it would appear feasible for urban authorities to act on behalf of individuals and firms and thereby minimise the transaction costs of engaging directly in the water market. However, the activities of water entities are generally constrained by the political determination to use mandatory and regulated control to achieve the necessary adjustments in the urban water settings.

Notwithstanding that some restraints are imposed on trade by irrigators\textsuperscript{5}, the current policy intent to “remove institutional barriers to trade” and to devise “more efficient administrative arrangements to facilitate water trade in connected systems” (CoAG, 2004: 1) would appear to be primarily aimed at the irrigation sector, not the urban domain. Arguably, these arrangements are a reflection of the perceived political costs of allowing wholesale transfer of water resources from low-value agriculture to higher value urban uses. However, these costs are likely to be overstated on several grounds. First, the amount of water that would be necessarily transferred to support urban growth efficiently is relatively modest. Quiggin’s (2006: 12) “back of envelope” calculations place national irrigation-to-urban water transfer at 750 Gl but concedes that practicable transfers are likely to be much less. However, “even modest trade could significantly reduce the severity of urban water supply problems” (Quiggin, 2006: 12). Second, much of the debate about water trade has ignored the voluntary nature of exchange and the benefits that accrue to water sellers (see, for example, Miell, 2003; Truss, 2005). Third, to date, relatively limited attention has been given to the possibility of employing innovative market instruments similar to those deployed in the USA.

Significantly, whilst one of CoAG’s (2004: 19) proposed outcomes for the urban sector was to “facilitate water trading between and within the urban and rural sectors” (CoAG, 2004: 19), the “actions” specified by CoAG in this context pertain solely to demand management and urban design rules. Prospects for a level playing field between sectors in the water market thus seem remote for the foreseeable future. Similarly, serious analysis of alternative market instruments is some way off.

4. Additional intersectoral policy contrasts

In addition to the relatively high costs and constraints confronting urban entities that chose to operate in the water market, the policy perspective adopted in the urban context differs from irrigation on several

\textsuperscript{4} In practical terms these constraints have hitherto placed only a modest impost on urban communities. However, the contrasting policy approach to the irrigation sector is poignant.

\textsuperscript{5} For instance, irrigators may have to satisfy a hydraulic load test to import water, or other caveats might exist to limit environmental externalities. Similarly, some rules may be imposed to account for stranded assets and the attendant social externalities. By way of contrast, in the urban setting assets frequently become stranded by structural change. Such events seldom attract a policy response from government.
other fronts. In the first place, the approach in urban areas has been characterised by mandatory
behavioural change enshrined in by-laws by water authorities. As a general rule, hosing of hard surfaces
has been outlawed, use of trigger devices on hoses made obligatory and garden watering limited to
specific times of the day. Violations attract punitive sanctions with some states imposing fines or even
imprisonment for breaches (see, for instance, NERWA, 2005a). In contrast, the behaviour adopted by
irrigators is not subject to the same level of government oversight. Irrigators are assumed to make
rational productive decisions about water resources, albeit within the confines of the irrigation sector.
An assumption about the same level of rationality is not evident in the context of urban water users.
Notwithstanding that some constraints on agricultural activity occur to minimise externalities6, as they
do with most productive pursuits, it is difficult to conceptualise an environment in which agencies would
attempt to dictate to irrigators the distinction between profligate and efficient water use. In effect, the
market value of water is used to influence the behaviour of irrigators whereas urban households have
their water consumption behaviour bureaucratically proscribed, particularly in the case of outdoor
pursuits.

Importantly, under the current arrangements the sanctions on urban water users and the accompanying
intrusiveness of bureaucratic control takes little account of the overall availability of the resource, since
trade between competing sectors is constrained. Thus, whilst market transfers to ameliorate the costs
borne by urban users remain limited, “political markets” become the mechanism by which the overall
scarcity of the resource is resolved between sectors. In contrast, a more transparent approach to
intersectoral water transfers in the western USA places significant caveats over the power of urban water
bureaucrats and their ability unilaterally to proscribe urban behaviour. This is not to say that political
influences are completely usurped by the market—rather, an intersectoral market plays a vital role in
constraining the political determination of the value of water in different applications.

A second policy contrast relates to the geographic scope of government’s influence on household
behaviour. Hard surface watering has not simply been ruled undesirable in the driest of towns; it is
regarded as recalcitrant in even the most humid parts of NSW or Victoria. Similarly, adjustment to
building regulations to accord with “smart-water-designs” has commonly been applied on a jurisdiction
basis, regardless of major climatic variations within states7. Once again, this approach stands in stark
contrast to that adopted in irrigation. Irrigators are given the liberty to undertake those activities that are
deemed suitable to their individual locale; the individual and not the state makes the assessment of
“appropriateness”, usually based on economic criteria.

Third, water policy in the urban sector has been punctuated by state sponsorship of purported water-
saving devices, seemingly without serious scrutiny of the benefits and costs of this approach. For
instance, in Victoria generous subsidies continue to be offered for the installation of a range of
appliances. Analyses of data available from the DSE (2004) reveal that there are wide variations in the
“cost” of these water savings, in addition to serious concerns about the equity implications of the
resultant distribution of funds. Water-saving shower roses would appear to be amongst the most cost-
effective means of gaining discounts on potable use, with some $A700 of public funds required to yield a

---

6 For instance, irrigators may face constraints from environmental protection agencies on the quality of return flows to minimise
the transport of chemical residues.
7 In NSW the BASIX formulae that was originally applied state-wide was adjusted to account for the aridity of the far west of
the state. Nevertheless, the regional basis of the formulae still entails significant inconsistencies that bear little resemblance to
the realities in different climates.
single megalitre of potable water. However, to garner a similar amount of water by subsidising water-efficient dishwashers requires an impost on the state purse of almost $A33,000 (Crase & Dollery, 2006). To the best of our knowledge, there are few subsidies offered to irrigators that offer such a wide disparity of returns. Moreover, there are very few water markets that would allow price dispersions of this magnitude to persist. Allowing for greater connectedness between the urban and irrigation sectors, as occurs in the USA, has the potential to reduce the extent of such dispersions. When water can be willingly traded from agriculture to urban users, the pervasive effects of seemingly random subsidies can be circumvented.

Fourth, the urban water sector has been typified by the implementation of project assessment criteria that extend beyond the economic or financial domain. The enthusiasm for reclaiming and recycling water in urban settings is illustrative of this point. The reclamation of sewage water to generate a near-potable substitute is difficult to justify on economic grounds alone. The cost of reclaiming and treating effluent to make it a feasible potable substitute commonly exceeds the cost of treating raw water by a factor of two or three (see, for instance, Hurlimann & McKay, 2005). However, in their enthusiasm to see urban communities “live within their water means”, states have embarked on such projects on the basis that they meet other criteria, usually shrouded in the mystique of such concepts as the “triple bottom line” (see, for example, Dimitriadis, 2005). No analogously reckless arguments are extended to irrigators in the states’ endeavours to encourage water recycling. Rather, the price of water is used as the primary suasive instrument in irrigation accompanied by occasional subsidies in recognition of the spillover benefits to the community at large.

Finally, the apparent determination of the states to avoid additional conventional investments in urban water infrastructure is not matched in the irrigation sector. On the one hand, states have pronounced that “new dams are not the solution” (DSE, 2004: 95) for urban water shortages and have expressed disquiet about building structures that would “take water from... farmers who depend on irrigation for their livelihood” (DSE, 2004: 95). In a similar vein, the NSW government has proclaimed that “there is no need for a twelfth dam” (DIPNR, 2004: 8). At the national level, the parliamentary secretary to the Prime Minister’s office has declared that “cities must learn to use the water they had (sic) more efficiently before they considered buying irrigation water from outside their catchments” (Nairn, 2005, cited in Quiggin, 2005: 1). This aversion to new investments in infrastructure does not, however, appear to have been extended to more “adventurous” escapades such as desalination. The apparent steely determination to avoid exploration of conventional engineering adjuncts in urban contexts is disturbing.

Water sold in most irrigation districts is much cheaper than many of the “refit and recycle” options presently on offer in urban areas. The challenge is to transport this water from its present location to where it realises a higher value, and to do so at reasonable cost. The present policy aversion to conventional infrastructure (i.e. pipes and dams) runs the risk of disregarding potentially feasible solutions that would see irrigation water transported to growing urban centres. The alternatives of embarking on massive capital investments in such projects as water reclamation and desalination with ongoing environmental and economic burdens need to be carefully considered against all options. In conjunction with a more efficient market setting for both urban and irrigation sectors, the use of conventional infrastructure to transport irrigation water to urban environs at least deserves consideration (Quiggin, 2005: 1).

Politicians appreciate that Australian voters are entitled to view with suspicion policies that comprise only engineering answers. The decades of “water development” and the desire to undertake “nation building” on the basis of water infrastructure has left the current generation with a costly legacy (see, for
instance, Watson, 2003). Publicly sponsored irrigation has proven expensive in terms of dollars and the riverine environment (see, for instance, Crase et al., 2004). However, halting the development of even modest intersectoral conveyance infrastructure for fear of a political backlash also runs the risk of stifling mutually beneficial exchange. There is ample evidence from elsewhere in the world that market transfers can give rise to innovative arrangements that address the need for urban water security and raise the welfare of those who sell water (see, for example, Hamilton et al., 1989; Chang & Griffin, 1992; Hearne & Easter, 1998).

Paradoxically, the present policy approach that continues to segregate the irrigation sector from the impact of intersectoral transfers perpetuates the cost of earlier policy choices, albeit in a less-overt manner. First, it underpins behavioural imposts on urban communities which are likely to be overly intrusive relative to those that would emerge under an intersectoral market. Second, it condemns irrigation farmers, wishing to sell water rights, to lower prices and less varied choices within the market. For example, under the current regime the scope for farmers to lease water to urban communities or engage in options contracts is severely limited.

5. Concluding remarks

The intensity of the debate surrounding water policy in Australia shows no signs of abating. Water is becoming increasingly scarce and the public policy response to this scarcity will have a profound and enduring influence over the future of urban and agricultural sectors alike.

To date policy makers have responded by promoting a market framework in irrigation to enhance resource allocation. However, political enthusiasm for the market in urban contexts is decidedly tepid. Whilst the transaction costs for urban individuals and firms to engage in a water market are likely to be excessive, and may perhaps partly explain this policy stance, scope exists for urban water entities to act on behalf of urban constituents in the market. Current and proposed legislative reform in NSW and Victoria shows that active trade by urban entities is feasible, albeit hampered by a range of political and bureaucratic constraints. Moreover, these constraints stand in stark contrast to the current reform effort to reduce the impediments to market participation confronted by irrigators.

The contemporary policy in the urban sector is dominated by a philosophy of “living within existing means” at almost any cost. Expensive water recycling projects, elaborate engineering solutions and stringent controls on the behaviour of consumers are the norm. This is a dangerous policy precedent that ignores important economic principles that have been used to undergird the recent impressive performance of the Australian economy. In other domains resource allocation has been increasingly focussed on market mechanisms—reforms in labour markets and capital markets being cases in point. To apply a different metric for the allocation of water resources between competing urban and irrigation users thus seems fraught with problems.

As noted in Table 1, irrigation dominates the use of Australia’s water resources. And yet in 2000/01 each kilolitre of water harnessed in agriculture yielded output worth less than $A0.20 on average. Given that these are mean results, it seems reasonable to expect that a significant potion of irrigated agricultural production also falls short of this amount. In urban settings the current price paid for potable water in most cities approaches $A1.00 and is planned to increase to as much as $A2.00 in some instances. In the absence of any major urban protest, it seems reasonable to suggest that most city dwellers are capable of paying this amount. Notwithstanding that potable water is more costly to produce, the magnitude of
these additional expenses is immaterial against the manifest variations in value between sectors.\(^8\) Trade between sectors is clearly an option and there is scope at least to consider the additional infrastructure costs entailed in transporting the resource to willing buyers.

In contrast, proponents of arrangements that would see urban trade tightly fettered commonly point to the value of the agrarian activity fostered by irrigation. Invariably this is embellished by appeals to the cultural heritage of the “Australian bush”, even though no obvious distinction between natural and agricultural landscapes is offered (Watson, 2004). Urban Australians are repeatedly told that they must curb their wasteful use of water and they cannot expect simply to buy it from the first willing seller. To do so would apparently bring forth massive social and economic dislocation in the iconic bush.

Importantly, the failure seriously to consider inter-sectoral trade is hampering the development of alternative market instruments that may be more efficacious and politically palatable. In other locales, where intersectoral transfers have received greater policy support, innovative deals have emerged which have clearly benefited both parties. Options contracts are particularly appealing in this context since they meld the efficiency benefits of the market mechanism with the political necessity to assuage the costs associated with the export of water from rural areas. Unfortunately, whilst Australian policy makers remain reluctant to allow market connectedness between sectors few deals of this nature are likely to materialise.

References


\(^8\) In 2002/03 the average operating costs of generating a megalitre of potable water in Victoria was $A558, which included the cost of raw water (Victorian Water Industry Association, 2003: 79). On the basis of these data the conversion of raw water to potable water might be expected to fall short of $A0.5 per kl.

Department of Prime Minister and Cabinet (DPMC) (2005). *About the National Water Initiative.* DPMC, Canberra.


