



WHAT IMPEDES WATER MARKETS?

H Bjornlund

Introduction

Most water resources within the Murray-Darling Basin are now fully committed, and the extraction for consumptive uses is effectively capped, and will inevitably be further reduced. Therefore, the only way of providing water for new uses is through a reallocation of existing resources. Similarly, the only way of increasing the economic output from the capped resource is to reallocate water from inefficient low value users to efficient high value users. The water market is the instrument relied on to facilitate these processes, and full-cost recovery prices are one of the drivers of the process, encouraging or forcing the inefficient low value users to make the necessary farm adjustments, or stop irrigating. As the combined forces of the Cap, increased demand for water for environmental purposes, a prolonged drought, and the initial success of water markets have reduced irrigators' seasonal access to water this reallocation process has become imperative. The importance of a smooth reallocation process has been further emphasised as water allocation policies have shifted the risk management burden associated with fluctuating seasonal allocations from water authorities to individual irrigators.

These developments have placed increased demand on water market mechanisms to operate quicker and with greater certainty. Both the entitlement and allocation markets (permanent and temporary markets) provide irrigators with an important tool to manage the increased

important to understand what impedes the operations of water markets. This paper will discuss market impediments based on three workshops with stakeholders and 32 focus groups with irrigators in South Australia, Victoria and NSW (Bjornlund 2004a).

Uncertainty of future supply

Uncertainty with respect to the future level of seasonal supply came through very strongly as the main impediment to trade in entitlements. The impact of the Cap, perceived or real, and the unresolved issues of environmental needs have generated this uncertainty. The Snowy River debate has caused great unease, as has the Murray-Darling Basin's 'Living Murray' initiative (MDBMC, 2002). That these developments happen to coincide with one of the longest and most severe droughts on record, have worsened the impact, and in many instances confused the relationship between cause and effect. As a result, great uncertainty exists about future allocation levels. Irrigators therefore raise the question 'Why would you buy entitlements if you don't know what you get?'. If you pay \$1,000/ML today, you don't know what you will receive in years to come. Conversely, if you pay \$80/ML today in the allocation market, you will receive one ML, and with the Exchanges in place, you will receive it instantly. The only way this problem can be resolved is by the creation of certainty, which will require the completion of the 'Living Murray' process and the production of water management plans (different name in each state) throughout the basin as well as the

makers therefore is to trade off city votes for country votes'. Irrigators also expressed the need to 'keep some water up your sleeves' rather than selling it 'just in case', and that it was better not to sell seasonal allocations, because 'you never know', when the government will come and take the water back, with the argument that 'since you have sold it, you obviously don't need it'.

Physical constraints

Channel capacity was mentioned as an important impediment. In some districts trade into a channel will not be allowed, unless the additional demand created by the trade can be supplied, without affecting the supply reliability of existing irrigators. Many irrigators, who rely on purchases of allocations, are concerned that their channel might become over committed because of other farmers buying entitlements, with the result that they may not be able to get their seasonal purchases delivered in the future. This problem could be overcome by the introduction of separate supply capacity entitlements; this would allow irrigators to buy these entitlements, and thereby secure access to supply. Further, if supply entitlements were designed to include the period during which supply can take place, it would be possible to buy water for delivery by constrained channels during off-peak periods relying on on-farm storage (Bjornlund, 2004b).

Limitation on trade out of irrigation districts

Within all three States some types of limitations on trade out of districts exist. The systems used vary from state to state. Trade of entitlements out of Murray Irrigation Limited (MIL) is not permitted if trade reduces the total entitlement to below the 1995 volume. Western Murray Irrigation (WMI) generally does not allow trade of entitlements out of the district. If land is taken out of irrigation for urban subdivision, transfers are allowed subject to the payment of exit fees. This fee is amortisation based, and set at a level to cover the future running costs of the area, for which the seller would have been responsible (MDBC, 2000). Seasonal trade is also restricted out of most irrigation districts and defined in the annual Water Allocation Plan.

Workshops and focus groups with irrigators, water brokers and other stakeholders in the irrigation industry have identified a number of impediments to the operation of water markets

supply uncertainty and facilitate a continued reallocation of water both within and between seasons. The use of the allocation market has grown explosively during the last six to seven years, a process which has been significantly enhanced by the emergence of water exchanges in NSW and Victoria (Bjornlund, 2003a). The use of entitlement markets has also grown but at much lower volumes. If maximum benefits are to be gained from trade, it is

completion of the National Water Initiative (CoAG, 2004).

This concern is associated with a general distrust of governments, politicians and their motives for policy making. There was a lot of talk about constantly 'shifting goal posts', and the term 'total fear' of what politicians might do was used. The belief was that the influence of the environmental movements in the big cities 'is growing every year' and that 'the objective of policy

Within the Central Irrigation Trust (CIT), there is a two percent cap. This restriction on trade effectively prevents trade of entitlements out of most of the districts. Additional outward trade can only take place if substituted by inward trade.

The argument both within the MIL and CIT is that the economic development potential should be retained within the district, and that substantial export of entitlement out of a district will leave the rest of the irrigators to pay a larger burden of the delivery and maintenance costs and will result in a general reduction in economic activity, jobs and services within the area. It is further argued that substantial investments have been made in developing and improving infrastructure and that this infrastructure is yet to reach its full potential. WMI also argues that they want the development potential retained because the present uncertainty associated with crown leases and aboriginal issues, prevalent in western NSW, impedes development. They expect that development will pick up, once these issues have been settled.

Within the GMID, a different approach has been taken with a two percent per annum cap on trade out of districts. That is, no more than two percent of the total entitlement at the beginning of the year can be traded out during the year. The argument here is to prevent water from trading out at too rapid a pace, allowing both communities and the authority time to adjust. For many years this rule had little impact; it was first invoked in 1998/99 when trade out of Torrumbarry reached two percent in February, which delayed trade out until July 1999 (DNRE, 2001). However, during the drought of 2002/03 three of the districts within the GMID reached the two per cent limit and already in October 2004 four districts had reached that limit for 2003/04. In the focus groups these rules had strong support.

Issues of culture and tradition

Past surveys of irrigators indicate that farmers are not totally content with markets as the only means of allocating water (Symes *et al.*, 1999; Bjornlund, 2002a; Tisdell and Ward, 2003). Tisdell and Ward found that irrigation communities strongly disagree with the idea that 'water entitlements will no longer be an inherent asset in farming', and strongly support the authorities' right 'to intervene in the market if trade has the potential to impact on third parties, the economic viability of local towns and communities, environmental flow objectives, and when the negotiated conditions of trade or resulting distribution from trade is seen as unjust or unfair' (p. 28).

Table 1. Farm businesses, which have not participated in water trading.

Area	% of farm businesses
Pyramid Hill/Boort (Victoria)	10.6
Torrumbarry System (Victoria)	35.4
Murray irrigation limited (NSW)	11.9
Private diverters Murray Region (NSW)	27.0
Private Diverters River Murray SA (Riverland)	60.6
Private Diverters River Murray SA (lower Murray)	44.5
Central Irrigation Trust, SA	85.3

Based on an analysis of water entitlement registers and water trading registers for the respective areas as of 30 June 2001.

Table 2. Trading activity on the temporary market 1995/96 to 2000/01 - MIL.

	% of farm businesses		
	Buying	Selling	Not trading
1995/96	23.4	23.2	53.5
1996/97	21.2	15.4	63.6
1997/98	40.3	29.4	30.2
1998/99	38.8	31.5	29.7
1999/00	44.6	25.4	29.9
2000/01	37.1	30.2	32.7
2001/02	34.6	32.3	33.1

The workshop in Victoria placed some emphasis on cultural issues. Participants argued that traditionally irrigators do not see themselves as water traders but as farmers, and will therefore only consider growing a crop. It would be against their culture and tradition to sell the water to gain an income, rather than grow a crop. The focus group participants were ambivalent on the issue; with irrigators expressing very strong concerns about the potential community impacts of water trading out of districts and the impact of non-irrigators speculating in water (which Tisdell and Ward also found). They also expressed views like 'trade should only be allowed within district at prices that irrigators can afford', 'the poorer will get poorer and the rich will get richer; generally poorer farmers can't afford to purchase water so they fall even further behind', and 'there should be a moratorium on trading in permanent entitlement to give people time to reassess and review the impact that trading has had'. Irrigators want to protect their communities against the vagaries of the free market but are also astutely aware that they need more open and flexible markets to help them manage increased risk and uncertainty. There are therefore signs that irrigators are increasingly treating water as just another commodity in the allocation market, while they remain reluctant to sell water in the entitlement market (Bjornlund 2003a,b).

Analyses of the water entitlement and

water trading registers suggest that market participation is quite high in NSW and Victoria (table 1), with only 10-12% of farm businesses within the Pyramid Hill-Boort area and MIL never having participated in any kind of water trading. Table 2 reflects the increase in trade participation in any given year within the MIL and shows a doubling of the participation rate since 1997/98. During the last five seasons more than two thirds of all farm businesses were active in the allocation market. The participation rate in SA and in the Murray supplied part of the GMID is much lower; this reflects a higher level of reliability of water supply.

These figures indicate that markets have been fairly widely adopted by irrigators; however, in asking irrigators what they think about the market in general it was indicated that about 30% of buyers in the temporary market during 1998/99 within both the GMID and MIL, and 30% of irrigators within the GMID who have never traded, are against water markets, because they activate unused water, and thereby reduce seasonal allocations (Bjornlund, 2002b).

Lack of more flexible and secure property rights consistent across jurisdictions

Present property right structures and the lack of secure registers of water entitlements were mentioned in all three states as important impediments to the further

adoption of water markets. In SA, water and land rights have been formally separated for quite some time, while in NSW and Queensland the separation is part of the new Water Act 2000. Victoria so far has not taken any steps to implement this separation, but is presently considering such a move (DSE, 2003). Discussions at the Victorian workshop as well as in focus groups in all three states were lively with respect to this issue; proponents of the separation were vocal, while others reported significant opposition to such a move. The perceived benefits of this separation would be more flexible instruments such as long-term leases and leaseback arrangements. Both these lease forms would provide irrigators who rely on the allocation markets with much more security of price and supply. Leaseback will enable irrigators to sell their entitlements to finance the necessary farm adjustments, and consequently to be in a position to develop their properties, while at the same time retaining the long-term control of the seasonal allocations.

Separating the interest in land and water as well as unbundling the interest in water into its components would also ease the introduction of more sophisticated derivatives of water entitlements and allocations such as futures, options and conditional leases, which will allow more flexible and predictable trading to take place outside periods of severe water shortage. This would take the pressure of future drought periods by allowing farmers to make mutually profitable long-term arrangements about how they are going to handle future droughts, during periods of normal supply, when heads are cool and minds are more logical. Buyers can make more rational decisions and can 'shop around', whilst sellers will not be caught up in the 'greed-of-the-moment' during periods of drought and frantic buying. In other markets it has been proven that secondary products have become the dominating market, and that these products have significantly changed demand pattern and thereby increased overall efficiency (ACIL 2003).

A final impediment to trade, generated by policy differences between states, was identified between NSW and Victoria. In NSW the ability to carry unused water over to the next season is announced late in the season. Victoria does not have such a provision. There is therefore a potential for NSW irrigators to buy cheap water in Victoria toward the end of the season, when remaining unused allocations have little or no value. To prevent this, the Victorian Government has placed a ban on trade into

NSW, from the time when NSW announces their carry over ability.

Financial institutions

Financial institutions have traditionally required irrigators to control the necessary water entitlements as a condition for approving funding for developments. This in essence has been an impediment to the use of the allocation market as a vehicle for new developments, and as a driver of the entitlement market. It was reported at the SA workshop that financial institutions have become more willing to waive this requirement. The development of long-term leases as well as leaseback arrangements would protect both the financial institutions and the developers in this process. Along the same lines Goulburn-Murray Water has made it possible for developers to obtain security of channel capacity for their total water need, while they develop their property, and while they purchase the necessary volume of entitlement (DNRE, 2001a). This again reduces the risk for both developers and financial institutions during the development process.

Administrative issues

Administrative issues as impediments to the use of entitlement markets came through very strongly in the workshops and focus groups in all three states. This reflects the review of the Interstate Permanent Water Trading Pilot Program (Young *et al.*, 2000), and the survey work of Tisdell and Ward (2003), and Bjornlund and McKay (1999, 2001). The issues are the time it takes, the costs involved and the uncertainty of the outcome of the process. In Victoria the main issue is the need to advertise (28 days), in SA it is the need to produce an Irrigation and Drainage Management Plan, and for interstate trade it is the 35 days that applications have to spend in the mail. Within all jurisdictions a chronic shortage of staff within the relevant departments was referred to as a major cause of the time delay.

Bjornlund and McKay (2001) showed that irrigators' perceptions of the administrative processes in the allocation market in NSW and Victoria have become more and more favourable over time. On the other hand irrigators using the entitlement market continued to rate the process as being equally difficult. These factors have been an impediment to the adoption of the entitlement market and a driver of the allocation market. Within the GMID, interviews of irrigators originally used the entitlement market, but subsequently had used the allocation market, found the following to be

important reasons for this change: (i) 39% said that 'it is too difficult to buy entitlements'; (ii) 32% said that 'the transfer cost of buying entitlements is too high'; and (iii) 50% said that 'with the Exchange in place it is so easy' to buy allocations. Among the sellers, 59% referred to the ease of using the exchange, while 9% referred to the difficulty of the transfer process when selling entitlements. Obviously it is predominantly the buyers who are suffering from the administrative problems.

The second area of concern, with respect to administrative issues is related to the lack of transparency in the market. This issue was particularly discussed in the SA workshop, reflecting the fact that there is no Exchange operating in that state, and therefore no public access to information about supply and demand. With the operations of the Exchanges in Victoria and NSW, transparency in the market is very good.

Tax implications

Tax laws could be hypothesised to have a significant influence on which market buyers and sellers use. The purchase of an allocation is an operational cost and therefore tax deductible, while sales are annual income to be offset against cost. Since most sellers have relatively low farm incomes (Bjornlund, 2002a), tax is not a major concern. On the other hand, purchases of entitlements cannot be deducted or depreciated in tax, and sales might attract capital gains tax (DNRE, 2001). Quite a large proportion of market participants are aware of this fact: 14% of the buyers of allocations in NSW and 16% in GMID during 1998/99, said that tax benefits were an important reason for using that market, while 40% of the buyers of entitlements within the GMID who subsequently used the allocation market to sell water, gave tax benefits as an important reason for this decision. However, estimations of tax implications of water trading in both entitlement and allocation markets suggests that most irrigators should be largely indifferent to which market they use from a tax perspective (Box 1).

Adjustment pressure

Many irrigators cannot afford the capital outlay associated with buying entitlements, because their available capital is tied up in other farm adjustments such as expanding their property, changing production and improving irrigation and drainage infrastructure. They therefore depend on the allocation market (Bjornlund, 2002b). These irrigators would benefit from longer-

term leases as well as leaseback arrangements, in order to assist them in the adjustment process by providing long-term supply and price certainty. Reflecting this, 62% of the buyers of allocations within the GMID during 1998/99 said that an important or very important reason for using the allocation market was that even though they needed the water every year, they could not afford to buy it, and 33% of the entitlement buyers, who had used the allocation market for subsequent purchases, said that they did this, because they could not afford to buy more entitlements. Likewise, there is a large group of irrigators who have given up developing their property to be financially viable in the long term, but do not want to sell their entitlements and give up the farming lifestyle and leave the community. They use the allocation market to either buy enough water to keep their farm businesses running or to sell all or most of their water to generate a household income combined with off-farm work (Bjornlund, 2002a).

Conclusions

This paper has discussed impediments to the operations of water markets, in particular the market for long term entitlements, based on workshops with irrigators, water brokers and other stakeholders in the irrigation industry, and focus groups with irrigators. Nine categories of market impediments were identified: 1) uncertainty about future supply, 2) physical constraints, 3) limitations on trade out of irrigation areas, 4) issues of culture and tradition, 5) lack of more flexible and secure property rights consistent across jurisdictions, 6) financial institutions, 7) administrative issues, 8) tax implications and 9) adjustment pressures.

The major impediments to trade as such are uncertainty of supply, physical constraints, administrative issues and limitations of trade out of areas. Important impediments to the use of entitlement markets relative to allocation markets are administrative issues, uncertainty of supply, tax implications and adjustment pressures. The major impediments to the future evolution and expansion of the use of water markets are the lack of more flexible and secure interest in water and greater consistency of the definition of these interests across jurisdictions. Irrigators have been hesitant to adopt water markets because of culture and tradition, and many have therefore been reluctant users of water markets in response to increasing adjustment pressures, brought to bear on irrigation communities by the new generation of water policies.

Box 1. Comparison of permanent and temporary prices.

Assumptions:

- An allocation price of \$80/ML and an entitlement price of \$800/ML¹;
- a marginal tax rate of 40% for buyers and 17% for sellers;
- a cost of money of 8%;
- a cost of water supply of \$20/ML pa; and,
- a sales water entitlement set at the expected long-term average of 60% for buyers, and a maximum of 30% of sellers (set by regulation).

For sellers:

1. income from trade \$80/ML, less delivery cost \$20/ML, yielding a net income of \$60/ML;
2. after tax net income \$60 less 17% = \$49.80/ML;
3. however, when comparing with the price of an entitlement, we have to consider that the alternative of selling 1 ML of entitlement is to sell 1.3ML of allocation, increasing the comparable annual after tax net income to \$64.74/ML;
4. capitalised at 8% yields a capital value of \$809/ML; therefore,
5. given a water market price of \$800/ML, most sellers should be indifferent to which market they use.

For buyers:

1. cost of water \$80/ML, since the seller pays delivery cost, this constitutes the full annual cost;
2. after tax net cost \$80/ML less 40% = \$48/ML;
3. to compare with the entitlement market, we have to consider that a buyer will have to buy on average 1.6 ML of allocation per year to replace 1 ML of entitlement, raising the comparable annual cost to 1.6 x \$48 or \$76.80/ML;
4. capitalising this price at 8% yields a comparable capital cost of \$960/ML;
5. when comparing this price to the permanent market price of \$800, we have to consider that by buying 1 ML of entitlement, the buyer has to pay the delivery cost of \$20/ML or an after tax cost of \$12/ML in perpetuity. Capitalising this after tax delivery cost at 8% produces a capital cost of \$150/ML. Adding this to the entitlement price of \$800/ML produces a comparable entitlement price of \$950/ML; therefore,
6. under this scenario most buyers should be indifferent to which market they use.

1. These prices reflect market conditions during the 1998/2000 seasons and have been used as prices since has increased significantly and allocation prices has fluctuated significantly due to the long drought. These prices are therefore not likely to reflect long term trends (Bjornlund and Rossini, 2004).

The Author

Henning Bjornlund is a Senior Research Fellow in the School of International Business, University of South Australia, specialising in aspects of water trading. Email: henning.bjornlund@unisa.edu.au

References

- ACIL Tasman (2003): *Water Trading in Australia - Current and Prospective Products*. Canberra: ACIL Tasman.
- Bjornlund, H. (2004a): *Water markets, Water rights and the Environment - What the Irrigation Community Tells Us, Victoria, New South Wales and South Australia*. Industry Partner Report written as part of the ARC SPIRT project Draft Final Report Section 3. (A copy can be obtained by e-mailing the author at henning.bjornlund@unisa.edu.au).
- Bjornlund, H. (2004b): *Where to from here? - A framework for the next generation of water market policies*. Industry Partner Report written as part of the ARC SPIRT project Draft Final Report Section 4. (A copy can be obtained by e-mailing the author at henning.bjornlund@unisa.edu.au).
- Bjornlund, H. and Rossini, P. (2004): Factors Influencing Prices Paid in the Market for Temporary Water. *Pacific Rim Property Journal* (10)4, in print.
- Bjornlund, H. (2003a): Efficient water market mechanisms to cope with water scarcity. *Water Resources Development* 19(4), 553-568.
- Bjornlund, H. (2003b): Farmer Participation in markets for temporary and permanent water in southeastern Australia. *Agricultural Water Management* 63(1), 57-76.
- Bjornlund, H. (2002a): The socio-economic structure of irrigation communities - water markets and the structural adjustment process. *Journal of Rural Society* 12(2), 123-147.
- Bjornlund, H. (2002b): The Adoption, Perception and Impact of the New Water Policy Paradigm within Two Australian States. Proceedings from the Conference 'Irrigation Water Policies: Micro and Macro Consideration'. Agadir, Morocco, June. Available at URL <http://www.worldbank.agadirconference.com>.
- Bjornlund, H. (2000): To Regulate or to Market - Striking the Balance for Sustainable Water Use. *Proceedings from the joint conference: Water and the Law*, Adelaide, October, 7-14
- Bjornlund, H. and McKay, J. (1999): Water Markets: Buyers and Sellers Perception. *Water* 26(2), 41-45.
- Bjornlund, H and McKay (2001): Operational Aspect of Water Markets. *Proceedings from the 3rd Australasian Natural Resources Law and Policy Conference*, Adelaide, March, 50-59.

- CoAG (2004): Communiqué 25 June 2004.
Available at URL <http://www.pm.gov.au>
- DNRE, Department of Natural Resources and Environment (2001): *The Value of Water: A Guide to Water Trading in Victoria*. Melbourne: DNRE.
- DSE, Department of Sustainability and Environment (2003): *Securing Our Water Future - Green Paper for Discussion*. Melbourne: DSE.
- MDBC, Murray Darling Basin Commission (2000): *Future Infrastructure Maintenance: (in water origin/donor areas) - Addressing Concern About Trading*. Discussion Paper for Permanent Interstate Water Trading Workshop in Albury, December. Canberra: MDBC.
- MDBMC, Murray Darling Basin Ministerial Council (2002): *The Living Murray*, Canberra: MDBMC.
- Syme, G.J., B.E. Nancarrow and J.A. McCreddin (1999): Defining the components of fairness in the allocation of water to environmental and human uses. *Journal of Environmental Management* 57, 51-70.
- Tisdell, J. and J. Ward (2003): Attitudes Towards Water Markets: An Australian Case Study. *Society and Natural Resources* 16, 61-75.