WHAT IS DRIVING ACTIVITIES IN WATER MARKETS?

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Introduction

The use of Water markets have increased significantly within the three southeastern states during the last six to ten years sending strong signals about the economic value of water to users, while emerging legislation as well as CoAG and Murray-Darling Basin Commission policy initiatives aim to ensure that the economic signals also incorporate environmental and social values. This process has been supported by the emergence of water exchanges providing farmers with easy, cheap, fast, convenient and secure means of transferring water on the temporary market (Bjornlund 2003a,b). Irrigators are therefore becoming familiar with water markets, how they operate and their potential benefits (Bjornlund 2003b) and markets have assisted them in coping with water scarcity, policy uncertainty, and adjustment pressures (Bjornlund 2003c, 2002a). Many irrigators are now making annual business decisions whether to buy or sell water based on fluctuating commodity prices and the level of water scarcity and follow the market from year to year. There is therefore evidence of a commodification of water in the temporary market, while in the permanent market water is still perceived as an inherent part of the farm (Bjornlund 2003b, Tisdell and Ward 2003). However, there are also clear indications that considerable uncertainty and ignorance exist about the way markets operate, and many factors impede their efficient operations (Bjornlund 2002b).

To further the adoption of water markets it is important to understand what drives buyers and sellers in the markets and thereby influence supply, demand and prices. This paper will explore the issue of market drivers based on workshops, focus groups and interviews with irrigators, activities on the Water Exchange, and records of water authorities. Seven categories of drivers have been identified and will be discussed in this paper.

Farming Patterns and Agricultural Practices

Different commodities have a different use pattern and can afford or are willing to pay different prices at different times

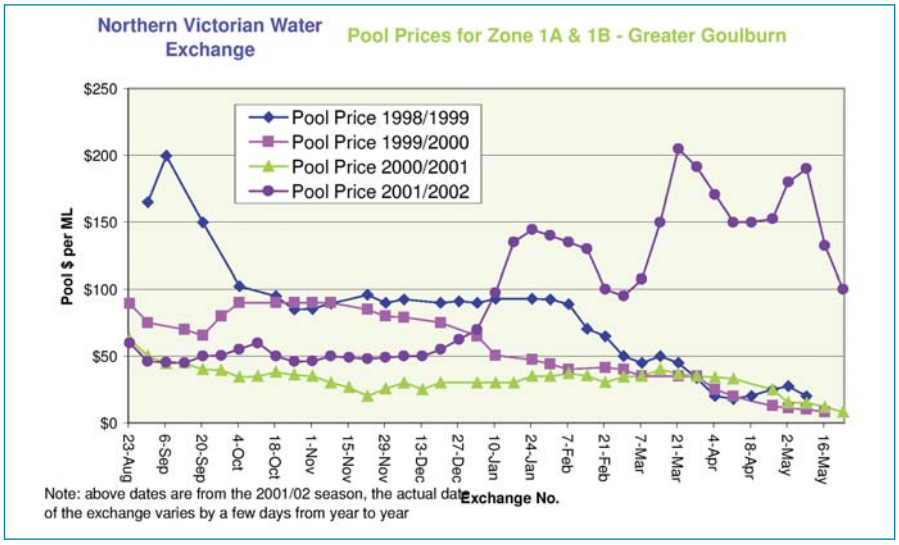

Figure 1. Price levels on the Northern Victorian Water Exchange 1998/99 to 2001/02.

of the year. Dairy farmers have a weekly income and therefore tend to buy water during the season, as they need it. They also have a higher gross margin per ML than most grazing and grain growing farmers and are therefore not as sensitive to price fluctuations. Rice farmers and most broad acre farmers have a fairly narrow cost margin and receive a bulk payment at the time of harvest; they therefore tend not to plant any more land than they can irrigate with the water they have or can buy at that time at a price where they can make a profit (about $30/ML). They will then again be willing to buy just before harvest if the crop needs a bit extra to finish up or they need to fill the soil profile for a follow on crop. Dairy farmer are aware of this pattern and therefore plan their buying not to coincide.

Changes to farming practices also have an impact on demand for water. Within the dairy industry there has been a trend toward split calving, which shifts demand to the winter period where the level of natural precipitation is higher, this reduces demand for water during the hot summer months. Also, there has been a trend toward keeping animals in feedlots and then producing feed such as grain or silage. This has not been without problems, since the use of feeding grain or silage requires different management practices and is more labour and capital-intensive as farmers need to invest in equipment to harvest, handle and store the feed.

Commodity Prices

The prices of and demand for various commodities has an impact on supply and demand in water markets. The price of feeding grain is an example of this; during the first year of the exchange dairy farmers were advised that at prices above $90/ML they would be better-off buying feeding grain. This influenced the behaviour of farmers during the first two seasons (Figure 1). In NSW, the rule of thumb was that as long as water prices stayed below the price of half a ton of grain, the farmers would be better off buying water. As a result of the drought the supply of feed was very low both during 2001/02 and 2002/03 and therefore very expensive increasing dairy farmers' willingness to pay for water toward the end of 2001/02 and the beginning of 2002/03 (Figure 2).

During 2001/02 commodity prices for the farmers normally supplying the temporary market; that is, the cattle, lamb, wool and grain growers, were very high; these farmers were therefore reluctant to sell, which reduced supply and forced up prices; at the same time, dairy prices were high increasing the dairy farmers' willingness to pay resulting in record prices (Figure 1).

Figure 2. Price levels on Watermove 2001/02 to 2002/03.

Interviews with buyers and sellers of water during 1998/99 clearly confirmed the importance of commodity prices as a driver of temporary trade: 45% of sellers within the GMID and 34% within the MIL gave low commodity prices as an important reason for selling while 48% of the buyers within the GMID and 36% within the MIL gave good commodity prices as an important reason for buying, while approximately 38% of buyers in both regions gave 'a one-off opportunity to sell more of a certain product' as an important reason to buy.

Climatic Variations

If natural precipitation within the irrigated area is down or evaporation is up due to hot weather and strong dry winds, then demand for water will be high in order to substitute rainfall and replace evaporation. The spring of 2000/01 was very wet reducing the need for early irrigation, which reduced demand in the market keeping prices down (Figure 1). The spring of 2001/02 was very dry and hot with strong dry winds, as a result evaporation was very high; the combined impact was a very high need for irrigation with use up by 13% to 15% compared to previous seasons. Demand and thus prices did not rise immediately, due to the experiences from past years, despite the fact that some farm consultants were advising to buy, because they could see that demand eventually would drive prices up. Demand did indeed build up during spring contributing to significant price increases during December and January. Finally, that year opening rains did not start until very late in autumn causing demand to remain high; this was a contributing factor to the high price level late that season (Figure 1).

Supply of Water

Three main factors have an impact on the level of water supply: 1) allocation level; 2) policy decisions; and 3) major non-agricultural players. When seasons are dry in the catchment, allocations are low, thereby increasing demand for water in the market. Table 1 clearly shows how volume traded as percentage of water use increases when allocations are low. During periods with only 100% allocation trade accounts for 15-18% of water use and up to 24% when allocations only reached 57% in 2002/03, whereas when allocations are at 200% trade only accounts for 5-6%. Irrigators within the Goulburn System, which have not had any sales-water the last five years, are therefore far more active in the water market than irrigators within the Murray System, only 10% of farm businesses within the Goulburn System have never participated in any kind of water trading compared to 35% in the Murray System (table 2).

During1998/99 the opening allocation was only 40% within the Goulburn System; horticultural growers therefore panicked and bought water to protect their permanent plantings resulting in very high opening prices (Figure 1). However, prices dropped again as allocations reached 100% during September. The following two years opening allocations were also below 50%, but armed with their experiences from the first year farmers did not panic and prices remained relatively low.

At the start of 2002/03 the allocation was 34%, but contrary to previous seasons Goulburn-Murray Water (G-MW) gave little hope that it would reach 100% (Figure 2). Horticultural growers therefore bought water to protect their permanent plantings. Initially they expected an allocation of 60-70% and bought water to satisfy their demand at that level. This demand caused prices on the Exchange to reach $500/ML early in the season. However it soon became clear that the allocation would never reach even 60%. Horticultural growers therefore reentered the market to satisfy their demand at that level, pushing prices back up to $500.

During 2001/02 and 2002/03 G-MW for the first times allowed temporary trade upstream into the Goulburn System under the substitution rule thereby increasing supply. When this was announced (late in January 2002 and early in January 2003) prices temporarily dropped, until the market had absorbed this additional supply (Figure 2).

Urban water authorities and other institutional water users are large suppliers to the temporary market, so their entry and exit from the market will have a significant impact on supply. Institutional sellers are typically not active in the market over the Christmas-New Year period while irrigators are still buying. This has traditionally caused a reduction in supply, and in both 2001/02 and 2002/03 it was a contributing factor to rising prices in late December.

Table 1. Relationship between seasonal allocations and extent of trade.

Season	Goulburn System		Murray System	
	Allocation (%)[1]	% traded[2]	Allocation %	% traded
1995/96	150	7	200	3
1996/97	200	4	200	3
1997/98	120	9	130	13
1998/99	100	13	200	5
1999/00	100	14	190	8
2000/01	100	16	200	2
2001/02	100	18	200	5
2002/03	57	24	129	16

1. These are the maximum allocation level reached for each season.
2. Total temporary trade as percentage of water use for each season.
Based on DNRE (2002).

Risk Management

Farmers are increasingly concerned about risk management, as the risk burden associated with fluctuation in supply during the seasons has been shifted from the authorities to the irrigators. Further, irrigators perceive that the MDB Cap has reduced their access to water and presents a significant risk to their long-term viability (Bjornlund 2002c). This perception was echoed by 49% of the permanent buyers within NSW who gave the impact of the Cap as an important reason to buy water permanently.

Table 2 shows the mixture of different trades that farm businesses have been involved in until 30 June 2001 within the Pyramid Hill/Boort area (PHB) supplied by the Goulburn System and the Torrumbarry area supplied by the Murray System. Very few have only been involved in permanent trade, while quite a large proportion have only participated in temporary trade as either buyers or sellers. The largest group within the PHB, with 25.3%, has participated in both temporary purchases and sales. These farmers either adjusted their risk position during the season, or are making an annual decision whether to buy or sell depending on commodity prices and the price of water. The second largest group, with 24.1%, has both participated in permanent and temporary transfers and have thus shifted their risk position. Cross tabulating the latter group's activities in the permanent and temporary market the following were revealed (within the PHB):

- 65.6% of those selling water permanently, also bought water on the temporary market; they are shifting their risk position to rely more heavily on annual purchases in exchange for cash. Perhaps they have a production, which is more adaptable to changing supply, and they are therefore better able to manage the risk, or they are willing to rely on temporary purchases.
- 88.5% of those selling water permanently, also sold water on the annual market; these irrigators have only sold a proportion of their unused water, and sell what is still in excess on the annual market; in effect they have not shifted their risk position but cashed in on an unused asset.
- 79.7% of those buying water on the permanent market, also bought water on the temporary market; they have bought some drought insurance, but could not afford full cover.
- 60.9% of those buying water on the permanent market also sold water on the temporary market; these irrigators bought full drought insurance and now sell water annually, when they do not need it. They might be more conservative or risk averse, or have less flexible productions to manage such risk.

Workshop participants argued that speculation in buying and selling of water is a growing driver in water markets. In support of this statement interviews showed that 12% of temporary sellers in NSW and 22% within the GMID gave speculation as an important reason for selling water on the temporary market. Among permanent buyers, 11% within NSW and 38% within the GMID said that speculation was an important reason for buying water on the permanent market. Some irrigators are willing to gamble on fluctuations in price during the season. During the first three years of the Exchange prices started high and ended low (Figure 1). Armed with this experience some might sell water early in the season and buy back later and reap the benefits. Irrigators behaving this way during 2001/02 suffered a significant loss.

Cost and Financial Issues

A number of cost and financial considerations are also driving the actions of irrigators. Some irrigators are selling water permanently and buying temporarily in order to reduce council rates and water rates. Along the same lines a group of irrigators took Gonnawarra Council to court challenging the fact that the Council includes water rights in the rating base, the case was however settled out of court so no ruling was made on the issue.

Water is considered to be a good long-term investment, not so much due to demand factors but rather because of supply factors. As the pressure increases on returning more water to the environment, supply for consumptive uses will decrease, forcing prices up. When commodity prices are good, or extra money is injected into the farm economy, such as dairy adjustment payout, cash might be available, and permanent water rights may be considered a good investment. However, when interviewing irrigators who sold water on the temporary market during 1998/99 it was found that only 9% in NSW and 5% within the GMID said that an important reason for using the temporary market was that they expected prices on the permanent market to increase. When interviewing irrigators within the GMID who have sold water on the permanent market in the past, but subsequently used the temporary market, 41% said that they did so because they expected permanent prices to increase. This could suggest that sellers, who have once accepted a price on the permanent market, and then seen prices increase, have given this issue more thought.

The very high prices of temporary water during 2001/02 and 2002/03, have driven the permanent market, because the relative price relationship between temporary and permanent water shifts in favour of the permanent market, and many irrigators report a dissatisfaction with chasing water every year and the increased uncertainty of getting the water when they needed it.

The level of penalties associated with use in excess of entitlement has had an important influence on demand for water and buyers' willingness to pay. Until 2001/02 penalty rates within the GMID were $200/ML, which was as high as prices went at the end of that season (Figure 1). For 2002/03 the penalty rate was set up to $500/ML, which again was one of the reasons why prices during that season went to $500/ML.

There is also evidence that the sellers have a strong desire to keep the land and water assets together, to protect their value and keep their options open. In NSW 54% and within the GMID 64% of the temporary sellers said that an

Table 2. Mixture of trading activity by farm businesses.

Trading category	% of farm businesses in category	
	Pyramid Hill/Boort	Torrumbarry
Only permanent seller	0.4	1.7
Only permanent buyer	1.1	0.8
Only temporary seller	21.4	18.9
Only temporary buyer	17.0	16.1
Only permanent buyer and seller	0.2	0.1
Only temporary buyer and seller	25.3	12.2
Both permanent and temporary trader	24.1	14.9
Non-trader	10.6	35.4

important reason for using the temporary market was to protect the value of their property. Also, within the GMID, 79% of the irrigators who sold water on the permanent market, but used the temporary market for subsequent sales, said that an important reason for this change was to protect the value of their property. Again, irrigators who have actually done permanent transfers seem to have given the issue more thought.

Tax consideration is also an important driver of temporary markets relative to permanent markets. Annual purchases are operational costs and therefore tax deductible, while sales are annual income to be offset against costs. Since most sellers have relatively low farm incomes (Bjornlund 2002a) they pay little or no tax. On the other hand, permanent purchases cannot be deducted or depreciated in tax, and permanent sales might attract capital gains tax. Quite a large proportion of market participants are aware of this fact. Tax benefits were given as an important reason for using the temporary market by14% of the temporary buyers in NSW and 16% in GMID, while 40% of the permanent buyers within the GMID using the temporary market for subsequent purchases gave tax benefits as an important reason for this change. Again, irrigators who have actually done permanent transfers seem to have given the issue more thought.

Administrative Issues

Within all three states workshop and focus group participants stressed that the administratively lengthy, complicated and thereby costly processes of permanent trade as well as the uncertainty of the outcome, compared to the relative ease, certainty and low cost of the temporary market, are significant drivers of the temporary market. These concerns came strongly through in the interviews with permanent traders who had used the temporary market for subsequent transaction, 39% of the permanent buyers said that an important reason for using the temporary market for subsequent purchases was the difficulty of the permanent transfer process, and 32% referred to the high cost of permanent trade; similarly, 50% said that an important reason for changing to the temporary market was that with the Exchange in place it is so easy. Among the permanent sellers, 59% referred to the ease of use of the Exchange, while only 9% referred to the difficulty of the permanent transfer process - obviously, it is the buyers who have to face the difficulty of the administrative processes.

The allocation level is revised the 1st and 15th of each month. This influences the trading pattern, as irrigators try to hold off buying until after that day to see if allocations should be increased thereby avoiding the purchase.

Conclusions

This paper has identified seven categories of water market drivers: 1) farming patterns and agricultural practices, 2) commodity prices, 3) climatic variations, 4) supply, 5) risk management, 6) cost and financial issues, and 7) administrative issues. The major driver of the increased use of temporary trade has been resource constraints caused by a prolonged period of drought, the impact of the MDB Cap, and water trading activating unused entitlements; water exchanges have facilitated this expansion in temporary trade. Permanent trade is constrained due to the uncertain, complicated, slow and costly transfer process, the considerable policy uncertainty associated with the future security of water entitlements, and farmers perception of entitlements as an inherent part of the farm.

Risk management was identified as one of the main drivers of both the permanent and temporary markets as irrigators try to come to terms with the effect of new water allocation policies, significantly shifting the risk burden from water authorities to the individual irrigators. Long-term leases and leaseback arrangements would improve irrigators' risk management capability. The implementation of such instruments would be enhanced by the formal separation of land and water rights, which is now emerging in most jurisdictions, but there is still considerable opposition to this move within sectors of the irrigation communities. Changes might be required to the way water authorities structure water rates, and the way councils compute council rates, in order to prevent rate avoidance.

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