WESTERN AUSTRALIAN DEPARTMENT OF WATER

SUBMISSION TO PRODUCTIVITY COMMISSION'S ISSUES PAPER:

RURAL WATER USE AND THE ENVIRONMENT; THE ROLE OF MARKET MECHANISMS

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General Comments

Using Market Mechanisms to Achieve Efficient Resource Allocation

The Issues Paper identifies the objective of the National Water Initiative (NWI) as:

> 23. *Full implementation of this Agreement will result in a nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes …*

The Productivity Commission, in defining the scope of this study, has stated in the Issues Paper that:

> "*Because irrigators in the agricultural sector use approximately 90 percent of extracted rural water, water use by irrigators will be the main focus of this study*." (p.7)

However, in managing a scarce resource to optimise economic, social and environmental outcomes, greater consideration needs to be given to the competing uses for the resource. These competing uses go beyond the environmental and recreational uses identified in the Issues Paper (page 7). In particular, consideration needs to be given to intra and inter catchment transfers between irrigation, domestic and industrial uses. The Issues Paper refers to these as 'beyond the farm' issues which may warrant consideration as part of the study (page 13). It is argued below that in the context of the National Water Initiative's objective 23, consideration of 'beyond the farm' issues is essential.

Consideration also needs to be given to the instantaneous allocation of the resource and the allocation of the resource over time. In short, although setting up markets can ideally lead to the efficient allocation of the resource at a point in time, it does not guarantee efficient outcomes over time. For example, the allocation of large volumes of water to irrigation, when there is no other consumptive use, is reasonable. However, if there is no mechanism for reallocating the resource at a future date, when users that place a higher value on the resource (as expressed by 'willingness to pay') are put increasing demands on it, the allocation will become inefficient. This issue is of particular significance in terms of past allocations of water for irrigation purposes. Without a mechanism for transferring water between competing uses,

either permanently or temporarily, significant volumes of water can be effectively locked up. Further, competing demands for water, if not met from transfers, can lead to investment decisions that are not efficient, or to over-extraction from available sources with the resulting environmental consequences (see Gnangara Mound example below).

Naturally, the above argument is not an inhibitor to the efficient allocation of water if all water resources form the supply for a single market, to which all consumers of the resource have access. In such circumstances the market would automatically allocate water to the highest value use. However, historically this has not been the case. Markets have been segmented, with little ability for water to be traded between uses (This same point is made in the Productivity Commission's Staff Working Paper 'Irrigation Externalities: Pricing and Charges' - Appendix A, p.69).

The Water Services Association of Australia (WSAA)[1] writes:

> *"It is not possible or appropriate to consider the two geographies as having different and competing interests. Rural and urban water uses are highly interdependent and the interests of all stakeholders demand that urban and rural water be considered in tandem from a policy perspective.*
>
> *WSAA does not seek to divert water from rural areas for urban use but it does seek a fair distribution of supply based on the needs of all users and the benefits to the nation." (p.5)*

Dealing with Externalities

The usual prescriptions for dealing with externalities include:

1. Regulation: in terms of restricting the level of extraction of a resource or damage to a resource from private use.
2. Internalising the externality: through inclusion of the costs (and benefits) of the externality into the pricing signals faced by private users. For example, the 'polluter pays principle' would require prices to be set to reflect the environmental impact of private water use.

[1] Australia's Water – Sharing Our Future Prosperity (June 2005),

In this regard, and following on from the comments made above, irrigators rarely face the private cost of the resource they consume. The price paid by irrigators is not the 'full-cost' price of provision and is usually significantly less than the financial cost of the provision of the bulk water from the regulated source. As such, implementing a pricing regime that incorporates a charge for externalities is undermined by the effective cap placed on water charges to irrigators. That is, if irrigators are not in a position to pay the 'full-cost' of water, it must be assumed that what is being paid is at the limit of their 'ability to pay'. Consequently, any additional costs internalised within the assessment of full cost would not be passed on the irrigators (to signal the environmental impact of the use of the resource), but rather would add to the notional subsidy underpinning irrigation activities.

Water is an intermediate good in the production of irrigation commodities. That is, it is an input to a final product which is usually traded in a competitive market. As such, consideration must be given to the impact on the competitiveness of the irrigation activity if prices are to reflect full cost, including externalities.

Returning to the comments made above on the segmentation of the water market, the segmentation of the water market into irrigation and other uses can have side effects which are just as damaging as the direct externalities identified within a given catchment. As mentioned above, many urban markets face constraints on the availability of water. In order to address theses limitations urban water utilities may be forced into a position where they are over-extracting from some existing sources (see Gnangara mound example below). This activity can have a damaging impact on the environment. If, in parallel with over-extraction, governments are forced to impose significant water restrictions (or develop expensive alternative sources), and also to increase consumption tariffs (in an attempt to control discretionary water consumption), there will also be social impacts.

Case study 1 - Increases in water table draw-down in sensitive areas

The Gnangara Mound is one of the most significant groundwater resources near Perth, providing fresh water for public water supply, agriculture, industry, parks, school grounds and domestic gardens. The annual groundwater abstracted from Gnangara is estimated as 335 GL. Of this, 150 GL is for public water supply, 127 GL for licensed users such as horticulture and 58 GL for unlicensed use (mainly backyard bores in the urban area).

Numerous wetlands, areas of vegetation, rivers and cave systems depend on the same groundwater resource to maintain their ecosystems. However, wetland and groundwater levels have been declining in most areas of the Gnangara Mound, due to a combination of:

- dry climatic conditions since the early 1970's, with a particularly dry period over the last 8 years;
- pine plantations reaching maturity and substantially limiting the net recharge to groundwater; and
- increasing levels of public and private groundwater abstraction.

Declining groundwater levels on the Gnangara Mound have resulted in a range of environmental impacts, including localised vegetation deaths, acidification of wetlands, peat fires and loss of aquatic species.

The above situation could be described as unsustainable, in the sense that it does not describe an economically efficient allocation of the resource, it can lead to negative externalities, and it can have a socially undesirable outcomes.

Under the heading of "Urban water … the 'pools and garden' myth" WSAA[2] writes:

> "*The reality is that water is used wisely in the cities for a range of purposes, including high value-added industrial and commercial uses. Over the past 20 years there has been a substantial reduction in per capita urban consumption. Sydney, for example, has been able to accommodate an additional 700,000 people without using more water. In 2001, the urban-based manufacturing and services sector produced 89 percent of the nations gross value added. Agriculture, forestry and fisheries accounted for 2 percent. Yet in 2001 agriculture used 67 percent of Australia's water.*"

The case for a systematic approach to trading between urban and irrigation districts is clear. Benefits can accrue to both parties, and in addition can have flow on benefits to the environment by relieving pressure on stressed urban supplies, such as Gnangara. In the case study below, trade between the Water Corporation and Harvey Water (Irrigation Cooperative) has led to a significant transfer of water to the Perth urban area.

Case study 2 – Water Trading between Irrigation Districts and Urban Water Supply

In the Harvey irrigation district, the replacement of open irrigation channels with a network of pipes will significantly reduce current water distribution losses through and evaporation and leakage. The resultant savings will make significant additional water available to the Integrated Water Supply Scheme (IWSS), under a long term agreement between Harvey Water Irrigators and the Water Corporation.

This is an efficiency measure that will produce benefits independent of seasonal fluctuation or long-term climate variation. As a result of earlier investment in the piping of irrigation channels in the Waroona Irrigation District, Harvey Water and Water Corporation have already agreed on a water trade that has delivered 6GL into the IWSS in 04/05.

The proposed further investment of $28.5 million for the piping of channels in the Harvey/Logue district could provide the basis for a permanent trade of a further 17GL per annum. Piping of the distribution network will also have direct benefits the district's irrigation farmers by increasing their control over on-farm water supplies, allowing the use of new farming techniques for increased productivity and improved on farm water use efficiency.

Further opportunities for reducing water losses exist in the Collie Irrigation Area and an estimated additional 17 GL of water could be made available through similar efficiency savings and water trading in this area. There is some scope for the creation of further efficiency savings in other irrigated agriculture settings throughout the State.

[2] WSAA *ibid*

Regulated Prices, Markets and Allocations

Historically, the prices charged to irrigators for water has been to recover, at best, short run marginal cost (SRMC). At a time when water is in surplus availability it is better to allocate it to anyone, even at a very low SRMC, than to no one at all (the fixed costs will remain whether water is consumed or not). As mentioned previously, this can present future problems when alternative users for this allocated water are offering higher prices. However, if having re-allocated to the highest value use (ie that use that is willing to pay the highest price) there remains surplus water it is pointless to set the price of this water to long run marginal cost (LRMC) if this would be unfordable to the irrigators. That is, setting prices at LRMC would probably price the irrigators out of the market and be of no benefit to the service provider. Clearly this would not be a Pareto Efficient outcome. Consequently the efficient outcome requires differential prices be paid by irrigators and other providers while surplus water exists.

Western Australia's Economic Regulation Authority (ERA)[3] has commented:

> '*The lack of an effective water entitlement trading regime within and between sectors impedes the discovery of water's true scarcity value. For example, prices paid for water by irrigators do not reflect the opportunity value of that water in other uses – such as urban uses.*'

However, the main concern here seems to be the allocation of a property right for water to a particular market without cost. For the irrigation sector to then have the ability to sell subsidised water to the urban sector at prices way above their own purchase price is not consistent with a market approach where water is allocated to its highest and best use as determined by 'willingness to pay'.

[3] Economic Regulation Authority - Inquiry on Urban Water and Wastewater Pricing (November 2005)

Again the ERA's[4] assessment of this situation is:

> "*If trading is not feasible, a second best solution would be to ensure that rural water is priced appropriately (through regulatory means) to reflect its scarcity value*." (page 38)

However, the regulated price to irrigators should only apply to water that is not surplus to other higher value uses (for reasons given above). The effect of this is that irrigators should not be in a position to extract profits from their subsidised bulk water allocations. The problem seems to be not with the pricing regime but rather with the way the property rights to the resource are being allocated and the way in which the market for water is segmented by the allocation process.

Currently these allocated property rights are not perpetual, however under the National Water Initiative there is a push to make these rights perpetual. Such a move would lock in a large part of the State's water resources in the hands of a small segment of the community. Unless such perpetual rights come with some cost of carry and an associated trading market that includes all players, not just irrigators, it will represent a significant transfer of wealth from public to private hands. Consequently, there is a need to strike a balance between certainty for longer term licence holders and public water supply management.

From an irrigation industry perspective it could be argued that the capital used to provide bulk water was provided with funding from the Commonwealth and State for use in providing irrigation services. It is therefore unreasonable for the urban service providers to expect to extract an economic return on an asset it did not itself pay for. Although this argument may have some merit, the problem lies not only with the infrastructure providing the water but also with the way the resource itself has historically been allocated.

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[4] ERA *ibid*