Economic Issues for the South West Yarragadee Water Formation
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Introduction

In Western Australia, the Rights in Water and Irrigation Act places control of water in watercourses and underground water in the State with the Water and Rivers Commission. The controls in the Act are designed to encourage the responsible development of water resources and limit the amount that can be abstracted to a level which can be sustained over the long-term. It is also designed to allocate resources for beneficial private and public purposes; ensure water is available for environmental needs and enable the resources to be shared in an equitable manner.

Guidelines for the allocation of water under the Act require the Commission to take into account the public interest; the environment, other water users, alternative sources and consistency with other Government legislation and policies.

Relevant Government policies and the demand for water in the region are covered in this report and the notes that follow. First up is a section on the economic principles that underpin any Government decision on allocation.

Economic Principles

Assuming that environmental requirements have been fully met with an appropriate margin for error (the precautionary principle), the allocation of the surplus groundwater by the Government is then a matter of balancing the efficiency and equity considerations associated with the resource.

In economic terms, efficiency has a similar meaning to common use and the avoidance of waste but goes further to imply the maximum community benefit from the use of the water. Equity issues relate to the distribution of benefits arising from the water use in terms of community groups, industries and current versus future generations. In simplistic terms, efficiency is about the size of the pie and equity is about the size of the slices and who gets one.

Efficiency considerations are only relevant if a resource is limiting production. There is no need to maximise production from a resource when it is freely available. In this study, we assume that water is a limited resource and we are concerned to ensure it is used efficiently.

In a free market for water, we would expect that those industries or people able to use the water to make products with the greatest value added would be in a position to pay the most for the water rights. The products that can be sold for the highest price provide the community with the most financial output for the volume of water
used. The concept of “highest and best” use thus underpins most Government decision-making with the aim being to use water to maximise a community’s net economic wealth.

A Government can choose to allocate water to uses that do not produce the greatest output where it feels that there are other advantages from such an allocation. The outcomes in essence provide the community with compensating benefits for the lost financial gain.

Willingness to pay is a reflection of water value. Measured in this way, drinking water and other urban applications will always be higher priced than for example, reticulation of public open green spaces.

Equity issues are used daily by everyone in deciding what is fair and unfair. However, the lack of perceived predictability in outcomes has discouraged economists from applying such tests to policy development. Issues of fairness have been left to the political realm and the work of the social sciences. An increased interest has now developed in equity given that many of the so-called rational economist views have failed to garner popular support.

Research is now showing that some behaviour patterns are predictable and can be replicated demonstrating a greater level of consistency in human decision.

While theories are still being widely debated, a number of criteria appear important in the evaluation of a fair policy or process. The following concepts have been derived from literature on fairness:\footnote{Zajac, E. The Political Economy of Fairness, 1996.}

- A fair process of policy development or allocation;
- A right to be involved in the process;
- Efficient use of scarce resources - waste is a poor outcome;
- Soundly managed resource use and processes free of corruption or capture;
- The right of all involved to a minimum entitlement;
- Equality of opportunity for those involved;
- Reward proportional to effort or sharing of the gain and pain;
- Existing users have priority rights;
- Community compensation for lost rights in a market process;
- Support for deregulation when it reduces inequality. Conversely, regulation is supported when it curbs abuses of power or monopoly behaviour.

Striking a balance between efficiency and equity considerations is the challenge in evaluating use of the water from the South West Yarragadee. An important consideration is that numerous Government policies point to the important roles played by the local community both in consultation processes and resource management. Few specifically mention the rights of other potential users. This emphasis appears to provide regional communities with some form of \textit{a-priori} rights and potentially veto rights over resource use. There is no legislative basis for this position, with the relevant Act actually separating water rights from land ownership.
However, numerous Government policies affecting the regions of the State include a “regional” dimension with few specifically citing an urban dimension.

Market mechanisms are not suitable for the allocation of this water, as the only known purchasers would be Government agencies (the three public water supply boards) or speculators. Strong community opposition to large sales to speculators would be anticipated; however, water would not be allocated specifically for the purpose of speculation. Market mechanisms may be suitable for the water rights once they have been allocated but even then some concerns at the potential for market failure exist with a range of buyers from irrigation farming to urban customers.

**Rights to Water and Obligations**

Our history of water rights in Australia and the Australian tradition of resource sharing leads Economics Consulting Services to suggest that the responsible development of community owned groundwater resources would take into account:

- an obligation to use the water productively and efficiently, having regards to environmental water needs;
- to maintain the infrastructure installed for future generations;
- to maximise economic opportunities;
- to refrain from creating monopolies or other obstacles to the exchange of water rights;
- to ensure that holders of the water rights are permitted ongoing profitability; and
- to harvest only the produce, not the natural capital.

These principles are reflected in such concepts as inter-generational equity and sustainable development.

**The State Water Supply Strategy**

The State Water Supply Strategy seeks to ensure that water resources are managed in the best way possible, taking into account environmental, social and economic needs of current and future generations.

The Strategy mentions a number of principles that guide the water allocation decision-making process including:

- ensuring that social, environmental and economic requirements of water use are considered for all water allocation plans;
- the need to consider provisions for future beneficial community use through allocation reservations; and
- decisions based on scientific information and application of the Precautionary Principle in cases where scientific certainty does not exist;
- allocating water of a quality that is ‘fit for purpose’ so that the most valuable resources are available for the highest value uses;
- ensuring that all water is used efficiently;
• providing equity to all water users through the licensing process and protecting the rights of existing water users to access water resources on a sustainable basis; and
• providing opportunities and mechanisms through which the community can become involved in allocation decisions.

The Strategy emphasises that water is a State resource and the nature and distribution of rainfall in Western Australia makes it vital that water resources can be accessed and transferred beyond regional boundaries. This ensures a more reliable and equitable access to water for all. However, the Strategy states that before transfers can take place, all reasonable regional needs including social, recreational and projected future development are to be satisfied.

**Draft Western Australian State Sustainability Strategy**

This is a very broad strategy covering all aspects of Government policy in the State. Sections relate to the use of natural resources, population settlements, community development and governance.

A specific section on water use aims to reduce water consumption, achieve significant water reuse, and ensure greater coordination through Regional Groundwater Management Plans.

**Council of Australian Governments (COAG)**

The key elements of the Competition Principles Agreement signed by the Commonwealth and State Governments covering water issues can be summarised as:
• integrated catchment management;
• water allocation for the environment;
• water pricing based on the principles of full cost recovery and transparency of cross-subsidies;
• new investment in irrigation schemes only when economically viable and ecologically sustainable;
• water allocation based on the separation of water property rights from land with clear specification of entitlements in terms of ownership, volume, reliability, transferability and, if appropriate, quality;
• trading, including cross border sales, of water allocations and entitlements within the social or physical and ecological constraints of the catchment;
• the separation, as far as possible, of resource management and regulatory roles of Government from water service provision;
• greater responsibility at the local level for the management of water resources;
• greater public education about water use and consultation in the implementation of water reforms; and
• appropriate research into water use efficiency technologies and related areas.

Underlying the COAG Agreement is the principle that the community gains when water is used in its “highest and best use”. The National Competition Council summarised the COAG principles in noting that water is to be used to maximise its contribution to national income and welfare and that trading arrangements in water allocations or entitlements be instituted once the entitlement arrangements are introduced.
The NCC has stated that water trading in an open market is the best way to ensure that water ends up in the highest valued use.

As an incentive to achieve reforms (in terms of electricity, water, transport etc), COAG has been providing payments to State Governments on the basis of agreed performance measures. The third set of payments for 2000-01 to 2005-06 amount to more than $4 billion.

The COAG principles provide a framework for water use but have been framed around water supply issues in the eastern states that appear to be focused on over-allocation. They operate best for surface water supplies that are fully allocated for irrigation purposes and where trading in rights can improve the "community benefit". They provide less guidance for the allocation of new water rights as faced in this study.

As part of the water reform process, the States and the Commonwealth established a High Level Steering Group on Water. This group reported that:

- unallocated resources should be allocated to promote the most efficient and beneficial uses. Allocation methods should be equitable;
- all States and Territories are strongly committed to the introduction and enhancement of water trading, thus allowing water to move to its highest value use, subject to physical and ecological constraints and the protection of third parties;
- trade of groundwater entitlements should be within common aquifers and consistent with groundwater management plans and other relevant resource management plans and policies;
- trade in volumetric allocations should be possible among hydraulically linked groundwater and surface water systems;
- methods of allocation such as "first-come, first-served" should be phased out well before resources approach full allocation; and
- water trading zones and groundwater management units should be defined in terms of the ability to transfer the water physically from one area to another, environmental requirements and other third party issues.

Summary of relevant Government policy issues

The important issues arising from the legal and policy constraints for the South West Yarragadee Formation can be summarised as:

- reservation of water to fully recognise environmental requirements;
- any new allocation to consider the "highest and best" use for the water and hence to maximise the contribution to national income and welfare;
- allocation to recognise efficient water use;
- allocation to recognise equity considerations;
- allocation and management decisions to involve local communities;
• any new extraction infrastructure to be commercially viable and repaid with consumption based charges; and
• water trading of rights to be encouraged. (is this supposed to read ‘trading of water rights to be encouraged’???)

Regional Development Policies

The Draft State Government Regional Development Policy\(^2\) emphasises the importance of infrastructure to regional development and the quality of life. The Policy stresses that Western Australia will benefit through the preparation of comprehensive power and water strategies covering access quality and affordability issues. However, the only specific objective included in the draft report is the completion of a State Water Strategy incorporating regional issues. This has been completed as mentioned earlier.

The South West Strategy prepared by the South West Regional Development Commission stresses that availability of appropriate quality water is critical to the continuation and future growth of all activities in the region. It also mentions that “an overall ample supply has been established....” and that “the South West is an important potential water supply for Perth”.

Water Demand in the Region

The level of potential water demand from users in the region will be an important consideration for the Water and Rivers Commission in its deliberations. This study has attempted to forecast future demand for a range of key industry sectors. They represent the major water users.

Horticulture

Horticulture in this report includes vegetables, fruit, flowers, and the nursery industry. It does not include table grapes or viticulture, as these are included in a separate report.

The horticulture industry has been one of Western Australia’s fastest growing primary production sectors with gross value of production estimated at $555 million in 2000-01. There are 1,800 establishments involved in horticulture making the State largely self-sufficient in fresh vegetables and fruit. Some imports meet the demand for commodities that are not well suited to production in the State or are out of season in the State.

The small population and distance from eastern states markets means that any future increase in horticulture production will need to be export based. Exports already make up nearly half of production. There is potential for increased exports to south east Asian countries and Western Australia is well placed to service this forecast demand. However, marketing and supply logistics have proven challenging for many exporters in the past and will continue to inhibit expansion in the future.

Statistics on the horticulture sector are difficult to collect with a large number of small producers and keen competition leading to reluctant disclosure. The replanting

\(^2\) Draft Regional Policy Statement for Western Australia, November 2002
of orchards with new species at different densities makes comparison of fruit yields and areas difficult. This report has used the best available information but the statistical shortcomings need to be recognised. Horticultural production is notoriously volatile with substantial shifts in annual production and prices. Vegetable production in particular fluctuates with expected market demand and many producers make only short-term planting decisions. Long-term forecasting is hence challenging and any forecasts need to be viewed with considerable scepticism. This report is no exception.

Australian Bureau of Statistics for the financial year to June 2001 indicate a total of 14,000 hectares of horticulture enterprises in the South West Statistical Division. This Statistical Division runs from Mandurah to Walpole and includes 12 local Government areas - the cities Mandurah and Bunbury and the shires of Murray, Waroona, Boddington, Harvey, Collie, Dardanup, Capel, Donnybrook-Balingup, Busselton, Boyup Brook, Bridgetown-Greenbushes, Nannup, Augusta-Margaret River and Manjimup. Horticulture production in Bunbury, Mandurah, Boddington and Murray represents less than 3 per cent of the total area.

Grapes made up the largest commodity group accounting for nearly half (41 per cent) of the horticultural area with vegetables and fruit (including nuts and olives) providing over a quarter share each.

Excluding grapes, plantings can be separated into variety and statistical area with the top 15 classifications accounting for over 80 per cent of the estimated area. Nine of these are situated in areas with potential access to the South West Yarragadee groundwater. Combining the estimated area overlying the aquifer and the potential for variety expansion suggests a possible increase in planted area by 2015 of 2,780 hectares. With an average water use rate of 8ML per hectare this suggests a future water demand of 22GL of water. Allowing a 20 per cent buffer for varieties not included suggests a total demand of 26.5GL.

Current water licenses in the groundwater areas covered by this study total 2,084 hectares and involve licenses for 18.3GL of water. The forecast thus suggests a 160 per cent increase in area and a 145 per cent increase in water use.

**Viticulture**
The wine regions of Blackwood Valley, Geographe and Margaret River wholly or partly fall within the study area.

The Margaret River wine region encompasses areas of the Busselton and Augusta Margaret River shires with the towns of Busselton, Dunsborough, Yallingup, Cowaramup, Margaret River, Karridale and Augusta. An estimated 40 per cent overlies the South West Yarragadee aquifer but water supplies are limited in the areas around Margaret River and future plantings are likely to favour areas with available water. This study assumes that 50 per cent of future plantings in the Margaret River Shire will come from land overlying the South West Yarragadee Formation and 40 per cent in the Busselton Shire.

The Blackwood Valley wine region is located south of Collie and southeast of Capel and includes the towns of Nannup, Balingup, Greenbushes, Bridgetown and Boyup Brook. About 100 hectares of vines are planted to the west of Nannup representing 11 per cent of the area planted in the viticulture area. Again, it is assumed that future...
plantings may be biased towards groundwater areas suggesting that up to 20 per cent of future areas could come from land overlying the aquifer.

The Geographe wine region is located to the north-east boundary of the Margaret River region, to the northern boundary of the Blackwood wine region and stretches as far east as Collie and north as Wagerup. It includes the city of Bunbury and towns of Harvey, Wokalup, Collie, Dardanup, Ferguson Valley, Capel, Boyanup, Donnybrook and Kirup. Fifty vineyards are planted in the Dardanup/Ferguson Valley area and south of Bunbury. They represent around half of the total planted area. Future plantings are expected to follow a similar trend.

Based on forecast growth rates of 2.6 per cent for the Blackwood region and 4.5 per cent per annum for the other wine regions, plantings of wine grapes are forecast to expand from just under 5,000 hectares to 16,250 hectares. This represents a three-fold expansion in the industry and will challenge marketing agencies. With some expansion in table grapes and improvements in the efficiency of water use, water demand to meet the new-planted areas will be 10.9GL.

Dairy
The Western Australian dairy industry was found in the south west of the State to supply fresh milk to metropolitan and regional consumers. The industry operated under a regulated supply system for market milk until deregulation in July 2000. Market milk prices essentially underpinned farm profitability while demand for manufacturing milk determined total demand.

In the decade prior to deregulation, milk supply grew steadily at around 4.5 per cent pa to achieve an annual supply of just under 400 million litres in 2000. Immediately after deregulation processors were forced to reduce white milk prices paid to farmers to ensure they remained viable. Farm incomes fell by about 30 per cent in Western Australia with 23 per cent of producers leaving the industry and production falling by 5 per cent.

Any further growth in WA milk production is highly dependent on a higher milk price. Without higher prices, rationalisation of the industry towards larger, lower cost farms is essential. Rationalisation of processing facilities and higher throughputs are also needed to improve international competitiveness for processed commodities.

Current industry intelligence suggests minimal growth in milk production in the short term. In the longer term, the industry has a vision of 800 ML, double current production levels. With little growth in domestic milk sales, low world commodity prices and an industry with many small farmers, a more conservative target of 600 ML within 15-20 years has been adopted for this study.

A review of farm production options shows that much of the increase in production will come from irrigated pastures requiring an additional 30GL of groundwater. The location of the farms suggests that this groundwater could come from the South West Yarragadee Formation. Whether this source is used will depend on the cost of obtaining access and delivery costs.

Land Availability
The estimated increase in horticulture, viticulture and dairy activities suggests an increase in the land under irrigation over the aquifer of about 19,000 hectares. This is a large increase and suitable land may become a limiting factor.
Mining
The heavy mineral sands mining companies use groundwater in mining and sand separation processes. They have indicated little change in their use of South West Yarragadee water with new mines replacing the water used as existing mines close.

Industry
There is no heavy industry overlying the South West Yarragadee Formation with the closest potential development in the Kemerton Industrial Park. This Park lies just to the north of the aquifer. Future developments include a possible softwood or plantation hardwood pulp and paper mill. Current technology would allow a plant to operate with around 7GL of water a year but the uncertainties over plant configuration suggest that 10GL would be a better forecast estimate.

Urban
The Busselton and Bunbury Water Boards draw town water supplies from the Yarragadee Formation in areas adjacent to their towns. Both have applied for and been granted licenses to meet their perceived needs for the medium to long term. Further work on urban demand is continuing and will be finalised in the next few weeks.