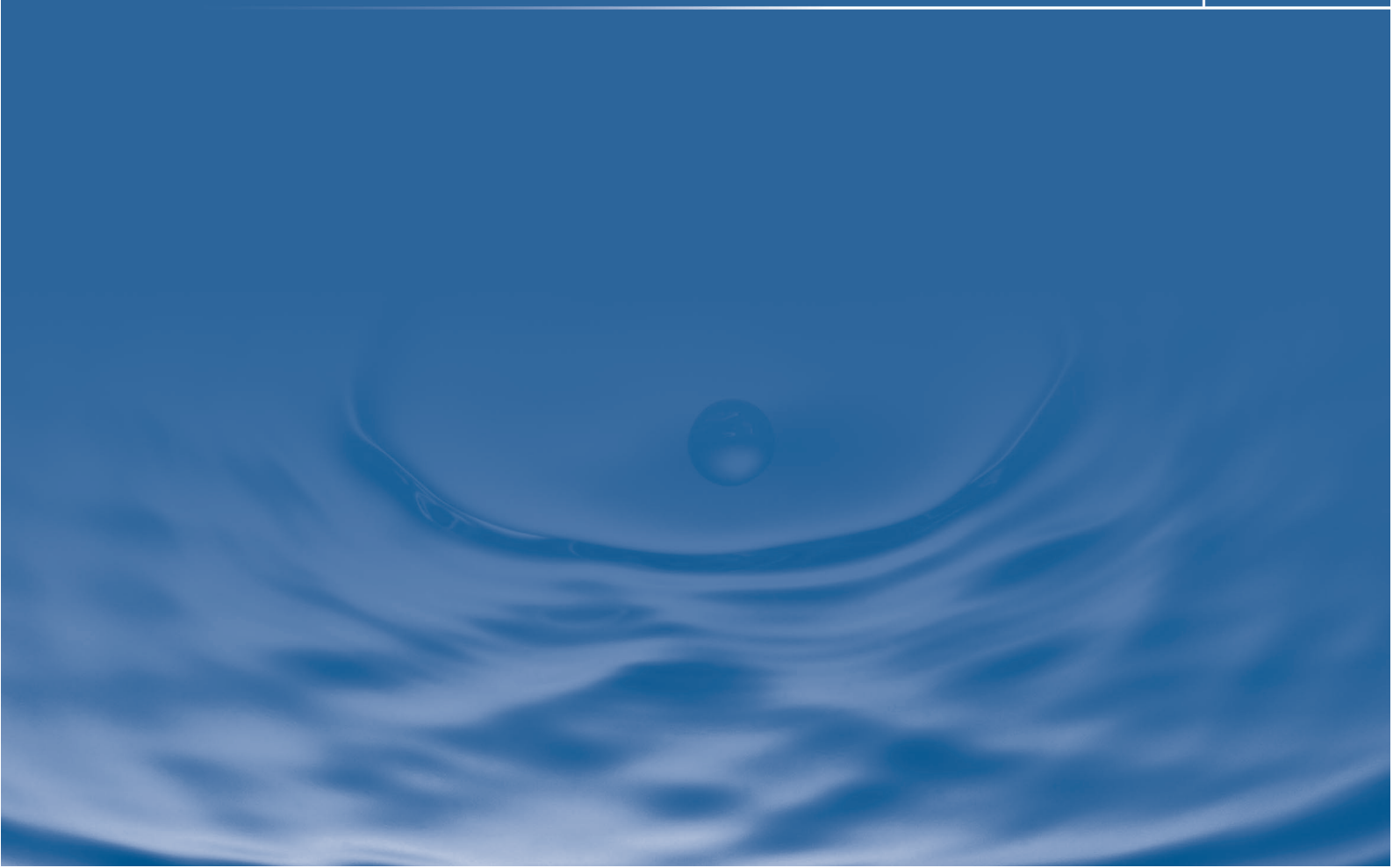


PART 2 IRRIGATION INDUSTRY



5. NEED FOR A REVIEW OF IRRIGATION

5.1 OVERVIEW AND NEED FOR A REVIEW

Irrigated agriculture contributes \$800-900 million to the State economy annually and consumes approximately 40 per cent of the water used in the State. This compares favourably with other states and internationally where water use in agriculture typically is up to 80 per cent of the total.

The 2003 State Water Strategy recommended that irrigation activities within Western Australia be reviewed. The review (now completed) provides a basis for understanding how water is used within irrigated agriculture. It also sets out what needs to be done to ensure that water is used efficiently and sustainably by this important industry.

Better systems for allocating, managing and applying water are needed because the gap between the known resources and the sum total of the competing demands for water is narrowing. Managers and users alike are challenged also by the need to strike a balance between the growing demand for water and the expectation of a clean and healthy environment. Finally and most importantly, all of the above are occurring at a time when rainfall (and hence the supply of water) is declining due to long-term climate change. It is small wonder that water allocation and management rank among the most contentious issues facing Western Australia today.

The State has a remarkable and perhaps unique opportunity because pressure on water resources is generally less than that experienced in many other parts of Australia. Western Australian water managers have been typically cautious in allocating water resources. Consequently, Western Australia is in a very favourable position to learn from the successes and the failures of those jurisdictions that have already had to contend with heavy pressure on their water resources.

But the window of opportunity is closing fast. Water use across the State doubled between 1985 and 2000, and current use is running ahead of predictions that it will double again by 2020. Most models are predicting a continuation of climate change and an additional decline in average rainfall and run-off in the south-west of the State. As more of the State's water resources approach the limit of sustainable use, symptomatic increases in competition and disputes over water are becoming more common. The challenge for Western Australia is to take the great opportunity it has to get its water resource management right (Camkin 2003).

5.2 TERMS OF REFERENCE

The Terms of Reference for the Irrigation Review were approved in December 2003 by the Premier's Water Resources Cabinet Sub-Committee. The Steering Committee was appointed to:

- Establish the amount of irrigation water supplied and used within Western Australia together with the economic and social benefits generated by such usage.
- Considering factors such as water availability, environmental impact, climate change etc., identify the likely future forms, scale, locations, water needs and economic benefits of irrigated agriculture in Western Australia.
- Identify opportunities for improving the efficiency with which irrigation water is delivered and used together with the associated costs, benefits and beneficiaries thereof.
- Identify constraints (including but not limited to Government policies and priorities) to improving the efficiency with which water is delivered and used. Explore the possibility and appropriateness of forming collaborative links between all levels of government, industry, researchers and the community.
- Review the potential for water trading to improve the efficiency with which water is delivered and used; identify policy and other constraints to water trading and, if appropriate, recommend actions needed to facilitate water trading.

5.3 COMMUNITY CONSULTATION

During eight months of stakeholder consultation from March to November 2004, the Steering Committee received 50 submissions on behalf of 58 organisations and individuals that operate in Western Australia. Among those who made submissions to the Irrigation Review were seven government agencies (12 per cent), thirty-six agribusiness operations and consultancies including several individuals (62 per cent), four irrigation cooperatives (seven per cent), seven industry bodies (12 per cent) and four banks (seven per cent). Key irrigation issues as well as a wide range of relevant water resource management issues were raised and discussed. A detailed list of issues and comments is provided in Appendix 2.

The results of this consultation are summarised as follows:

- Eighty per cent of stakeholder submissions urged the government to introduce secure water entitlements.
- Sixty-six per cent of these preferred perpetual water entitlements and argued that this could be paid for by simple administration fees that did not cover environmental externalities. These water users also supported the risk assignment proposals in the *National Water Initiative Discussion Paper*.
- Seventy per cent of submissions supported allocating water to highest value and best use, 52 per cent supported water trading, and 50 per cent urged the government to remove barriers to water trading by separating the 'right to take' water from the 'right to use' it.
- Sixty-two per cent of submissions were in favour of the metering of commercial water use state-wide.
- A large proportion of submissions stressed the need for a more strategic perspective within government and improvements to the funding, efficiency and service standards of the water resource manager.

Issues raised by contributors have been considered by the Steering Committee and are addressed throughout this report. Submission details are shown in this section under the headings: water entitlements, water resource management, water trading, and overall strategy and planning.

5.3.1 SUBMISSIONS ON WATER ENTITLEMENTS

- *Duration of Entitlements* – An overwhelming majority of stakeholders urged the government to introduce secure water entitlements, but views varied on the form of security. Sixty-six per cent suggested perpetual water entitlements and 14 per cent suggested non-perpetual entitlements. The remaining 20 per cent did not comment on the issue.
- *Volume of Entitlements* – 60 per cent supported entitlements that were specified as a share of the resource instead of volumetric entitlements; 40 per cent did not comment.
- *Exclusivity* – 52 per cent supported 'exclusive' entitlements that can be sold, given, bequeathed or leased; 48 per cent did not comment.
- *Unbundling* – 50 per cent of the submissions supported separation of the 'right to take' from the 'right to use' water, the other half did not comment. Fifty-two per cent supported separation of water entitlements from land titles, two per cent disagreed and 46 per cent did not comment (refer also to Water Trading).
- *Torrens System* – 46 per cent supported the adoption of a Torrens registration system, two per cent recommended a similar system; 52 per cent did not comment.
- *Risk Assignment* – 46 per cent supported the concept that the party who causes a water entitlement to change should bear the cost; 54 per cent did not comment.
- *Compensation for Change* – 42 per cent supported compensation being payable for water withdrawals because of changes in government policy; 58 per cent did not comment.

5.3.2 SUBMISSIONS ON WATER RESOURCE MANAGEMENT

- *Metering* – 62 per cent supported state-wide metering of commercial water use; 38 per cent did not comment. Forty-six per cent supported metering of commercial water use on Gngangara Mound; 54 per cent did not comment.
- *Funding to Department of Environment* – 58 per cent supported increasing funding to Department of Environment for water resource management; 42 per cent did not comment.
- *Allocation Limit* – 54 per cent felt that knowledge of allocation limits is insufficient; six per cent disagree; 40 per cent did not comment.
- *Consultation and Links* – 52 per cent supported stakeholder consultation and links between government, industry and the community; 48 per cent did not comment.
- *Water Licence Administration Fees* – 50 per cent supported water licence administration fees, provided users were granted perpetual/long-term water entitlements and conditional upon such fees not being considered government revenue. The purposes for which fees were used must also be agreed in advance and transparent. Four per cent were opposed to licence fees; 46 per cent did not comment.
- *Government Water Resource Investigation* – 50 per cent felt that government water resource investigation is insufficient; two per cent disagreed; 48 per cent did not comment.
- *Sustainability* – 48 per cent recommended considering sustainability in water resource management; 52 per cent did not comment.
- *Water Resource Management Committees* – 42 per cent supported promotion of local water resource management committees; 52 per cent supported a State water resource management committee; six per cent did not comment.
- *Department of Environment Systems and Processes* – 38 per cent suggested that the DoE update and streamline systems and processes; 62 per cent did not comment.
- *Monitoring of Licence Conditions* – 36 per cent recommended monitoring conditions for all commercial licences.
- *Water Corporation* – 34 per cent felt that the Water Corporation has undue influence over state water management issues; 66 per cent did not comment.

5.3.3 SUBMISSIONS ON WATER TRADING

- *Allocation of Water to Highest Value Use* – 70 per cent supported allocating water to highest value and best use; six per cent disagreed; 24 per cent did not comment.
- *Support of Water Trading* – Generally, 52 per cent supported water trading, two per cent did not support it; 46 per cent did not comment.
- *Trading Across Jurisdiction/Irrigation Areas* – 52 per cent supported trading across jurisdictions or irrigation areas; four per cent disagreed; 44 per cent did not comment.
- *Unbundling* – 50 per cent supported separation of the 'right to take' from the 'right to use' water; the other half did not comment. Fifty-two per cent supported separation of water entitlements from land titles; two per cent disagreed; 46 per cent did not comment (refer also to Water Entitlements).
- *Impacts on Regional Communities* – 40 per cent supported analysis of likely impacts on regional communities.
- *Water Market Benefit* – 34 per cent felt that government lacks understanding of the benefits which flow from a free water market; 66 per cent did not comment.
- *Trading on the basis of Efficiency Gains* – 14 per cent supported trading based on efficiency gains; 86 per cent did not comment.
- *Concerns about Speculation* – 12 per cent were concerned about water trading speculation; 88 per cent did not comment.

5.3.4 SUBMISSIONS ON OVERALL STRATEGY AND PLANNING

- *National Water Initiative* – 54 per cent supported the full adoption of NWI principles with minimal adjustments.
- *Water Conservation* – 38 per cent encouraged water conservation, including better use of stormwater and recycled water.
- *Triple Bottom Line* – 26 per cent suggested a triple bottom line approach to water resource management; 74 per cent did not comment.

5.4 ISSUES WITHIN THE IRRIGATION ENVIRONMENT

The way water is used by irrigators varies in efficiency and effectiveness across the wide range of crops irrigated in Western Australia. Efficiency of use refers to how well water is distributed and used (minimal losses and wastage). Effectiveness refers to the extent to which it is used to deliver a valuable outcome (maximum productive output) (Fairweather et. al. 2003). Water use is evaluated according to these criteria in this section of the report.

5.4.1 ISSUES RELATED TO WATER USE

The Irrigation Review has identified a number of key issues relating to the use of water for irrigation.

- Half the irrigation water delivered to agriculture is used within the Ord Irrigation and South West Irrigation Areas. Both of these areas primarily use open channel systems and flood irrigation. Losses (leakage and evaporation) as the result of using open channels are estimated to be in the range of 20 to 30 per cent of water delivered. This result is consistent with the results measured on similar irrigation schemes in the eastern states. The recent piping of the Waroona Irrigation district by Harvey Water has resulted in water savings of about 3,600 megalitres per annum. Piping also enables improvements in on-farm efficiency to be made by delivering pressurized water which can be used in sprinkler systems etc.
- Flood irrigation systems are inherently inefficient in delivering water to crops. Management of delivery also has a significant influence on water distribution efficiency. For example, pastures at Harvey use 15 to 27 per cent less water per hectare if flood irrigation systems are replaced with centre pivot systems (ACIL Tasman 2004). For some vegetable crops, drip tape systems can reduce water use by up to 50 per cent in comparison to centre pivot systems (Thomas 2004).
- Even in areas where flood irrigation systems are not used, many of the systems are outdated. In addition, the transition to modern efficient systems (e.g. from centre pivot to drip tape) has been slow, due to the costs of adopting new technology and the low value attributable to the water savings made.
- Over-irrigation can lead to significant water losses through subsurface drainage and then to contamination of groundwater. For example, research into vegetable production on coastal sands reveals that when crops are watered twice a day by overhead sprinklers, up to 70 per cent of the water and 50 per cent of the nitrogen applied is transported beyond the plant root zone⁵. While considerable work has been done on improving on-farm water distribution uniformity, there is still significant potential for irrigators to adopt irrigation systems that apply water more efficiently. Again, irrigators in some sectors are reluctant to adopt more efficient technologies and practices probably because there is no incentive for them to change.
- Very efficient use of water has been achieved in wine grape production (less than 0.5 megalitres per hectare in cool climate areas of the lower south-west, and two or more megalitres per hectare in the northern parts of the South West region). Perennial orchard fruit production which uses well-managed mini-sprinkler systems and soil moisture monitoring to schedule irrigation is also efficient.
- The cost of Western Australian irrigation water is generally low⁶, reflecting the fact that water is readily available in most areas. Self-supply irrigators construct their own dams or groundwater bores and install pumps and piping systems at considerable cost.
- Low cost irrigation water results in irrigators placing little emphasis on using water efficiently and also gives them little reason to invest in new equipment to reduce the amount of water used.

The Steering Committee believes that an improved water resource management framework, and in particular one which facilitates water trading, will raise the value for water; thereby creating the impetus for irrigators to save water on-farm.

5.4.2 NEED TO BRING WATER RESOURCE MANAGEMENT IN LINE WITH NATIONAL BEST PRACTICE

Despite the fact that the adoption of improved irrigation technologies by irrigators is an important and ongoing requirement, the efficient use of water within the irrigation industry is constrained largely by the bureaucratic approach adopted towards the management and allocation of water resources and also by the policies and practices of the water resource manager. Western Australia's current water management framework does not place an appropriate economic value on water; hence there is little incentive for irrigators to improve their water use efficiency or to invest in water-saving technologies. Institutional and policy constraints that maintain the value of water at artificially low levels also result in ineffective water usage since there is no motivation for water users to transfer water from low value to higher value uses. The Steering Committee believes that the current 'command-and-control' approach constrains the application of market forces and militates against the widespread application of water trading.

In 1994, the Council of Australian Governments (CoAG) agreed to reform water policies in Australia through means such as the better definition of water rights and increasing the reliance on water markets to allocate water. CoAG reiterated these objectives in the National Water Initiative in 2003, emphasising the importance of fully functioning water markets as a mechanism for underpinning investment in water-efficient systems and initiating a transition by water to higher value uses (CoAG 2003). Most CoAG requirements were incorporated into the 2001 reforms to the *Rights in Water and Irrigation Act 1914 (RIWI Act 1914)*; however they have not yet been implemented effectively and it is the view of the Steering Committee that only minimal benefits have, to date, been achieved (see also Section 7 – Improved Governance of Water Resources in Western Australia).

⁵ Neil Lantzke, 2003, *Best Practices for Irrigation and Fertilizer Management on Sandy Soil*, Horticulture, Australia Project vg9801, final report March 2003.

⁶ In the Frankland region, however, water for irrigation is generally scarce and trades are occurring at values that reflect the scarcity (pers. comm. N. Delroy). These trades are not supported by the water resource management framework in WA, because the catchment areas are not proclaimed, and no water resource management (and water licensing) occurs in this area.

5.4.3 GOVERNANCE ISSUES

Until recently, the portfolios of seven ministers had an impact upon water management and policy (Premier, Treasury, Government Enterprises, Environment, Planning and Infrastructure, Agriculture, and State Development). With the exception of the Minister for Agriculture, all these Ministers are members of the Premier's Water Resources Cabinet Sub-Committee which coordinates water management across government agencies.

- The importance of the Water Resources Cabinet Sub-Committee is recognised. However, water is such an important and integral part of our social, economic and environmental fabric that it warrants a separate ministerial portfolio in a similar way to Energy, the Environment and State Development.
- It is important that agencies with responsibilities or interests in water resource management and allocation work together effectively. The State Water Council has been reasonably successful in coordinating projects and government responses to the recent drought in Western Australia, and therefore should continue to operate in its current form.
- The Department of Environment is responsible for environmental protection as well as water resource management and allocation. The DoE is operating under an interim arrangement whereby the Department of Environmental Protection and the Water and Rivers Commission are amalgamated to improve operational efficiency. However, these entities are still separate in a legislative sense. Also, potential for conflict of interest exists where Ministerial conditions set under the *Environmental Protection Act 1986* conflict with water resource management programs established under the *Rights in Water and Irrigation Act 1914*. These issues are discussed in more detail in Section 7 Improved Governance of Water Resources in Western Australia.

5.4.4 POLICY AND MANAGEMENT ISSUES

Currently, there are very few drivers that deliver efficient water use.

- Water entitlements do not give irrigators the flexibility they need to manage their water consumption efficiently or to develop their enterprises. A water entitlement provides a volumetric allocation for a particular purpose and ties the water use to an area of land. This arrangement creates constraints on how water is used, and on irrigation enterprise development. It also prevents water trading from operating effectively.
- Security of entitlement is a matter of considerable concern. The *RWI Act 1914* allows a water licence to be granted for an indefinite term; however, under the Department of Environment policy, licences are issued only for a maximum of 10 years. Short-term licences and uncertainty over how licences can be amended by the resource manager create uncertainty over whether water needed by an enterprise will continue to be made available in the long-term. This in turn can inhibit initial investment, impede further investment and even reduce the value of the entitlement itself (ACIL Tasman 2003).
- The State water resource management system only partly reflects the intent of the 2003 CoAG agreement related to market mechanisms for water. There is a high degree of government intervention which in turn gives rise to high transaction costs. The reserved rights through the 'use it or lose it' policy inhibits the development of an effective trading market. The establishment of a user pays approach to water resource management is also precluded even though this would fund many of the reforms needed.
- The 'first come first served' water allocation policy is sub-optimal because water allocated on this basis might be used more effectively by later applicants. In addition, agricultural and other industries do not pay a resource rent for the water they use; consequently the full cost of water is not revealed to the user, and hence the real costs of wasteful use have no impact. Research over a number of years has shown that the current use (and sometimes over-use) of water by irrigators is rational because irrigation water constitutes only a small part of the production cost and/or the true cost is not brought to account through a suitable value-creation mechanism.
- The failure to realise the full market value of water within irrigation industries together with the lack of security of entitlements results in a lack of incentive to invest in efficient technology and practices. Where water allocation is based on a tender or auction system, the 'highest and best' use of water is encouraged. Where water is used for low value production, margins are insufficient to encourage irrigators to invest in new technology or equipment in order to save water.
- The planning of land use and water use are separated from each other. There is a need for these to be integrated and coordinated.

The increasing demands on (and competition for) water resources requires a better approach to water resource management. The Steering Committee recommends more emphasis be given to the following aspects:

- The knowledge of the use, availability and quality of water resources needs to be improved. Water systems need to be managed closely as they approach full allocation, in order to protect both consumptive uses and environmental provisions. In areas currently under stress due to over allocation or overuse (e.g. Gnangara) there is an urgent need for all parties to cooperate in finding appropriate solutions.
- More effort needs to be applied to the determination of sustainable yields. In addition, systems need to be monitored effectively in order to facilitate management and the maintenance of sustainable patterns of use. These practices will increase the degree of certainty associated with water entitlements.
- The failure to monitor resources, together with the limited metering of water use, creates uncertainty as to whether water will continue to be made available to new users. Better monitoring of water resources leads to better planning and creates greater certainty over the ability to manage water in a sustainable manner. The issues covered in this section are presented in greater detail in Section 8 – Laws, Policies and Practices Impacting on Management of Irrigation Water in Western Australia.

5.5 PRINCIPLES FOR WATER RESOURCE MANAGEMENT

The Steering Committee has identified a set of principles which should underpin the future direction of water management in the State. The Steering Committee believes that improvements are needed in the definition of water resources. In addition, there is need for water entitlements which provide investment security, maximise the economic value derived from water use, and ensure that sufficient water is devoted to the maintenance of healthy rivers and aquifers.

The need for caution when allocating water (as expressed recently by the Department of Environment) is accepted, particularly in those instances where the performance of a groundwater system under development stress has yet to be established, and/or the impacts on it of climate change are unclear. Despite this acceptance, the Steering Committee believes that a more proactive approach to water resource management is needed and that a new system based upon the following principles is required:

- Institutional separation of the 'right to take' from the 'right to use' and from conditions of use to provide a sound framework for water allocation and planning.
- The creation of an effective water trading market within an overall strategic management framework. This will place a value on water and act as a key driver of improved water use effectiveness and efficiency.
- The use of perpetual or ongoing water entitlements together with the clear assignment of responsibility for risks to provide investment certainty, hence sustainability, in the event that water availability is reduced in the future.
- Decision-making processes which are based upon sound science, together with sufficient system capacity to permit the timely determination of Environmental Water Provisions (EWPs) and sustainable yields for all of Western Australia's water systems.
- A system of transparent EWPs that is expressed in the same terms as those of normal entitlements.
- Input from community consultation in water planning, in setting environmental allocations, and in determining regional economic needs.
- Fair burden sharing, with the impacts associated with resource availability or non-availability being shared equitably between government, industry and the community.

The recommendations presented in Sections 8 and Appendix 3 are based on these principles.