

Research for Action water

Research for Action 2009-2013

Importance of water to primary industries

Water, and how it is managed in an agricultural and natural resource context, is one of the most significant natural resource management issues in NSW. Over recent times water quantity and quality has gained a prominent position in the consciousness of politicians, the media and the community, including land managers and primary producers. It is widely considered that water has been over allocated in Australia and is a scarce resource which is often used inefficiently.

Awareness of the need to change the way water is managed has been reinforced by the current drought and concerns about climate change. If current predictions for reduced flows in rivers are accurate, significant changes are needed at every level of water management. This will need to include consideration not only of down stream use, including irrigation, urban and environmental use, but also upstream land management practices that impact on hydrology, including recharge and surface run-off.

Water is a critical ingredient for primary production. Striking the balance between extractive uses and environmental water requirements is a major challenge.

Production levels of both rain-fed and irrigated agricultural and forestry enterprises are directly correlated to the volume of water available to these activities and how efficiently it is used.

The health and productivity of aquatic ecosystems are dependent on total river flows, specific flow regimes and water quality.

The coastal marine environment and therefore our coastal fisheries are also affected by the quality and volumes of water arising from catchment flows.



I&I NSW – PROFITABLE, ADAPTIVE AND SUSTAINABLE PRIMARY INDUSTRIES IN NSW

The role of the Science and Innovation Division of Industry & Investment NSW

The key questions that research needs to answer are:

- How do we maximise the returns from water use for the benefit of the community?
- How do we simultaneously achieve functional and productive water dependent ecosystems?
- How do we inform the development of water planning and policies to ensure the needs of primary industries are accommodated?

Industry & Investment NSW (I&I NSW) has expertise in water research at the paddock, farm and small subcatchment scales. This is of critical importance as these are the scales at which management intervention occurs and this is often overlooked by other agencies and organisations.

I&I NSW conducts water research in association with economic analysis. Analysis and modelling of a combination of biophysical and economic factors is used to analyse the on farm and downstream triple

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bottom line impacts of new technologies and changes in land use and helps lead to profitable decisions by primary producers about their use of water. Bio-economic analysis should also inform the development of water use policy and how that reflects the interests of the community.

All primary industries are dependant on access to a supply of water of required quantity and/or quality. A large proportion of I&I NSW research that relates to productivity and management of natural resources is strongly linked with water. The Science and Innovation Division has identified water research as a priority for the future, and is investing directly into water research through improving the understanding of the impact of land use on water. In addition, much of the farming systems, plant breeding and livestock health activities are involved with research intended to improve the efficiency and productivity of our water systems.

There is clear recognition of overlaps between water and other priority research themes in the Science and Innovation Division of I&I NSW. The development of better water management strategies is integral to having productive primary production systems. In one sense, each of the research themes can be viewed as underpinning the continued delivery of productivity and food security in primary industries.

Working with our stakeholders

The Australian Government is a major investor into better water management. The National Water Initiative (NWI) continues to be the overarching framework for the national water reform agenda and investment through the \$12.8 billion Water for the Future program.

The Water Smart Australia program is an initiative of the NWI and I&I NSW is leading projects to implement better water management practices.

The national water reform agenda has resulted in a strong demand for research to support water policy, planning and regulatory approaches required to improve the overall management of water. The COAG Working Group on Climate Change and Water is currently developing a coordinated national strategy for knowledge and research to support water reform. It is anticipated this strategy will be developed by the end of 2009.

I&I NSW is playing a key role in inter-jurisdictional issues relating to water. For example, I&I NSW is the only NSW Government partner in the NWI/ARC National Centre for Groundwater Research and Training scheduled to commence in July 2009.

I&I NSW is developing relationships with the Murray Darling Basin Authority and is a registered provider of high quality, high resolution water data to the Bureau of Meteorology under its Hydrological Monitoring Program.

The water research staff of I&I NSW are in active collaboration with a number of other organisations including:

- Future Farm Industries CRC
- CRC for Irrigation Futures
- ACIAR
- Research and Development Corporations
- Universities including Charles Sturt, NSW, Sydney, Melbourne, ANU, Southern Cross
- Catchment Management Authorities



OUTCOME

Returns from the use of water are maximised

Objectives	Strategies
<p>Improve current and develop new agricultural, horticultural and forestry systems to improve water use and productivity at the farm, catchment and state scale</p>	<ol style="list-style-type: none"> 1. Increase knowledge and understanding of farming systems, livestock systems and rotations that utilise water more efficiently 2. Increase knowledge and understanding of management strategies to increase the tolerance of plants and systems, to periods of water stress 3. Better integrate cropping and grazing systems to optimise water use outcomes 4. Understand critical water management needs for protected cropping industries (eg greenhouse, hydroponics) 5. Identify issues and locations where significant adaptation or adjustment is required to respond to new water use needs
<p>Identify plant varieties and adjust traits that enable them to capture more of the available water</p>	<ol style="list-style-type: none"> 6. Develop new crop and pasture varieties that maximise yield when fully or partially irrigated 7. Accurate identification (phenotype) of plant growth traits that can be adjusted to improve yield when water is limited 8. Investigate the role of genetic variation to improve yield when crops and pastures are stressed at critical growth stages
<p>Improve the water productivity of irrigation systems</p>	<ol style="list-style-type: none"> 9. Irrigation systems (on and off farm) that are flexible and better aligned to crop, soil and irrigation supply (quality and quantity) constraints 10. Investigate the role of hydroponics to improve water productivity in covered cropping and field situations 11. Continued improvement of irrigation technology to measure and manage water in irrigation systems

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OUTCOME	
Functional and productive ecosystems are maintained or improved	
Objectives	Strategies
Develop management systems for agricultural industries that minimise adverse impacts on water quality and ecosystem functions	<ol style="list-style-type: none"> 12. Conduct research and monitoring to improve knowledge of the interactions between land uses and hydrological processes affecting stream flow and water quality 13. Improve understanding of the interactions between land management systems, drainage systems and water quality 14. Investigate interactions between on-farm water retention systems and hydrological processes (groundwater, recharge, runoff, stream flow), water quality and aquatic ecology 15. Investigate interactions between nutrient management practices on nutrient loads to waterways and groundwater 16. Improve the knowledge of interactions between agriculture and forestry systems on sediment loads to waterways



OUTCOME	
Water resource planning and policies address primary industries' needs	
Objectives	Strategies
<p>Improve the capacity of primary industries to respond to the availability of water in both the short and long term</p>	<ul style="list-style-type: none"> 17. Define what is required to make sound, defensible decisions regarding the use of water that is currently available 18. Inform and develop planning decisions that account for reasonable variability in water supply 19. Inform and develop planning decisions around longer term climate change forecasts on water availability
<p>Provide evidence and knowledge to develop policy that results in sound water management</p>	<ul style="list-style-type: none"> 20. Investigate the implications of climate change policy on water availability for primary industries 21. Identify which industries in which locations will require adjustment 22. Develop production systems and technologies that will assist with adjustment 23. Conduct research required to influence water sharing decisions for the benefit of primary industries

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