

Water sustainability: future directions



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Whether you're a believer or a sceptic about global warming and the influence of human activity on the climate, there is little argument about the current impact of drought and changing rainfall patterns on Australia. The Australian community is coming to grips with the fact that we need to be cleverer on how we use water. This has resulted in a significant increase in interest about water sustainability and has increased demands on governments at all levels to improve water usage and efficiency.

There are a number of methods being currently considered or used in different places in Australia to improve water efficiency and to generate 'new' water sources. One of these sources is the recycling of water that would normally have been discarded. Ten years ago there was only sporadic activity by a few utilities and researchers 'testing the water' on how to most effectively recycle water. There were some water recycling success stories, for example Managed Aquifer Recharge in South Australia and Western Australia, and third pipe systems in NSW. Overall, however, there was a wide level of scepticism and reluctance from state regulators along with public ignorance and misperception. Water recycling was considered too difficult, too expensive and not worth the health and political risk.

Recent changes to the Australian climate have had a significant impact on these opinions. In the last 10 years there has been a large increase in water recycling in most Australian states. Surveys have also shown that the Australian community now generally strongly supports the recycling of water, frequently placing it at the top of priorities they believe water utilities should be focusing on (for example see the results of a recent Western Australian community engagement program¹). Developers have also realised that there can be commercial gain by setting up water recycling in new developments. Often water recycling applications suggested by developers push the boundaries of

what is known about treatment capability as well as potential health and ecological risks.

At the same time, new Australian national water recycling guidelines has been produced. These guidelines use a risk management approach, incorporating techniques such as multi-barrier systems, hazard analysis and critical control point (HACCP), quantitative microbial risk assessment (QMRA) and assessment of environmental impacts. The impact and role of microorganisms is a central theme in these guidelines.

Despite the improvements in the guidelines, the greater enthusiasm, and increases in water recycling, there are a number of issues where greater understanding is needed. These include assessments of health risk, water treatment efficiency, management and operational issues, and ecological impacts. A failure to understand these issues could result in operational problems, outbreaks of disease in the community, or damaged environments. Alone, this shows that research remains an important part of any water recycling scheme and for water recycling in general. In addition, however, the public have shown that they have the greatest trust in the advice and activity of researchers². Current microbiological research on water recycling includes detection of pathogens and their removal, the biodegradation of organic chemicals and nutrients, and improved water treatment – particularly the potential for using environments as part of active treatment systems, quantitative risk management, and ecological impacts.

Internationally, Australia is at the forefront of water recycling. This edition of *Microbiology Australia* has papers from a number of researchers who are well-known for their active research on various aspect of microbiology associated with water recycling. It is through their efforts that we can continue to increase the amount and acceptance of recycled water in Australia and assist to solve one of the major issues facing the country in the 21st century. I would like to thank the authors for the time and effort they have taken to write their papers and I hope it provides you with an update of this rapidly growing area.

References

1. Water Corporation (2008) Water Forever Reflections Paper http://www.watercorporation.com.au/P/publications_diversity.cfm
2. Po, M. *et al.* (2005) Predicting Community Behaviour in Relation to Wastewater Reuse: What Drives Decisions to Accept or Reject? Water for a Healthy Country National Research Flagship. CSIRO Land and Water, Perth, Western Australia, 128pp.

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