Recycling water, up and down to the Darling

As the drought tightens its grip on Australia, some city councils are promoting the slogan, 'make every drop count'. For many farmers, however, there are few drops to count. But there could be, if a water recycling scheme proposed by Darling Downs Vision 2000 – a group of business, farming and community representatives – is implemented.

The scheme involves piping wastewater from Brisbane sewage treatment plants to the Darling Downs, about two hours west of the city, where crops such as wheat, cotton, maize and soybean are grown.

'As water supplies become scarce and the impact of the drought hits home, the whole country is recognising the value of water far more,' Darling Downs Vision 2000 chief executive officer, John McVeigh, says.

'Brisbane continues to have a problem disposing of its wastewater into Moreton Bay, while less than two hours away, farming communities have a critical water shortage. If we can bring these two issues together, we'll have a win-win situation.'

To assess the feasibility of such a scheme, scientists from CSIRO Sustainable Ecosystems and CSIRO Land and Water were commissioned to determine the economic and environmental benefits and risks of using recycled water on farms.

'Our analysis was based on 10 farms representing the range of farms, crop types and irrigation regimes on the Darling Downs,' project leader and agricultural economist, Dr Lisa Brennan, says.

The scientists gathered information relating to how much recycled water the farmers wanted, what their sources of irrigation water were (bores, rivers, dams or rainfall), what crops they grew, and what they would like to grow. They also looked at soil type – as different soils have different production potentials – and crop management practices.

Using a crop simulation model developed by the Agricultural Production Systems Research Unit (APSRU), the scientists then simulated farming systems with and without recycled water, and used 40 years of historical climate data to explore the potential climate-driven variability.

'Recycled water not only boosted crop yield in most cases, it also reduced production volatility over a variable climatic period on some farms,' Brennan says.

Using the output from these simulations, such as yield per hectare and the amount of water and fertiliser used, Brennan performed an economic analysis.

'The analysis looked at the costs and benefits once the recycled water was delivered to the farm,' she says. 'That included the water price, any infrastructure the farmer might need to store and pump the water, and any savings from reducing their reliance on bore or river water.'

The analysis showed that if farmers had to pay $150 per megalitre of water – the most expensive scenario – they would still earn a profit of $203 per megalitre. Reliable production and improved crop quality would also allow farmers to capture further benefits in the marketing of cotton crops.

The study was then extended to look at the environmental implications of using recycled water across the whole catchment. Model simulations showed that the major environmental risk identified by CSIRO – increased salt accumulation in the soil and groundwater – was manageable.

'We found that the amount of salt introduced to the soil through recycled water would not be detrimental to crop production,' Brennan says.

'And we can manage the risk of salt accumulation and rising groundwater by planting crops, such as deep-rooted lucerne, which can help restrict the movement of water and salt from below the root zone to the groundwater.'

Brennan says that by reducing farmers' reliance on water from the Condamine River, and overland flow into dams, the amount of water entering the river system could increase, improving ecosystem health and providing downstream benefits. The strain on groundwater would also diminish.

'The groundwater system is under stress because recharge to the system is much lower than the rate of groundwater

Recycled water has the potential to boost crop yield and reduce production volatility on Darling Downs farms.

Grassroots vision

DARLING Downs Vision 2000 was formed in 1995 after business, farming and community representatives became frustrated by the low priority given to the area's water supply issues by various levels of government.

'Rather than sitting on the sideline complaining, we decided to get more active and involved with governments, and start planning water use efficiency activities and search for new water supplies,' the association's chief executive officer, John McVeigh, says.

The association may now apply the initiatives investigated by CSIRO for the Darling Downs recycled water scheme to the nearby Lockyer Valley.

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Saving our beef and bacon

extraction through bores,' Brennan says. 'Studies suggest groundwater levels will not recover if this pumping trend continues.'

CSIRO's report, *An economic and environmental evaluation of the benefits and risks from using recycled water for irrigated crop production on the Darling Downs*, will be used by the Darling Downs Vision 2000 association to inform local, state and federal governments.

'This will be important from a south-east Queensland perspective,' McVeigh says. 'But for the Darling Downs itself, we'll ask CSIRO to develop management regimes, which may include land and water management plans for some catchments and individual farms.'

A successful scheme would reduce water shortage problems on the Darling Downs. But there is one bridge yet to cross.

'There's broad support for this project at various levels of government,' McVeigh says. 'But the sticking point will be the cost of infrastructure to pipe the water from Brisbane to the Darling Downs. It's a very big hill to pump water over.'

APSRU is a collaborative venture between CSIRO, the University of Queensland and the Queensland Departments of Primary Industries and Natural Resources and Mines.

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Wendy Pyper

Australia's capacity to cope with a major outbreak of livestock disease is being enhanced with the installation of a robotic sample handling and information management system at the Australian Animal Health Laboratory (AAHL).

The system, funded by Agriculture, Fisheries and Forestry – Australia, will better equip AAHL to deal with the high throughput of samples required for disease surveillance, enabling about 5000 sera to be tested per eight-hour shift.

The need for high-capacity sampling was highlighted late last year during a simulated foot-and-mouth disease outbreak exercise that tested Australia's preparedness, and its response and recovery capabilities.

The week-long exercise replicated issues ranging from immediate disease control, trade management, and communication between governments and industry, to longer-term impacts such as depression in affected communities.

More than 1000 government and industry participants had to deal with the simulated outbreak, which spread from a farm near Beaudesert, in south-east Queensland, to northern New South Wales, and transported into Victoria.

The exercise began with confirmation of the outbreak on days one and two. It then progressed to the end of the first week of the outbreak on day three, and to three months into the epidemic on day four.

At the end of the simulation, there were 454 infected properties and 822 504 animals slaughtered. It was concluded that an outbreak of this magnitude would have significantly tested Australia's planning, resources and response capability, and a report on the lessons learned has been prepared for the Council of Australian Governments.

Experience in the United Kingdom has shown that if foot-and-mouth disease occurred in Australia, large numbers of samples might have to be tested. The UK epidemic ran from February to September 2001 and more than three million samples were processed.

Foot-and-mouth is a highly contagious viral disease of cloven-hoofed animals such as pigs, cattle, sheep, goats and deer. It does not pose a threat to human health. The disease is spread rapidly via contact with animals, transmission via people or transport vehicles, or through the air. Australia has been free of the disease since 1872.

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