Irrigation at the crossroads

IN 1887 the Victorian Government invited two Californian irrigation entrepreneurs, George and William Chaffey, to come to Australia and start an irrigation colony on the Murray River.

After the brothers arrived, political wrangles in Melbourne delayed the Victorian project. The South Australian Government seized its chance and offered the brothers a similar deal in SA. The Chaffeys founded Renmark in February, 1887, and Mildura three months later.

The Chaffey venture, promising boundless prosperity in Australia for 'tillers of her sunny and fruitful soil', promptly went broke. It was the first time that irrigators, most with no experience, had encountered the unique Australian environment.

But the Chaffeys were right. There was a great future in irrigation. The 6% of Australia's modest run-off that flows into the Murray-Darling Basin now supports a multi-billion dollar irrigation industry. More than 75% of Australia's irrigated agriculture now grows in the Basin.

The great growth years of irrigation, however, have finished. State and federal governments are being forced to confront the very industries they coaxed into existence; vast and thirsty enterprises to which, in some catchments, they have allocated more water than the volume in the rivers.

Three main problems face the irrigation industry: not enough water in some areas, too much water in others, and everywhere, degradaton of rivers and catchments.

Most readily available surface water supplies have been tapped, and are either over-committed, fully committed or nearing full commitment. There are calls to give some water back to the environment; to increase 'environmental flows' as a counter to blue-green algae blooms and other problems.

The irrigation industry is facing pressure to improve its sustainability. In many areas excess use of irrigation water has mobilised salt, bringing saline water tables to the surface and feeding saline drainage water into creeks and rivers. In the Murrumbidgee Irrigation Area, for example, the projections are that in 20 or 30 years some 25% of irrigation land will be lost to salt.

Somehow water managers, knowing there will be no more storages, have to sort out the competing demands of irrigation, town supplies, drinking water for Adelaide and the need for environmental flows. The pressure is on to get the most return for the least water with the least waste. Most agree that will mean a new kind of irrigation industry, built

Bill van Aken

Excess water from irrigation in the Murray-Darling Basin has mobilised a vast reservoir of salt from beneath the soil, raising saline water tables so once-productive land is progressively abandoned. In the Murrumbidgee Irrigation Area, some 25% of irrigation land is expected to be lost to salt in the next 20-30 years.

on tradeable water rights which will increase the price of water, and perhaps on tightened regulations to decrease its use.

Caught in the middle of this conundrum are the authorities that manage the Murray-Darling Basin. The Murray-Darling Basin Ministerial Council and the Murray-Darling Basin Commission work across state borders with government departments and the community to plan and coordinate natural-resource management in the catchment.

In June this year (1995), the council agreed on action aimed at balancing the

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consumptive and environmental uses of water in the rivers of the Basin. It introduced an interim cap on further increases in water diversions and set up a working group to determine the appropriate level of development associated with a cap on diversions, and to suggest how the cap could be implemented.

The move came in response to a report commissioned by the council that assessed the effects of past and likely future increases in water use across the Basin. The report, *An audit of water use in Murray-Darling Basin*, revealed that in the past six years water use rose by 8% or 790 gigalitres (1.6 times the capacity of the Sydney Harbour) and would continue to rise unless water-management arrangements were changed. Defining a balance between water for consumptive uses (irrigation, domestic and industrial) and that required to be left in rivers (environmental flows) was identified as an urgent priority.

When allocations for each river system in the Murray-Darling Basin were made, it was assumed that due to differences in the level of development of individual irrigators, all the available water would not be used. At that time water managers had the task of encouraging irrigation.

Even during the past five years, only 63% of the water that was permitted to be used, was used. As the capacity of irrigators to divert and consume water continues to increase, changes to existing water management arrangements will be needed to prevent a substantial expansion in the volume of water diverted for consumptive use. Such an increase would further degrade the health of the Basin's rivers.

Dr Wayne Meyer, CSIRO Division of Water Resources project leader, advocates a mix of market mechanisms and regulation to try and force a change in Australia's irrigation practices. He says there is a need for a general rise in the price of irrigation water, but that price on its own is a 'blunt instrument': it should be sharpened by coupling it with a tightening of water supply.

A proposal that sums up many Meyer's ideas is his suggestion to remove irrigators' water meters from their inlet pipes and to place them on their drains instead. He also advocates a special levy on the sale of irrigation products to help pay for land restoration and research.

Meyer argues that metering drainage water would penalise growers for what they waste, not for what they use efficiently. And he says it is wasted water which causes salinity and land degradation.

'Metering drainage water would penalise growers for what they waste'

'It's not really rational long-term economics if you degrade your resource base,' Meyer says. 'If we continue to do as we are, then you've got to say that most of the irrigation areas in south-east Australia, particularly inland ones, have a life expectancy of 150 to 200 years.'

David Mussared

Mining sewers for suburban irrigation

ROUSE Hill is a new development sited in the north-west of the Sydney Basin where future urban growth is expected. It has only about 300 residences now, but there are plans for a suburb of 13 000 houses and more than 25 000 people. To stop more effluent entering waterways, and to delay the need for a new dam, Sydney Water has chosen Rouse Hill as the first large-scale development in Australia to recycle its water.

Effluent from the suburb will be treated to high tertiary level and a portion piped back through a separate mains system to be used for watering lawns, flushing toilets, washing cars and fighting fires. Home owners will have two sets of taps, with the recycled water tap colour-coded lilac. They are billed for potable water at the normal rate of 70 cents a kilolitre, but will pay only 20 cents a kilolitre for the recycled water.

The Rouse Hill development is likely to be the shape of things to come for new developments in Sydney, but is considered too expensive for older suburbs which have pre-existing water and sewage infrastructure.

One possibility for older suburbs is water mining , pioneered by ACTEW Corporation (formerly ACT Electricity and Water). With water mining, authorities choose a suburban area where water is needed, then seek out a nearby major sewer to mine . Effluent is extracted from the sewer, treated, and the water used. Excess sludge is returned to the sewer.

In May ACTEW opened Australia s first suburban water mine, a pilot plant extracting about 300 kilolitres of recycled water per day from an underground sewer. The water will be used to irrigate playing fields in the Canberra suburb of Lyneham. ACTEW plans eventually to boost supply to 1000 kilolitres a day, using the water on a golf course and the Canberra Racecourse.

The suburban environment created a need for a compact plant with different technology to that used at Rouse Hill. The water mine consists of a three-stage treatment process involving screening of incoming sewage and solids; the use of biological filters; and a double disinfection process using microfiltration through Memtec filters, followed by chlorination as a safeguard.

The CSIRO Division of Chemicals and Polymers in Melbourne is building a pilot plant, based on CSIRO s Sirofloc technology, for the local chemical treatment of storm water and sewer overflows. The division s Dr Tony Priestley says chemical treatments of stormwater will come into their own in areas like Sydney, where there is not enough space for artificial wetlands.