



Rice and cotton: reducing their thirst

RICE and cotton are two of Australia's largest irrigation crops. Both industries are now under pressure to prove their environmental credentials, and to lessen their drain on water resources.

In rice-growing areas irrigated by the Murrumbidgee River, farmers face increasing restrictions on where they can plant rice. To try and slow rising water tables, the New South Wales Government says rice ought not be grown where a crop uses more than 16 megalitres per hectare.

On some soils rice growers have had to use as much as 30 megalitres a hectare, with the extra water filtering down and topping up the saline water table below. Dr Liz Humphreys, from the CSIRO Division of Water Resources in Griffith, has been trying to find ways to stop water leaking away.

Humphreys has come up with a solution which would make most dryland croppers cringe: rotary hoeing the saturated clay soil in flooded rice bays to 'puddle' it into a water-resistant barrier. She says the technique of creating a massive soil structure to stop moisture seeping down is practical, because many farmers already own rotary hoes.

Humphreys says the puddling technique might really come into its own if water prices rise and allocations are tightened, or if more rigorous monitoring and enforcement of the rice water use is adopted.

At Narrabri, Dr Greg Constable from the CSIRO Division of Plant Industry says the cotton industry has already managed to boost

its water-use efficiency by as much as 20 or 30 per cent, largely because of improved farm management practices and research guidelines issued in the 1970s by CSIRO and NSW Agriculture for improved irrigation scheduling.

Constable says the Narrabri laboratory has looked at improved delivery systems for cotton irrigation – such as drippers – but concluded that such systems were too expensive. There is some water saving with drip irrigation, he says, but the potential savings are less than the cost of the drippers.

He says that in the long term breeding and genetic engineering may further improve water-use efficiency, and perhaps also make dryland cotton more viable.

For example, in Canberra Dr Curt Brubaker from the CSIRO Division of Plant Industry is trying to cross-breed cotton with an Australian native species, the desert rose (*Gossypium sturtianum*). The main aim is to reduce levels of the toxin gossypol in cotton seed, but any hybrids may also turn out to be less thirsty.

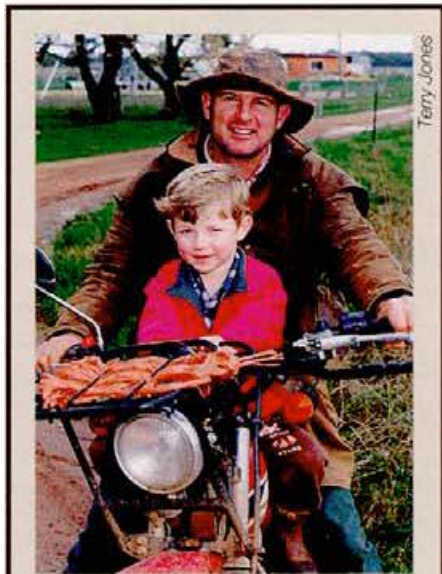
However, Constable says there is no immediate prospect of reducing the water used by each hectare of cotton.

'If you reduce that amount, the grower will have a reduction in income,' he says. 'As it is, cotton growers receive a maximum of six megalitres per hectare. With the drought in recent times, some cotton growers have had no irrigation for three years.'

David Mussared



Puddling involves rotary hoeing the saturated clay soil in flooded rice bays into a water-resistant barrier. This prevents moisture from seeping away.



Terry Jones

A puddling proponent

PUDDLING may be among the oldest forms of cropping in the world, but it could be the salvation of rice farmers in the Riverina district of New South Wales who have soils that do not hold up under irrigation.

Bernie Walsh (pictured with his son, Adam) of Yanco, at the gateway to the Murrumbidgee Irrigation Area, has been puddling rice for three years in a delicate irrigation and soil balancing act. Walsh's 240-hectare farm has red clay soil that when irrigated breaks down into pebbles, allowing water to leak away.

After eight years working with NSW Agriculture, the Department of Water Resources and more recently CSIRO's Division of Water Resources, Walsh has reduced the leakage by puddling his rice bays. Last season, despite the drought, he used 16 megalitres of water per hectare to irrigate his rice. Previously, 20-25 megalitres a hectare had been used.

Walsh has employed professional surveyors to design his property for long-term sustainable rice farming along with a prime lamb enterprise. He says conservation rice farming up to the turn of the century should pave the way for his family to continue growing rice beyond 2000.

Terry Jones