

www.ecosmagazine.com

Published: 2010

Change a constant for Australian rice growers

Adam Barclay

Water-intensive rice farming is a contentious issue in a bone-dry country. Australian growers battle negative public opinion and an 8-year drought – which isn't over yet.



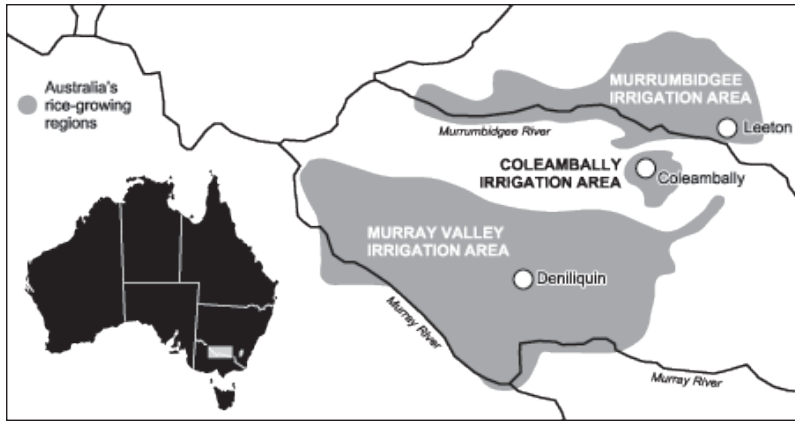
Rice and rice harvester. Australian rice growing is highly water efficient by world standards.

Reporting the impact of an 8-year drought on rice production is a strange caper, I thought, as the wheels of a four-wheel motorbike covered me head to toe with mud. I was sitting behind Rob Houghton, a farmer from just outside Leeton, New South Wales, who was driving me through the pouring rain to his soybean field. When I met Mr Houghton, I expected him to take me to his rice field. The problem is, he's not growing any this year. Mr Houghton wasn't allocated enough water this season to ensure a good rice crop. The alternative was soybeans, which, although not as profitable (see table), don't need as much water.

'There have been only two years since my father started growing rice here in 1942 that we haven't grown rice, and they've been in the last five years – this year and two years ago,' says Mr Houghton.

Australian rice production from 1999 to 2002 averaged more than 1.3 million tons per year. In the seven years from 2003 to 2009, the average was less than 360 000 tons. The 2008 harvest saw the lowest production since the industry began in Australia, at a mere 19 000 tons. The drought average is actually skewed by a million-ton crop in 2006, partly the result of an advance of growers' future allocations. The 2010 crop is expected to bring in around 185 000 tons.

Mr Houghton farms 520 hectares in the Riverina region of south-west New South Wales, which includes the Murray Valley, Murrumbidgee, and Coleambally irrigation areas. Overall, the region is home to around 1500 rice-farming families.



Credit: Ricegrower's Association of Australia

Before the drought began in 2002, Mr Houghton grew a rice crop of 100–150 hectares each summer (planting in October–November and harvesting in March–April). His farm yielded about 10 tons per hectare. Since the rains failed, that area for rice has fallen to an average of around 30 hectares per year, excluding the seasons in which he grew no rice at all.

‘The summer crop is where we really make our money,’ says Mr Houghton. ‘In drought times, though, we’ve really ramped up our winter crop program because your water goes so much further.’

The long-term lack of rain has not only reduced the amount of water available to farmers, but it has also increased water requirements when rice *is* grown. In better times, Mr Houghton needed 13 million litres (megalitres) of water per hectare per season to grow rice. In the 2008–09 season, with water tables sinking lower and lower after almost a decade of drought, the figure was 22 megalitres.

‘We just need a good wet winter to sort that out,’ says Mr Houghton. ‘It’s only a short-term impact, but you can’t grow rice economically using 22 megalitres per hectare and, environmentally, it’s not a sound move either.’

Water sharing

Aside from limiting crop choices, he says that the dry spell has forced the region’s rice growers to make fundamental changes to the way they farm. Growers are becoming canner in the way they shape their fields to make the best possible use of the water they have. By using clever contouring, coupled with well-planned drainage and recirculation systems, many Riverina farmers can grow a winter crop by simply using the residual moisture of the preceding rice crop – no or minimal supplementary irrigation is needed.



Credit: Adam Barclay

Such efficient use of water (Australian rice growers are regarded widely as the most water-efficient in the world) is one of the arguments the rice industry uses to counter claims by many – especially people living in the parched southern Australian cities – that water-thirsty rice simply shouldn't be grown in temperate Australia. If you look at rice as part of an annual cropping cycle, however, the water used per ton of food produced presents a far more compelling equation than that of rice viewed in isolation.

Nevertheless, according to Arlene Buchan, Healthy Rivers Campaigner for the Australian Conservation Foundation (ACF), current levels of water allocation present a major threat to rivers and wetlands in the Murray–Darling Basin. As the country's food bowl and most important river system, the Basin supplies water to the majority of Australia's population in the cities, towns, and farms across the more densely populated south-east quarter of the continent.

'Overextraction of water for irrigation is the biggest driver of environmental degradation,' says Dr Buchan, who also points out that the ACF itself is not anti-rice. 'The way you fix things is not by mandating what crops you can grow in what areas. You fix it by getting the sharing of water right. If you say to a rice or cotton grower, "no more rice, no more cotton", they're just going to grow something else. They'll use the same amount of water, which doesn't benefit the environment.'

Rice: last in the human-use hierarchy

Water in the Murray–Darling Basin is allocated in a hierarchy, beginning with 'critical needs' (for domestic, industrial, and stock use), followed by so-called high-security entitlements (for permanent plantings such as fruit trees and grapevines), and then general security entitlements (for annual crops such as rice and wheat). In times of water shortage, allocations for annual crops – which can be effectively switched on and off each year – are slashed first. In this way, water availability dictates what farmers can and can't grow. The implication is that, if allocations are appropriate, the question of banning specific crops – such as rice or cotton – is a moot one.

Coleambally rice grower Lynne Stuckings, who farms 405 hectares with her husband, John, grew around 145 hectares of rice annually before 2003. 'Since the drought, we've had a couple of years without rice,' she laments. 'Last year, we grew 24 hectares; this year, we've got 48 hectares.'

Ms Stuckings contends that many growers feel there is sufficient water allocated to the environment already, though she concedes that it's a farmer's point of view. 'We look after our environment – we want to pass our farm on to future generations. We're not actually wasting water; we're growing food with it.'

Wayne Meyer, Professor of Natural Resources Science at the University of Adelaide, spent almost two decades working on irrigation issues in the Riverina region with the CSIRO and Charles Sturt University. He agrees with the ACF that there needs to be a rebalancing of water allocations.

'The evidence is absolutely stark that the water entitlements have been overallocated,' he says.

When the allocation system was set up, there was less environmental awareness, in general, and the government awarded licences in numbers 'which far exceeded in dry times any capacity for the system to deliver,' says Prof Meyer. 'The consequence is that the river is drying from the mouth up. Having it dry up before it gets to the end is a sure way to stuff up your natural resources.'

However, Prof Meyer also agrees that blaming rice farmers is not the solution. He counters the claim that rice and cotton farmers are the heaviest water users. 'That's never been true,' he says. 'The major amount of water used in the Murray–Darling system is for pasture. Both in volume and area, it's by far the biggest amount, and most of that is dairy pasture.'

A drier future

In the 1980s and 1990s, Prof Meyer said that one of the problems stemming from water-intensive agriculture was that water tables were rising and bringing salinity with them. He and his colleagues investigated ways to reduce drainage to a point sufficient to maintain salt balance but low enough to keep groundwater levels down. He argues that if farmers were bound by drainage limits (along with appropriate water allocations), then 'whether you grow rice, cotton, beans, or whatever, if you can operate within those constraints, then go for it. The limit shouldn't be on determining what crop you grow but on the operating conditions, which are set on the basis of looking after the public asset.'

The rice industry is bracing for a post-drought future of below historical allocations. In mid-2010, the Murray–Darling

Basin Authority (the Federal Government agency responsible for planning the Basin's water resource management) is scheduled to release its much-awaited draft Basin Plan, which is set to include 'sustainable diversion limits' that will almost certainly mean less water for farmers in the Riverina.

'But there isn't anything in that plan that will devastate us like the drought has,' says Ruth Wade, Executive Director of the Ricegrowers' Association of Australia, a voluntary organisation made up of current and retired rice growers.

Before the drought, the rice industry planned its operations around annual production of about 1.2 million tons. In anticipation of reallocation, this has been revised down to about 800 000 tons.

As is always the case when farming regions are hit by drought, the surrounding communities suffer. Businesses that depend on farmers have been hit particularly hard.

'You've only got to walk up the street here,' says Mr Houghton, gesturing to the main street of Leeton, 'to see the vacant shops where people haven't been able to continue.'



Credit: Adam Barclay

Ms Wade emphasises the interdependency of communities across the rice-growing region. 'Take the rice industry out of towns like Leeton, Coleambally, and Deniliquin, and they bleed to death,' she says. 'Deniliquin has had it really tough. They lost their mill, they lost all of the transport systems that go with it. Transport companies, all of the people involved in the storage and supply systems – they all suffer.'

Water trading

To maintain a livable income through this lean period, some farmers have become water traders, selling their allocations temporarily to other growers. Others have opted to sell their allocation permanently to the Federal

Government, which, as part of its Water for the Future program, has set aside \$3.1 billion over 10 years to buy from irrigators in the Murray–Darling Basin water that will remain in the natural environment.

Although at this stage there are no mandatory water buybacks, many farmers see little choice.

‘The government says they only buy from willing sellers, but they’re not actually willing,’ says Ms Stuckings. ‘They’re farmers under duress because we’re in drought. And banks are starting to put pressure on people, too, so people have no other options.’

Coleambally offers a striking example of a strategy to deal with drought. With the government looking to purchase water allocations quickly, there were worries that the area would disintegrate into a messy patchwork of irrigated and dryland farms with an unworkable water supply system in between. In August 2008, envisaging dire consequences for the community, Robert Black, then Chairman of the Coleambally Irrigation Area, offered the whole town up for sale to the government for \$3.5 billion. All of it. Every business, every shop, every home, along with every drop of the area’s 600 000 megalitres of water entitlements. Although nobody took the sale seriously, it made the point that, if the government is to buy water allocations, it needs to do so in a considered, strategic way.

Mr Houghton says that a portion of the farmers who have sold their allocations have stayed on their property because they want to remain farmers, but have changed their operations to grazing or dryland cropping. Others, especially older farmers, have used the sale as an opportunity to exit agriculture. But, overall, ‘There hasn’t been a “sell and move out; there’s no future in this” kind of mentality.’

Sunny outlook

Several factors combine to make rice in Australia successful: the climate (when there’s enough water), which provides a huge amount of sunlight; expert producers who average around 10 tons per hectare (with some growers achieving more than 14 tons); and the tight integration of the production, commercial, and research arms of the industry. Together these factors result in some of the highest yields in the world.

Russell Reinke, who runs the rice breeding program at Yanco Agricultural Institute with fellow breeder Peter Snell, says that, given the magnitude of water issues in Australia, there is a constant drive to improve water efficiency. This has been achieved using several approaches, including breeding more water-efficient rice varieties, ensuring that rice isn’t grown on leaky soils, and simply pushing the yield envelope to grow more rice per hectare without using more water.

‘The other thing we’ve done is to reduce growth duration while not sacrificing yield,’ says Dr Reinke. ‘When you can sow a variety two or three weeks later in the season, you’ve avoided a certain amount of evaporation from the water surface.’

The next step, he says, is to develop varieties that can be established under an aerobic system (in the same way that dryland crops such as wheat are grown) and putting standing water on the field only when it’s needed most, from around the middle to the end of the growing season.



Credit: Adam Barclay

After water-use efficiency, the biggest target for breeders is cold tolerance, which is also linked to water productivity. A body of standing water acts as a thermal blanket, retaining protective warmth when the ambient temperature drops too low. Create a variety with high cold tolerance, and you cut the amount of water needed throughout the growing season.

The breeder tasked with cracking the cold-tolerance puzzle is Dr Snell.

‘We’ve got quite high cold tolerance to start with because a lot of our stock started from Californian material, which is generally tolerant,’ he says. ‘But, with up to 30°C between maximum and minimum temperatures in summer, we want extreme cold tolerance. We’re talking about being able to cope with temperatures as low as 10°C at critical stages of the plant’s growth.’

Without that sort of cold tolerance, the aerobic rice varieties Dr Reinke describes will remain nothing more than a nice idea. But, according to Dr Snell, that may be about to change, with a promising cold-tolerant variety due to be released later in 2010.

Mr Houghton suggests that the close relationship between growers and researchers is ‘the reason that the industry is as strong as it is now in such hard times. Geographically, we’re in a relatively small area, so it’s almost a family environment. One of the benefits is that any outcomes of R&D are very quickly implemented on the farm. The lines of communication are very crisp, so when there’s a new development it’s put out there straight away. There’s good access to our R&D people, everyone knows who’s doing what and there’s plenty of opportunity for growers to avail themselves of the latest technologies and theories.’

Looking into the future

Despite this advantage, he worries about the impact of the drought on the next generation of farmers. ‘I have a son who’s 14,’ he says. ‘He hasn’t seen the good times. All he’s seen is drought; all he’s heard about in agriculture is how to cope with drought.’

He adds, with a quizzical tone, that his son still wants to be a farmer, ‘and I don’t really understand why. But there are a lot of young guys who don’t even consider farming as an option because it’s just too hard.’

Nevertheless, he sees rice as being a part of Riverina farming in the long term.

‘It’s such a marketable commodity,’ he says, ‘and the branding of the industry is so strong both domestically and

internationally. We'll never get back to "the good old days", but we've made major improvements in our water efficiency and management, so we'll get a lot more out of the water into the future.'

This article has been adapted from an article in Rice Today, published by the International Rice Research Institute. www.irri.org.

From ECOS online <http://www.ecomagazine.com/?paper=EC154p22>