

Sugar's bitter sweet dilemma

Brad Collis outlines efforts by the cane-growing industry to lessen its impact on the Great Barrier Reef.

Dr Chris Grof with four-metre-high sugar cane used in a photosynthesis experiment.

Tony Palmas has fished the reefs and estuaries along the coast near his 145-hectare cane farm at Ingham all his life. So did his father, and he hopes the barramundi and reef-fish will still be there for his grandchildren. Like most cane growers along Queensland's coastal belt, Palmas is an avid fisher.

So it has come as a shock, laced with some disbelief and even resentment for them to be accused of slowly killing both their leisure haven and Australia's greatest natural icon, The Great Barrier Reef.

An estimated 15 million tones of sediment containing 7700 tonnes of nitro-

gen and 11 000 tonnes of phosphorus is said to discharge into the Great Barrier Reef lagoon each year from coastal agriculture.

Because of the structure of the outer reef, there's no escape for these nutrients into the Pacific. 'It's like pouring discharge into a bathtub,' a research scientist with the Great Barrier Reef Marine Park Authority, Dr Sheridan Morris, told farmers at an Australian Farm Management Society conference at Toowoomba last year.

Morris pleaded with the farmers to move to zero tillage, saying it would reduce soil erosion from an annual average

of 150 tonnes a hectare to 5-15 tonnes a hectare – close to the natural erosion rate.

But a lot of farmers have yet to be convinced, and many are awaiting the verdict of one of the most comprehensive agricultural research efforts ever mounted in this country, led by the CRC (Cooperative Research Centre) for Sustainable Sugar Production. Thirteen research and industry bodies have assigned specialists in on-farm production systems, transport and milling. The total research and development expenditure on sugar sustainability is now approaching \$42 million a year.

The task is to quantify the problem, then solve it. This means keeping Queensland's \$2 billion sugar industry profitable, while reducing or even eliminating its environmental impact.

Tony Palmas is one of several cane growers who have invited the scientists onto his land to install equipment. His reasoning reflects both the practical and the political sides to the issue. 'Urea is expensive and I can't afford to have it running off to the sea,' he says. 'And as a keen fisher, I'm concerned if it's damaging the reef.'

On the other hand, if the sugar industry is not at fault, then we don't want the blame. A lot of us are already annoyed at being attacked before the facts are known.'

However, some say the circumstantial evidence against the industry is strong. Dr Chris Crossland, former director of the CRC for Reef Research, says there are two issues to be resolved: the effects of cane-growing practices on coastal wetlands, and the effects on groundwater. Added to this is the pressure from some cane-growing quarters for even further expansion.

'The coastal wetlands, the saltmarsh and mangroves, are the reef's kidneys,'

Crossland says. 'They filter sediment and nutrients. But there's a strong push being made to expand cane into these areas. If it happens, there'll be a serious fight and it won't be waged by rabid greenies, but by scientists and even many in the cane industry who now understand these issues better.'

Crossland's anxiety reflects a modern dilemma. The sugar industry's total worth to the Australian economy is put at \$5 billion a year, and it underpins a significant part of Queensland's economy. The gross value of Queensland's 1996-97 season sugar production of about five million tonnes was \$1.8 billion. There's an expanding international market and uncleared coastal land is strong temptation for 'bottom line' administrations.

A few doors along the same corridor from Crossland is director of the Sustainable Sugar Production CRC, Professor Bob Lawn, who is a little more sanguine. He points out that tourism is now of the same economic magnitude as sugar, which is why the industry has accepted the pressure to examine itself frankly.

'It's facing increasing competition in international sugar markets, but knows it

has to meet these challenges without damaging its off-site environment,' Lawn says. 'That's why half our research is looking at environmental impacts and half is focussed on better production practices.'

'And the first two years have been taken up simply with sorting fact from perception. Cane growing covers less than 10 per cent of the reef catchment area. If you take a bigger area and include the Burdekin catchment, the industry uses 0.3 per cent of the land. So there are other forms of land use - grazing and urban growth - that also have to be considered.'

Lawn in fact portrays the sugar industry as a model of good corporate citizenship, as acknowledging environmental concerns and working hard to address them.

'A lot has already changed,' he says. 'Ten years ago the crops were burned, the biomass going up in smoke. Now 66% of cane is cut green and the trash left on the ground to stabilise the soil. Our studies are already showing that soil movement off these fields is minimal.'

'Because a lot of nutrient used by the cane remains in the trash, which quickly breaks down in the wet tropics, this





Canegrowers

A system is being developed to monitor the nitrogen content of cane juice at 26 Queensland mills, and feed the results back to individual farms. The information will help growers guard against excessive fertiliser applications.

practice should also reduce the amount of fertiliser that needs to be added each year.'

Dr Russell Muchow, and Dr Brian Keating from CSIRO Tropical Agriculture are joint project leaders on the sustainable sugar production program. Muchow says part of the industry's problem is that most of the growth since the 1970s has come from increases in the area of land cultivated, rather than from lifts in yield.

He says farmers and scientists have therefore got to first lift the industry's productivity so that it doesn't need more land. The second key area of research is to develop new management practices that better maintain and stabilise the soil base.

To lessen the need for more land to lift production, another scientist from the division, Dr Chris Grof, is using biotech-

nology (genetic engineering) to increase sucrose yield and quality. 'We're looking at changing the plant's metabolism, to direct less carbon from photosynthesis to starch and more to sucrose,' he explains.

With Keating, Grof is also working on a prescriptive tool that will help farmers better manage fertiliser use, in particular urea which is used to add nitrogen. He says farmers need a way to know just how much nitrogen their soil needs, rather than annually applying a blanket amount with all the excess running into the surrounding ecosystem.

'With 6900 cane growers along the Queensland coast we can't measure the nitrogen on every farm, but all cane is funnelled through 26 mills,' Grof says. 'We hope to be able to monitor the nitrogen content in cane juice there and feed the results back to individual farms.'

Dr Heiko Bohl, a German hydrogeologist working with CSIRO Land and Water on sediment and nutrient run-off, says earlier studies have already suggested that between 20 and 60% of nitrogen applied to canefields is lost to waterways or the atmosphere.

'That's up to 36 000 tonnes a year, costing farmers an unnecessary \$36 million,' he says. 'So a large part of this exercise is saving the industry money. The environmental benefit then follows.'

Jennifer Marohasy, an entomologist and environmental manager with Canegrowers, the main farmer lobby, says that predicting the amount of nitrogen each farm needs every year is the biggest hurdle. 'Twenty years ago we could put a man on the moon, yet today we still can't

abstract

The task of the CRC for Sustainable Sugar Production is to quantify and find ways of controlling the effects of cane-growing practices on groundwater and coastal wetlands, the 'kidneys' of the Great Barrier Reef. Research challenges are to lift the industry's productivity so that it doesn't need more land, and to develop new farm management practices that better maintain and stabilise the soil base. Genetic engineering is being used to increase sucrose yield and quality, and a system is being developed to help growers use fertiliser more efficiently, and prevent nitrogen runoff. The research is supported by the cane growing industry.

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predict how much nitrogen a crop needs,' she says. 'The result is that farmers over-compensate.'

However, like Tony Palmas, she too is annoyed that the cane industry has been condemned without evidence, saying it's simply the softest target.

'The monitoring is showing there is considerable nutrient coming off the farms, but the monitors further downstream aren't picking this up,' she says. 'The data are hazy, and there's not a single canegrower who doesn't want the answers. That's why they are supporting the research.'

'We're not waiting for the conclusive evidence before we try to minimise the off-farm environmental impact. It's why I've been appointed as a full-time environmental manager, and it's why some of our strongest critics are from within our own ranks.'

'There are canegrowers who are complaining about declining fish numbers, and it just might be that the banana industry, grazing and urban growth are responsible or equally responsible.'



Canegrowers



The practice of burning crop residues has declined in the past 10 years. Now two-thirds of cane is cut green and the trash left on the ground to stabilise soils. Studies have shown that soil movement off these fields is minimal.