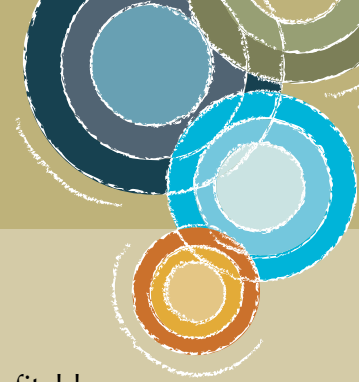


Managing wetlands in intensive agricultural systems



Cane production

Wetland management, cane farming and cattle agistment combine to achieve profitable and sustainable outcomes in the wet tropics.

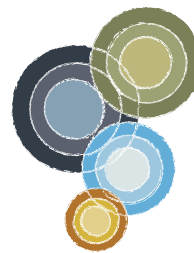
The link between farming and wetlands

Rivers, creeks, lagoons, springs, ring tanks and dams are all wetlands. In fact, Queensland's beautiful coastline is also wetland.

Intensive agriculture relies on wetlands to support a range of production processes. For instance, wetlands regulate irrigation and stock water quality, provide flood management and erosion control and improve pest management (through wetland vegetation). Aside from their on-farm benefits, they are a place to fish, put the boat in, or swim.

Land use practices have the potential to impact both on-farm and downstream wetlands. To ensure wetlands remain functional, farm practices sometimes need to be adjusted. In some instances, building or modifying wetlands can help with nutrient removal, sediment control and water re-use, among others.

This case study is one of a series developed by the Department of Primary Industries and Fisheries (DPI&F) through the Queensland Wetlands Programme. It demonstrates the benefits of wetlands in improving farm management and incomes, and the farm practices that contribute to wetland health. The series can be viewed in the Managing Wetlands section of *WetlandInfo* (www.epa.qld.gov.au/wetlandinfo).



Queensland
Wetlands Programme

The Queensland Wetlands Programme

The Australian and Queensland governments established the Queensland Wetlands Programme to protect wetlands throughout Queensland.

The Queensland Wetlands Programme is lead by the Australian Department of Environment, Water, Heritage and the Arts and the Queensland Environmental Protection Agency. A number of Australian and Queensland government agencies and organisations assist in the Programme's implementation.

The Queensland Wetlands Programme would like to thank Mario Porta Jnr and the following organisation for their contribution to, and support of this product:



CANEGROWERS
www.canegrowers.com.au



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The cane farm and its environment

Ingham farmer Mario Porta owns Burnside, a 1000 hectare cane and cattle enterprise on the Herbert River floodplain at the southern end of the Wet Tropics region. The Herbert River floodplain includes wetland ecosystems that are of national significance.

The property now boasts many remnant and rehabilitated ephemeral swamps and riverine wetlands that were once part of extensive ecosystems across the Herbert River floodplain.

A vision for sustainable production

When Mario and his father bought the former grazing property in 1995 they wanted to ensure that farm practices maximised profitability without jeopardising the future value of the property.

To do this, they needed a management approach that balanced production with natural resource outcomes.

The family developed a plan that tackled productivity and sustainability objectives 'hand in hand', not as discrete activities. Mario sees himself as being both an economist and an environmentalist.

Mario says the "penny dropped" at a presentation by innovative Tully canegrower Ross Digman in the early 1990s. Ross's pioneering approach to reinstate floodplain wetlands and lagoons had improved yields in marginal farm areas, enhanced farm manageability and delivered water quality and biodiversity outcomes for the farm and the community.

Mario says Ross's message was "a no brainer" and saw an opportunity for a similar outcome in the low-lying areas of his property that were affecting yields and the environment.

Through careful property planning and talking to other producers who had tried reinstating floodplain wetlands, Jabiru Wetlands were born.

Managing wetlands for improved productivity

The cane industry has been proactive in achieving better environmental outcomes by improving nutrient management and runoff from farms. These improvements have been achieved in partnership with government and the community.

At Burnside, previous management had drained or filled some of the original floodplain wetlands. These low-lying areas were boggy and weed-infested, and only achieved marginal production outcomes.

By incorporating rehabilitated wetlands into the production system, Mario could:

- improve land condition over the long term;
- increase yields in low-lying areas of the farm
- provide better flood management and farm trafficability
- reduce erosion and runoff
- improve water quality
- improve land values by developing a farm landscape with diverse features
- improve biodiversity by connecting the wetlands with the nearby creek
- potentially include farm-based tourism into the income stream.

Managing waterways with Farm Management Systems and best practice

As good natural resource management outcomes are closely linked to farm practices, constructing or rehabilitating farm wetlands has rarely been done without considering how other areas of the business are being managed.

Some growers plan and manage their farm informally, without much documentation. Others collect and record farm information to help them plan, manage and improve their farming operations.

Canegrowers Senior Environmental Manager Dr Tim Wrigley believes most growers already have the basis for a Farm Management System (FMS). He says more farm practices will need to be documented in the future so growers can demonstrate that they are farming responsibly.

The SmartCane FMS brings together tools and resources to help growers develop best practice, build and improve their farming operations while also meeting their legal requirements.

SmartCane FMS program includes

1. COMPASS
2. BSES Farm Productivity Assessment (FPA).
3. BSES 'Six easy steps to nutrient management'
4. Farm Economic Assessment Tool (FEAT)
5. Land and Water Management Plan
6. Grub plan
7. Chemcert accreditation
8. Occupational Health and Safety
9. Irrigation efficiency audit

The management approach at Burnside

Mario says the keys to his success are adequate planning and asking for information and help from other growers, government staff and Natural Resource Management groups. In fact, the Herbert River Catchment Group helped Mario develop the application for the Australian Government Envirofund grant that funded a third of the \$90,000 wetlands project.

One of the first steps toward developing the wetlands was to revegetate as the former grazing property and cattle stud was devoid of tree cover. Thousands of trees were planted across the property.

Contour and soil mapping was done to describe flow paths and assess the feasibility of wetland rehabilitation. Soil testing by BSES determined soil permeability and if acid sulfate soils were present.

Headlands were reformed, becoming wide 'water paths'. These wide passages also ensured the farm remained accessible in wet weather and was safe for vehicles and staff.

Soil excavated from the 5 hectares of rehabilitated wetlands was used to raise paddock height, which, combined with dual-row, raised beds, improved yields by 5 tonnes per hectare in previously poor production areas.

Jabiru Wetlands contains the following design features:

- **Long hydraulic residence time (HRT).** Water flowing into the wetland is forced to travel around a series of strategically-placed levee banks and islands. This makes sure sediments and nutrients are deposited before flowing into the nearby creek.
- **Habitat sites.** Logs found on the property and placed into wetland banks provide a source of carbon (the main fuel for many wetland processes) as well as habitat for fish. Raised, central islands offer a safe habitat for birds.
- **Raised viewing stations.** Raised and planted wetland banks increase the amount of shade over the wetland. The raised banks are wide enough for a vehicle, which makes monitoring easier and a great way to view the wetland in the shade.

Mario suggests the sugar industry progress their natural resource management credentials by taking on industry-recommended practices. These include *Six easy steps to nutrient management* by BSES and programs such as COMPASS, Chemcert and Farm Productivity Assessment (BSES). Together, these individual programs form the SmartCane FMS.

Mario says that by trying new practices such as controlled traffic, minimum till, trash blanketing and legume break cropping, as well as using prescribed blends of fertiliser, he has improved his bottom line and the natural resource management outcomes.

Implementing controlled traffic technology has reduced the distance travelled by a single piece of machinery by up to **1700 km a year**, which amounts to less labour, less fuel and fewer emissions. The 2006 planting results show Mario saved \$65,000 in fertiliser by soil mapping across the farm – a good result for Mario’s business, local waterways and the Great Barrier Reef lagoon.

The staff at Burnside use a farm operation manual which describes farm practices like fertiliser and lime application rates, and provides workplace health and safety information. This ensures that everyone knows what to do and farm inputs are applied where and when required.

Long term management

The success of revegetation work depends on follow-up maintenance. While an ongoing responsibility, it does benefit business. While complete weed elimination is unlikely, trees that were planted 4-5 years at Burnside ago now provide some control of invasive wetland weeds such as hymenachne (*Hymenachne amplexicaulis*), para grass (*Brachiaria mutica*) and salvinia (*Salvinia molesta*).

The Porta family and the Burnside staff are committed to maintaining their plantings. The Herbert River Catchment Group also helped the family apply for funding for Greencorps planting and site maintenance.

So what’s the bottom line?

Reinstating the property’s floodplain wetlands initially reduced the production area by 10 hectares. However, Mario was confident that crop tonnages would improve in the low-lying areas of the farm. In fact, he believed the overall cropped area could be increased by 16 ha because previously unproductive areas could be brought into production.

Some five years after re-establishing the wetlands, Mario’s initial losses in production capacity have been offset by improved tonnages (5 tonnes per hectare) across the property. Mario believes this was due to improved field drainage and better water management across the farm.

The range of best practices have also played their part in the improved yields, reinforcing Mario’s belief that sustainability and productivity issues are well connected.

An economic analysis using Farm Economic Assessment Tool (FEAT) was used to explore the cost-benefit of the wetland system at Burnside. The results of the DPI&F analysis indicated that, with a capital outlay of \$120 000 (of which \$30 000 was provided by the Envirofund grant) the farm gross margin has improved by \$49,620 per year. This is mostly due to additional production capacity and yield improvement (assumptions used in the analysis are provided in Table 1).

Table 1: Assumptions used in FEAT analysis

Farm information	<ul style="list-style-type: none"> • 505 ha (ratoon 300 ha/plant 121.4 ha/fallow 78.6 ha) • no irrigation • legume (soy) break cropping (soy not harvested)
Changes to production capacity	<ul style="list-style-type: none"> • increase in cropped area of 16 ha
Yield improvement	<ul style="list-style-type: none"> • average 5 t/ha
Net present value (NPV)	<ul style="list-style-type: none"> • \$585,346 (over 20 years)
Discount rate	<ul style="list-style-type: none"> • 7.00%

Going the next step

While sugar prices influence the Porta's natural resource management approach, there are plans to establish a vegetated corridor along the watercourse to connect Jabiru Wetlands to nearby Cattle Creek. Other plans include fixing an amphibious vehicle to assist weed management in the wetlands and along watercourses.

Mario conceded that it is difficult to find the time to mix research and develop and new ideas with planting, managing and harvesting. However, he said he believed that by attending industry seminars, trying new products and methods, it all added to the knowledge base needed to grow cane profitably and sustainably.

Sustainable outcomes from constructed wetlands and best practice

Jabiru Wetlands and the farm practices employed by the management and staff at Burnside are an excellent example of how good wetland and vegetation management can be linked to industry Farm Management Systems to achieve profitable and sustainable agricultural outcomes.

These practices contribute to wetland protection by reducing nutrient and sediments loads and increasing beneficial vegetation.

For more information on how to protect or rehabilitate wetlands, visit Managing Wetlands at www.epa.qld.gov.au/wetlandinfo

Acknowledgements

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Dr. Tim Wrigley—Canegrowers Australia

Other Products

Managing wetlands in intensive agricultural systems—cotton production

Managing wetlands in intensive agricultural systems—dairy production

Managing wetlands in intensive agricultural systems—ginger production

Managing wetlands in intensive agricultural systems—nursery industry

For more information visit Managing Wetlands section of *WetlandInfo* at www.epa.qld.gov.au/wetlandinfo or contact:

DPI&F Business Information Centre
on **13 25 23** (weekdays 8am to 6pm)

Email: callweb@dpi.qld.gov.au

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