The dairy farm and its environment

The Watson's dairy farm lies in the headwaters of the Mary River catchment at Conondale in South East Queensland. The 330 hectare property supports a herd of 500–600 Friesian cows including heifers, dry cows and calves.

This family is clearly committed to improving land condition, waterway health and farm productivity. They have close ties with the Mary River Catchment Coordinating Committee and have been involved in catchment planning since the early 1990s.

Sediment and nutrient discharges in the region can have negative impacts on the health of the Ramsar listed wetlands and seagrasses in the Mary River estuary and Great Sandy Marine Park. The marine park links Fraser Island and the Great Barrier Reef, two World Heritage areas.

Sediment loads and nutrient enrichment can also affect the habitat of the endangered Mary River cod (Maccullochella peelii mariensis), Mary River turtle (Elusor macrurus) and the iconic lungfish (Neoceratodus forsteri) in the freshwater reaches of the river.

A vision for sustainable production

When the Watson's bought the property in 1984 it had been a dairy and grazing farm for 30 years and the land condition needed improving if it was going to achieve long-term productivity. Riparian areas were devoid of tree cover and pastures were degraded; laneways, gates and loafing (cattle resting) areas were unmanageable during wet periods.

The Watson's also realised that soil health needed improvement and they began a long-term process to recover manageability, resilience and productivity for the property.

Managing waterways with Farm Management Systems and best practice

The Queensland Dairyfamer's Organisation Farm Management System (FMS) Dairying Better-n-Better for Tomorrow program has helped the Watson's improve fertility and water management.

Dairy industry Natural Resource Management Coordinator Bronwyn Ford says the program uses the Dairy Self Assessment Tool (DairySAT) which helps farmers identify priorities for on-farm natural resource management and "benchmark their current practices against a range of industry best practices".

DairySAT links directly with the Queensland Dairy Farming Environmental Code of Practice and includes sections on farmer's legal requirements.

The self-assessment tool can be used to address priorities for a group of farmers in a sub-catchment through a series of three workshops.

The Watson's say the workshops provide information about better management practices, use a range of practical learning principles and are conducted in a supportive environment.

Queensland Dairyfarmer's Organisation FMS

Dairying Better-n-Better for Tomorrow farm management system has three stages:

Stage 1: DairySAT

- Natural resource management issues identified and prioritised on-farm
- Linkages with regional and catchment natural resource management priorities identified
- Linkages with Queensland Dairy Farming Environmental Code of Practice

Stage 2: Workshop series

- Key practical learning principles used
- Technical advice and support available
- On-farm advice from other farmers

Stage 3: Action planning

- Farm management system (action plans) developed and implemented
- Farm and sub-catchment monitoring
- Actions implemented to address on-farm natural resource management changes
- Monitoring plan implemented via an action plan

The management approach

The alluvial sands of the Mary River banks and river flats are easily eroded during heavy rain. Since riparian clearing began in the 1800s, large sections of the river bank have been eroded due to a combination of steep terrain, alluvial soils and cattle.

Aerial maps were invaluable for planning management activities such as laneways, irrigation and fencing. The first action was to remove fences crossing the river, which were "one less thing to worry about during floods".

Single strand electric fencing was installed to keep cattle away from the river. A Riverbank Restoration Grant from the Mary River Catchment Coordinating Committee helped provide the simple, low-cost electric fences which are easy to take down, recover and put back up after floods.

Improved drainage and access was needed in the laneways and loafing areas. A comparatively small investment of $1500 was enough to raise and harden these areas with rock (road-base). This made a significant difference in time spent moving cattle from paddocks to the milking shed. Cleaner laneways meant that less silt accumulated on udders and this reduced machinery maintenance costs in the milking shed.

The Watson's provided additional, off-stream water troughs which also allowed them to divide their farm and put time-controlled cell grazing into operation.

The Watson's stabilised the degraded banks by planting between 300–500 native, riparian trees along waterways each year. They have been doing this since they bought the property in 1984. The established tree canopy has led to fewer weeds. The invasive species are managed with low-level weed control. The banks now also provide flood control and biodiversity outcomes.

The benefits of maintaining riparian vegetation cover was realised during the 1999 flood, described as a one-year-in-50 event. While neighbouring properties lost sections of river bank, the Watsons' revegetated banks suffered virtually no bank slumping.

The Watson's experience confirmed that allowing cattle unrestricted access to the river "doesn't stack up on either economic or environmental grounds".

The long term benefits in productivity were due to improved pasture use, reduced mustering time and better overall herd management, better control of mastitis, foot rot and other water-borne disease outbreaks and access to clean water, avoiding heat stress in summer.

Managing pastures

Pasture health and milk production go hand in hand and the Watson's philosophy is to "produce milk at least cost, not at any cost". The introduction of a minimum tillage system improved soil health and matched optimal pasture production with the potential for irrigation.

Overgrazing causes poor pasture recovery, and it is important to sustain pasture health and resilience. To maintain good pasture cover and feed utilisation, 1.2 hectare paddocks are used in conjunction with 50-day rotations.

Electronic soil-moisture monitoring is the backbone of modern irrigation programs and the Watson's use neutron probes to make the best use of soil properties and applied nutrients. They suggest equipment based on capacitance probe technology (such as the EnviroSCAN®, EasyAG® or the Diviner® suite of products) was worth investigating.

Irrespective of the type of fertiliser, over-irrigating causes nutrients to be leached through the soil profile and "are lost to the grower and water quality downstream is reduced".

As members of the National Soil Acidity Program, the Watson's advocate using lime to redress soil acidification caused by pasture management.

Managing effluent

The Watson's looked at different ways to manage dairy effluent before deciding on a 'weeping wall'. This trafficable solids trap will improve effluent management as well as maximise the potential for reusing the effluent.

The South East Queensland sub-tropical dairy program demonstrated that reusing effluent for irrigation could potentially save the equivalent of $2000 per year in fertiliser costs.

Improvements in dairy effluent management systems can attract potential contributions of $10,000 from the Rural Water Use Efficiency scheme.

Farmers interested in upgrading effluent management systems and riparian areas are encouraged to contact their local Queensland Dairyfarmers' Organisation representative or the dairy industry natural resource management coordinator.

So what's the bottom line?

Restoring and fencing the riparian area and installing 15 off-stream water troughs cost the Watson's **$71,000**. An additional **$12,000** in fencing costs was needed to develop cell grazing across the farm.

Milk loss caused by heat stress costs **$11.00** per cow which represents a potential, annual loss of **$3000**. Heat stress can be avoided by planting trees or providing artificial shade structures.

Off-stream watering reduced heat stress and increased milk production by 140 litres per day (across the milking herd), providing an extra **$18,000** year.

Controlled rotational grazing has improved feed utilisation and pasture productivity by at least 20%, providing an additional income of ¯-¦¬⌐¤¤ per hectare.

Restricting river access also improved pasture fertility because defecation increased on the pastures. This reduced inputs of artificial nitrogen and added **$2750.00** per year to the bottom line.

Time taken to muster cattle from the river was reduced by about 60 minutes per day; this saves the Watson's around **$2800.00** per year in labour costs.

It is well known that the rate of environmental mastitis* increases when cattle have access to waterways and teat ends are exposed to bacterial contamination. Since access to the river was restricted, mastitis cases have dropped from around 10% to 1% of the herd. This has saved them **$2800.00** in veterinary costs and discarded milk.

*Environmental mastitis is an intra-mammary infection by organisms surviving in the cow's surroundings (soil, manure, bedding, water), or on body sites of the cow other than the mammary gland, and during calving. (Countdown Downunder: Farm Guidelines for Mastitis Control, Dairy Research and Development Corporation, Australia, 1998).

Table 1: Economic benefits of riparian fencing and restoration in conjunction with a cell grazing regime

One-off costs	**Details and assumptions**	**Cost ($)**
Riparian fencing	1.8km single strand fence @ $1.30 per metre	2 340
Riparian restoration	Trees, labour and other materials	8 500
Off-stream watering points	15 troughs@ $4000 each inc. installation	60 000
Cell grazing subdivision (fencing)	9.0 km single strand electric fence @ $1.30 per metre	11 700
Total one off costs		82 540
Annual costs		
Grazing land lost due to riparian fencing	5ha @ $960.00 per ha	4 800
Milk loss as a result of heat stress	Assumes $11.00 per cow	3 000
Fence and trough maintenance	Per year	1 500
Total annual costs		9 300
Annual benefits		**Benefit ($)**
Increased pasture utilisation	20% increase in pasture utilisation equates to an extra 120,000 litres milk per year	51 000
Nutrient recycling	Estimated @ $500 benefit per 100 cows	2 750
Reduced mustering time per year	Estimated time saved is 60mins per day @ $15.50 per hour	2 830
Reduced incidence of environmental mastitis	Assumes a reduction of herd mastitis from 10% to 1%	2 800
Reduced herd mortality and injury from river hazards	Assumes herd mortality rate of 0.50% year @ $800.00 per cow	2 200
Improved milk production for access to clean water supplies	Estimated benefit per cow is 0.5 litres per day @ 0.42cents/litre	17 882
Total annual benefit		**$ 79 462**
Total net present value (NPV)		**$ 570 363**
Discount rate (over 10 years)		**6.00%**
Equivalent Annual Return (equals total annual benefit less annual costs)		**$ 70 162**

Going the next step

The Watson's have another wetland project in mind which will add further value to their farm. They plan to enhance a remnant riverine wetland system to encourage more water birds and improve the visual amenity of the farm.

Sustainable outcomes for the dairy farm and wetlands

The Watson's management approach and active involvement in catchment management projects, the QDO's FMS, 'Dairying Better-n-Better for Tomorrow' and the 'DairySAT' self assessment process has helped achieve improvements in soil and pasture health and stable production outcomes. This occurred during a highly variable period of drought that continues to pressure dairy farmers in South East Queensland.

These practices are also contributing to wetland protection by reducing nutrient and sediments loads and increasing beneficial vegetation.

The Watson's concede that "there is no El Dorado in agriculture, particularly if money is the sole motivator"; but they believe that a positive approach using good research and knowledge means "you can predict the outcome of an action before you start".

Acknowledgements

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Other Products

Managing wetlands in intensive agricultural systems—cane production

Managing wetlands in intensive agricultural systems—cotton production

Managing wetlands in intensive agricultural systems—ginger production

Managing wetlands in intensive agricultural systems—nursery industry

For more information visit Wetland*Info* at www.wetlandinfo.ehp.qld.gov.au
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