

## Cleaner Production Case Study

**Cleaner production** involves reducing the consumption of raw materials (including water and energy) and reducing the volume and toxicity of waste and other emissions.

### Industry:

Dairy farming:  
Michael, Jenny and Ben Hurrell.  
Comboyne, NSW mid-north coast.

### Farm characteristics

Land area: 437 ha  
Milking area: 180 ha  
Slopes: Flats to undulating hills  
Elevation: 400–600 m above sea level  
Soils: Free-draining, volcanic red soils  
Vegetation: Mostly cleared, a few pockets of remnant rainforest in gullies and shelter belts.  
Catchment: Thone catchment, flowing into Hastings River.  
Water: Hardy's Creek supplies stock watering system (pumped to a header tank). Creek reliable except in very dry years. Irrigation to 20 ha using a bike shift system but lack of water restricts irrigation. Farm has a 7 ML dam, reserved for stock and irrigation in dry periods.  
Rainfall: 1800 mm/year average  
Herd: 540 total. 450 milkers, 70 dries, 470 heifers; all on site.  
Feed: Pasture-based. Kikuyu base, with perennial and annual ryegrasses and clovers.  
Purchased feed: 2.5 tonnes of grain/head/year (average).  
Cropping: In 2003 Hurrells grew 20 ha of sorghum with a yield of 530 kg DM of silage stored in a bun.

### Environmental successes

This is one of a series of case studies featuring companies that participated in the Department of Environment and Conservation (NSW) \$5 million 'Profiting from Cleaner Production' – Industry Partnership Program. NSW companies are discovering that cleaner production not only protects the environment but also reduces operating costs, streamlines processes, boosts profits and improves staff engagement and morale.

# Dairy profits from planning and innovation

**The Hurrells began share-farming in 1978. Over the years they purchased adjoining properties and these were consolidated with the home farm in 2000. The Hurrells realised that as their herd size increased, farm infrastructure had to be developed: laneways, irrigation and stock watering systems, shade and shelter belts, as well as the milking shed, yards and effluent system.**

The Hurrells maximise the use of nutrients on farm by recycling manure back into production. Like many dairy farmers, they are continually exploring new ways to increase farm productivity and maximise the use of resources.

### What did they do?

#### Build laneways to link pastures to the dairy

Well-built laneways are a key part of the Hurrell's farm infrastructure. Over the years they have developed an efficient system of laneways, with pastures 2 km away from the dairy in some cases. The laneways vary in width from 2.5 m, 4 m and 5–7 m wide. The Hurrells have also experimented with different materials including concrete, gravel, sawdust, woodchips and consolidated earth. Where gullies have to be crossed, crossings have been built using a piped culvert under a concrete slab.

#### Install an efficient stock watering system

The Hurrells have installed a reliable, almost maintenance-free stock watering system. A pump delivers creek water to header tanks from where it is gravity-fed to troughs via a poly pipe reticulation system. Water troughs have been located within the grazed pasture areas.

### Why did they do it?

By working out how best to build and manage their laneways, the Hurrells have saved themselves considerable time and effort. The herd moves faster along laneways and across gullies, and bikes and tractors travel faster too—a significant saving in time as well as wear and tear. The gravel lanes take up less space than dirt lanes, so more land is available for grazing.

The new stock watering system gives the Hurrells better control over water quality and quantity, and has had a major impact on milk production and profitability.

Placing the water troughs within the grazed pasture areas also means that manure stays in the paddocks where the nutrients are useful, rather than being deposited in areas where they are lost to the farm.

### What are the environmental gains?

Less manure is deposited on laneways because the herd moves faster along them, and there is a lower risk of nutrients polluting drainage lines and watercourses. The laneways have greatly reduced the risk of environmental damage caused by nutrients or erosion.

Because the laneways are well-drained the herd is healthier—there's a lower incidence of mastitis and hoof problems.

The new stock watering system means that cows no longer need access to the creeks and gullies to drink, reducing the pressure on the riparian zones: creek banks are less subject to erosion, vegetation in the creeks can flourish, cows no longer spend hours standing directly in the creek.

## What are the costs and savings?

### One-off costs

Laneways:	Gravel for lanes	\$50,00
	Equipment & machinery	\$40,000
	Concrete laneways	\$40,000
	Gully crossings	\$10,000
	<b>Sub-total</b>	<b>\$140,000</b>
Stock watering system:	Troughs, reticulation	\$98,000
	Design	\$2,000
	<b>Sub-total</b>	<b>\$100,000</b>
	<b>Total costs</b>	<b>\$240,000</b>

### Savings per year

Reduced labour	\$4,000
Reduced mastitis	\$1,000
Nutrient recovery	\$2,000
Reduced lane width	\$3,500
<b>Total savings per year</b>	<b>\$10,500</b>
Productivity gains per year	\$58,000

**Total cost benefit per year** **\$68,500**

### Payback period

Four to seven years.

## What are the productivity gains?

The farm is now capable of milking over 465 cows. This allows the farm overheads to be diluted over a higher turnover. The extra 215 cows produce approx 1.7 million litres of milk, worth \$200,000 at a gross margin of 12 cents per litre (gross margin = profit + fixed costs).

Before the farm infrastructure was built, pasture utilization was approximately 9,000 L/ha. Now it's over 12,000 L/ha with similar inputs of seed, fertilizer and water. The improved pasture utilisation is equivalent to approx \$130,000 of milk per year (at 24c/litre).

These extra incomes of \$200,000 and \$130,000 can't be solely attributed to improvements in laneways and the stock watering system because other 'fixed cost' investments were necessary to achieve these results, such as extra

cows, fencing, a higher level of management, upgrading the dairy shed and larger machinery.

It's estimated that laneways and stock watering systems account for 10%–20% of the increased income, giving a total cost benefit of approx \$33,000 to \$58,000 per year.

## What are the environmental gains?

Laneways with adequate vegetation filter strips and troughs located in paddocks can reduce the potential for nutrient run-off into drainage lines. The estimated quantities of nitrogen (N), phosphorus (P) and potassium (K) that can potentially be prevented from entering watercourses, for a 450-cow herd, is:

- N 2.25–5.25 tonnes/year
- P 0.3–0.9 tonnes/year
- K 2.1–5.1 tonnes/year.



(Top) One of the new gravel laneways. Trees along the laneway provide good shade for the cattle, but low limbs limit vehicle access. Michael recommends not planting trees along laneways.

(Bottom) Jenny and Michael Hurrell discuss farm plans with Ray Johnston, NSW Agriculture (centre). 'We strive for a productive, safe, sustainable and animal-friendly farm.'

## More information

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