



## ADAPTING TO A CHANGING CLIMATE: CASE STUDY 23

# WAIKATO ORGANIC DAIRY FARM

## Making the most of dairy farm effluent

### THE FARM

- Organic dairy farm at Wharepapa South, Waikato.
- Total of 400 hectares: 265 effective are milked off and 80 effective graze heifers, and some sheep and beef cattle.
- The milking platform ranges across flat to hill country.
- Run organically for 10 years and in the fourth year of certification.
- Converted from sheep and beef to dairy four years ago.

### THE FAMILY

- Russell and Deanna Bayley.
- Participants of the Organic Focus programme which monitors and benchmarks a range of data from their farm.



### GOOD ADVICE

- Talk to other farmers about their effluent systems. Use the experts to design your system but stay involved and provide your input.
- If converting a farm, find out where the climate and industry is headed and design an effluent system (and other systems) accordingly. It's easier and cheaper to set up an effluent system at the same time rather than later on.

*The effluent system on a Wharepapa South organic dairy farm has been redeveloped to adapt to future weather extremes while remaining profitable.*

In 2008, Russell and Deanna Bayley's farm was severely affected by the drought. Their organic farming system presented particular challenges, including a difficulty finding organic supplements and grazing.

This led to the couple deciding they needed to adapt and implement a more flexible farming system to ride out future weather extremes while remaining profitable. They chose a system that stores effluent during winter and spring, to be applied to pasture in summer. This gives the soil water and nutrients in drier months to boost pasture growth.

### THE FARM AND THE CHANGING CLIMATE

The Waikato region is expected to experience higher temperatures and more rainfall spread unevenly across the year; winter will be wetter but spring and summer drier.

While climatic change experienced in any given year will probably be relatively low, more frequent extreme weather events, such as drought and heavy rainfall, are expected and will pose a significant threat to farming.

Russell recognises this threat which was reinforced by their experience in the 2008 drought when the farm very quickly went from feast to famine.

"The old effluent system I had meant that I had to apply the effluent even when the soils were saturated and it was pouring down with rain."

This is wasted nutrients and water.

### THE PREVIOUS EFFLUENT SYSTEM

Previously, the farm had nowhere to store effluent for longer than a few days. Effluent was gravity fed from the dairy shed to a 100 000 litre storage tank where it was pumped into a separator. The liquid component was then pumped into a 75 000 litre tank and used to wash down the feed pad or pumped onto paddocks.

Although relatively efficient, the system's low storage capacity meant effluent was irrigated onto the farm all year round. The idea that effluent was applied to already saturated soils and nutrients were leaching from soil into waterways, contrasted with Russell and Deanna's philosophies of organic farming.

### THE REDEVELOPED EFFLUENT SYSTEM

The core of the effluent system was kept the same. The significant change is the new four million litre storage pond which holds about six months' worth of effluent.

Rather than pump it straight onto the farm, effluent goes to the storage pond on a hill behind the dairy shed and feed pad. From here, it is gravity fed to a traveling irrigator and spread onto paddocks.

Previously, just 38 hectares had effluent spread over it. This has grown to 88 hectares because potassium levels in the soil were becoming concentrated which was unsustainable in the long-term. High potassium levels in the soil make it difficult for plants to take up magnesium. Dairy cows particularly require magnesium to help their metabolism so they don't get milk fever at calving.

It is unlikely that the farm can significantly reduce its fertiliser use because effluent is now spread less frequently.

#### THE COST

Storage pond construction	\$5 000
Storage pond installation	\$15 000
Pipework to extend the effluent area	\$20 000
<b>TOTAL</b>	<b>\$40 000</b>

The storage pond is located on land with a high clay content so lining was not required which reduced the total cost.

#### GREATER STORAGE BOOSTS FLEXIBILITY

The main benefit of the new effluent system is increased flexibility. Russell no longer has to spread effluent when soil is too wet to absorb more water or nutrients.

"We can hold all of the effluent that is produced on the feed pad and in the milking shed during winter and spring until the summer when the soils are starting to get dry. The larger effluent area means that we can utilise the nutrients that our cows are producing more effectively."

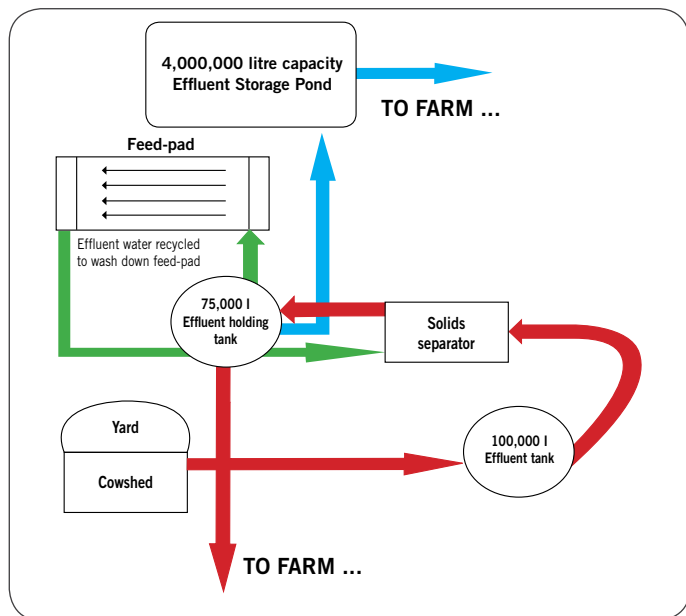
There is also no extra ongoing work for farm staff.

The redeveloped system has quickly proved its worth. Russell was able to hold off from applying effluent to the soil until December and then apply it continuously over summer.

The Bayleys may install another storage pond higher on the farm to gravity feed effluent to new areas.

## Key points

- 1 The organic dairy farm was adapted to changing climatic conditions expected in the Waikato – more weather extremes, wetter winters, and drier summer and spring periods.
- 2 The effluent system was redeveloped to store more effluent to irrigate paddocks and maintain pasture growth during dry conditions.
- 3 The storage pond holds up to six months' worth of effluent which can be saved rather than applied to saturated soil.
- 4 Effluent is spread across a larger area of the milking platform which lowers the risk of nutrient leaching and runoff, and reduces the risk of metabolic problems.
- 5 Dairy shed water is used to wash down the feed pad then irrigate 33 percent of the farm's milking platform.



The farm's effluent system. Red and green arrows represent the original system. Green arrows show recycling of effluent liquids. Blue arrows represent the redeveloped system.

#### THIS IS ONE IN A SERIES OF CASE STUDIES CALLED ADAPTING TO A CHANGING CLIMATE

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#### FOR MORE INFORMATION

- Agricultural effluent discharge is regulated by regional councils and must comply with the Resource Management Act. Check the discharge rules for your area by searching "farm effluent discharge" in the regional plan available from your regional council: [www.localcouncils.govt.nz](http://www.localcouncils.govt.nz)
- Read about the likely effects of the changing climate on agriculture in Climate Change: *Likely Impacts on New Zealand Agriculture* available from the Ministry for the Environment: [www.mfe.govt.nz](http://www.mfe.govt.nz)