**Level 3: Future Proofing Strategies**

**Environmental and Ethical Strategies.**

**Teacher Note:**

Dairy farming is changing fast, and farmers like Gray and Marilyn Baldwin are making big decisions to protect the environment, care for animals, and keep their farm successful in the future.

This article *“****Future proofing a Dairy Farm: Gray and Marilyn Baldwin’s Big Changes*”** is a shorten version of ***“Future proofing in South Waikato- Dairy Country”***

**Future Proofing Strategy Questions:**

This case study provides an opportunity for students to explore how environmental and ethical issues like pollution and animal welfare are shaping the way farmers work, and what smart strategies they are using to stay ahead.

Students will be asked to think about how new ideas can help farms be more sustainable and profitable in the long run.

**Future Proofing a Dairy Farm:**

**Gray and Marilyn Baldwin’s Big Changes**

Dairy farming is changing, and Waikato farmers Gray and Marilyn Baldwin are making major changes to future-proof their farm. Their goal: to be more sustainable and stay ahead of environmental regulations.

**What They Have Done:**

In just two years, the Baldwins:

* Bought the family farm they had been leasing.
* Spent $1 million on a new feed pad, silage bunkers, and a modern effluent system.
* Switched to autumn calving to chase winter milk premiums.
* Stopped rearing their own calves – instead, they now breed all cows to Wagyu beef, selling calves for extra income.
* Joined a new milk company (Miraka), which rewards good environmental practices.
* Built a 1.1-hectare wetland to help reduce nitrogen runoff into rivers.
* Planted native trees and fenced off waterways.

**Why the Big Changes?**

Gray says the biggest reason is preparing for tougher environmental rules, especially about nitrogen use linked to water pollution. Their new infrastructure helps keep cows off paddocks in winter, reducing nitrogen runoff.

However, they now use more machinery, so Gray worries about carbon emissions becoming the next focus. “We have reduced water pollution, but increased our carbon footprint,” he says.

Even so, he believes food production is essential, and he is staying positive about farming’s future.

**Winter Milk and Less Waste**

Feeding cows on concrete during winter means:

* Less feed is wasted.
* Pastures are not damaged.
* Cows stay healthier and cleaner.
* It is less stressful during bad weather.

They now produce record milk volumes and save feed for dry summers.

**No More Bobby Calves**

To avoid sending young calves to the meat works, the Baldwins breed all cows to Wagyu. Calves are sold at just a few days old for around $200 each, creating over $150,000 in income. This helps cover the cost of buying replacement cows instead of breeding their own.

**Looking After the Environment**

They have helped restore a wetland that captures runoff from 85 hectares of farmland. It is part of a $150,000 research project with groups like DairyNZ and NIWA. The wetland slows water and filters out pollutants before the water enters nearby rivers.

Scientists are studying this wetland to see how well it removes nitrates and other pollutants. If it proves successful, wetlands could become a key tool for other farmers trying to meet new environmental limits.

**The Future of Farming**

The Baldwins' story shows how farms can adapt to be:

* Environmentally responsible
* Animal-friendly
* Financially sustainable

Their once-a-day milking system, new infrastructure, and future-focused decisions aim to balance profit with protection of the land, animals, and people.

“We are not just milking cows,” Marilyn says. “We are looking after the animals, the land, the water and the people who work here.”

***Shortened version of “Future proofing in South Waikato- Dairy Country”***

**Future proofing questions**

1. What are the influences environmental and ethic influences impacting this farming business?
2. What are the future needs of this dairy farming business?
3. Using a strategy that the dairy farming business has implemented, explain how that has mitigated an environmental influence for the business?
4. How have this strategy, ensured the businesses long-term viability?
5. Using a strategy that the dairy farming business has implemented, explain how that has mitigated an ethical influence for the business?
6. How have this strategy, ensured the businesses long-term viability?
7. Can you provide a new strategy (not in the article) for each of another environmental and ethical influence named in Question 1, that would mitigate or solve the influences, to ensure long-term viability of the business?
8. Using the new strategies that you have named in Question 7, explain which of these strategies would best meet the business’ future needs?
9. Justify your decision, discussing how the strategy in Question 8, would ensure their long-term viability?

**Answers**

1. What are the environmental and ethical influences impacting this farming business?

* Environmental influences:
  + Water pollution from nitrogen runoff and effluent.
  + Pressure to reduce greenhouse gas (carbon) emissions.
  + Need to protect native ecosystems and waterways.
* Ethical influences:
  + Public concern over the treatment of bobby calves (calves sent to slaughter at a few days old).
  + Animal welfare expectations, especially during winter and summer extremes.
  + Growing consumer demand for sustainable and ethical food production.

1. What are the future needs of this dairy farming business?

* To reduce environmental impact - nitrogen and carbon footprints.
* To meet future government regulations e.g., water quality and carbon emissions.
* To maintain animal welfare standards.
* To stay profitable and productive, especially in climate extremes.
* To ensure positive public perception of dairy farming.
* To be resilient in a changing market e.g., ethical consumers, premium contracts.

1. Using a strategy the dairy farming business has implemented, explain how that has mitigated an environmental influence for the business.

Strategy: Building a feed pad and modern effluent system.

How it mitigated the environmental influence:

* Cows are off paddocks during wet winter months, reducing soil damage and nitrogen runoff.
* Effluent is collected, managed, and reused for irrigation, reducing pollution in nearby rivers.

1. How has this strategy ensured the business’s long-term viability?

* Helps the farm meet Healthy Rivers environmental regulations.
* Reduces environmental fines and maintains good standing with regulating authorities.
* Supports sustainable milk production, appealing to premium buyers like Miraka.
* Improves pasture condition and reduces feed waste, leading to cost savings and better productivity.

Altogether thes*e,* increase milk production while protecting the environment and receiving premium prices from Miraka, increasing financial returns to support the long-term viability of their dairy farming business.

1. Using a strategy the dairy farming business has implemented, explain how that has mitigated an ethical influence for the business.

Strategy: Breeding cows to Wagyu beef instead of rearing replacement calves.

How it mitigated the ethical influence:

* Eliminates the need to send bobby calves to slaughter, which is a major public concern.
* Calves are sold into the beef industry with better life outcomes, aligning with animal welfare expectations.

1. How has this strategy ensured the business’s long-term viability?

* Generates over $150,000 per season in calf sales.
* Avoids ethical criticism and negative public/media attention.
* Allows the farm to focus on purchasing better-quality cows, improving herd performance.
* Supports a positive brand image, which is important for contracts with companies like Miraka.

Together this increases the cash flow and the social licence to farm which will ensure the long-term viability of the dairy farming business.

1. Can you provide a new strategy (not in the article) for another environmental and ethical influence named in Question 1, that would mitigate or solve the influences, to ensure long-term viability of the business?

*Examples answers*

Environmental Influence Strategies:

* Nitrogen runoff - Install precision fertiliser technology to monitor and apply nutrients only where and when needed.
* Carbon emissions - Transition to electric or hybrid farm vehicles and machinery to reduce fossil fuel use.

Ethical Influence Strategies:

* Bobby calves/animal ethics - Create a farm-based calf rearing hub for beef calves, partnering with other local farms to give calves a full life on-farm before beef finishing.
* Animal welfare - Invest in cow wearable technology (e.g., health monitoring collars) to track cow health and comfort in real-time.

1. Using the new strategies that you have named in Question 7, explain which of these strategies would best meet the business’ future needs?

*Examples answer*

The strategy that best meets the business’ future needs is transitioning to electric or hybrid farm vehicles and machinery.

1. Justify your decision, discussing how the strategy in Question 8 would ensure their long-term viability?

As environmental focus shifts from water pollution to carbon emissions, Gray has already expressed concern about their growing carbon footprint. Transitioning to electric/hybrid vehicles would directly reduce emissions, positioning the farm ahead of future regulations.

This would prepare the farm for future climate-based regulations e.g., emissions taxes or reporting and improves sustainability, which appeals to environmentally focused dairy processors like Miraka which pay premium prices. It would help reduces fuel costs long term, especially as diesel prices increase or carbon levies are introduced. These reduce farm expenses and improve cash flow improve the farms financial position helping the business to remain financially stable and viable.

**Future proofing in South Waikato- Dairy Country**

<https://dairycountry.co.nz/future-proofing-in-south-waikato/>

The landscape for dairy farming is changing and has launched Gray and Marilyn Baldwin on a journey to make considerable changes to their Waikato operation. They told **Sheryl Brown**why they’ve made significant investment to be more sustainable and how they plan to pay for it.

In the last two years, Gray and Marilyn Baldwin have sold their farm next door, bought the Baldwin family farm at Putaruru, which they had been leasing for six years prior, spent a million dollars on a feed pad, silage bunkers and effluent system, switched to 100% autumn calving, changed dairy companies, and have stopped rearing replacement dairy calves, instead contracting their entire herd to Wagyu beef.

Meanwhile, they’ve initiated a 1.1-hectare wetland research project on their farm and have fenced off and planted sidings in manuka.

It’s been a significant investment for them, particularly coming out of the dairy downturn, but bank managers will back farmers who have a plan, Marilyn says.

The couple put the pieces of the puzzle together to form a sustainable and profitable dairy farming business.

Future proofing from future environmental regulations is probably the biggest reason behind the new infrastructure, Gray says.

“When we have to give our nitrogen reference point as part of Healthy Rivers Plan Change, having the pad we will be able to demonstrate that we’re self-contained and the cows are not on the paddocks in the middle of winter with a whole lot of supplementary feed and making a mess. We will significantly reduce our nitrogen footprint because of the feed pad.”

Gray is worried they are swapping nitrogen pollution for carbon pollution, however.

“We now have a tractor working 8-10 hours a day and we have a larger carbon footprint. I do worry about if/when the focus of society changes from water to carbon and someone comes and says farmers have to account for their carbon.

We’ve traded one for another.

“But we are in the business of making food and people are always going to need food – I’m optimistic about the future.”

A big incentive for the change in their farm system has been chasing the winter milk premium and avoiding summer droughts, he says. Making the decision to commit to a full autumn calving system flowed on to the decision to build the 650-cow feed pad and new effluent system and switch to supply Miraka.

“You can milk well in the winter when you have a feed pad, and you’re set up to do it.  
We had 188 concrete trucks come in – it’s a serious investment so we must make money and maximise the winter premium. I do worry about if/when the focus of society changes from water to carbon and someone comes and says farmers have to account for their carbon. We have traded one for another.”

They have a winter contract with Miraka to supply 1000kg milksolids (MS)/day for 60 days. Miraka has a “slamdunk” marketing strategy, from its unique Māori culture  
to its geothermal resources and its environmental incentives for suppliers, Gray says.

“Rather than receiving penalties from your dairy company, it’s a positive approach and as farmers we have the potential to earn up to an extra 20c/kg milksolid. We earned an extra 7c this season, but we will go closer to that next season when we have the rest of the effluent system set up.”  
The infrastructure has been built in the middle of the farm, 800 metres from the farm dairy. It is all gravity orientated, with effluent from the feed pad running downhill to the weeping walls, then down to the effluent pond. The green water is pumped via a tractor PTO pump back up to the flood wash system on the feed pad. The next phase will be to pipe the effluent from the farm dairy down to the weeping wall. Solids from the weeping walls will be used as organic matter for their 105ha maize block, with the liquid from the pond irrigated on up to 30ha of the milking platform through small pods.  
When the cows are dry in summer, they will be able to lock up paddocks and make grass silage, Gray says.  
“If we can irrigate 20mm-a-day equivalent for eight weeks I imagine that should make a good silage crop.”  
Feeding the cows on concrete means they are not wasting supplement or damaging pasture by feeding out in paddocks. In one season they have already seen the benefits saving 300 tonnes DM of maize silage that is still sitting in the bunker.  
“I wish we had built a feed pad 10 years ago. Before in the dry summers we were feeding out palm kernel in trailers, the cows were hungry, and they made a mess around the trailers. In the winter we were feeding out maize in the paddock and were wasting a lot of feed. It was stressful. This year in June I went to see the cows, it was horizontal sleet and cold and the cows were happily chewing their cuds. With this infrastructure even in the bad weather you haven’t got the stress.”  
This season, with all the changes onfarm, they will achieve a record production for the farm, pushing 275,000kg MS.  
They have purchased a JH Stoll mixer wagon and feed a combination of maize, grass and lucerne silage and minerals to the cows. They grow oats and annual ryegrass in between maize crops and might trial Hogan ryegrass this year.  
Their son Joel is the farm manager and is working with a nutritionist from All Farm NZ to ensure the right ratio of protein, starch and NDF in the diet.  
“In winter we budget on the cows having 4kg grass in the paddock so we need to add protein to the ration on the feed pad.”  
Everyone has their own portfolios they are responsible for in the farm business.  
Gray looks after land development and manages the forestry and cropping block, Marilyn rears the calves and is in charge of herd records, Joel is the farm manager and  
responsible for the day-to-day running of the operation, while his wife Joanna does the rosters, PAYE and health and safety.  
The Jersey herd has been milking once a day since 2012, which suits the topography of the property, which is 20% flat, 50% rolling and 30% steep, with the longest walk for the cows 3.5km. They tried to go back to twice-a-day milkings for about two months last year, but lameness became a problem, Marilyn says.  
“Our whole farming practice is looking after animals, looking after the river, looking after the land and looking after the people that operate our farm,” she says.  
The once-a-day system and autumn calving also appeals to staff.  
“The cows are dry in January and February when staff want to have annual leave. All these things shape up to make it a good model.”  
Another big driver to going winter milking was to get out of the bobby calf market.  
“Sending bobby calves to the works at four days old is getting increasingly difficult, the townies are cutting up rough – and we don’t want exposure to that,” Gray says. “Any autumn calf is worth more than a spring calf. Last year we took all our autumn four-day-old calves to the Frankton sale, the worst calves got $60, and the best got $250.”  
This season they bred 100% of the herd to Wagyu beef with the four-day-old calves contracted at $200. That $150,000-plus income pays for the future herd replacements they will have to buy. They will buy top empty three, four and five-year-old spring cows, send them to their grazier in Gisborne for 10 months, and put them in calf to beef in June to calve down the following autumn.  
Not breeding their own replacements means they have a more transient herd and more stock records to do, but they are able to buy better genetics.  
“There are more farmers around our district with better BWs than we will ever have,” Gray says.  
Their empty rate is high at 30%, but to get around that they mate the empty winter cows in spring again, keep milking them over summer and sell them as in-calf spring cows.  
“That means you can get a 350-day lactation out of them, we keep milking them in January, February and March before we dry them off to sell so that raises your total days in milk significantly.”  
Once the cows are dried off they’re sent grazing until they’re ready to be sold on June 1.  
The couple have a long-term relationship with two graziers in Gisborne where they sent all their young stock in the past, and where they now send their carryovers and dry cows.  
All the animals come back in great condition after grazing on hill country and the cows come home and are able to handle their hills, Marilyn says.

**A re-established wetland**

Gray Baldwin’s grandfather dug out a wetland on his Putaruru property and constructed a drain to make another paddock for grazing his sheep, which was standard practice at the time.

Some 60 years later, the late farmer and conservationist Gordon Stephenson was on the Baldwin farm and pointed the paddock out and said it would make a good wetland.

There is now a re-established 1.1-hectare wetland capturing runoff from 85ha of the now-converted dairy farm.

The wetland project is a $150,000 joint venture between DairyNZ, NIWA, Waikato River Authority, Waikato Regional Council, Opus and Hill Laboratories.

Some 15,000 plants were placed in the new wetland in May 2016 after the paddock had been constructed into six basins which slows the water flow before it gets into the Ngutuwera River. NIWA has set up monitoring equipment to measure where the water enters and exits the wetland.

The wetland could potentially improve water quality by removing up to 70% of the nitrate from runoff through bacteria and uptake by plants, DairyNZ environment manager Dr. David Burger says.

The constructed wetland has two NIWA sample sites which continuously measure water flow into the first basin, and water flow out of the last basin before it enters the river. Along with waterflow, NIWA is testing nitrogen, phosphorous, sediment and E.coli levels. NIWA is doing monthly tests as well as testing during rainfall periods to gain knowledge about what is happening to the water nitrate levels and whether any treatment is occurring when water flow is increased.

The constructed wetland has been designed with a sediment trap at the first basin to capture sediment running off the 85ha and there are small bunds between the basins to slow water flow.

It’s a recipe to slow the water enough to allow more contact with the plants and bugs to break down the nitrate levels.

The entire wetland is designed to be low lying with a uniform water level to ensure plant survivability and maximise water contact times.

While it was still too early for results, the constructed wetland appeared to be working, Burger says.  
“I’m very pleased with how it’s working in terms of the hydrology. We’ve had a couple of serious rain events, and it’s performed really well.”  
The constructed wetland is being tested alongside a natural seepage wetland on the Baldwin property. NIWA is using experimental chambers in the natural wetland to measure the denitrification rate. These numbers will be compared to the constructed wetland, to gauge the efficacy of each option, Burger says.  
Building a constructed wetland could become a cost effective tool in a farmer’s tool box when meeting incoming environmental regulations, David says.  
Before landowners and councils commit to these mitigations for limit-setting, more work is needed, however, to quantify their environmental benefit, provide outcome certainty and promote their use for improving water quality.  
Once it’s known how efficient a constructed wetland is for reducing nitrate and other contaminant levels it can become a plausible option for landowners and regional councils.  
“We want to create certainty on how efficient a constructed and a natural wetland can be in different landscapes. We know wetlands are great for improving water quality but right now there is no guarantee that a reduction in farm nutrient losses achieved through a wetland will be recognised as a contribution towards meeting environmental limits. We need a consensus between scientists and regulatory bodies.”  
DairyNZ is embarking on a research study with NIWA in partnership with regional councils to develop constructed wetland and targeted riparian guidelines for a range of pastoral landscapes.