Water Wairarapa

ELM GROVE DAIRY

Case Study

INTRODUCTION

The Elm Grove dairy conversion case study summary is one of a series produced by Water Wairarapa to inform the farming community of the land use options available in Wairarapa through the supply of reliable, pressurised water to the farm gate.

It describes a theoretical conversion of the existing Elm Grove dryland farming system to an irrigated intensive bovine dairy operation. The current farming operation, located approximately 3km southeast of Greytown, is described in full in the accompanying 'Elm Grove Overview'.

The information contained in this case study is the summary of a report prepared by industry consultants BakerAg. It is based on a set of assumptions (outlined below) and is one of many possible scenarios on offer for this property.

When considering the decision to irrigate or not, many factors need to be considered, including financial, environmental, management, peace of mind (risk mitigation), succession planning and a willingness to embrace change. This case study broadly considers only the first three factors.

ASSUMPTIONS

The table below compares three potential dairy configurations considered as an optimised use of Elm Grove land under irrigation. The irrigated scenarios explore three levels of intensification; 'Low Stocked Average Operator', 'Medium Stocked Top 10% Operator', and 'Highly Stocked Top 10% operator'. The operating assumptions for each scenario are outlined below:

	Low-stocked - Average Operator	Medium -stocked - Top 10%	High-stocked - Top 10%
Effective area	190ha	190ha	190ha
Stocking rate	2.8	3.1	3.5
Cows milked (peak)	534	589	657
KgMS / cow	427	484	494
Total milk production	228,018	285,076	324,558
Infrastructure specification	Modest	In-shed feeding	High-spec
FTE staff required	3	3	4
Pasture offered	13.6 TDM/Ha	14.4 TDM/Ha	14.3 TDM/Ha
Supplement feed offered	2 TDM/Ha	3.4 TDM/Ha	6.3 TDM/Ha

NB: These assumptions were formed in 2015 using an average milk price of $6.40 / KgMS

Key Assumptions:

- 190ha irrigated using 4,000m^3 of water/ha, representing 86% of Elm Grove's 220.1ha effective area (remaining land area is not used - either retired or around residences).
- The conversion to dairy has been assessed on a 'Scorched Earth Conversion', where all fencing, water reticulation, races, pastures and infrastructure are new (excluding existing housing).
- The conversions are irrigated with 153ha under four centre pivots and 37ha of k-lines.
- Fonterra shares prices at $5.58 per share and farm is assumed to be 'fully shared' by the end of year 1.
- Expenditure has been inflated at 2.5% per year.

FINANCIAL VIABILITY

Based on the regional average for properties similar to Elm Grove, an expected farm surplus from a dryland operation is ~$602/ha using the Farmax feed budgeting programme. The following table provides a comparative insight into the financial viability of each scenario at a Gross Margin level (Gross Farm Revenue less Farm Working Expenses) in year 5.
NB: This analysis assumes a milk price of $6.40 per KgMS

Gross Margin - Year 5	Low-stocked - Average		Medium-stocked - Top 10%		High-stocked - Top 10%	
	$ Total	$ / eff ha	$ Total	$ / eff ha	$ Total	$ / eff ha
Gross Farm Revenue	1,759,977	9,263	2,187,604	11,514	2,497,444	13,144
Farm Working Expenses	(1,031,363)	(5,428)	(1,228,260)	(6,465)	(1,536,929)	(8,089)
Gross Margin	728,614	3,835	959,344	5,049	960,515	5,055

Gross Margin determines the cash surplus available to service farm debt, including the incremental increase in debt servicing costs and depreciation associated with developing on farm irrigation infrastructure.

Farm Surplus (Gross Margin less the cost of water, depreciation and interest) will be dependent on the ultimate cost of water, depreciation and capital structure adopted per farm. Farm Surplus shown below does not include the cost of water and uses an approximation for depreciation and interest expenses.

Farm Surplus (pre-water)	Low-stocked - Average		Medium-stocked - Top 10%		High-stocked - Top 10%	
	$ Total	$ / eff ha	$ Total	$ / eff ha	$ Total	$ / eff ha
Gross Margin	728,614	3,835	959,344	5,049	960,515	5,055
Depreciation	(126,475)	(666)	(128,475)	(676)	(157,975)	(831)
Interest expense	(451,301)	(2,375)	(441,103)	(2,322)	(551,684)	(2,904)
Farm Surplus (pre-water)	150,838	794	389,766	2,051	250,856	1,320

CAPITAL

The costs of conversion were priced as if using external contractors. A summary of conversion costings for the three farm models is shown below. It is important to note that every property is unique and that an assessment to irrigate requires a farm-by-farm analysis.

All per hectare figures are calculated across the entire 190ha effective area at 'a point in time'. It is one example of what can be achieved with the supply of reliable water. Further, it may take 2-3 years to achieve these results.

Capital expenditure & conversion costs $	Low	Medium	High
Cowshed & infrastructure	1,837,000	1,887,000	2,412,000
Fencing & tracks	633,000	633,000	633,000
Irrigation	1,036,887	1,036,887	1,036,887
Plant & machinery	185,000	185,000	325,000
Livestock	1,047,000	1,152,000	1,287,000
Fonterra shares	1,341,134	1,677,593	1,907,507
Other	249,280	249,280	274,280
Total	6,329,301	6,820,760	7,875,674
Total per hectare	33,312	35,899	41,451

KEY SENSITIVITIES

Shown below is the total surplus (pre-water) per hectare assuming -/+ 20% and -/+ 10% movements in price and farm working expenditure respectively.

Sensitivity to milk prices	$5.12	$5.76	$6.40	$7.04	$7.68
Low-stocked - Average	(141,109)	4,865	150,838	296,812	442,786
Medium-stocked - Top 10%	24,576	207,171	389,766	572,361	754,956
High-stocked - Top 10%	(164,383)	43,237	250,856	458,476	666,096

Sensitivity to farm working expenses	-10%	-5%	0%	5%	10%
Low-stocked - Average	266,662	208,730	150,838	92,946	35,054
Medium-stocked - Top 10%	525,440	457,603	389,766	321,929	254,093
High-stocked - Top 10%	420,347	335,602	250,856	166,111	81,366

The sensitivity analysis highlights the significance of the milk price in determining total farm surplus. In each case, a small movement in the milk price can dramatically influence returns; it is an aspect of the business farmers have no control over. The analysis shows that any price below ~$6.00kgMS would threaten the economics of a dairy conversion.

IRRIGATION INSIGHTS

The decision to irrigate involves many factors including economic, risk mitigation, and personal and family considerations. Insights from irrigation schemes in other regions include:

- Irrigation increases certainty. Farmers have more confidence in planning decisions and budgeting by removing the one variable they have the least control over, the climate.
- Water is an enabler. It provides opportunities, including new land uses and the ability to profit from seasonal pricing cycles and market volatility.
- Irrigation reduces production volatility. A farmer with irrigation in a dryland farming area is a lesser credit risk to lenders.
- Water improves an entire farming business, not just the irrigated footprint. Beyond reducing the risk profile and improving profitability, farmers who have successfully used irrigation tend to become more sophisticated farmers that typically grow their businesses though acquiring additional land.
- The decision to irrigate cannot be based solely on profitability. It is important to consider other economic factors to which a dollar amount is difficult to assign. These include reduction in operating risk, reduced production volatility, becoming a better credit risk, and more opportunities.
- The economic and social benefits of irrigation are far-reaching. It revives rural communities by providing new employment opportunities which attract new (often younger) families to the district.

ENVIRONMENTAL IMPACTS

Intensifying a farming operation increases the risk of adverse environmental impacts. The extent of these risks will depend on the farm's physical characteristics, most of which can be mitigated through proactive management on-farm.

Good Management Practice (GMP) is addressed through the development of a Farm Environment Plan. GMP is an environmental risk-management tool that assists farmers recognise and mitigate on-farm environmental risks.

For Elm Grove, the following are examples of management practices that could be put in place in a Farm Environment Plan for the dairy conversion scenario.

Wetland planting & retirement of bush

- Retire heavy soils surrounding Elm Grove's fenced-off native bush.
- Develop the wetland area.
- Fence water races and install reticulated water systems (Included in costs).
- Retain stands of native trees, riparian planting of waterways, retain shelter where possible.

Nutrient loss mitigation

- Regular soil testing to monitor nutrient levels and assist in developing fertiliser plans.
- Avoid waterways when spreading fertiliser.
- Applying nitrogen at a rate and at a time that maximises uptake by pastures and crops.
- Matching fertiliser inputs to crop needs (a crop nutrient budget).

Stocking policy

- Grazing dairy cows through winter on crops in the stony country.
- Wintering cattle on the stony soils to preserve the soil structure of the heavier soils.
- Good cattle wintering practices such as break-feeding from the top of a slope down and excluding access waterways.

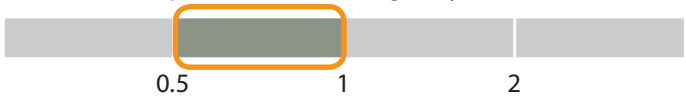
Preventing soil damage

- Use of direct drilling (Cross Slot) rather than conventional cultivation to preserve the structural integrity of the topsoil. Minimum tillage reduces surface wash and wind erosion and conserves soil moisture. It also reduces the water requirement.

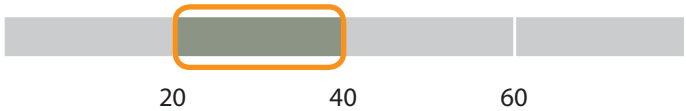
INDICATIVE NUTRIENT LOSSES

Based on the OVERSEER® Nutrient Budget Model, the indicative nutrient losses for Elm Grove as a dairy operation are shown in the following charts.

Indicative Phosphorous (P) losses Kg/ha/year



Indicative Nitrogen (N) losses Kg/ha/year



MANAGEMENT & LIFESTYLE

It is well-documented that moving from a dryland livestock farm to a successful irrigated dairy farming operation requires new skills, management changes and associated lifestyle changes.

Management considerations

- Managing and overseeing an on-farm irrigation development programme.
- Possibility to assign a contract milker or pursue a share milking opportunity.
- Sound business and succession planning to manage potentially significant debt.
- Sound planning in areas such as effluent management and availability of stock shelter.

Labour considerations

- A team of 3-4 people employed to run the farm.
- Staff live and work on the property; additional housing built.

CONCLUSION

Converting Elm Grove to an irrigated dairy farm would result in a sustainable and repeatable pasture-based system that could be operated at or above the local average for milk production.

The Top 10% Operator model (medium-stocked) is likely to generate the best return. A relatively high level of skill and close monitoring would be needed to sustain performance.

An average efficient operator model (lower-stocked) is likely to generate the lowest gross return. It runs at a relatively low level of intensity, making it simpler to operate and most likely to repeat the physical performance year-on-year.

A Top 10% Operator model (high-stocked) is likely to generate the highest level of physical performance but mid-range economic results. Given the capital invested and the exposure to volatile milk prices, along with larger environmental impacts, this is the least-preferred scenario.

A dairy conversion has the potential to generate a financial surplus before the cost of water and existing debt. However the milk price will impact this and it should be noted that this scenario assumes a price of $6.40.

THIS CASE STUDY SERIES

This case study is one of a series of land use scenarios tested on Elm Grove and two other Wairarapa properties. The full series is:

Elm Grove

Dairy Conversion
Apple Orchard
Mixed Operation

Otahuao

Sheep Dairy
Mixed Operation

Easterbo

Sheep Dairy
Mixed Operation
Livestock Finishing

For details of these options go to:
www.wairarapawater.org.nz

YOUR FEEDBACK IS NEEDED

This case study and the others in this series are designed to assist farmers answer an important survey in mid-2016 that will influence the proposed water storage scheme's feasibility and ownership structure.

The survey will not seek any form of commitment. However it will ask farmer participants to indicate their interest in any future irrigation scheme so that they have the option to access stored water in the future.

KEEP IN TOUCH

Send your email address to greg.ordish@gw.govt.nz and we'll keep you updated on developments.

WHO CAN HELP

This information is intended to provide a starting point for consideration of individual situations. It covers just one scenario – conversion of the existing operation to dairy farming.

For the detailed report contact Greg Ordish who is available to work alongside you to answer questions, and provide information and experience from other areas.

Phone or text Greg Ordish on **06 826 1513** or **021 667 609**.

Other useful sources of information:

Talk to your banker, accountant or farm advisor - we are also working with them.

Talk to the Wairarapa Water Users Society.

www.dairynz.co.nz

www.irrigationnz.co.nz

www.smartirrigation.co.nz

www.wairarapawater.org.nz