Water Wairarapa

OTAHUAO MIXED USE

Case Study

INTRODUCTION

The Otahuao mixed use 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 Otahuao dryland farming system to an irrigated, mixed-use farm that includes arable, specialist seeds and livestock finishing. The current farming operation is located approximately 8km east of Masterton and is described in full in the accompanying 'Otahuao 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 the existing dryland farming operation with what is considered an optimised configuration (on this land class) of arable, specialist seeds and livestock finishing enterprises. The irrigated scenarios include production levels achieved by both an Average Efficient Operator and a Top 10% Operator.

Assumed milk production	Baseline Dryland Model	Irrigated Average Efficient Operator	Irrigated Top 10% Operator
Cropping on 58ha of silt soils	Feed barley, peas, ryegrass seed, red clover seed, standing silage Pea straw & barley straw sold	Feed barley, peas, ryegrass seed, red clover seed, standing silage Pea straw & barley straw sold Onions	Feed barley, peas, ryegrass seed, red clover seed, standing silage Pea straw & barley straw sold Onions
Cropping on heavy soils	**172ha heavy soils** Feed barley, peas, ryegrass seed, red clover seed Standing silage	**50ha heavy soils:** Barley, peas, ryegrass seed, pak choi **122ha dryland heavy soils** Feed barley, red clover seed, standing silage	**50ha heavy soils:** Barley, peas, ryegrass seed, pak choi **122ha dryland heavy soils** Feed barley, red clover seed, standing silage
Feed crops & supplements	Turnips followed by permanent pasture Standing silage	Turnips followed by permanent pasture Standing silage	Turnips followed by permanent pasture Standing silage
Stock numbers	5,695 lambs 1,200 ewe hoggets 190 weaner heifers 45 cows with calves	8,400 lambs 1,000 ewe hoggets 200 weaner bulls	9,700 lambs 1,000 ewe hoggets 220 weaner bulls

Key Assumptions:

- 108ha irrigated using 3115m^3 of water/ha, representing 32.5% of Otahuao's 331.4ha effective area.
- Crops grown in this example include: barley (30ha); peas (9 ha); pak choi seed (15ha); red clover seed (16ha); and ryegrass seed (20.5ha).
- A Top 10% arable operator achieves higher crop yields through superior husbandry techniques and timing.
- A Top 10% livestock operator achieves higher pasture production and utilisation through superior grazing management and increased stock growth rates.
- Improved pasture yields enable more stock to be traded. Stock are on the farm for less time and consume a lower percentage of the farm's total annual dry matter production.

FINANCIAL VIABILITY

The following table provides a comparative insight into financial viability at a Gross Margin level (being Gross Farm Revenue less Farm Working Expenses).

The Average Efficient Operator and Top 10% Operator scenarios are compared against the regional average for this type of property, referred to as 'Baseline Dryland' developed using the Farmax feed budgeting tool.

Gross Margin	Baseline Dryland		Irrigated Average		Irrigated Top 10%	
	$ Total	$ / eff ha	$ Total	$ / eff ha	$ Total	$ / eff ha
Gross Farm Revenue	652,116	1,968	1,016,915	3,069	1,152,738	3,478
Farm Working Expenses	(457,313)	(1,380)	(704,037)	(2,124)	(704,552)	(2,126)
Gross Margin	**194,803**	**588**	**312,878**	**944**	**448,186**	**1,352**

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) is dependent on the ultimate cost of water, depreciation and capital structure adopted per farm. The Farm Surplus shown below excludes the cost of water and uses an approximation for depreciation and interest expenses.

Farm Surplus (pre-water)	Baseline Dryland		Irrigated Average		Irrigated Top 10%	
	$ Total	$ / eff ha	$ Total	$ / eff ha	$ Total	$ / eff ha
Gross Margin	194,803	588	312,878	944	448,186	1,352
Depreciation	-	-	(71,016)	(214)	(71,016)	(214)
Interest expense	(2,000)	(6)	(66,441)	(200)	(48,981)	(148)
Farm Surplus (pre-water)	**192,803**	**582**	**175,421**	**529**	**328,189**	**990**

CAPITAL

While the extent of the farm includes moderately-steep and rolling hill country, the irrigable footprint of Otahuao (108ha) is largely flat to easy-contoured land. As such, it is suitable for two pivot irrigators servicing 58ha, supported by guns on the remaining 50ha. Otahuao highlights the fact 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 331.4ha 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.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	$
Irrigation infrastructure	611,347
Consents	15,000
Fencing & shelter belts	65,460
Bridges	15,000
Stock Water	7,466
Earthworks	15,000
Machinery	360,000
Total	1,089,273

KEY SENSITIVITIES

Shown below is the gross margin (per hectare) assuming a -/+ 10% movement in crop price, yield, and farm working expenditure.

Sensitivity to crop prices & yields	-10%	-5%	0%	5%	10%
Irrigated Average	645	795	944	1,094	1,243
Irrigated Top 10%	1,088	1,220	1,352	1,484	1,616

Sensitivity to farm working expenditure	-10%	-5%	0%	5%	10%
Irrigated Average	1,323	1,134	944	755	565
Irrigated Top 10%	1,643	1,498	1,352	1,207	1,062

Increased certainty provided by irrigation is more likely to deliver higher production levels, increasing the probability of higher farm surpluses on a sustainable basis.

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 a higher level of 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 to recognise and mitigate on-farm environmental risks.

For Otahuao, the following are examples of management practices that could be put in place in a Farm Environment Plan for the mixed use scenario:

Nutrient loss mitigation

- Regular soil testing to monitor nutrient levels and assist in developing fertiliser plans.
- Avoiding 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.
- The remaining stock policy is around lamb finishing; the animal with the lowest nitrogen leaching risk which is least likely to damage soil structure.
- Good cattle wintering practices such as break-feeding from the top of a slope down and excluding access to waterways.

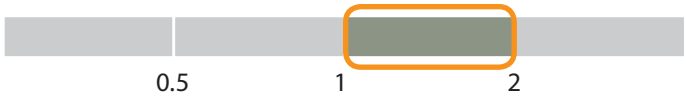
Preventing soil damage

- Wintering cattle on the stony soils to preserve the soil structure of the heavier soils.
- 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.

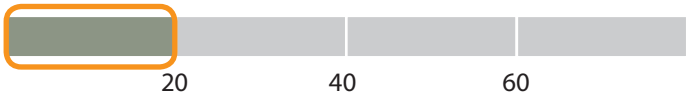
INDICATIVE NUTRIENT LOSSES

Based on the OVERSEER® Nutrient Budget Model, the indicative nutrient losses for Otahuao as the mixed use operation used in this scenario are shown in the following charts.

Indicative Phosphorous (P) losses Kg/ha/year



Indicative Nitrogen (N) losses Kg/ha/year



CONCLUSION

Conversion from current land use to an irrigated mixed operation results in increased and reliable pasture and crop production. These conversions have the potential to produce more intensive and higher-value farming systems.

The greatest advantage of cash cropping is that it eliminates crop failures while increasing crop yields. Irrigation helps to establish annual grasses earlier, giving the farmer confidence to buy stock earlier in the autumn when prices are lower which leads to greater trading margins. Other benefits of this farming system include increases in total pasture production (+21 to +34%) and more animals traded, more reliable summer production, and varied trading opportunities.

MANAGEMENT & LIFESTYLE

It is well-documented that moving from a dryland livestock operation to a successful irrigated mixed farming operation requires upskilling. It will also require a management change and associated lifestyle changes. This transition and the associated investment (in both infrastructure and upskilling) will be rewarded with higher levels of sustainable farm surpluses.

Upskilling in cash cropping, particularly higher value crops such as brassica seed or sweet corn will take time. Many new irrigators lease ground to proven operators in the district during the early years to learn and develop best practice techniques before undertaking it themselves.

Management considerations

- Managing and overseeing an on farm irrigation development project.
- Transitioning changes to the farm systems to include multiple high value, high risk crops.
- Matching crops with soil type and micro climates.
- Selecting which crops for which rotation.
- Owning and operating specialised machinery vs contracting.

Labour considerations

- Securing a seasonal work force that may be required to work long hours around planting and harvesting.
- Relatively intensive winters with large numbers of cattle on feed breaks.

THIS CASE STUDY SERIES

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

Elm Grove
- Dairy Conversion
- Apple Orchard
- Mixed Operation

Easterbo
- Sheep Dairy
- Mixed Operation
- Livestock Finishing

Otahuao
- Sheep Dairy
- *Mixed Operation*

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 irrigated mixed 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.far.org.nz

www.beefandlambnz.com

www.dairynz.co.nz

www.irrigationnz.co.nz

www.smartirrigation.co.nz

www.wairarapawater.org.nz