Water Wairarapa

ELM GROVE MIXED USE

Case Study

INTRODUCTION

The Elm Grove 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 Elm Grove dryland farming system to an irrigated mixed-use farm that includes arable, specialist seeds and livestock finishing. 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 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 stony soils	161ha of stony soils	141ha of irrigated stony soils	141ha of irrigated stony soils
Cropping on heavier soils	27ha of heavier soils	n/a	n/a
Cropping on silt soils	31ha of silt soils	45ha of dryland silt over stones soils	45ha of dryland silt over stone soils
Stock numbers	6,600 lambs 245 bulls 500 ewe hoggets	4,300 lambs 700 bulls 500 dairy cows	1,700 lambs 890 bulls 600 dairy cows

Key Assumptions:

- 186ha irrigated using 3,583m^3 of water/ha, representing 86% of Elm Grove's 220.1ha effective area.
- Crops grown in this example include: barley (62ha); peas (6ha); pak choi seed (6ha); red clover seed (12ha); ryegrass seed (12ha); and onion seed (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 is on the farm for less time and consume a lower percentage of the farms total annual dry matter production.

FINANCIAL VIABILITY

The following table provides a comparative insight into financial viability at a Gross Margin level (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	391,201	1,786	1,080,991	4,936	1,194,682	5,455
Farm Working Expenses	(259,384)	(1,184)	(697,039)	(3,183)	(696,520)	(3,180)
Gross Margin	**131,817**	**602**	**383,952**	**1,753**	**498,162**	**2,275**

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)	Baseline Dryland		Irrigated Average		Irrigated Top 10%	
	$ Total	$ / eff ha	$ Total	$ / eff ha	$ Total	$ / eff ha
Gross Margin	131,817	602	383,952	1,753	498,162	2,275
Depreciation	-	-	(97,268)	(444)	(97,268)	(444)
Interest expense	(2,000)	(9)	(108,785)	(497)	(94,049)	(429)
Farm Surplus (pre-water)	**129,817**	**593**	**177,899**	**812**	**306,845**	**1,401**

CAPITAL

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 220.1ha 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	$
Pivot irrigator (153 ha)	805,480
Gun irrigators	172,070
Consents	15,000
Fencing shelter belts	266,385
Laneway	28,000
Stock water	39,800
Livestock	-
Machinery (optional)	360,000
Total	1,686,735

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	585	699	812	926	1,040
Irrigated Top 10%	1,157	1,279	1,401	1,524	1,645

Sensitivity to farm working expenditure	-10%	-5%	0%	5%	10%
Irrigated Average	1,131	971	812	653	494
Irrigated Top 10%	1,719	1,560	1,401	1,242	1,083

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

Wetland planting & retirement of bush

- Retiring heavy soils surrounding Elm Grove's fenced-off native bush area.
- Costings include fencing water races and installing reticulated water systems.
- Retaining stands of existing native trees, riparian planting of waterways, developing a wetland area and retaining shelter where possible.

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

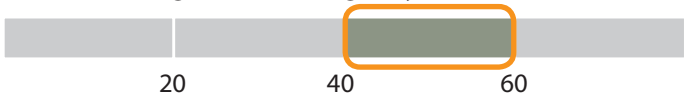
- Wintering cattle on the stony soils to preserve the soil structure of the heavier soils.
- Use of direct drilling (Cross Slot) rather than conventional cultivation to preserve the structural integrity of the topsoil. Minimum tillage reduces surface wash and wind erosion and conserves soil moisture.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

INDICATIVE NUTRIENT LOSSES

Based on the OVERSEER® Nutrient Budget Model, the indicative nutrient losses for Elm Grove as the mixed used 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



MANAGEMENT & LIFESTYLE

It is well-documented that moving from a dryland livestock operation to a successful ungated 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.

CONCLUSION

Conversion from current land use to a mixed operation under irrigation 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.

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 considering individual situations. It covers just one scenario – conversion of the existing operation to sheep 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.irrigationnz.co.nz

www.smartirrigation.co.nz

www.wairarapawater.org.nz