Water Wairarapa

ELM GROVE APPLE ORCHARD

Case Study

INTRODUCTION

The Elm Grove apple orchard 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 apple orchard. Elm Grove has a mainly flat contour and includes soils that with appropriate management are suitable for growing pip fruit. 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 AgFirst. It is based on the 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 model assumes three irrigated orchard sizes, 15ha, 50ha and 100ha, each using 2,890m^3 of water/ha. In each case between 1,800 and 2,000 trees are planted per hectare.
- Varietal mix consists of both commodity varieties (e.g. Braeburn and Royal Gala) and higher-value modern (sweeter) varieties (e.g. Cripps Pink and Envy) grown under licence. The assumed mix listed below is weighted towards the high-growth Asian export market:
  - Braeburn (10%)
  - Cripps Pink™ (10%)
  - Envy™ (15%)
  - Fuji (20%)
  - Jazz™ (10%)
  - Pacific Queen™ (10%)
  - Pacific Rose™ (5%)
  - Royal Gala (20%)

- While larger irrigated orchard developments offer economies of scale, operating cost and income per hectare are similar for both small and large orchards.
- Assumed management costs are the same for all 3 orchard sizes and reflect the management cost for the larger orchard.
- While the assumed Orchard Operating Expenditure per hectare is the same for both an Average Efficient Operator and Top 10% Operator, it is assumed a Top 10% Operator will produce more apples per hectare and achieve higher 'pack-out' percentages (through higher quality fruit).
- Cost of trees is based on a planting rate of 1,800-2,000 trees per hectare at an average cost of $17.50 per tree (including royalties for specialist rootstocks and varieties). Due to high demand, the lead time on popular rootstock orders is up to two years.
- High-quality trellis systems and support structures at an average cost of $24,000 per hectare.
- Micro sprinklers have been chosen over drippers to provide even water distribution.
- Plant and equipment includes tractors, sprayers, mowers and pruning equipment.
- An average cost of $5,000 per hectare for implement sheds and amenities.
- No artificial or additional shelter is necessary.

FINANCIAL VIABILITY

Based on the regional average for properties similar to Elm Grove, an expected farm surplus from a dryland operation is ~$602/ha.

The following table provides an insight into financial viability at Orchard Gate Return (Gross Orchard Revenue less post-harvest expenses) and Gross Margin (Orchard Gate Return less Operating Expenditure) levels. This scenario assumes a 'Top 10' operator and a 15ha orchard.

Gross Margin based on 15ha	Year 1		Year 3		Year 5		Year 7		Year 9		Year 12	
	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha
Gross Orchard Revenue	-	-	515,859	34,391	1,043,795	69,586	1,197,006	79,800	1,280,608	85,374	1,328,206	88,547
Post Harvest Expenses	-	-	(160,897)	10,726)	325,574)	(21,705)	(381,150)	(25,410)	(402,731)	(26,849)	(418,445)	(27,896)
Orchard Gate Return (OGR)	-	-	354,962	23,664	718,221	47,881	815,856	54,390	877,877	58,525	909,761	60,651
Less Orchard Operating Expenditure	(341,868)	(22,791)	(388,841)	(25,923)	(433,333)	(28,889)	(451,051)	(30,070)	(460,209)	(30,681)	(469,846)	(31,323)
Gross Margin	(341,868)	(22,791)	(33,879)	(2,259)	284,888	18,993	364,805	24,320	417,668	27,845	439,915	29,328

Orchard 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. Orchard Surplus shown below does not include the cost of water and uses an approximation for depreciation and interest expenses.

Orchard Surplus (pre-water)	Year 1		Year 3		Year 5		Year 7		Year 9		Year 12	
	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha
Gross Margin	(341,868)	22,791)	(33,879)	(2,259)	284,888	8,993	364,805	4,320	417,668	27,845	439,915	29,328
Depreciation	(65,243)	(4,350)	(57,985)	(3,866)	(51,666)	(3,444)	(46,148)	(3,077)	(41,313)	(2,754)	(35,135)	(2,342)
Interest	(88,584)	(5,906)	(125,351)	(8,357)	(151,041)	(10,069)	(151,041)	(10,069)	(151,041)	(10,069)	(151,041)	(10,069)
Orchard Surplus (pre-water)	(495,695)	(33,046)	(217,215)	(14,481)	82,181	5,479	167,616	11,174	225,314	15,021	253,739	16,916

The differences between apple production and pastoral farming are numerous. Apple production is a capital-intensive enterprise that requires significant working capital to maintain productivity, irrespective of the market price. It requires a different set of skills and is vulnerable to adverse climatic events at some times of the year. The financial rewards can be attractive, particularly from licenced varieties that enjoy strong demand conditions in export markets.

Apple orchards require a minimum of 10 years to mature, with the first 2 years after conversion delivering minimal revenue.

Capital expenditure & conversion costs	15 ha		50 ha		100 ha	
	$ Total	$ / ha	$ Total	$ / ha	$ Total	$ / ha
Trees & royalties	525,000	35,000	1,750,000	35,000	3,500,000	35,000
Planting & support structures	360,000	24,000	1,200,000	24,000	2,400,000	24,000
Micro sprinkler irrigation	198,645	13,243	600,000	12,000	1,036,600	10,366
Plant & equipment	135,000	9,000	450,000	9,000	900,000	9,000
Shedding	75,000	5,000	250,000	5,000	500,000	5,000
Shelter	-	-	-	-	-	-
Total	1,293,645	86,243	4,250,000	85,000	8,336,600	83,366

The figures used in the table above are based on a modern Hawke's Bay orchard. There are many ways an orchard can be developed, e.g. use of a less robust support structure, higher vigour rootstock planted at lower tree density and trained in a multi-leader form. Further, royalty payments on cultivar and rootstocks differ.

KEY SENSITIVITIES

Shown below is the Gross Margin per hectare assuming a -/+ 20% movement in the export price for Class One fruit. The figures are based on a 15ha orchard in its 12th year of production, assuming a Gross Margin of $13,084/ha for an Average Efficient Operator and $29,328/ha for a Top 10% Performer.

Sensitivity to changes in export prices	-20%	Budget	20%
Irrigated Average	(1,551)	13,084	27,720
Irrigated Top 10%	11,074	29,328	47,583

Whilst costs per hectare are less likely to vary between an Average Efficient and Top 10% Operator, the difference is production per hectare and fruit quality (reflected in pack-out rates), all of which require superior orchard management skills. The financial prize for achieving Top 10% Operator performance is significant.

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

The Elm Grove land identified as suitable for growing apples is currently pastoral land used for winter grazing that has been managed under a low-input regime for many years. The previous wetland area and southern end of the property is not suitable for pip fruit production without significant drainage work.

Nutrient management

- Pip fruit production on the designated Elm Grove soils would require only minimal ground-applied fertiliser inputs.
- Risk of nitrogen or other applied nutrients leaching into waterways is minimal provided normal best-practice is undertaken and applications are timed appropriately based on crop growth-phase and weather conditions.

Soil management

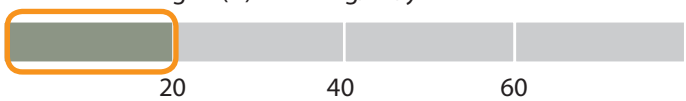
- The designated soils on Elm Grove have a high gravel content which should minimise soil compaction and wheel tracks from regular tractor passes.
- Minimise compaction by avoiding spraying when soils are fully saturated. Tank mix-compatible products reduce the number of passes required.
- Mulch pruning material in winter to return carbon and organic matter to the soil. This aids soil structure and microbial activity. When a nitrogen source and/or microbial food is added, it accelerates the breakdown of woody material and increases the amount of valuable organic matter returned to the soil.
- Improve soil structure by strategically planting inter-row swards that includes nitrogen fixing legumes, deep rooted grasses and broadleaf species.

INDICATIVE NUTRIENT LOSSES

Based on the OVERSEER® Nutrient Budget Model, the indicative nutrient losses for Elm Grove as an apple orchard 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 apple orchard offers a significant increase in effective farm surplus for both the Average Efficient Operator and a Top 10% Operator.

This case study highlights that the conversion to apple production on Elm Grove is viable assuming the pre-requisite development capital can be secured. It will also require access to skilled orchard management and modern management systems.

A positive operating surplus can be achieved at the end of year 5 by an Average Efficient Operator and the end of year 4 by a Top 10% Operator.

The success of this conversion will also depend on other factors including the availability of suitable varieties and rootstock, access to modern infrastructure (a local fruit packing facility and post-harvest facilities), skilled management and a supply of seasonal labour.

MANAGEMENT & LIFESTYLE

The transition from a dryland livestock farm to an irrigated apple orchard requires a major changes in skills, management and lifestyle for the property owner. Success will however bring suitable rewards with sustainable surpluses.

Management considerations

- Managing and overseeing an orchard development project.
- Attracting a fully-qualified, Top 10% Operator will require a competitive remuneration package. However the impact of a top operator on surpluses per hectare from increased production and fruit quality more than justifies the expense. The larger the orchard the lower the cost of employing a Top 10% Operator as a percentage of total orchard operating expenditure.
- Securing access to modern and efficient packing and post-harvest infrastructure and services.
- Securing access to rootstock for licenced varieties.

Labour considerations

- Securing the services of seasonal labour can be difficult. Elm Grove's proximity to Greytown may provide a readily available labour pool.

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

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 and apple orchard.

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.pipfruitnz.co.nz

www.irrigationnz.co.nz

www.smartirrigation.co.nz

www.wairarapawater.org.nz