Lincoln University

FINANCIAL BUDGET MANUAL 2016

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PREFACE

The "Financial Budget Manual 2016" is an invaluable reference book for farmers and growers, consultants and students. It contains a wealth of up to date information on farm and orchard costs and prices, the profitability of different enterprises, and income taxation. Following its successful introduction in 1999, the manual is now available on the web. However, many users find having the information in a book is the most convenient and efficient format, and this manual is the result of the University's commitment to the wide readership.

Information is available in sections on the web, for individual purchase as pdf's or you can purchase the complete book as a pdf. www.aginfo.lincoln.ac.nz.

Unless stated otherwise, data contained in the Manual are current mid-2016 and are exclusive of GST. Prices do not remain stationary so the Manual should be used as a guide only. Market movements and exchange rate changes are just two of the factors which can rapidly alter costs and prices. The availability of discounts for bulk purchases, and deferred payment arrangements, may also affect final costs for budgeting purposes. In addition, some commodity price information is becoming increasingly sensitive and remains confidential between the client and the supplier and/or buyer. It is therefore unavailable for publication in this Manual.

Information quoted has been gathered from hundreds of sources throughout New Zealand, but some variation may occur between regions. Trade names have been used for clarity and convenience; no preferential endorsement by the University is intended, nor is any criticism implied of any product which does not appear in the Manual. If you as a supplier would like your products listed – please use the website as your point of contact.

Please note that each of the sections is paged individually, and comprehensive index provided.

Our sincere thanks to staff at Lay Associates Ltd., who contributed updates for Section 4 on Tax. Thanks also to all the individuals, organisations and commercial firms who have provided information for our use. Without their co-operation, the production of the Financial Budget Manual would not be possible, and we sincerely appreciate the willingness of all those who have contributed. We wish to express our appreciation to the Assistant Editor Annmarie Baldwin for her efforts in gathering and collating the information.

Any suggestions for the improvement of the Manual would be welcomed.

For readers' information the Faculty of Agribusiness and Commerce at Lincoln University also produces a companion volume - the "Farm Technical Manual". It is a versatile reference book, which brings into one place all manner of essential technical information required by farmers and others involved in the farming industry.

David and Virginia Askin
EDITORS

September 2016

SECTION 3
LIVESTOCK, CROPPING and HORTICULTURE

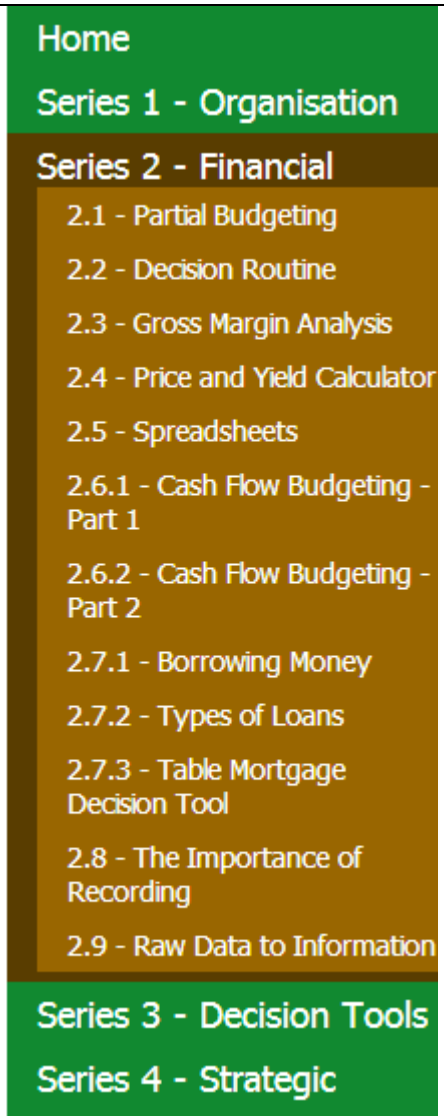
INTRODUCING ENTERPRISE ANALYSIS

3. Introducing Enterprise Analysis and Gross Margins

3.1 INTRODUCTION

3.1.1 Background

Everything changes. Well maybe not everything, but much about farming and farming business is changing and changing dramatically. At one end of a scale Wendell Berry and others espouse a timeless view of community, land, 'local vs global' and husbandry, where change is slow and ordered, controlled by season and farmers in small operations work together in biologically complex 'small' farms. We suggest you take time to read him and others like him, as their ideas and proposals provide a useful counterpoint to farming as business only. This section, sits towards the other end of that 'scale'. It is unabashedly about farming as business and the way farmers do business continues to change dramatically. Here are just two significant areas for consideration.



From I.AGRI – Resources freely available.
http://www.howtofarm.co.nz

Firstly, pollution and secondly, the tools for farmers to manage, control and analyse their farm operations.

First let's consider pollution. Nitrate leaching is a somewhat obscure term for pollution. For much of the last century most farming has been about maximising profitability around maximum productivity. Little thought and few regulations related directly to pollution. That has changed dramatically and more change is on the way. 'Overseer' is a computer based model that seeks to predict pollution once various variables are stated. It is based on research and best estimates. It is under continual development as research results are added and is set to assist regional councils manage pollution limits in agriculture. Rules are being established and at least in Canterbury they favour those with a history of pollution over those with very low pollution history! There is much for the next generation to cope with. Decisions made will affect our quality of life and economic well-being. No longer is productivity and profitability the end-game – now environmental quality is a game changer. The challenges are worth facing and new ways of doing things are required. It is a great time to be a student, a farmer or associated professional!

Secondly, the tools to analyse and manage enterprises are also rapidly changing. A range of local and international companies provide many tools and systems- we can't offer advice as to which is best for you. The range is challenging to evaluate. But there are some principles to run with. First port of call would be to talk with others in our area, as well as with your accountant. Unless you are willing to change accountant, you may need to follow their advice. But,

accountants also need to keep up with the times and with the tools available for farmers to use. There is no shortage of options - Cash Manager, FARMAX, Farm^{IQ}, iAGRI, MINDA, Xero, MYOB to name some – and with add-ons and work together options the accountants and manager's roles continue to change! One farmer recently reported 6 different mapping systems on their property – and they were looking at an Australian farm management product. There's considerable challenge in this area.

Cash Manager Rural is perhaps the most widely used farm financial package in New Zealand. In recent years it has provided users with an ability to store their data online. Recording farm activities is made easy with smart phone apps- and recording for compliance purposes is increasingly important- particularly around Farm Environment Plans.

The MINDA suite from LIC (Livestock Improvement Corporation LTD) may well be the product of choice for the dairy industry as it provides many practical tools specifically targeted at the day to day management and analysis of a New Zealand dairy farm.

ProductionWise is likely to be the tool of choice for intensive cropping farmers and this section's cropping component relies heavily on output from ProductionWise.

Enterprise analysis starts with inputs and outputs and the primary tool is still a spreadsheet like Excel. This manual provides a number of simple examples based in Excel spreadsheets and linked worksheets. We believe it is important to understand first principles and a farm budget or gross margin presented in excel with each cell's information and where it came from (calculations/ linked cells etc) allows students and others to understand the farm's finances from first principles.

Kale area required

Enter green values

Kale offered per cow per day (kg)	12	kg
Total number of cows	430	
Number of days grazing	95	
Percentage wastage	10	%
Average yield	12000	kg/ha
Kale required before wastage allowed for	490,200	kg
Kale required with wastage allowed for	539,220	kg
Therefore ha to sow =	**44.9**	**ha**

Area to plant depending on percentage wastage and Yield kg/ha

		Percentage wastage				
		44.9	5	10	15	20
Yield, kg/ha	10000	51.5	53.9	56.4	58.8	
	12000	42.9	44.9	47.0	49.0	
	14000	36.8	38.5	40.3	42.0	
	16000	32.2	33.7	35.2	36.8	

With data above - how wide is my break?

Width of paddock your data here -	200
Calculated Break size required m/day	**23.7**

Area to plant depending on kg kale offered and Yield kg/ha

		Kale offered kg/cow/day				
		44.9	10	11	12	13
Yield, kg/ha	10000	44.9	49.4	53.9	58.4	
	12000	37.4	41.2	44.9	48.7	
	14000	32.1	35.3	38.5	41.7	
	16000	28.1	30.9	33.7	36.5	

Kale calculator, showing area to plant and break size for user with sensitivity analysis tables, showing varying areas required at drilling.

The question above (how much kale or fodder beet to sow) may not be important to you, but you may wish to use the spreadsheet on-line as a way of learning how cells and calculations work in Excel. You will need to visit the web site (www.aginfo.lincoln.ac.nz) and download the example spreadsheet.

NZ is well served by our private and government lead industry bodies eg Beef and Lamb New Zealand, DairyNZ, the Foundation for Arable Research etc provide a number of worthwhile interactive tools. Many are provided by the commercial agents. Ask your agent for tools their company provides.

Adequate financial analysis of perennial crops (grapes, apples, citrus etc) requires a development budget that covers (normally) 10-15 years, showing very significant expenditure in the first years and increasing annual profitability later in the cycle. A simple gross margin may be helpful to compare a situation where differing proportions of cultivars are being considered. Apple profitability is at least in part built on the willingness to regularly change cultivar as market preferences change and new cultivars become available. This means an averaged price over 5-6 or more cultivars will not show a complete picture. The answer may mislead. Beware. Seek advice before you cultivate and plant.

If you don't measure it, you can't manage it... and if you don't record it you can't report on it!
Who said farming was simple!?

Accurate enterprise analysis is built on a number of factors. Tools used must be appropriate, carrying calculations that make sense in the world of biology first and foremost. Information relating to prices and costs must be as up to date as possible. Finally, unique situations in the growers own enterprise or plans must be entered for the analysis to be helpful – and not misleading.

Banks don't just lend money to agri-businesses. They provide very useful information services – eg overleaf from ANZ's Agricultural Price Review.

3.1.2 Agricultural Price Review

AGRICULTURAL PRICE PREVIEW FOR 2015/16					
June Year End	**2012/13**	**2013/14**	**2014/15p**	**2015/16f**	**% change**
Finance					
Weighted Rural Interest Rate	5.95	5.85	6.25	6.30	NA
Dairy ($ per kilogram of milksolid) after retentions					
Fonterra Milk Price	5.84	8.40	4.50-4.70	5.75	+25%
Dividend per share after retentions	0.32	0.10	0.30	NA	NA
Tatua	7.40	8.90	6.75	7.00	+4%
Westland	6.04	7.57	5.00	5.75	+15%
Open Country Dairy	5.90	8.40	4.50-4.70	5.75	+25%
Synlait	5.89	8.31	4.50-4.70	5.75	+25%
Wool ($ per kilogram greasy, whole of clip net of costs)					
Fine (<24 micron)	11.05	10.35	9.30	9.70	+4%
Medium (25-31 micron)	6.45	5.55	5.60	5.90	+5%
Crossbred (>31 micron)	2.95	3.75	3.85	3.75	-3%
Sheep ($ per head, weighted averages, GST exclusive and net levies at farm gate)					
Lamb (17.5 kg carcass)	83	94	92	95	+3%
Mutton (24.5 kg carcass)	60	74	65	67.5	+4%
Stores (LW 30-35 kg)	45-80	65-85	60-85	65-85	+3%
Beef ($ per kilogram of carcass weight, weighted averages, GST exclusive and net levies at farm gate)					
Steer (296-320 kg carcass)	3.80	4.05	4.60	4.85	+5%
Heifer (195-220 kg carcass)	3.70	3.95	4.45	4.70	+6%
Bull (296-320 kg carcass)	3.75	3.90	4.40	4.60	+5%
M Cow (160-195 kg carcass)	2.80	2.75	3.10	3.25	+5%
Deer ($ per kilogram of carcass weight, weighted averages, GST exclusive and net levies at farm gate)					
Stag (60 kg carcass)	6.70	6.35	6.35	6.05	-5%
Hind (50 kg carcass)	6.60	6.25	6.25	5.95	-5%
Velvet ($ per kg)	96	100	125	115	-8%
Grains ($ per tonne, AgriHQ prices grower bids delivered nearest store or mill, net levies and freight to this point)					
Milling Wheat	410 to 430	410 to 450	400 to 450	410 to 440	Unchanged
Feed Wheat	350 to 380	380 to 440	370 to 445	360 to 390	-8%
Feed Barley	340 to 380	370 to 435	360 to 445	350 to 390	-8%
Maize Grain	400 to 440	440 to 500	400 to 460	380 to 420	-7%
Palm Kernel	290 to 350	300 to 370	230 to 310	260 to 280	Unchanged
Kiwifruit ($ per tray OGR, crop year)					
Zespri™ Green	4.62	5.23	5.96	5.25	-12%
Zespri™ Gold	10.45	12.91	9.78	7.00	-28%
Apples (Weighted FOB returns $ per TCE, crop year, % change 2014 to 2015 crop)					
Braeburn	18.3	22.4	24.4	21.0	-14%
Royal Gala	26.2	27.4	24.7	25.0	+1%
Fuji	23.5	26.4	32.0	30.5	-5%
Jazz™	21.6	28.5	31.4	31.0	-1%
Pacific Rose	33.5	36.8	38.2	36.0	-6%
Grapes ($ per tonne, national average, vintage year, % change 2014 to 2015 vintage)					
Sauvignon Blanc	1,151	1,231	1,605	1,675	+4%
Merlot	1,517	1,510	1,768	1,800	+2%
Pinot Noir	2,429	2,754	2,931	3,000	+2%
Chardonnay Mendoza	1,014	1,089	1,692	1,700	Unchanged
Chardonnay Other	1,122	1,177	1,690	1,700	+1%
Pinot Gris	1,306	1,239	1,530	1,550	+1%

ANZ. Feature article, Ag Price Review 2015/16.

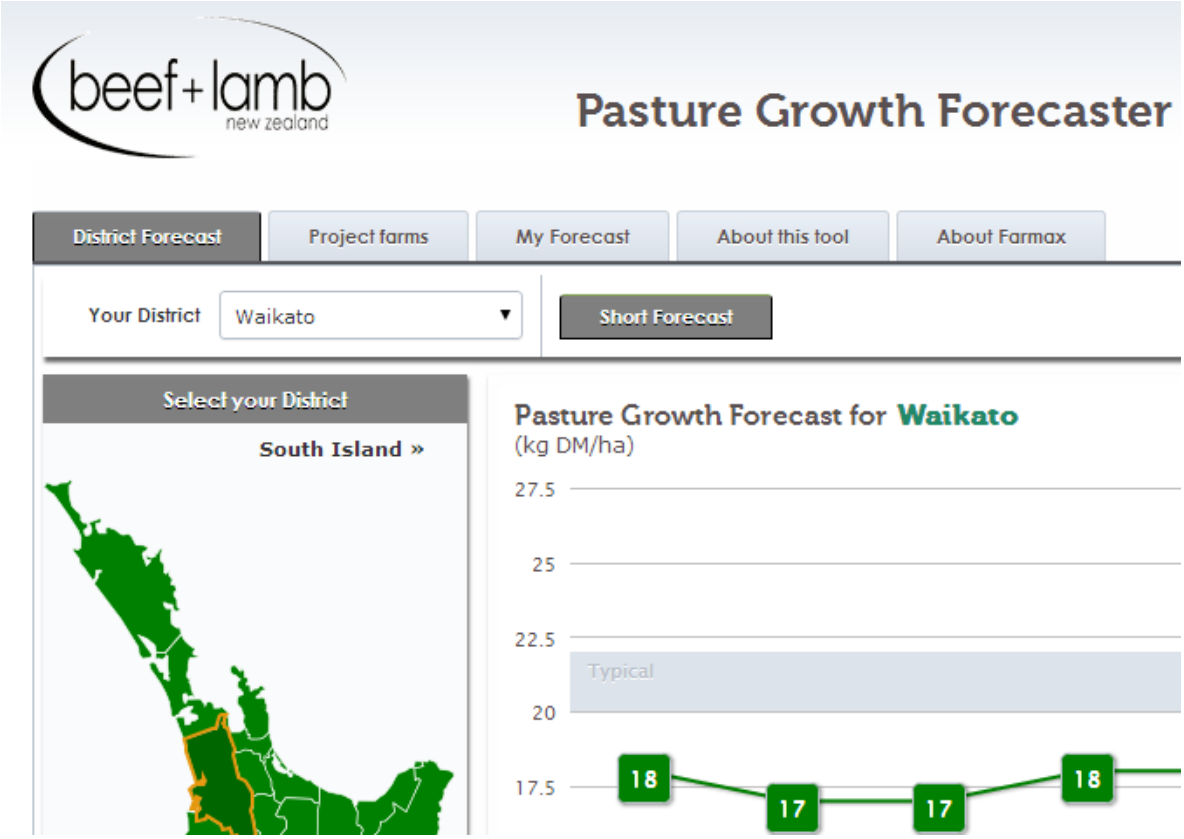
3.1.3 Resources

There are many more useful resources than we can highlight. We are bound to have missed some and apologise to those who have missed out in being mentioned here. Let us know for next time (david.askin@lincoln.ac.nz).
Key starting points are your own industry's web site(s) but remember also, to check bank web sites. These also provide tools for farmers and analysis of trends. A few examples have been chosen to highlight and encourage the reader to pursue the internet resources directly.

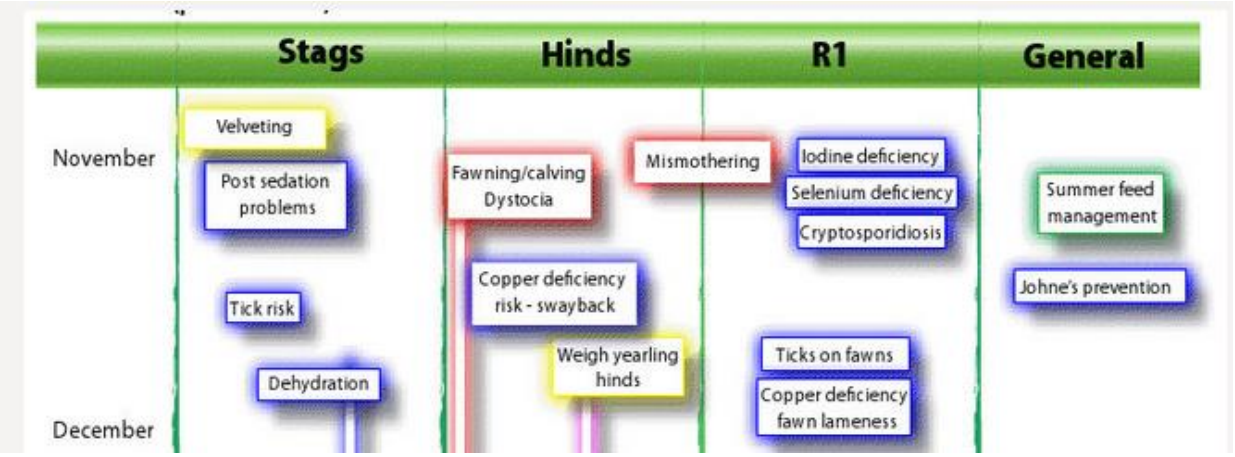
https://apps.farmax.co.nz/pasture/BeefLambNZ pasture calculator - payment required for personalised service.

http://www.dairynz.co.nz/people/employee-turnover-cost-calculator/ - Losing staff, high staff turnover? The calculator helps you understand how expensive that process really is. DairyNZ provide further useful tools and suggestions to improve staff retention.

Dairy NZ provide a practical pdf document with screen shots to help you with your first and subsequent budgets.
http://www.dairynz.co.nz/media/502536/quick_cash_budget_guide.pdf
A more detailed annual budget with cash flow is available – complete with hints regarding access to unlock the budget to personalise it for your needs.
http://www.dairynz.co.nz/farm/financial/budgets/annual-cash-budgets



https://apps.farmax.co.nz/pasture/BeefLambNZ
DeerNZ provides useful information and a calendar that can be printed and used as a reminder for managers, owners and a learning tool for new staff.
http://bit.ly/1uxavfr



Useful tables showing daily feed requirements for particular gain required of various livestock and their current liveweight.
http://bit.ly/1mHzbix

The NZ Ministry of Primary Industries (MPI) monitoring reports have been 'must have' information for anyone seeking to understand New Zealand's agricultural enterprises. Keep an eye on the link below – hopefully they continue to update these - eg.
https://www.mpi.govt.nz/news-and-resources/open-data-and-forecasting/agriculture/

3.1.4 Use of Gross Margins

Gross Margins may be used as a first step in comparing the profitability of different enterprises. The direct or variable costs associated with a particular enterprise are subtracted from the total income from that enterprise. The gross margin result is then normally expressed in terms of dollars per stock unit or per hectare. In some instances it may be worth also comparing enterprises against other limits to production – eg water.
Direct or variable costs include items such as animal health costs, and harvesting costs. They do not include costs common to all enterprises, such as rates and interest payments (fixed costs).
Care must be taken when interpreting results of Gross margin analysis. It is important to note that gross margins make the assumption that each enterprise is independent of all other farm or orchard activities, both technically and financially. This is seldom the case, with enterprises competing for labour and other resources, and unaccounted for synergies (eg the nitrogen fixed by a white clover seed crop is not accounted for in a gross margin analysis). Gross margins also assume that each additional unit of production is worth as much as, and costs as much as, each preceding unit. Note also that different properties are likely to show differing gross margin returns for identical enterprises, because yields, costs and various environmental variables will differ according to each individual property.
In many instances, the farmer or grower will find it necessary to prepare partial or full budgets in order to further compare alternative enterprises. For example, the price of irrigation is under-estimated in the analyses that follow. Using water is expensive[1], not only in terms of pivots or canals, but also in the compliance costs around managing pollution, as well as costs in obtaining finance. For some farmers many thousands are spent in environment courts seeking permissions… and when given, consents may be withdrawn due to changing rules. That makes for a very tough environment in which to farm.

[1] For those in Canterbury able to join Central Plains water, fees in the order of $1800/ha to join and annual fees of $650/ha mean that high production and low pollution requirements will be a challenging marriage.

There is general agreement that gross margins are helpful with arable crops – but even so there are a multitude of factors – timing of expenditure and income stream, weather, length of time in the ground, difficulty with harvest (lodging, damp weather) that can dramatically change expected outcomes. Relatively new crops, for example hybrid carrots/radish may look attractive – but if pollination fails the crop may be a very expensive loss and if another crop is too close then purity standards may mean payments drop to zero. Some crops leave behind useful nitrogen and remove few nutrients (white clover) whereas others (eg wheat, maize) remove large amounts of nutrient and don't enhance soil fertility.

Barley and wheat normally require extra labour at harvest due to the large tonnage / ha to manage – and all of those tonnes need on-farm storage and (expensive) trucking to market. Feed barley is dependent on the fortunes of dairy farmers who have been buying large quantities of barley to encourage ever greater milk production.

In other words- there's much more to consider than just the figures presented in this section.

Complexity abounds also in terms of the choices confronting a farmer. There are many options relating to controlling insect and weed pests. Various companies provide their own best bet chemicals. This manual does not seek to endorse any one company's products, but rather provides you with information around options and a framework for decision making.

Although gross margins have a number of limitations – there are some good reasons for starting with a gross margin, particularly when enterprises that have fundamental similarities are to be compared. Once a gross margin has been created – comparison within an enterprise as various factors are changed becomes very straight forward using the power of spreadsheets as a starting point.

Note that the examples presented do not try to cover all enterprises. The intent is to provide some examples that will assist you in creating your own analysis, uniquely fitting your own situation.

Cost, price and yield estimates for the stock and crop enterprises are based largely on Canterbury figures as of mid-year 2016.

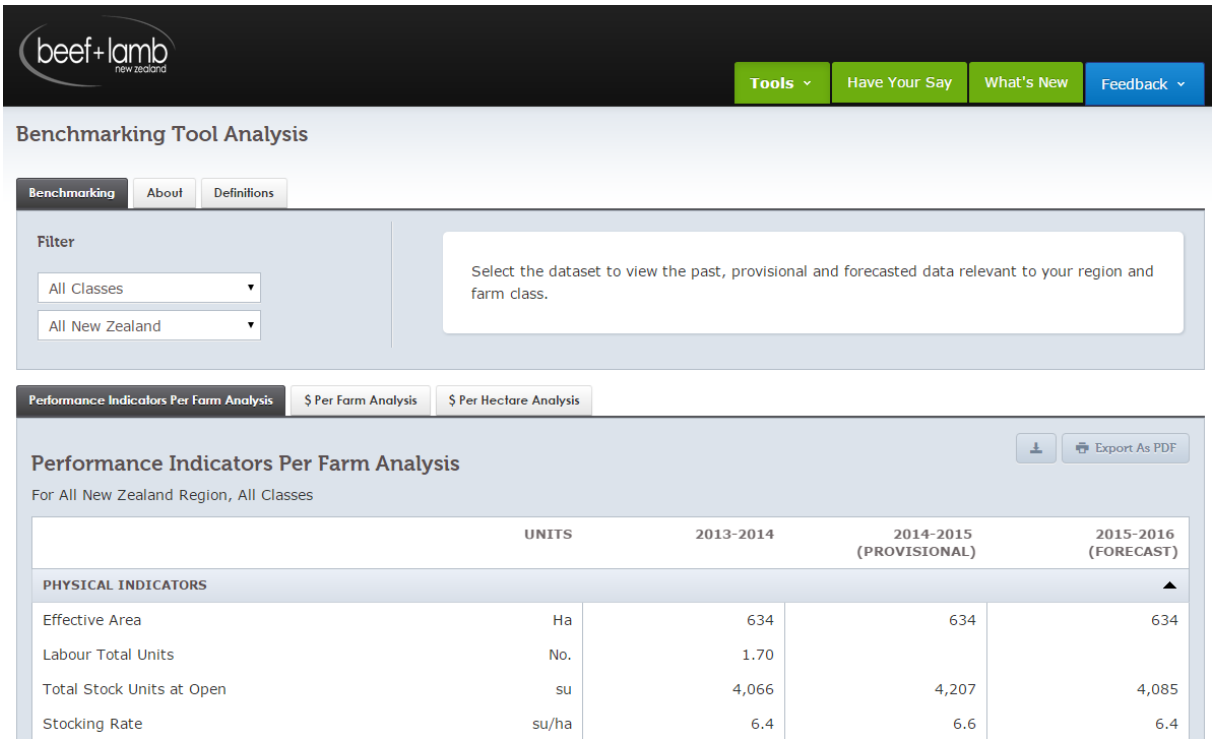
Interest and Supplementary Feed Costs:

Interest and supplementary feed costs are normally excluded from gross margins when comparing enterprises (in particular livestock enterprises) for the same property.

However a partial budgeting approach may be adopted with livestock enterprises, including estimates of interest and feed costs in order to provide a more accurate indication of actual returns. The interest cost takes account of the high capital requirements of some enterprises, and the fact that in many instances borrowed capital is involved. Feed costs can be ignored where there is no change in the supplementary feed required to change from one stock enterprise to another. Where there is a change however, all additional supplementary feed costs, should be included.

NOTE: ALL FIGURES USED IN THE CALCULATIONS ARE GST EXCLUSIVE.

3.1.5 Beef and Lamb Information tools and portal



The screen shot above lets you know of some of the tools for analysis and comparison (benchmarking) available at http://portal.beeflambnz.com/tools/benchmarking-tool/

3.2 LIVESTOCK GROSS MARGINS

Prices and costs used are those ruling in mid-2016.

Assistance in the preparation of these gross margins was given by a number of industry sources as well as staff from the Faculty of Commerce, Farm Management Division. Their assistance is gratefully acknowledged.

3.2.1 Sheep Gross Margins

Animal health expenses have been estimated on a per stock unit (SU) basis, given a 'normal' animal health programme. There is a wide range of costs that contribute to this expenditure including scanning, drenching, vaccinating, dipping, tailing, tags and vet expenses. Accurate gross margins can only be calculated if specific programmes are costed out. Care is required when costs per head and per SU are used in gross margins. As performance increases per head, the SU conversion may alter and introduce some anomalies if not adjusted accordingly.

As with the comments for the dairy industry a gross margin is only a starting point. Full farm budgets are considerably more useful and needed when significant decisions are being made.

However the ability to make quick comparisons across enterprises ensures an on-going role for gross margins.

No liability (whether as a result of negligence or otherwise) is accepted for any loss of any kind that may arise from actions based on the examples in this section.

3.2.2 Sheep – Intensive Breeding Ewe Flock focussed on meat production

SHEEP GROSS MARGIN								
Crossbred Ewe Flock Breeding Own Replacements								
(High Performance)								
Texel, East Friesian, Coopworth (meat and fecundity focussed)								
Capital Stock Wintered:								
	No.				Total	SU	Total SU	
Breeding Ewes (MA 68kg lw)	1100	@	$160		$176,000	1.35	1485	
2 th Ewes approx 62kg to ram	275	@	$175		$48,125	1.3	358	
Hoggets	344	@	$125		$42,969	1.2	413	
Rams	14	@	$800		$11,000	1.1	15	
Totals	1,733				$278,094		2,270	
Dollar Investment in sheep per stock unit					$122.50			
Production Parameters:								
Ewe to ram ratio			100		Other			
Ewe replacement rate (2th vs MA ewes)			25	%	Wool bale	190	kg/bale	
% of hoggets that are culled			20	%				
Ram replacement %			35	%				
Lambing % Ewes			155	% (survival to sale)				
Lambing % Hoggets			95	%	No. dead resulting fr mortality %			
Death rate (ewes/hoggets)			4	%	Ewes/2Th	55		
Lamb kill carcase weight			18	kg	Hgts	14		
Productivity			kg	% shorn	Total wt of wool			
Wool clip (kg/ewe)			5	96	6,600			
kg/hogget & % shorn			3	96	990			
kg/lamb & % of lambs shorn			1.2	50	1,416			
Total Wool weight					9,006	kg wool		
Lamb price/kg ($/kg carcass weight)			$ 5.50					
Income:								
(Revenue per head net of freight and levies, wool net of selling charges)								
Ewe and 2Th Lambs sold	1702.25	@	$99.00		$168,523			
Hogget's lambs	314	@	$99.00		$31,037			
Cfa ewes	220	@	$80.00		$17,600			
Wool (kg)	9005.7	@	$5.00	/kg	$45,029			
TOTAL INCOME								**$262,188**

Expenditure:								
Shearing -								
Sheep		1,320	@	$370	per 100	$4,884		
Hoggets		330	@	$370	per 100	$1,221		
Lambs		1,180	@	$360	per 100	$4,247		
Total shorn		2,830						
Wool shed expenses, packs				$60.00	per 100	$1,698		
							$12,050	
Animal Health /SUnit		2,270	@	$5.00			$11,351	
Cartage								
Wool - bales		47	@	$13.00			$616	
Ram Purchase		5	@	$800			$3,850	
TOTAL DIRECT COSTS								**$27,867**
TOTAL GROSS MARGIN (before interest)								**$234,321**
GROSS MARGIN per dollar invested in sheep								$0.84
GROSS MARGIN per Stock Unit								**$103.22**
Interest Costs:								
Interest on Capital Stock Value:								
$278,094		@		7.00%				$19,467
RETURN per Stock Unit (after interest)								$95

All Prices are GST exclusive – please check all prices

3.2.3 Bull Beef

Please note prices can change rapidly in this industry. Check your local market conditions, rather than just taking the values here at face value.

BULL GROSS MARGIN

Friesian Bulls purchased as 100 kg weaners as early as possible in Spring
sold at 19 to 24 months of age, when reach target weight
(70% killed at 20 months)

Buy each Spring 100 calves weighing 100 kg

Stock Wintered:

	No.		Value	Total	SU	Total SU
Rsg 1 yr Friesian Bulls	98	@	$840	$82,320	3.6	353
Rsg 2 yr Friesian Bulls	29	@	$1,230	$36,162	6	176
Total stock wintered	**127**			**$118,482**		**529**

Dollar Investment in beef per stock unit $224

Production Parameters:

Death rate. **2** %

Sales			No. less mortality able to be sold
Percent sold at 19-21 months, between March and May	70.00	%	67
Residual sold at about two years old in Oct/Nov	30.00	%	29
Sell majority at 19 to 21 months of age between March and May, retain balance until Oct/Nov (sell at 24 months of age).	Total to sell		96

Income:

Bulls 19-24 months, slaughtered as they reach target weight

	No.	Wt		$ /kg	
Carcase Wt at sale	96	275	kg	$ 5.10 /kg	$ 134,640

TOTAL INCOME **$134,640**

All Prices are GST exclusive – please check all prices

Expenditure:	(Weaner prices very variable, check local market)						
Weaner Bulls (100 kg)	100	@	$3.50	/ kg		$35,000	
Animal Health							
Anthelminitics (4x)	400	@	$2.00	/ dose	$800		
Pour on	100	@	$1.22	/ head	$122		
Cobalt injection	100	@	$0.75	/ dose	$75		
Copper Bullet	100	@	$2.78	/ dose	$278		
Five in One vacc (2x)	200	@	$1.30	/head	$260	$1,535	
Transport based on 50km							
Weaners to Farm	100	@	$8.00	/ head	$800		
Finished Bulls to Works	96	@	$28.60	/ head	$2,746	$3,546	
Levies - AHB, M&WNZ	96	@	$16.00	/ head		$1,536	
NAIT	96	@	$1.40	/ head		$134	
TOTAL DIRECT COSTS							**$41,751**

TOTAL GROSS MARGIN (before interest)	$92,889

GROSS MARGIN per dollar invested in cattle	$0.78

GROSS MARGIN per Stock Unit							**$175.53**
Interest Costs:							
Interest on Capital Stock Value:							
$118,482	7.00%					$8,294	
RETURN per stock unit (after interest)							**$159.85**

All Prices are GST exclusive – please check all prices

3.2.4 Dairy cow enterprise analysis

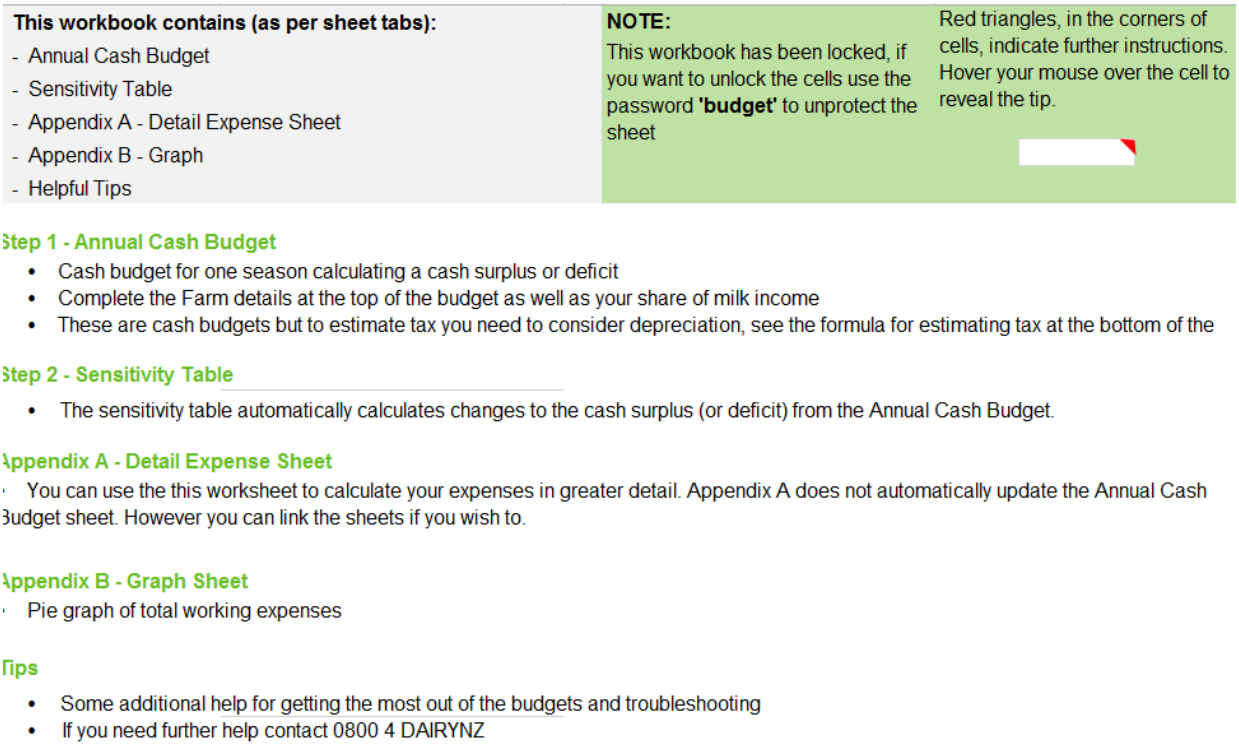
Dairying is the most important component of New Zealand's agricultural output, earning in excess of $13 billion annually.

http://www.dcanz.com/about-nz-dairy-industry/dairying-today →

> *'With annual exports in excess of NZ$13.7 billion, the dairy industry is New Zealand's biggest export earner, accounting for more than 29% by value of the country's merchandise exports. Around 95% of New Zealand's milk is exported.'*

The empowering tools available for enterprise analysis continue to be developed. There is something really mind sharpening about the way milk in the vat tells an important story on a daily basis. Little wonder then, that the dairy industry is managed with some very powerful tools to inform management.

Key players provide their clients with excellent tools. DairyNZ is a good starting point- refer below:-



This workbook contains (as per sheet tabs):

- Annual Cash Budget
- Sensitivity Table
- Appendix A - Detail Expense Sheet
- Appendix B - Graph
- Helpful Tips

NOTE:
This workbook has been locked, if you want to unlock the cells use the password **'budget'** to unprotect the sheet

Red triangles, in the corners of cells, indicate further instructions. Hover your mouse over the cell to reveal the tip.

Step 1 - Annual Cash Budget

- Cash budget for one season calculating a cash surplus or deficit
- Complete the Farm details at the top of the budget as well as your share of milk income
- These are cash budgets but to estimate tax you need to consider depreciation, see the formula for estimating tax at the bottom of the

Step 2 - Sensitivity Table

- The sensitivity table automatically calculates changes to the cash surplus (or deficit) from the Annual Cash Budget.

Appendix A - Detail Expense Sheet

- You can use the this worksheet to calculate your expenses in greater detail. Appendix A does not automatically update the Annual Cash Budget sheet. However you can link the sheets if you wish to.

Appendix B - Graph Sheet

- Pie graph of total working expenses

Tips

- Some additional help for getting the most out of the budgets and troubleshooting
- If you need further help contact 0800 4 DAIRYNZ

From http://www.dairynz.co.nz/farm/financial/budgets/annual-cash-budgets/

This section is divided broadly into two. The first provides the reader with resources relating directly to budgeting and points towards management tools that owners and managers/milkers use on a daily, to monthly and yearly basis to hone their business and pasture/cow management.

A whole industry sits alongside the dairy farm or milking platform. These farmers are often referred to as dairy grazers, providing winter feed in the form of kale and fodder/sugar beet to allow the milking platform to accumulate enough feed to start a new milking season in the spring. A view of the dairy grazers' income as a cash flow with a downloadable spreadsheet is explained later in this section.

With the very significant rise in the importance of Dairy to NZ's economy has also come a significant cost in terms of downstream pollution – often referred to as Nitrate leaching. Those issues will become more important as both society and markets demand more attention is put on environmental (and animal welfare) issues.

3.2.5 DairyNZ Annual Cash Budget

From http://www.dairynz.co.nz/farm/financial/budgets/annual-cash-budgets/

Annual Cash Budget

Name:	**Example Farm Budget of Average NZ Owner Operator**				**Budget Period**	**1/6/20XX**	**to**	**31/5/20XX**	
Farm Details	**150,000 kgMS**	**400 cows**	**145.0 ha**		**375 kgMS/cow**	**1,034 kgMS/ha**		**2.8 cows/ha**	

Income							$ Total	$/kgMS	$/cow	$/ha
Dairy Cash Income	**Share of milk cheque received**					**100%**				
Milk Solids	advance	150,000	kgMS	x	$ 4.00	/kgMS	$600,000	$4.00	$1,500	$4,138
Milk Solids	retrospective	155,000	kgMS	x	$ 0.50	/kgMs	$77,500	$0.52	$194	$534
Milk Solids	dividend	155,000	shares	x	$ 0.40	/share	$62,000	$0.41	$155	$428
Milk Solids Previous season May production and advance on season							$25,000	$0.17	$63	$172
Net livestock sales (calves + culls + other - purchases)							$70,000	$0.47	$175	$483
Other dairy income (incurring GST) e.g.colostrum							$6,000	$0.04	$15	$41
Other dairy income (tax paid) e.g. farm cottage rent, rebates										
Net Dairy Cash Income							**$840,500**	**$5.60**	**$2,101**	**$5,797**
Other Income (incurring GST) e.g. contracting, non-dairy income							$25,000	$0.17	$63	$172
Other tax paid income e.g. off-farm salaries or wages							$20,000	$0.13	$50	$138
Total Income							**$885,500**	**$5.90**	**$2,214**	**$6,107**

Use the Detail Expense Worksheet in the Appendix if you prefer (note this will not update the expenses sheet below)

Expenses	$ Total	$/kgMs	$/cow	$/ha
Wages	$80,000	$0.53	$200	$552
Animal health	$30,000	$0.20	$75	$207
Breeding and herd improvement	$20,000	$0.13	$50	$138
Farm dairy	$9,000	$0.06	$23	$62
Electricity (farm dairy, water supply)	$17,500	$0.12	$44	$121
Supplements made (incl. Contractors)	$100,000	$0.67	$250	$690
Supplements purchased				
Young and dry stock grazing	$40,000	$0.27	$100	$276
Winter cow grazing	$10,000	$0.07	$25	$69
Support Block lease	$10,000	$0.07	$25	$69
Fertiliser (incl. N)	$65,000	$0.43	$163	$448
Irrigation	$5,000	$0.03	$13	$34
Regrassing and cropping	$6,000	$0.04	$15	$41
Weed and pest	$3,800	$0.03	$10	$26
Vehicles and fuel	$19,000	$0.13	$48	$131
R&M (land, buildings, plant, machinery)	$32,000	$0.21	$80	$221
Freight and general farm expenses	$7,500	$0.05	$19	$52
Administration e.g. accountant, consultant, phone	$14,000	$0.09	$35	$97
Insurance	$10,000	$0.07	$25	$69
ACC	$3,700	$0.02	$9	$26
Rates	$15,000	$0.10	$38	$103
Total Farm Working Expenses	**$497,500**	**$3.32**	**$1,244**	**$3,431**

All Prices are GST exclusive – please check all prices

Other expenses e.g. non-dairy expenses, off-farm expenses				
Rent e.g. milking, land lease (excludes run-off), cow lease	$20,000	$0.13	$50	$138
Overdraft Interest	$10,000	$0.07	$25	$69
Term Interest (mortgage)	$195,000	$1.30	$488	$1,345
Principal Repayments				
Tax * Ask accountant or see estimate formula below	$10,000	$0.07	$25	$69
Drawings	$75,000	$0.50	$188	$517
Capital transactions (purchases less sales e.g. land, shares, machinery)				
Total Expenses	**$807,500**	**$5.38**	**$2,019**	**$5,569**
Click here to view a pie chart of Total Expenses				
Cash Surplus / Deficit	**$78,000**	**$0.52**	**$195**	**$538**

*** Estimating Tax**
Taxable profit / loss = Total Income - FWE - other expenses - rent - interest - depreciation
Estimated tax payment / refund = Taxable profit / loss x estimated tax rate
Ask your accountant as this is an estimate only. It does not allow for other adjustments e.g. livestock valuation.

DairyNZ

Cash surplus / deficit sensitivity table

Payout

Production	-$2.00	-$1.50	-$1.00	-$0.50	$0.00	$0.50	$1.00	$1.50	$2.00
10%	-192,000	-109,500	-27,000	55,500	138,000	220,500	303,000	385,500	468,000
5%	-207,000	-128,300	-49,500	29,300	108,000	186,800	265,500	344,300	423,000
0	-222,000	-147,000	-72,000	3,000	78,000	153,000	228,000	303,000	378,000
-5%	-237,000	-165,800	-94,500	-23,300	48,000	119,300	190,500	261,800	333,000
-10%	-252,000	-184,500	-117,000	-49,500	18,000	85,500	153,000	220,500	288,000

Based on Annual Cash Budget changes to production and payout. Table displays Cash surplus or deficit scenarios. **Tax is not taken into account and will vary.**

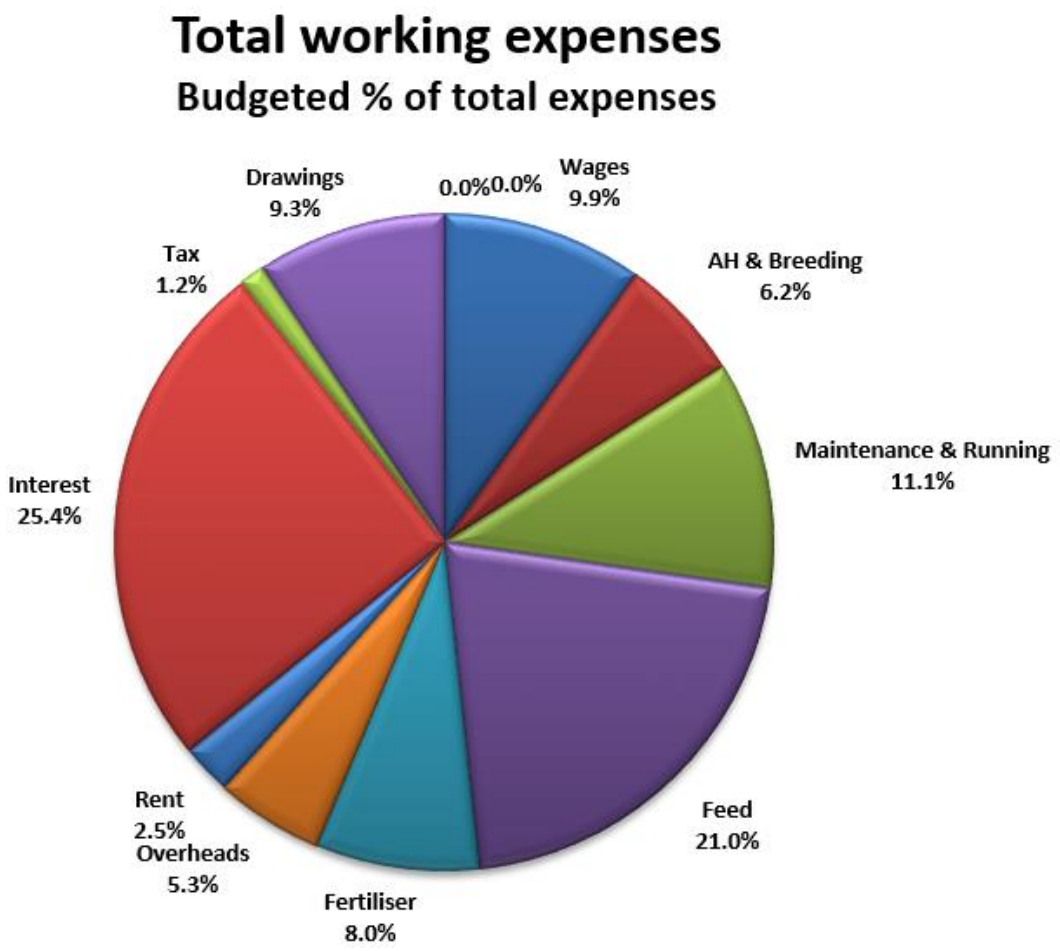
Payout

Farm working expenses	-$2.00	-$1.50	-$1.00	-$0.50	$0.00	$0.50	$1.00	$1.50	$2.00
-10%	-172,300	-97,300	-22,300	52,800	127,800	202,800	277,800	352,800	427,800
-5%	-197,100	-122,100	-47,100	27,900	102,900	177,900	252,900	327,900	402,900
0	-222,000	-147,000	-72,000	3,000	78,000	153,000	228,000	303,000	378,000
5%	-246,900	-171,900	-96,900	-21,900	53,100	128,100	203,100	278,100	353,100
10%	-271,800	-196,800	-121,800	-46,800	28,300	103,300	178,300	253,300	328,300

Based on Annual Cash Budget changes to FWEs and payout. Table displays Cash surplus or deficit scenarios. **Tax is not taken into account and will vary.**

DairyNZ

From previous tables, the starting point in these tables is a payout of $4/kg MS.



Graph from DairyNZ Annual cash budget example at
http://www.dairynz.co.nz/farm/financial/budgets/annual-cash-budgets/
The tools available for dairy farmers to manage their business of water, soil and soil fertility/losses, pasture, cow and milk production are continuing to develop. It is beyond the scope of this manual to do more than point users to tools worth considering.

The MINDA suite:

MINDApro **Herd Management Software** The smart way to manage your herd information	MINDApro provides powerful reporting features, as well as incorporating all of the functions of MINDAlink for easy herd recording. Have your herd information how you want it, when you want it, without complexity.
MINDA Mobile	MINDA Mobile is the latest in on farm technology for recording animal events and viewing animal information, right then and there when you need it.
MINDA Apps	Available for both Apple and Android operating systems, MINDA apps will turn your smartphone into an efficient and easy-to-use farming tool.
MINDA Milk	MINDA Milk is a web based tool that uses your herd test data to give you easier, bette and more timely information to help you make better, more informed decisions. In MINDA Milk, all the analysis of your herd test data is done for you.
MINDA Land & Feed	A free and simple tool for recording pasture levels and creating a feed wedge.
MINDA Weights	Liveweight analysis tools for rearing young stock to their full potential.

http://www.lic.co.nz/lic_MINDA.cfm

Lincoln University Dairy Farm and the Southland Demonstration farm

The Lincoln University Dairy Farm and the Southland Demonstration farm are both run as commercial demonstrations of best practice. Each year they generate a comprehensive budget and financial records that provide an excellent starting place to generate whole farm budgets. Follow them on facebook - they update regularly.

Refer→
http://www.siddc.org.nz.
This url[2] provides the budgeted (and actual) values for the season with analysis that assists with comparisons – eg cash farm working expenses per kg milksolids and cash operating surplus $/ha.

3.2.6 Dairy support / Dairy grazing enterprise analysis

Dairy farmers have formed strong relationships with Dairy Grazers who have become crucial members of the dairy team nationwide. During the winter the dairy platform (dairy farm) grows grass to calve and start milking on. That farm rests for about 10-14 weeks with minimal stock. Cows and often young stock are grazed by specialist dairy grazers. These are farmers who have planted kale and fodder/sugar beet for winter cow grazing and have pasture for the young stock to grow on. These 'dairy grazers' may also sell the necessary barley straw from their cash cropping enterprises.
A cash flow for one such enterprise is provided below – data from Mid-Canterbury.
Information in the table below is used in the next two pages – showing young stock and mixed age cows, with payments for grazing occurring in the month after grazing.

Here are some points worth noting→
The business is paid for example 20 c/kg DM of kale fed to the cows. That means the estimation of yield – amount offered- is very important. Various independent companies provide a yield estimating service.

Losses /yr (%) Cattle	2	
Calf Grazing Rate	$7.50	/hd/week
Rising 1 yr old	$12.50	/hd/week
Rising 2 yr old	$12.50	/hd/week
Average kale yield kg/ha	13000	
Kale sale price	0.2	$/kg DM kale sold standing
kg DM/cow/day as kale	11.00	
% Wastage in kale	10.00	
kg DM/cow/day as r/g straw	3	
kg in bale of r/g straw	300	
Cost of bale of r/g straw	$62.00	Medium square

Variables (above) stored in a Key Data Worksheet, driving calculations in subsequent worksheets. Changing any value in these green cells, will change many values in the linked worksheet – overleaf.
Note animal numbers in each month decline based on the mortality set.

[2] http://www.siddc.org.nz/files/LUDF%20Budget%202011%202012%20Season.pdf

Dairy Grazing cash flow and income calculator where calves, growing stock and the dairy herd are grazed.
Notes to bear in mind-

1. Breeding bulls are not included, but could be as 'dairy support' operators may be paid for them also. To include them it would be easy to upset the flow of deaths that are calculated automatically in the Calves and the R1 and R2 sections. Deaths are not calculated for the dairy cows.
2. In the live excel spreadsheet, green cells expect your input and red cells are 'leave alone' cells as they calculate for you.
3. This spreadsheet is used as part of Farm Management teaching at Lincoln University.

(Intend to make it available on www.aginfo.lincoln.ac.nz).
A further calculator takes relevant information from the budget to calculate the area of winter forage (kale or fodder beet) required.

Kale production required		
Kale intake per cow per day (kg)	11.00	kg
Total number of cow grazing days	27040	
Number of days grazing (not used directly - refer above)	92	
Percentage wastage	10.00	%
Kale required before wastage allowed for	297,440	kg
Kale required with wastage allowed for	327,184	kg
Average yield	13000	kg/ha
Therefore ha required	25.17	ha

Income expected and received for a Dairy grazing enterprise, grazing calves, R1/R2's and Dairy cows.

Year	2016	2016	2016	2016	2016	2016
Month	Jun	Jul	Aug	Sep	Oct	Nov
	30	31	31	30	31	30
Classification						
Number						
Age						
$/hd/week						
Income expected						
Paid/received	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Classification	**R'ing 1 y**	**R'ing 1 y**	**1 y**	**R'ing 2 y**	**R'ing 2 y**	**R'ing 2 y**
Number	510	509	508	507	507	506
Age (months)	10	11	12	13	14	15
$/hd/week	$12.50	$12.50	$12.50	$12.50	$12.50	$12.50
Income expected	$ 27,321.43	$28,185.09	$28,138.11	$27,185.05	$28,044.40	$27,094.51
Paid/received	$ -	$27,321.43	$28,185.09	$28,138.11	$27,185.05	$28,044.40
	June	July	August			
Classification	**MA Cows**	**MA Cows**	**MA Cows**			
Number	0	320	320			
Days grazing	30	31	31	30	31	30
Total kg required (intake)	n/a	109120	109120	0	0	0
$/kg DM	0.2	0.2	0.28	0.2	0.2	0.2
Income /mth expected for	$0.00	$21,824.00	$30,553.60	$0.00	$0.00	$0.00
Income paid for cow	$0.00	$0.00	$21,824.00	$30,553.60	$0.00	$0.00
Ryegrass straw kg/cow	2.5	2.5	2.5	2.5	2.5	2.5
$/kg of ryegrass straw	0.21	0.21	0.21	0.21	0.21	0.21
Cost / month for ryegrass straw over all cows	0	$5,125.33	$5,125.33	$0.00	$0.00	$0.00
	June	July	August	September	October	November
Income expected (Over all stock classes)	$27,321.43	$50,009.09	$58,691.71	$27,185.05	$28,044.40	$27,094.51
Income paid	$0.00	$27,321.43	$50,009.09	$58,691.71	$27,185.05	$28,044.40

Total for the year - $440,504 (Refer next page also).

2016	2017	2017	2017	2017	2017	2017	2017
Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
31	31	28	31	30	31	30	31
Calves	**Calves**	**Calves**	**Calves**	**Calves**	**R'ing 1 y**	**R'ing 1 y**	**R'ing 1 y**
400	399	399	398	397	397	396	395
4	5	6	7	8	9	10	11
$7.50	$7.50	$7.50	$7.50	$7.50	$12.50	$12.50	$12.50
$13,285.71	$13,263.57	$11,960.03	$13,219.40	$12,771.64	$21,958.95	$21,215.18	$21,885.81
$0.00	$13,285.71	$13,263.57	$11,960.03	$13,219.40	$12,771.64	$21,958.95	$21,215.18
R'ing 2 y	**R'ing 2 y**	**R'ing 2 y**	**R'ing 2 y**	**R'ing 2 y**	**(in-calf heif)**		
505	504	503	502	502	0		
16	17	18	19	20			
$12.50	$12.50	$12.50	$12.50	$12.50	20		
$27,951.00	$27,904.41	$25,161.98	$27,811.47	$26,869.47	$0.00		
$27,094.51	$27,951.00	$27,904.41	$25,161.98	$27,811.47	$26,869.47	$0.00	
							Cow grazing days
					MA cows	**MA Cows**	
					0	240	27040
31	31	28	31	30	31	30	
0	0	0	0	0	0	79200	
0.2	0.2	0.2	0.2	0.2	0.2	0.2	
$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,840.00	
$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$15,840.00
2.5	2.5	2.5	2.5	2.5	2.5	2.5	
0.21	0.21	0.21	0.21	0.21	0.21	0.21	
$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$3,720.00	
December	January	February	March	April	May	June	
$41,236.71	$41,167.98	$37,122.01	$41,030.87	$39,641.11	$21,958.95	$37,055.18	$21,885.81
$27,094.51	$41,236.71	$41,167.98	$37,122.01	$41,030.87	$39,641.11	$21,958.95	$37,055.18

NB
Note that grazing earns money in the month following the grazing- but the realised or actual cash flow will depend on agreements between the owner and grazer and payments being made in a timely manner.

The July column is outside the budget year (for this property), but has money earned in this year (from June grazing), and paid in the following year.

3.2.7 Deer

The limitations with gross margins discussed elsewhere apply in the deer industry. Some comparisons are provided, with the starting point being evaluation of costs of dry matter used. Calculations are provided below.

Baleage info calculated with help from Beef and Lamb's information, linked provided.					
Bale weight (kg)	700				
	% DM	$/tonne	Price/bale		Price cents/kg DM
at	35	$ 110.00	$ 77.00		31
or	40	$ 110.00	$ 77.00		28
or	45	$ 110.00	$ 77.00		24
	35	$ 120.00	$ 84.00		34
	40	$ 120.00	$ 84.00		30
	45	$ 120.00	$ 84.00		27
	35	$ 130.00	$ 91.00		37
	40	$ 130.00	$ 91.00		33
	45	$ 130.00	$ 91.00		29
Barley	85	$ 260.00			31
	85	$ 260.00			31
	85	$ 260.00			31
Kale	Based on current charges for kale as standing crop				20

Note the particularly challenging price for barley (arable farmer perspective) which may have changed by the time you read this!

Values – Wapiti cross bulls with a meat perspective – approx value $3-4,000. If high velvet genetics that value can rise to $6-10,000.

RED DEER GROSS MARGIN SELLING HYBRID WEANER STAGS AND SURPLUS WEANER HINDS

Capital Stock Wintered:

	No.		Total	SU	Total SU
6 Month Hinds	25 @	$280	$6,930	1.5	37
18 Month Hinds	24 @	$560	$13,444	2	48
M.A. Hinds	165 @	$500	$82,500	2.2	363
Breeding Stags	5 @	$6,000	$28,351	3.5	16.5
	218		$131,225		465

Dollar Investment in deer per stock unit $282.40

Production Parameters:

One stag to how many hinds?	1: 40	
Fawning - survival to sale	85	%
Death rate.	3	%
Rising 2 year hinds entering herd each year	15	% of MA hinds
Days during year when supplementary feeding needed	60	

Surplus weaner hinds and stags sold on the farm

All Breeding stock TB tested every second year

All Prices are GST exclusive – please check all prices

RED DEER GROSS MARGIN SELLING HYBRID WEANER STAGS AND SURPLUS WEANER HINDS

Income: (Net of commission and levies)

Breeding hinds produce how many fawns?				161				
Weaner Stags (58 kg LW)	80	58	@	$5.00	/kg	$23,295		
Weaner Hinds (52 kg LW)	56	52	@	$4.50	/kg	$13,005		
Works Hind (60 kg CW)	25	60	@	$7.80	/kg	$11,583		
Works Stag (85 kg CW)	1	85	@	$7.00	/kg	$595		
							$48,478	
Velvet (6-10 kg/hd)	5	6	@	$120.00	/ kg		$3,402	
Velvet very dependent on quality of stags.								
TOTAL INCOME								**$51,881**

Expenditure:

Sire Stag		1	@	$8,000			$8,000	
Animal Health		218	@	$12.00			$2,622	
Annual vet inspect				$250.00				
Velvet removal		5	@	$6.00			$28	
Freight selling stock to works		26	@	$0.00			$0	
TB Test (some areas, once/2yr)		218	@	$6.00			$1,310.90	
Supplements	60	Days/yr feeding			kg DM/head/day			
Barley	31	c/kg DM			0	$0		
Baleage	30	c/kg DM			0	$0		
Kale	25	c/kg DM			3	$9,832	$9,832	
Straw - not normally fed to deer								

TOTAL DIRECT COSTS	**$21,793**
TOTAL GROSS MARGIN (before interest)	**$30,088**
GROSS MARGIN per dollar invested in deer	**$0.23**
GROSS MARGIN per Stock Unit	**$64.75**

Interest Costs:

Interest on Capital Stock Value:

$131,225	@	7	% interest	$9,185.77

RETURN per Stock Unit (after interest)	$44.98

All Prices are GST exclusive – please check all prices

DEER GROSS MARGIN - VELVET PRODUCTION, RED DEER

Capital Stock Wintered:

		No.		Total	SU	Total SU
Desired total flock	400					
Spikers		65 @	$700	$45,161	1.7	110
Rsg 2 yr Stags		59 @	$850	$50,452	2.3	136.5
Rsg 3 yr Stags		57 @	$950	$53,935	3.0	170
M.A. Stags		219 @	$1,050	$230,323	3.0	658
		400		$379,871		1,075
Dollar Investment in deer per stock unit				$353.51		

Production Parameters:

Cull percentage, on ma stags	15	%
Death rate.	3	%

Velvet yields, ranges and prices are extremely variable. The following yield assumptions have been made for this gross margin.

			Value/kg
Spiker	0.7	kg	Spiker grade
2 yr	2.8	kg	Korean grades
3 yr	3.5	kg	Korean grades
M.A. Stags	5	kg	Korean grades
Percent second cut velvet	30	%	

(Third cut is built into the percent second cut rate)

Days during year when supplementary feeding needed 60 days

Income: (net of commission and levies)

Velvet Price - Grade - $ 110 /kg Super A Grade

Velvet Yields plus the % second cut, with no second cut from spikers

Spiker	63	@	0.7	kg	57	kg	$4,819
2 yr Stags	58	@	2.8	kg	210	kg	$17,733
3 yr Stags	55	@	3.5	kg	251	kg	$21,202
M.A. Stags	213	@	5	kg	1383	kg	$117,026
Total Velvet Sold					**1900**	kg	$160,780
Average weight of velvet / stag					**4.90**	kg/stag	
Cull stags sold	32	@	120	kg	7.00	/kg CW	$26,810

TOTAL INCOME **$187,589**

All Prices are GST exclusive – please check all prices

DEER GROSS MARGIN - VELVET PRODUCTION, RED DEER

EXPENDITURE							
Weaner stags	65	@	$350				$22,581
Velveting by accredited farmer							
Velvet assessment costs - one off fee					$200.00		
1st cut	388	@	$6		$2,328		
2nd cut	116	@	$6		$698		
Animal health	388	@	$15 /hd		$5,820		$9,046
Supplements	60	Days/yr feeding		kg DM/head/day			
Barley	27	c/kg DM		0	$0		
Baleage	30	c/kg DM		0	$0		
Kale	20	c/kg DM		5	$24,000		$24,000
TOTAL DIRECT COSTS							**$55,627**
TOTAL GROSS MARGIN (before interest)							**$131,962**
GROSS MARGIN per dollar invested in deer							**$0.35**
GROSS MARGIN per Stock Unit							**$122.80**

Interest costs:

Interest on Capital Stock Value:				
$379,871	@	7	% interest	$26,591
RETURN per Stock Unit (after interest)				$98.06

All Prices are GST exclusive – please check all prices

3.2.8 Pig Gross Margins

Information kindly provided by Fresh Pork Farms Ltd (Note significant change in profitability between 2014 and this edition).

PIG GROSS MARGIN - WEANER BUYER

Purchase Weaners and Finish - Canterbury

(95% bacon, 5% pork)

Capital Stock:

Weaners	5200	@	$115.00	$598,000

Production Parameters

Mortality rate		
Pork	2	%
Bacon	2.5	%
Carcass Weight		
Pork	55	kg
Bacon	75	kg
Feed used to Pigmeat sold (kg Dwt) (FCR)	2.94	FCR = Feed Conversion Ratio
Meal cost as a percentage of income	36%	
Buying 20kg weaners		
Purchase to Finish 13.4 weeks		Grading Penalty
Pork Schedule	$4.15	-$0.02
Bacon Schedule	$3.75	$0.09

Income

Porkers	255	@	$229.35	$58,438.38
Baconers	4817	@	$274.50	$1,322,129
	5071			

TOTAL INCOME $1,380,568

All Prices are GST exclusive – please check all prices

EXPENDITURE					
Stock purchase (delivered)					
Weaners	5200	@	$115	each	$598,000
Purchased Feed (delivered)					
Grower Diet (t)	598	@	$570	per tonne	$340,860
Finisher Diet (t)	304	@	$510	per tonne	$155,182
	902				$496,042
			Average feed price per tonne		$550
Animal Health		@	$3	per pig	$15,600
R & M		@	$3	per pig	$15,600
Electricity		@	$2	per pig	$10,400
Labour		@	$5	per pig	$26,000
Freight					
-weaners		@	$2	per pig	$10,400
-baconers		@	$4	per pig	$20,285
Sundries		@	$7.47	per pig	$38,844
TOTAL DIRECT COSTS					$1,231,171
TOTAL GROSS MARGIN (before interest)					$149,397
GROSS MARGIN per weaner					$28.73

Gross Margin per Weaner at Various Baconer Prices and Feed Costs

		Bacon price per head ($)		
		218	**275**	**274**
Feed cost per tonne ($)	**522**	-$13.69	$13.18	$40.06
(Average)	**550**	-$24.05	**$28.73**	$29.70
	638	-$34.41	-$7.54	$19.34

Interest Cost:

Interest on Capital Stock Value:					
$598,000	@	11.00%	per annum (13.4 weeks)		$16,951.00
Return per weaner after interest					$25.47

All Prices are GST exclusive – please check all prices

Information kindly provided by Fresh Pork Farms Ltd.

PIG GROSS MARGIN - WEANER PRODUCER

Indoor Sows Selling 20 kg Weaners - Canterbury

Capital Stock:

Sows	200	@	$480.00	
Boars*	7	@	$1,850.00	$108,950

*(in combination with Artificial Insemination)

Production Parameters

Weaners sold per sow per year	26
Sow Replacement rate	45
Boar replacement rate	50
Meal cost as a percentage of income	35%
Litters per sow per year	2.35
Feed/sow/yr (t)	1.30
High health herd (minimal disease)	

INCOME

Weaners at 20 kg	5200	@	$115.00	$598,000
Chopper Sows	70	@	$248.00	$17,360
Chopper Boars	3.5	@	$175.50	$614

TOTAL INCOME $615,974

All Prices are GST exclusive – please check all prices

EXPENDITURE

Replacement breeding stock (delivered)					
Gilts	90	@	$480	each	$43,200
Boars	3.5	@	$1,850	each	$6,475
Purchased Feed (delivered)					
Lactating Diet (t)	117	@	$571.00	per tonne	$66,807
Gestating Diet (t)	143	@	$501.00	per tonne	$71,643
Creep Diet (t)	31	@	$1,044.00	per tonne	$32,573
Weaner Diet (t)	65	@	$705.00	per tonne	$45,825
	356				$216,848
			Average feed price per tonne		$609
Genetic Costs (semen doses)	1000	@	$18.00	per dose	$18,000
Animal Health		@	$50.00	per sow	$10,000
R & M		@	$60.00	per sow	$12,000
Electricity		@	$100.00	per sow	$20,000
Labour		@	$450.00	per sow	$90,000
Sundries		@	$50.00	per sow	$10,000

TOTAL DIRECT COSTS	$426,523
TOTAL GROSS MARGIN (before interest)	$189,451
GROSS MARGIN Per Sow	$947.26
GROSS MARGIN Per Weaner	$36

Gross Margin per Sow at Various Weaner Prices and Feed Costs

		Weaner price per head $		
		95	**100**	**105**
Feed cost per tonne ($)	**556**	$345.10	$465.10	$585.10
(Average)	**618**	$237.37	**$947.26**	$477.37
	679	$129.64	$249.64	$369.64

Interest Cost:

Interest on Capital Stock Value					
$108,950	@	11.00%	per annum (13.4 weeks)		$3,088.31
Return per sow after interest					$931.82

All Prices are GST exclusive – please check all prices

3.3 CROP GROSS MARGINS AND ASSOCIATED FINANCIAL ANALYSIS

The following gross margins relate to an intensive cropping farm in Canterbury, on a medium soil type. Gross margins are a start to financial analysis. There are other analyses to assist in developing thoroughly profitable operations.

Profitability has a new bedfellow – called environmental management – best practice. Some will argue this has always been the case. It may have been, but most farmers need to be more aware of the complexities around yield, caring for the environment and profitability.

Take care when interpreting the Gross Margins in this section, as estimates of both yield and costs will differ according to each farm.

Various organisations eg FAR and IAGRI produce tools for farmer analysis. Online systems tend to hide the calculations – for ease of use. Particularly for the students who will use this manual, we have provided excel output with the actual spreadsheets available at www.aginfo.lincoln.ac.nz. The worksheets are linked so that key inputs – eg tractors, irrigation, chemicals and fertiliser costs are changed once in preliminary worksheets and a gross margin uses those key items as needed.

3.3.1 Foundation for Arable Research

The editors of this manual are convinced of the value of the industry having an independent research and advisory body working on behalf of arable farmers. The ProductionWise on-line system, managed by FAR, not only provides useful information for farmers individually, but the database is able to be analysed across farms to provide useful comparisons and more robust advice.

FAR have very kindly provided Gross margins for the cropping component of this section. These gross margins add a very useful timeliness component, assisting the reader with any cash flow budgeting they may need to do.

Please remember that a static screen shot does not do justice to the power of ProductionWise. All growers paying a levy with FAR have access to their software and that allows sensitivity analysis and reporting for traceability purposes.

3.3.2 iAgri and MINDA

The team at iAgri have spent years both farming and teaching at Lincoln University. Their tools allow gross margins to be created and the gross margins then contribute directly to a whole farm budget. Drag and drop features, smart phone apps and integration with MYOB and XERO make theirs a worthwhile contribution, particularly for cropping, beef and sheep farmers.

MINDA may well be the product of choice for the dairy industry, providing many specific tools for analysis and management.

3.3.3 Tractor costs/assumptions

Tractor costs were previously calculated by the editors – they are now built into the assumptions and Gross Margins kindly provided by Foundation for Arable Research.

3.3.4 Irrigation calculations

Irrigation is expensive. For example, Central Plains Water in Canterbury is likely to be sold to farmers at $650/ha (per year) following approx. $1850/ha joining fee. Note those joining that scheme have many other additional costs to factor in to their farm budgets.

Farmers can't just consider irrigation costs as though irrigation has no other effects other than increasing yield and fertiliser demands. There is a game changer in the form of limits on pollution (nitrate losses) set by regional councils and in most instances determined by the Overseer Model.

1 mm = 1 litre/m² and there are 10,000 m² in a ha, so 1 mm irrigation (or rainfall) = 10,000 litres (10 cu m; 10 tonne of water) on each ha

There is therefore underlying complexity that each farmer must consider. Presently there are many unknowns around the productivity that will be allowed, given that highly productive, irrigated systems tend to pollute more / leach more nitrogen. To get started with analysis we must put those considerations aside and establish what we do know. Putting some considerations aside does not minimise those issues. They are game changers, but the starting point in analysis is to gain clarity around what can be made clear.

Firstly, direct costs of irrigating. The costs tend to be in two parts – the electricity required to run pumps on a daily and night/weekend basis AND the pump capacity charges that apply. Please note that costs associated with wells and set up are not included – so profitability is being overstated. These too will change for the farmers on irrigation schemes were gravity will provide pressure in pipe lines, dramatically reducing the present costs of pumping water. There is some good news in this story!

Options for purchase of electricity have recently changed. In the past some contracts were available without a pump capacity charge. Now, the key element for farmers wishing to make their dollars go as far as possible is to realise the value of irrigating at night and weekends.

If a farmer's irrigation is 80% at night/weekends (and they pay a flat fee for pump capacity charge) their cost is $1.20/mm/ha. However if they are only able to water 50% of the time in night/weekend rates the cost rises to $1.43. (Refer tables below).

Note these costs are based on the table below – none of the key and very large set up costs are included, so it is clear that farmers are paying well in excess of the costs stated here. Indeed in the gross margins, kindly supplied by FAR, their estimate of irrigation cost is $2.15 per mm, which is likely to include fixed costs. What these calculations show is how seasonal costs can be reduced by careful management of contracts.

Costs of pumping and effect of day and night rates

Baseline information for calculations

Baseline expected irrigation for season (mm)		**200**	mm
Pump capacity	Pump power rating (kW)	**120**	kW
	Pumping capacity (l/s)	**60**	l/sec
Irrigation season	Start date	1/10/2016	Days
	End date	31/03/2017	**182**
			(ha)
Irrigated area	Pivot length ie radius (m)	700m	153.9
	Amount in tracks/not cropped (%)	4%	6.2
	Net area of crop irrigated (ha)		**147.8**

Electricity costs belong in four categories:-			Irrigation costs	
1	Company A	Night/Wkend (c/unit)	8.89	c/unit
2	Plus Network charges	Night/Wkend (c/unit)	1.31	c/unit
3	And Company A	Day (c/unit)	10.88	c/unit
4	Plus Network charges	Day (c/unit)	9.59	c/unit
		Total for Night Weekend (c/unit)	**10.2**	c/unit
		Total for Day (c/unit)	**20.5**	c/unit
		% of pumping at Night-Weekend rate	**60%**	
		Pump capacity charge ($/kW/day)	**0.59**	

Irrigation Cost Calculation

Irrigation rate- time to put one mm on one ha

Time to apply 1mm to 1 ha ie 10m^3 (minutes)	2.78	
Variable power cost		
Cost ($/unit) based on % night & day rates chosen	$0.14	
Variable cost ($/mm/ha)		**$0.79**
Capacity charge ($/mm/ha)		
Capacity charge for season for this pump 120 kW	$12,938	
Capacity charge - $/mm/ha		**$0.44**
Total cost ($/mm/ha)		**$1.23**

(NB - none of the installation costs, consents etc included in costs)

Cost for irrigation - 148 ha, 200 mm **$36,432**

From the spreadsheet above the table below can be produced, showing that for a fortunate irrigator with plenty of pump capacity, $5000 can be saved by moving from 50% pumping at night and weekend rates to 80% of pumping done at night and weekend rates- for one pivot over the season, delivering 200 mm water to 148 ha.

Percent of pumping done at night/weekend rates	$/mm/ha	$/season per pivot (148 ha)	Savings as more irrigation is done in night/weekends (50% as base line)
50	$1.29	$38,118	0
60	$1.23	$36,432	$1686
70	$1.18	$34,745	$3373
80	$1.12	$33,059	$5059

3.3.5 Wheat

The Foundation for Arable Research has results of independent research and a number of fact sheets available.
Refer for example –
http://www.far.org.nz/mm_uploads/C196_Disease_Control_in_Cereals_Using_SDHI_Fungicides.pdf
and http://www.far.org.nz/mm_uploads/FAR_strategy_issue_3_cereal_fungicide.pdf for information and photos provided by FAR researchers relating to appropriate/best choice fungicides in a range of winter and spring barley and wheat crops. The research results are focused on providing growers with economic analysis of treatments chosen. They provide advice in clear and straight forward terms – if that is ever possible given vagaries of climate, soil and plant responses!

Gross Margin Analysis for Wheat								
Crop	Starfire (KWW46) Wheat	**Start Date**	1/03/2015					
Sowing Area	1.00 ha	**End Date**	10/02/2016					
Income	**Date Occurred**	**Yield**	**Yield Source**		**Price**	**Per ha**	**Area (ha)**	**Total**
Grain Harvest	10/02/2016	11.50 t/ha	My Paddocks		$289.00 /t	$3,323.50	1.00	$3,323.50
Forage Harvest		0.00 t/ha			$0.00 /t	$0.00	1.00	$0.00
Grazing		0.00 lwt kg/ha			$0.00 /lwt kg	$0.00	1.00	$0.00
Operation	**Date Occurred**				**Performed By**	**Cost Per ha**	**Area (ha)**	**Total Cost**
Cultivation	1/03/2015					$75.00	1.00	$75.00
Spraying	20/03/2015					$20.00	1.00	$20.00
Cultivation	25/03/2015					$35.00	1.00	$35.00
Cultivation	30/03/2015					$35.00	1.00	$35.00
Sowing	17/04/2015					$50.00	1.00	$50.00
Spraying	24/04/2015					$20.00	1.00	$20.00
Spraying	7/06/2015					$20.00	1.00	$20.00
Fertiliser Application	20/08/2015					$15.00	1.00	$15.00
Spraying	28/08/2015					$20.00	1.00	$20.00
Fertiliser Application	8/10/2015					$15.00	1.00	$15.00
Spraying	9/10/2015					$20.00	1.00	$20.00
Fertiliser Application	8/11/2015					$15.00	1.00	$15.00
Spraying	9/11/2015					$20.00	1.00	$20.00
Spraying	10/12/2015					$20.00	1.00	$20.00
Grain Harvest	10/02/2016					$250.00	1.00	$250.00

Input	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Adjuvant	20/03/2015	Pulse Penetrant	0.15	L/ha	$26.91	$4.04	1.00	$4.04
Herbicide	20/03/2015	Roundup Transor	3	L/ha	$16.10	$48.30	1.00	$48.30
Seed	17/04/2015	Starfire (KWW46	110	kg/ha	$1.20	$132.00	1.00	$132.00
Herbicide	24/04/2015	Firebird	0.5	L/ha	$5.00	$2.50	1.00	$2.50
Herbicide	7/06/2015	Trimec	3.5	L/ha	$14.00	$49.00	1.00	$49.00
Insecticide	7/06/2015	Karate Zeon	40	mL/h	$0.30	$12.00	1.00	$12.00
Fertiliser	20/08/2015	Sulphate of Amn	150	kg/ha	$0.86	$129.00	1.00	$129.00
Herbicide	28/08/2015	Simplicity	0.5	L/ha	$100.00	$50.00	1.00	$50.00
Insecticide	28/08/2015	Transform	100	mL/h	$0.30	$30.00	1.00	$30.00
Fertiliser	8/10/2015	Urea	300	kg/ha	$0.60	$180.00	1.00	$180.00
Fungicide	9/10/2015	Opus	1	L/ha	$38.08	$38.08	1.00	$38.08
Growth Regulator	9/10/2015	Moddus	0.2	L/ha	$105.62	$21.12	1.00	$21.12
Growth Regulator	9/10/2015	Cycocel 750	1	L/ha	$9.00	$9.00	1.00	$9.00
Irrigation	1/11/2015	Water	35	mm/h	$2.15	$75.25	1.00	$75.25
Fertiliser	8/11/2015	Urea	150	kg/ha	$0.60	$90.00	1.00	$90.00
Fungicide	9/11/2015	Aviator Xpro	1	L/ha	$125.00	$125.00	1.00	$125.00
Irrigation	27/11/2015	Water	35	mm/h	$2.15	$75.25	1.00	$75.25
Fungicide	10/12/2015	Opus	0.5	L/ha	$55.48	$27.74	1.00	$27.74
Fungicide	10/12/2015	Comet	0.4	L/ha	$28.60	$11.44	1.00	$11.44
Irrigation	12/12/2015	Water	35	mm/h	$2.15	$75.25	1.00	$75.25
Irrigation	22/12/2015	Water	50	mm/h	$2.15	$107.50	1.00	$107.50
Irrigation	12/01/2016	Water	50	mm/h	$2.15	$107.50	1.00	$107.50

No Miscellaneous								
						Per ha	Area (ha)	Total
					Total Income	$3,323.50	1.00	$3,323.50
					Cost of Production	$2,029.97	1.00	$2,029.97
					Gross Margin	$1,293.53	1.00	$1,293.53

3.3.6 Barley

With the current downturn in dairy and other factors, barley prices are looking particularly unattractive to growers.

Gross Margin Analysis for Barley							
Crop	Sanette Barley	**Start Date**	14/09/2015				
Sowing Area	1.00 ha	**End Date**	8/02/2016				
Income	**Date Occurred**	**Yield**	**Yield Source**	**Price**	**Per ha**	**Area (ha)**	**Total**
Grain Harvest	8/02/2016	9.50 t/ha	My Paddocks	$267.00 /t	$2,536.50	1.00	$2,536.50
Forage Harvest	8/02/2016	1.80 t/ha	My Paddocks	$116.00 /t	$208.80	1.00	$208.80
Operation	**Date Occurred**			**Performed By**	**Cost Per ha**	**Area (ha)**	**Total Cost**
Cultivation-Heavy Cultivation	14/09/2015				$75.00	1.00	$75.00
Cultivation-Light Cultivation	18/09/2015				$35.00	1.00	$35.00
Sowing-Disc Seeder	20/09/2015				$75.00	1.00	$75.00
Fertiliser Application	13/10/2015				$15.00	1.00	$15.00
Spraying	26/10/2015				$20.00	1.00	$20.00
Fertiliser Application	11/11/2015				$15.00	1.00	$15.00
Spraying	13/11/2015				$20.00	1.00	$20.00
Spraying	28/11/2015				$20.00	1.00	$20.00
Grain Harvest-Conventional Harvester	8/02/2016				$250.00	1.00	$250.00
Forage Harvest-Large Square Baler	8/02/2016				$105.00	1.00	$105.00

Input	**Date Occurred**	**Product**	**Rate/ha**	**Unit**	**Cost Per Unit**	**Cost Per ha**	**Area (ha)**	**Total Cost**
		Sulphur Gain						
Fertiliser	20/09/2015	20S	350	kg/ha	$0.35	$122.15	1.00	$122.15
Seed	20/09/2015	Sanette	125	kg/ha	$1.18	$147.50	1.00	$147.50
Fertiliser	13/10/2015	Urea	130	kg/ha	$0.60	$78.00	1.00	$78.00
Herbicide	26/10/2015	Starane	0.6	L/ha	$46.00	$27.60	1.00	$27.60
Herbicide	26/10/2015	Trimec	2.75	L/ha	$14.00	$38.50	1.00	$38.50
Insecticide	26/10/2015	Mavrik Aquaflo	100	mL/ha	$0.15	$14.50	1.00	$14.50
Fertiliser	11/11/2015	Urea	80	kg/ha	$0.60	$48.00	1.00	$48.00
Irrigation	11/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	13/11/2015	Delaro	300	mL/ha	$0.12	$36.00	1.00	$36.00
Irrigation	26/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	28/11/2015	Proline	0.4	L/ha	$128.00	$51.20	1.00	$51.20
Fungicide	28/11/2015	Acanto	0.35	L/ha	$131.00	$45.85	1.00	$45.85
Growth Regulator	28/11/2015	Terpal	0.7	L/ha	$55.63	$38.94	1.00	$38.94
Irrigation	11/12/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	26/12/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	10/01/2016	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00

No Miscellaneous								
						Per ha	**Area (ha)**	**Total**
					Total Income	$2,745.30	1.00	$2,745.30
					Cost of Production	$1,708.24	1.00	$1,708.24
					Gross Margin	$1,037.06	1.00	$1,037.06

All Prices are GST exclusive – please check all prices

Information kindly provided by Foundation for Arable Research

FAR disclaimer at start of section refers to this and all crop gross margins.

3.3.7 White clover

Remember there will be residual N of value to the farming system (but may impact N losses estimated by Overseer).

Gross Margin Analysis for White Clover Seed							
Crop	Grasslands Bounty White Clover	Start Date	20/02/2015				
Sowing Area	1.00 ha	End Date	10/02/2016				
Income	Date Occurred	Yield	Yield Source		Price	Per ha	Area (ha)	Total
Grain Harvest	10/02/2016	0.70 t/ha	My Paddocks		$5400.00 /t	$3,780.00	1	$3,780.00
Forage Harvest		0.00 t/ha			$0.00 /t	$0.00	1	$0.00
Grazing		0.00 lwt kg/ha			$0.00 /lwt kg	$0.00	1	$0.00
Operation	Date Occurred					Cost Per ha	Area (ha)	Total Cost
Cultivation - Light Cultivation	20/02/2015					$35.00	1	$35.00
Cultivation - Light Cultivation	25/02/2015					$35.00	1	$35.00
Sowing - Disc Seeder	6/03/2015					$75.00	1	$75.00
Spraying	7/03/2015					$20.00	1	$20.00
Spraying	15/04/2015					$20.00	1	$20.00
Spraying	21/05/2015					$20.00	1	$20.00
Spraying	5/07/2015					$20.00	1	$20.00
Spraying	8/09/2015					$95.00	1	$95.00
Spraying	21/12/2015					$20.00	1	$20.00
Spraying	1/02/2016					$20.00	1	$20.00
Spraying	5/02/2016					$20.00	1	$20.00
Grain Harvest - Conventional Harvester	10/02/2016					$250.00	1	$250.00

Input	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Seed	6/03/2015	Grasslands Bounty	3	kg/ha	$15.00	$45.00	1	$45.00
Adjuvant	7/03/2015	Pulse Penetrant	0.15	L/ha	$26.91	$4.04	1	$4.04
Herbicide	7/03/2015	Roundup Ultra Max	2	L/ha	$9.50	$19.00	1	$19.00
Adjuvant	15/04/2015	Uptake Spraying Oil	1	L/ha	$12.87	$12.87	1	$12.87
Herbicide	15/04/2015	Preside	50	g/ha	$0.50	$25.10	1	$25.10
Herbicide	21/05/2015	Jaguar	1.5	L/ha	$36.00	$54.00	1	$54.00
Herbicide	5/07/2015	Kerb 500F	2	L/ha	$88.00	$176.00	1	$176.00
Herbicide	8/09/2015	Vixen	4	L/ha	$33.00	$132.00	1	$132.00
Irrigation	15/10/2015	Water	40	mm/ha	$2.15	$86.00	1	$86.00
Irrigation	15/11/2015	Water	40	mm/ha	$2.15	$86.00	1	$86.00
Irrigation	15/12/2015	Water	40	mm/ha	$2.15	$86.00	1	$86.00
Insecticide	21/12/2015	Karate Zeon	40	mL/ha	$0.35	$13.84	1	$13.84
Irrigation	11/01/2016	Water	30	mm/ha	$2.15	$64.50	1	$64.50
Herbicide	1/02/2016	Reglone	3	L/ha	$23.00	$69.00	1	$69.00
Herbicide	5/02/2016	Reglone	3	L/ha	$23.00	$69.00	1	$69.00
Miscellaneous						Cost Per ha	Area (ha)	Total Cost
Beehives						$200.00	1	$200.00
Seed Processing ($0.38/kg)						$266.00	1	$266.00
Freight ($60/t)						$42.00	1	$42.00
						Per ha	Area (ha)	Total
					Total Income	$3,780.00	1	$3,780.00
					Cost of Production	$2,080.34	1	$2,080.34
					Gross Margin	$1,699.66	1	$1,699.66

3.3.8 Perennial Ryegrass as a seed crop

FAR are in the process of enhancing the manner in which ProductionWise manages grazing animals in their gross margins. Note that at the date of printing, grazing is a total value, entered as that value – in this case $600 worth of grazing is estimated to arise from this crop.
That grazing value is important! There are substantial costs involved in growing perennial ryegrass and substantial risk at harvest, particularly as wet and or windy weather can knock out a lot of seed.
Damp weather at harvest can make it very hard to pick up after windrowing (cutting), as the crop will grow green leaf straight after cutting that will interfere with heading.

Gross Margin Analysis for Perennial Ryegrass Seed							
Crop	Grasslands Nui Perennial Ryegrass	Start Date	8/03/2015				
Sowing Area	1.00 ha	End Date	4/02/2016				
Income	**Date Occurred**	**Yield**	**Yield Source**	**Price**	**Per ha**	**Area (ha)**	**Total**
Grain Harvest	8/01/2016	2.00 t/ha	My Paddocks	$1900.00 /t	$3,800.00	1.00	$3,800.00
Forage Harvest	9/01/2016	3.60 t/ha	My Paddocks	$66.66 /t	$239.98	1.00	$239.98
Grazing		1.00 lwt kg/ha	User Defined	$600.00 /lwt kg	$600.00	1.00	$600.00
Operation	**Date Occurred**				**Cost Per ha**	**Area (ha)**	**Total Cost**
Cultivation - Light Cultivation	8/03/2015				$35.00	1.00	$35.00
Cultivation - Light Cultivation	11/03/2015				$35.00	1.00	$35.00
Sowing - Disc Seeder	3/04/2015				$75.00	1.00	$75.00
Spraying	5/04/2015				$20.00	1.00	$20.00
Fertiliser Application	6/04/2015				$15.00	1.00	$15.00
Grazing (Cost Covered by Labour)	25/05/2015				$0.00	1.00	$0.00
Spraying	17/06/2015				$20.00	1.00	$20.00
Spraying	8/07/2015				$20.00	1.00	$20.00
Fertiliser Application	12/08/2015				$15.00	1.00	$15.00
Cultivation - Heavy Roll	30/08/2015				$40.00	1.00	$40.00
Grazing (Cost Covered by Labour)	13/09/2015				$0.00	1.00	$0.00
Fertiliser Application	5/10/2015				$15.00	1.00	$15.00
Spraying	3/11/2015				$20.00	1.00	$20.00
Fertiliser Application	5/11/2015				$15.00	1.00	$15.00
Spraying	2/12/2015				$20.00	1.00	$20.00
Spraying	18/12/2015				$20.00	1.00	$20.00
Cutting - Mower	3/01/2016				$35.00	1.00	$35.00
Grain Harvest - Conventional Harvester	8/01/2016				$250.00	1.00	$250.00
Forage Harvest - Large Square Baler	9/01/2016				$180.00	1.00	$180.00
Fertiliser Application	11/01/2016				$15.00	1.00	$15.00
Grazing (Cost Covered by Labour)	4/02/2016				$0.00	1.00	$0.00

Input	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Seed	3/04/2015	Grasslands Nui	8	kg/ha	$12.00	$96.00	1.00	$96.00
Adjuvant	5/04/2015	Pulse Penetrant	0.15	L/ha	$26.91	$4.04	1.00	$4.04
Herbicide	5/04/2015	Roundup Ultra Max	2	L/ha	$9.50	$19.00	1.00	$19.00
Herbicide	5/04/2015	Nortron	2	L/ha	$29.26	$58.52	1.00	$58.52
Fertiliser	6/04/2015	Cropmaster 20	100	kg/ha	$0.85	$85.00	1.00	$85.00
Herbicide	17/06/2015	Jaguar	1.5	L/ha	$36.00	$54.00	1.00	$54.00
Herbicide	8/07/2015	Puma S	0.75	L/ha	$72.87	$54.65	1.00	$54.65
Fertiliser	12/08/2015	Urea	100	kg/ha	$0.60	$60.00	1.00	$60.00
Fertiliser	5/10/2015	Urea	125	kg/ha	$0.60	$75.00	1.00	$75.00
Irrigation	12/10/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	23/10/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	3/11/2015	Opus	0.5	L/ha	$38.17	$19.09	1.00	$19.09
Growth Regulator	3/11/2015	Moddus	1.6	L/ha	$105.62	$168.99	1.00	$168.99
Fertiliser	5/11/2015	Urea	125	kg/ha	$0.60	$75.00	1.00	$75.00
Irrigation	9/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	20/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	2/12/2015	Proline	0.4	L/ha	$128.00	$51.20	1.00	$51.20
Fungicide	2/12/2015	Protek	0.5	L/ha	$18.19	$9.10	1.00	$9.10
Fungicide	2/12/2015	Seguris Flexi	0.6	L/ha	$95.60	$57.36	1.00	$57.36
Irrigation	4/12/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	16/12/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	18/12/2015	Protek	0.5	L/ha	$18.19	$9.10	1.00	$9.10
Fertiliser	11/01/2016	Urea	100	kg/ha	$0.60	$60.00	1.00	$60.00
Irrigation	12/01/2016	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00

Miscellaneous	Cost Per ha	Area (ha)	Total Cost
Seed Processing ($0.30/kg)	$600.00	1.00	$600.00
Freight ($60/t)	$120.00	1.00	$120.00

	Per ha	Area (ha)	Total
Total Income	$4,639.98	1.00	$4,639.98
Cost of Production	$3,123.04	1.00	$3,123.04
Gross Margin	$1,516.94	1.00	$1,516.94

All Prices are GST exclusive – please check all prices

Information kindly provided by Foundation for Arable Research

FAR disclaimer at start of section refers to this and all crop gross margins.

3.3.9 Field Peas

Peas enhance soil fertility. This is the case with both peas harvested as dry seed (field peas) and those harvested as vining peas (when the seed is ready for human consumption as a freezer or vining pea).
However when dry about 85% of the nitrogen held in the crop is removed as seed, whereas only 50% is harvested and removed from a vining pea crop.

This means there are substantial, unquantified gains in soil fertility to be had when harvesting peas as vining crops.

The vining crops are harvested some weeks earlier, allowing the possibility of establishment of autumn feed for livestock or a late (watch frost!) barley crop for example.

Gross Margin Analysis for Field Peas

Crop	Canty 14 Pea	**Start Date**	11/09/2015					
Sowing Area	1.00 ha	**End Date**	13/02/2016					
Income	**Date Occurred**	**Yield**	**Yield Source**		**Price**	**Per ha**	**Area (ha)**	**Total**
Grain Harvest	10/02/2016	3.00 t/ha	My Paddocks		$960.00 /t	$2,880.00	1.00	$2,880.00
Forage Harvest	13/02/2016	1.50 t/ha	My Paddocks		$233.00 /t	$349.50	1.00	$349.50
Operation	**Date Occurred**					**Cost Per ha**	**Area (ha)**	**Total Cost**
Cultivation - Heavy Cultivation	11/09/2015					$75.00	1.00	$75.00
Cultivation - Heavy Cultivation	24/09/2015					$75.00	1.00	$75.00
Cultivation - Light Cultivation	28/09/2015					$35.00	1.00	$35.00
Sowing - Disc Seeder	5/10/2015					$75.00	1.00	$75.00
Spraying	12/10/2015					$20.00	1.00	$20.00
Spraying	6/11/2015					$20.00	1.00	$20.00
Spraying	8/12/2015					$20.00	1.00	$20.00
Grain Harvest - Pea Harvester	10/02/2016					$270.00	1.00	$270.00
Forage Harvest - Large Square Baler	13/02/2016					$150.00	1.00	$150.00
Input	**Date Occurred**	**Product**	**Rate/ha**	**Unit**	**Cost Per Unit**	**Cost Per ha**	**Area (ha)**	**Total Cost**
Seed	5/10/2015	Canty 14	250	kg/ha	$1.72	$430.00	1.00	$430.00
Herbicide	12/10/2015	Terb 500	2	L/ha	$10.39	$20.78	1.00	$20.78
Herbicide	6/11/2015	MCPB	3	L/ha	$14.00	$42.00	1.00	$42.00
Irrigation	11/11/2015	Water	30	mm/ha	$2.15	$64.50	1.00	$64.50
Fungicide	8/12/2015	Kocide Opti	500	g/ha	$0.05	$23.95	1.00	$23.95
Fungicide	8/12/2015	Tazer	400	mL/ha	$0.05	$21.80	1.00	$21.80
Insecticide	8/12/2015	Karate Zeon	40	mL/ha	$0.35	$13.84	1.00	$13.84
Irrigation	15/12/2015	Water	30	mm/ha	$2.15	$64.50	1.00	$64.50
Irrigation	13/01/2016	Water	30	mm/ha	$2.15	$64.50	1.00	$64.50
Miscellaneous						**Cost Per ha**	**Area (ha)**	**Total Cost**
Freight ($60/t)						$180.00	1.00	$180.00
						Per ha	Area (ha)	Total
					Total Income	$3,229.50	1.00	$3,229.50
					Cost of Production	$1,665.87	1.00	$1,665.87
					Gross Margin	$1,563.63	1.00	$1,563.63

3.3.10 Vining Peas

Gross Margin Analysis for Vining Peas								
Crop	Sherwood Pea	**Start Date**	14/07/2015					
Sowing Area	1.00 ha	**End Date**	30/11/2015					
Income	**Date Occurred**	**Yield**	**Yield Source**		**Price**	**Per ha**	**Area (ha)**	**Total**
Grain Harvest	26/11/2015	1.00 t/ha	My Paddocks		$2591.00 /t	$2,591.00	1.00	$2,591.00
Forage Harvest	30/11/2015	3.00 t/ha	My Paddocks		$125.00 /t	$375.00	1.00	$375.00
Grazing		0.00 lwt kg/ha			$0.00 /lwt kg	$0.00	1.00	$0.00
Operation	**Date Occurred**				**Performed By**	**Cost Per ha**	**Area (ha)**	**Total Cost**
Cultivation	14/07/2015					$75.00	1.00	$75.00
Cultivation	23/07/2015					$35.00	1.00	$35.00
Sowing	27/07/2015					$125.00	1.00	$125.00
Spraying	6/08/2015					$20.00	1.00	$20.00
Spraying	10/10/2015					$20.00	1.00	$20.00
Grain Harvest (included in contract price)	26/11/2015					$0.00	1.00	$0.00
Raking	29/11/2015					$20.00	1.00	$20.00
Forage Harvest	30/11/2015					$75.00	1.00	$75.00
Input	**Date Occurred**	**Product**	**Rate/ha**	**Unit**	**Cost Per Unit**	**Cost Per ha**	**Area (ha)**	**Total Cost**
Seed	27/07/2015	Sherwood	295	kg/ha	$2.17	$640.15	1.00	$640.15
Fertiliser	6/08/2015	Sodium Molybdate	0.15	kg/ha	$44.00	$6.60	1.00	$6.60
Herbicide	6/08/2015	Terb 500	2	L/ha	$10.39	$20.78	1.00	$20.78
Herbicide	10/10/2015	Tropotox Plus	3.5	L/ha	$12.40	$43.40	1.00	$43.40
Irrigation	12/10/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	25/10/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	8/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	21/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
						Per ha	**Area (ha)**	**Total**
					Total Income	$2,966.00	1.00	$2,966.00
					Cost of Production	$1,424.93	1.00	$1,424.93
					Gross Margin	$1,541.07	1.00	$1,541.07

Notes from Foundation for Arable Research- water use in peas

Any water stress reduced yield in the marrowfat peas and the best yields and returns were obtained by applying the maximum applied of almost 380 mm. Note at these water rates, the potential for loss of nutrient to ground water increases, but given that FAR have shown little yield response to fertiliser, it would be advisable for growers to increase water and decrease fertiliser use – in peas. Increasing water will increase disease problems – there's that complexity and need for careful husbandry again. These are just some of the complexities farmers face in each of the crops they grow. Tools in this section start a process of establishing base level profitability and choice – then further analysis will be required.

Table 12. Influence of irrigation treatments on yield in a marrowfat pea trial (f = weeks of full irrigation, n = weeks of no irrigation) and the resulting return per ha assuming two costs per mm of water applied (Value of seed $1000/t)

Trt	Increased yield over nil irrigation (t/ha)	Extra value of seed ($/ha)	Water applied mm	Return over cost of water applied ($/ha)		Kg/seed per mm water applied
				$1.50/mm	$2.00/mm	
3f+9n	0.58	580	108	418	364	5.4
9f+3n	0.94	940	248	568	444	3.8
3n+9f	0.93	930	216	606	488	4.3
9n+3f	0.51	510	84	384	342	6.1
Full	1.18	1180	379	611	422	3.1

http://www.far.org.nz/mm_uploads/Making_Peas_Pay_final_191213.pdf

COST:BENEFIT

Assess the cost:benefit by estimating (a) the cost per mm of irrigation (including infrastructure and operating costs) and (b) the value per kg of extra yield, then (c) look up the economic return value in Table 13. The values in the table were calculated assuming a 50mm application per irrigation. The economic return is more likely to be positive when the cost of irrigation is lower, for a crop with higher yield potential and / or higher seed value. Therefore priority should be given to crops with high seed yield and / or value as economic returns from irrigating are higher.

Table 13. Economic return ($ / ha) from a 50mm irrigation

Potential Yield (t/ha)	Irrigation Cost ($/mm)	Seed value ($/t)			
		400	600	800	1000
3.0	1.50	57	123	189	255
	2.00	32	98	164	230
	3.00	**-18**	48	114	180
	4.00	**-68**	**-2**	64	130
4.0	1.50	101	189	277	321
	2.00	76	164	252	340
	3.00	26	114	202	290
	4.00	**-24**	64	152	240
5.0	1.50	145	255	365	475
	2.00	120	230	340	450
	3.00	70	180	290	400
	4.00	20	130	240	350

Source - http://www.far.org.nz/mm_uploads/Making_Peas_Pay_final_191213.pdf

3.3.11 Oil Seed Rape (cv Visitive)

Gross Margin Analysis for Oil-Seed Rape								
Crop	Vistive Oil Seed Rape	Start Date	13/03/2015					
Sowing Area	1.00 ha	End Date	20/02/2016					
Income	**Date Occurred**	**Yield**	**Yield Source**		**Price**	**Per ha**	**Area (ha)**	**Total**
Grain Harvest	20/02/2016	4.50 t/ha	My Paddocks		$650.00 /t	$2,925.00	1	$2,925.00
Operation	**Date Occurred**					**Cost Per ha**	**Area (ha)**	**Total Cost**
Spraying	13/03/2015					$30.00	1.00	$30.00
Cultivation - Heavy Cultivation	20/03/2015					$75.00	1.00	$75.00
Sowing - Airseeder	24/03/2015					$120.00	1.00	$120.00
Spraying	9/05/2015					$20.00	1.00	$20.00
Spraying	12/05/2015					$30.00	1.00	$30.00
Fertiliser Application	31/05/2015					$15.00	1.00	$15.00
Spraying	20/06/2015					$30.00	1.00	$30.00
Fertiliser Application	4/08/2015					$15.00	1.00	$15.00
Fertiliser Application	14/08/2015					$15.00	1.00	$15.00
Fertiliser Application	7/09/2015					$30.00	1.00	$30.00
Spraying	18/09/2015					$30.00	1.00	$30.00
Spraying	18/09/2015					$30.00	1.00	$30.00
Fertiliser Application	1/10/2015					$15.00	1.00	$15.00
Fertiliser Application	7/10/2015					$15.00	1.00	$15.00
Spraying	8/10/2015					$30.00	1.00	$30.00
Spraying	27/10/2015					$30.00	1.00	$30.00
Spraying	30/12/2015					$45.00	1.00	$45.00
Grain Harvest - Conventional Harvester	20/02/2016					$250.00	1.00	$250.00

Input	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Herbicide	13/03/2015	Treflan Nf	2	L/ha	$11.00	$22.00	1.00	$22.00
Herbicide	13/03/2015	Magister Cs	0.3	L/ha	$125.04	$37.51	1.00	$37.51
Seed	24/03/2015	Vistive	2	kg/ha	$35.00	$70.00	1.00	$70.00
Seed Treatment	24/03/2015	Gaucho	0	L/ha	$0.00	$0.00	1.00	$0.00
Molluscicide	9/05/2015	Slug Out	5	kg/ha	$5.40	$27.00	1.00	$27.00
Adjuvant	12/05/2015	Agpro Crop Oil	1	L/ha	$12.13	$12.13	1.00	$12.13
Herbicide	12/05/2015	Gallant Ultra	0.25	L/ha	$222.43	$55.61	1.00	$55.61
Fertiliser	31/05/2015	Urea	90	kg/ha	$0.60	$54.00	1.00	$54.00
Herbicide	20/06/2015	Polka	2	L/ha	$67.00	$134.00	1.00	$134.00
Fertiliser	4/08/2015	Muriate of Potash	150	kg/ha	$0.68	$101.25	1.00	$101.25
Fertiliser	14/08/2015	Ammo 31	150	kg/ha	$0.58	$87.00	1.00	$87.00
Fertiliser	7/09/2015	Ammo 31	150	kg/ha	$0.58	$87.00	1.00	$87.00
Fungicide	18/09/2015	Folicur 430Sc	0.6	L/ha	$40.00	$24.00	1.00	$24.00
Fertiliser	18/09/2015	Molybor SL	1.5	L/ha	$14.00	$21.00	1.00	$21.00
Fertiliser	1/10/2015	Urea	150	kg/ha	$0.60	$90.00	1.00	$90.00
Fertiliser	7/10/2015	Urea	130	kg/ha	$0.60	$78.00	1.00	$78.00
Fertiliser	8/10/2015	Molybor SL	1.5	L/ha	$14.00	$21.00	1.00	$21.00
Fungicide	8/10/2015	Folicur 430Sc	0.5	L/ha	$40.00	$20.00	1.00	$20.00
Insecticide	8/10/2015	Pirimor 50	0.15	kg/ha	$64.17	$9.63	1.00	$9.63
Fungicide	27/10/2015	Prosaro	1	L/ha	$69.51	$69.51	1.00	$69.51
Insecticide	27/10/2015	Mavrik Aquaflo	100	mL/ha	$0.15	$15.00	1.00	$15.00
Adjuvant	30/12/2015	Agpro Crop Oil	1	L/ha	$12.13	$12.13	1.00	$12.13
Herbicide	30/12/2015	Roundup Ultra Max	2	L/ha	$9.50	$19.00	1.00	$19.00
						Per ha	**Area (ha)**	**Total**
					Total Income	$2,925.00	1.00	$2,925.00
					Cost of Production	$1,891.77	1.00	$1,891.77
					Gross Margin	$1,033.24	1.00	$1,033.24

3.3.12 Kale and Fodder Beet

The increase in dairy cows across New Zealand in the last 25 years has meant a very great rise in the amount of winter feed grown by specialist dairy grazers. Kale was the main feed grown, but fodder and sometimes sugar beet has made big inroads in Kale's dominance.
Once used to the feed, cows perform very well on them and fodder beet copes with snow better than kale, while providing a high quality feed.
There are challenges feeding these crops and full discussion is outside the scope of this manual.
Care must be taken with changing diets and particularly with sugar and also fodder beet, the high sugar content can lead to acidosis and rapid death.

DDT and Beets?
DDT is a very long lived organo-phosphate insecticide used by earlier generations to control grass grub.
Those farms with high levels of DDT are likely to prefer kale against beet as stock grazing beet tend to ingest soil (along with DDT) which may show up in milk samples

There are plenty of options for farmers to choose from in terms of cultivation, herbicide, insecticide and fertiliser. Generally 10 kg N are required for each tonne of dry matter. Very high levels of dry matter may be achieved through large amounts of fertiliser and irrigation – over 20 t DM/ha, but lodging and heavy stalks (kale) reduce utilisation. Very high yield targets, based on heavy fertiliser use and irrigation are rapidly becoming a 'thing of the past!' Why? Pollution limits imposed by regional councils are changing the way farmers operate – and in the process creating a range of new challenges. In Canterbury, ECAN's rules mean those who have been polluting heavily are allowed to continue and their land is more valuable than those who have been 'good' with minimal pollution – dryland sheep or forestry are in the good category and those properties cannot shift to dairy with irrigation and expect to pollute in the same manner as their neighbours who have been polluting for years. Interesting times.
The methodology to measure pollution is a process of modelling and estimation, with some measurements driving the model – known as Overseer.
With these new rules in mind, fifteen t DM/ha seems a reasonable target-where much of the DM grown is of high quality and well utilised.
Most of the costs are borne in the first four months of crop growth.
Insect control at the seedling stage and later in the season is critical to ensure high crop yields. Over-use of insecticides reduces the chances of a natural balance being established, but given the mono-cultural nature of the landscape, natural balances in insect and birds are unlikely.
Kale is often grown after run out pasture. Spraying with a high rate of roundup (up to 5 l/ha of Roundup 360) followed a month later by a low rate ensures a good kill of most weeds and allows some breakdown of the turf in the old pasture, but if cultivation is chosen the turf may need ploughing under to ensure a high quality seed bed.
Herbicide is normally Roundup with perhaps added Granstar or Versatil for flat weeds and a surfactant to increase effectiveness. The pesticide companies provide many opportunities for decisions!
However when soil structure has deteriorated sufficiently during (wet) winter grazing, direct drilling is abandoned in favour of cultivation. Most farmers would view the ease and cost of herbicide favourably compared with costs of cultivation- fuel, running costs and labour.

Given the deterioration in soil conditions that often occurs during winter forage grazing, it may be sensible to cost extra cultivation required when moving out of winter forage crops, against those crops' gross margins.
Sugar / fodder beet requires specialist lifting/harvesting equipment as a high proportion of the root is below grazing height in ground. That cost is approximately 2-3 c/kg.

Kale and beets are susceptible to insect damage as seedlings. Care must be exercised to protect it from being 'wiped out' by insects, but excessive use of insecticides can reduce chance of natural balance controlling, for example, white butterfly. Fertiliser requirements increase with increasing growth potential and potential is driven by water. Dryland crops can be expensive to grow, especially in dry years as insect damage requires continual inputs – while yield potential declines with water stress.

3.3.13 Fodder beet

Gross Margin Analysis for Fodder Beet								
Crop	SF Brigadier Fodder Beet	Start Date	11/10/2015					
Sowing Area	1.00 ha	End Date	1/06/2016					
Income	Date Occurred	Yield		Yield Source	Price	Per ha	Area (ha)	Total Income
Grain Harvest		t/ha			$/t	$0.00	1.00	$0.00
Forage Harvest	1/06/2016	t/ha		My Paddock	$/t	$4,300.00	1.00	$4,300.00
Grazing		lwt kg/ha			$/lwt kg	$0.00	1.00	$0.00
Operations	Date Occurred					Cost Per ha	Area (ha)	Total Cost
Spraying	11/10/2015					$20.00	1.00	$20.00
Cultivation-Plough	17/10/2015					$130.00	1.00	$130.00
Cultivation-Heavy Roll	18/10/2015					$40.00	1.00	$40.00
Fertiliser Application	18/10/2015					$18.00	1.00	$18.00
Cultivation-Disc Chain Harrow	19/10/2015					$40.00	1.00	$40.00
Cultivation-Grubber	20/10/2015					$60.00	1.00	$60.00
Fertiliser Application	24/10/2015					$18.00	1.00	$18.00
Sowing-Precision Seeder	25/10/2015					$150.00	1.00	$150.00
Cultivation-Heavy Roll	26/10/2015					$40.00	1.00	$40.00
Spraying	30/10/2015					$20.00	1.00	$20.00
Spraying	2/12/2015					$20.00	1.00	$20.00
Fertiliser Application	2/12/2015					$18.00	1.00	$18.00
Forage Harvester	1/06/2016					$20.00	1.00	$20.00
Inputs	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Adjuvant	11/10/2015	Highway	0.2	L/ha	$20.97	$4.19	1.00	$4.19
Herbicide	11/10/2015	Glyphosate 360	5	L/ha	$12.17	$60.85	1.00	$60.85
Fertiliser	18/10/2015	Lime	5,000.00	kg/ha	$0.03	$142.00	1.00	$142.00
Fertiliser	24/10/2015	DAP	620	kg/ha	$0.69	$426.56	1.00	$426.56
Seed	25/10/2015	SF Brigadier	0.92	kg/ha	$363.00	$333.96	1.00	$333.96
Herbicide	30/10/2015	Magister Cs	0.15	L/ha	$125.04	$18.76	1.00	$18.76
Herbicide	30/10/2015	Claw	2	L/ha	$22.53	$45.06	1.00	$45.06
Insecticide	30/10/2015	Attack	0.5	L/ha	$33.70	$16.85	1.00	$16.85
Herbicide	2/12/2015	Nortron	1.47	L/ha	$29.26	$43.01	1.00	$43.01
Herbicide	2/12/2015	Mitron 70Wg	1.47	L/ha	$79.59	$117.00	1.00	$117.00
Herbicide	2/12/2015	Betanal Forte	1.47	L/ha	$115.88	$170.34	1.00	$170.34
Fertiliser	2/12/2015	Urea	150	kg/ha	$0.60	$90.00	1.00	$90.00
Fertiliser	2/12/2015	Potassium Chloride	50	kg/ha	$0.86	$43.18	1.00	$43.18
Irrigation	20/12/2015	Water	15	mm/ha	$2.15	$32.25	1.00	$32.25
Irrigation	2/02/2016	Water	15	mm/ha	$2.15	$32.25	1.00	$32.25
						Per ha	Area (ha)	Total
					Total Income	$4,300.00	1.00	$4,300.00
					Cost of Production	$2,170.26	1.00	$2,170.26
					Gross Margin	$2,129.74	1.00	$2,129.74

Yields and price per kg may be considered conservative. Cultivation practices vary widely.

3.3.14 Kale

Gross Margin Analysis for Kale								
Sown Crop	Sovereign Kale	Start Date	2/12/2015					
Sowing Area	1.00 ha	End Date	26/06/2016					
Income	Date Occurred	Yield		Yield Source	Price	Per ha	Area (ha)	Total Income
Grain Harvest		0.00 t/ha			$0.00 /t	$0.00	1.00	$0.00
Forage Harvest	26/06/2016	8.83 t/ha	My Paddocks		$200.00 /t	$1,766.00	1.00	$1,766.00
Grazing		0.00 lwt kg/ha			$0.00 /lwt kg	$0.00	1.00	$0.00
Operations	Date Occurred					Cost Per ha	Area (ha)	Total Cost
Cultivation - Disc Chain Harrows	2/12/2015					$120.00	1.00	$120.00
Sowing - Conventional Seeder	3/12/2015					$80.00	1.00	$80.00
Cultivation - Disc Chain Harrows	3/12/2015					$120.00	1.00	$120.00
Fertiliser Application	3/12/2015					$15.00	1.00	$15.00
Spraying	5/12/2015					$17.67	1.00	$17.67
Fertiliser Application	16/03/2016					$15.00	1.00	$15.00
Forage Harvest - Forage Harvester	26/06/2016					$20.00	1.00	$20.00
Inputs	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Seed	3/12/2015	Sovereign	4.4	kg/ha	$22.50	$99.00	1.00	$99.00
Fertiliser	3/12/2015	Cropzeal DAP boron	200	kg/ha	$1.02	$204.60	1.00	$204.60
Fertiliser	3/12/2015	Potassium Chloride	50.00	kg/ha	$0.86	$43.18	1.00	$43.18
Fertiliser	3/12/2015	Urea	200	kg/ha	$0.60	$120.00	1.00	$120.00
Herbicide	5/12/2015	Solvo 360Cs	0.35	L/ha	$89.60	$31.36	1.00	$31.36
Insecticide	5/12/2015	Chlorpyrifos 500 Ec	1.2	L/ha	$14.25	$17.10	1.00	$17.10
Fertiliser	16/03/2016	Urea	150	kg/ha	$0.60	$90.00	1.00	$90.00
						Per ha	Area (ha)	Total
					Total Income	$1,766.00	1.00	$1,766.00
					Cost of Production	$992.91	1.00	$992.91
					Gross Margin	$773.10	1.00	$773.10

Editors note – These are conservative values for both yield and price per tonne reflected in the gross margin. Modify values to suit your unique situation.

3.3.15 Hybrid Carrot Seed Production

Canterbury produces a surprisingly large proportion of the world's hybrid carrot seed requirements.
The Gross Margin below shows that under present methods, seed crops are heavily reliant on a wide range of pesticides.
Risks are high. Crops may fail in terms of seed quality – germination must reach at least 87%, purity standards are high and it is quite possible to spend thousands of dollars and have a total yield failure. When it all works, the returns are high.

The yield in the Gross margin below (200 kg/ha or 0.2 t/ha) is conservative, but grower beware, carrots are in the ground for almost a year, require continual care and that means chemicals and pollinations is often very challenging. The two lines have to flower together for optimum pollination, and bees get very little out of pollinating carrots. Other more attractive pollinators will draw the bees away. Bad weather at harvest can reduce germination and suddenly prices for the crop can plummet.

Gross Margin Analysis for Carrot Seed								
Crop	Carrot	**Start Date**	28/01/2015					
Sowing Area	1.00 ha	**End Date**	28/03/2016					
Income	**Date Occurred**	**Yield**	**Yield Source**		**Price**	**Per ha**	**Area (ha)**	**Total**
Grain Harvest	28/03/2016	0.20 t/ha	My Paddocks		$45000.00 /t	$9,000.00	1.00	$9,000.00
Forage Harvest		0.00 t/ha			$0.00 /t	$0.00	1.00	$0.00
Operation	**Date Occurred**					**Cost Per ha**	**Area (ha)**	**Total Cost**
Cultivation - Subsoiler	28/01/2015					$120.00	1.00	$120.00
Cultivation - Heavy Cultivation	1/02/2015					$75.00	1.00	$75.00
Cultivation - Heavy Roll	2/02/2015					$40.00	1.00	$40.00
Cultivation - Heavy Cultivation	3/02/2015					$75.00	1.00	$75.00
Cultivation - Light Cultivation	6/02/2015					$35.00	1.00	$35.00
Sowing - Precision Seeder	11/02/2015					$150.00	1.00	$150.00
Spraying	16/02/2015					$20.00	1.00	$20.00
Fertiliser Application	1/05/2015					$15.00	1.00	$15.00
Spraying	7/06/2015					$20.00	1.00	$20.00
Spraying	11/08/2015					$20.00	1.00	$20.00
Spraying	20/09/2015					$20.00	1.00	$20.00
Fertiliser Application	8/10/2015					$15.00	1.00	$15.00
Spraying	24/10/2015					$20.00	1.00	$20.00
Spraying	30/10/2015					$20.00	1.00	$20.00
Spraying	5/11/2015					$20.00	1.00	$20.00
Cutting - Topper	5/11/2015					$35.00	1.00	$35.00
Spraying	2/12/2015					$20.00	1.00	$20.00
Spraying	15/12/2015					$20.00	1.00	$20.00
Spraying	24/12/2015					$20.00	1.00	$20.00
Cutting - Male Mulching	25/01/2016					$45.00	1.00	$45.00
Spraying	21/02/2016					$20.00	1.00	$20.00
Spraying	22/03/2016					$20.00	1.00	$20.00
Windrowing	23/03/2016					$70.00	1.00	$70.00
Grain Harvest - Conventional Harvester	28/03/2016					$250.00	1.00	$250.00

Input	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Insecticide	11/02/2015	Phorate	3	kg/ha	$14.00	$42.00	1.00	$42.00
Seed	11/02/2015	Carrot	3	kg/ha	$15.00	$45.00	1.00	$45.00
Herbicide	16/02/2015	Gesagard 500 Fw	1	L/ha	$37.00	$37.00	1.00	$37.00
Herbicide	16/02/2015	Linuron 400Sc	1	L/ha	$46.88	$46.88	1.00	$46.88
Fertiliser	1/05/2015	Urea	75	kg/ha	$0.60	$45.00	1.00	$45.00
Fungicide	7/06/2015	Proline	0.3	L/ha	$128.00	$38.40	1.00	$38.40
Fungicide	7/06/2015	Sportak Ew	0.5	L/ha	$43.30	$21.65	1.00	$21.65
Fungicide	7/06/2015	Protek	0.5	L/ha	$18.19	$9.10	1.00	$9.10
Adjuvant	11/08/2015	Uptake Spraying Oil	1	L/ha	$12.87	$12.87	1.00	$12.87
Herbicide	11/08/2015	Centurion Xtra	330	mL/ha	$0.10	$34.32	1.00	$34.32
Herbicide	11/08/2015	Sencor	300	g/ha	$0.10	$30.00	1.00	$30.00
Fungicide	20/09/2015	Folicur 430Sc	0.3	L/ha	$42.57	$12.77	1.00	$12.77
Fungicide	20/09/2015	Proline	0.3	L/ha	$128.00	$38.40	1.00	$38.40
Fungicide	20/09/2015	Protek	0.5	L/ha	$18.19	$9.10	1.00	$9.10
Fertiliser	8/10/2015	Urea	75	kg/ha	$0.60	$45.00	1.00	$45.00
Irrigation	10/10/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Adjuvant	24/10/2015	Li 700	1	L/ha	$25.90	$25.90	1.00	$25.90
Growth Regulator	24/10/2015	Terpal	2	L/ha	$55.63	$111.26	1.00	$111.26
Herbicide	30/10/2015	Linuron 400Sc	2	L/ha	$46.88	$93.76	1.00	$93.76
Herbicide	30/10/2015	Gesagard 500 Fw	1.5	L/ha	$37.00	$55.50	1.00	$55.50
Irrigation	1/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	5/11/2015	Comet	0.5	L/ha	$85.13	$42.57	1.00	$42.57
Fungicide	5/11/2015	Score 250 Ec	0.25	L/ha	$72.00	$18.00	1.00	$18.00
Irrigation	23/11/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	2/12/2015	Score 250 Ec	0.5	L/ha	$72.00	$36.00	1.00	$36.00
Insecticide	2/12/2015	Transform	0.1	L/ha	$300.00	$30.00	1.00	$30.00
Herbicide	15/12/2015	Linuron	2	kg/ha	$41.00	$82.00	1.00	$82.00
Irrigation	16/12/2015	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	24/12/2015	Pristine	1	L/ha	$125.42	$125.42	1.00	$125.42
Insecticide	24/12/2015	Pirimor 50	0.3	kg/ha	$64.17	$19.25	1.00	$19.25
Irrigation	7/01/2016	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	30/01/2016	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Irrigation	20/02/2016	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00
Fungicide	21/02/2016	Comet	0.5	L/ha	$85.13	$42.57	1.00	$42.57
Fungicide	21/02/2016	Score 250 Ec	0.25	L/ha	$72.00	$18.00	1.00	$18.00
Insecticide	21/02/2016	Lorsban 50Ec	1.25	L/ha	$16.73	$20.91	1.00	$20.91
Fungicide	22/03/2016	Rovral Flo	2	L/ha	$27.78	$55.56	1.00	$55.56
Irrigation	26/03/2016	Water	40	mm/ha	$2.15	$86.00	1.00	$86.00

Miscellaneous	Cost Per ha	Area (ha)	Total Cost
Seed Processing ($0.30/kg)	$60.00	1.00	$60.00
Freight ($60/t)	$12.00	1.00	$12.00
Beehives ($180/hive)	$1,440.00	1.00	$1,440.00

	Per ha	Area (ha)	Total
Total Income	$9,000.00	1.00	$9,000.00
Cost of Production	$4,609.17	1.00	$4,609.17
Gross Margin	$4,390.83	1.00	$4,390.83

A small increase in yield makes a very big difference to gross margin achieved.

All Prices are GST exclusive – please check all prices

Information kindly provided by Foundation for Arable Research

FAR disclaimer at start of section refers to this and all crop gross margins.

3.3.16 Maize

Please note the maize gross margin is provided by ProductionWise, ex FAR with thanks.

Gross Margin Analysis for Maize								
Crop	P0021 Maize	Start Date	5/10/2015					
Sowing Area	1.00 ha	End Date	2/05/2016					
Income	Date Occurred	Yield	Yield Source		Price	Per ha	Area (ha)	Total
Grain Harvest	2/05/2016	12.50 t/ha	My Paddocks		$330.00 /t	$4,125.00	1.00	$4,125.00
Operation	Date Occurred					Cost Per ha	Area (ha)	Total Cost
Spraying	5/10/2015					$20.00	1.00	$20.00
Sowing - Direct Drill	6/10/2015					$50.00	1.00	$50.00
Spraying	1/11/2015					$20.00	1.00	$20.00
Fertiliser Application	25/11/2015					$15.00	1.00	$15.00
Grain Harvest - Conventional Harves	2/05/2016					$250.00	1.00	$250.00
Input	Date Occurred	Product	Rate/ha	Unit	Cost Per Unit	Cost Per ha	Area (ha)	Total Cost
Herbicide	5/10/2015	Corral	7	L/ha	$11.70	$81.90	1.00	$81.90
Insecticide	5/10/2015	Karate Zeon	40	mL/ha	$0.35	$13.84	1.00	$13.84
Fertiliser	6/10/2015	Cropmaster 15	250	kg/ha	$0.87	$217.50	1.00	$217.50
Seed	6/10/2015	P0021	80000	seeds/ha	$0.00	$350.40	1.00	$350.40
Herbicide	1/11/2015	Atraflow	3	L/ha	$6.91	$20.73	1.00	$20.73
Fertiliser	25/11/2015	Urea	250	kg/ha	$0.60	$150.00	1.00	$150.00
Miscellaneous						Cost Per ha	Area (ha)	Total Cost
Drying ($27/t)						$337.50	1.00	$337.50
Freight ($10/t)						$125.00	1.00	$125.00
						Per ha	Area (ha)	Total
					Total Income	$4,125.00	1.00	$4,125.00
					Cost of Production	$1,651.87	1.00	$1,651.87
					Gross Margin	$2,473.13	1.00	$2,473.13

There's also an online, free interactive tool worth working with, at:
http://www.pioneer.co.nz/maize-grain/tools/maize-grain-economics/.

3.4 ENTERPRISE ANALYSIS IN HORTICULTURE

A simple gross margin doesn't do justice to the analysis required to make wise decisions. What is needed is a detailed development budget that spans start-up right through to full production (and beyond for crops lasting several years). The process of thinking and gaining information is intense and wide ranging. Expert opinion will be sought from many areas, including other growers willing to share their experiences. For some crops (eg strawberry) the time frame may be just 1-3 years, while apples may require a budget process spanning 15 years. Inputs (costs) are heavily loaded during set up. Growers should expect to spend at least $50,000/ha (often well in excess of this figure) in some or all of the following→

- Council consents,
- Design issues / advice – block layout,
- Equipment – some of the expenditure may be delayed until crops are yielding, or through the use of contractors,
- Trellis design, posts and other structures,
- Soil tests and fertilisers including start up fertiliser for major soil amelioration – eg Sulphur required as part of lowering pH for blueberry,
- Pest and Disease control,
- Weed Control,
- Irrigation including design, pumps, main lines, laterals, sprinklers, drippers,
- Netting including posts – height, size, layout, wire supports, bracing and style of netting,
- Packing sheds, cooler facilities, storage facilities, transport
- Pollination.

A key issue is timeliness – when does expenditure and income occur? Cash flow is critical.

The result is total expenditure climbing for the first few years with normally no income and increasing mortgage interest costs. Risks add to the challenge of creating a profitable enterprise and include snow / frost, wind, disease / insect attack and for crops focussed on export – NZ currency fluctuations can markedly affect profitability. Market preferences may change quickly and an apple cultivar that was preferred at the start of orchard development may no longer be preferred a few years later – just when trees of that cultivar are reaching maximum yield.

A useful analysis will incorporate many separate 'calculators' taking information and decisions and placing them appropriately into the 10+ year process indicating cash flow, mortgage and labour requirements. Some of these separate calculators may relate to fencing, trellising, irrigation, etc. Each component will have various possibilities and the calculators will assist growers in making wise decisions.

It is clear by now, that the analysis of perennial crops like grapes, apples etc requires considerable detail over time. This is normally done on an annual basis.

For annual crops, a more in-depth analysis will include the cash flow – expense and income, month by month.

Although there is a need for detailed analysis over years, relatively simple comparisons – of varying cultivars, for example, within an enterprise mean that Gross Margin analysis remains a useful, but limited tool.

Some very useful and detailed information continues to be available on the Ministry of Primary Industries web site. The information presented from there is gratefully acknowledged.

Note that many of the crops of interest in NZ horticulture are not covered, and that information is increasingly hard to come by as it is deemed commercially sensitive. Vegetable production in particular fits into that category.

3.4.1 Grapes

Information kindly supplied by Ministry of Primary Industries (Refer disclaimer notice overleaf, applying to all MPI supplied information in this section).

Marlborough vineyard model grape prices

Year ended 30 June	2006-15 ($/t)	2011-15 ($/t)	2015 ($/t)	2016 ($/t)	2017 budget ($/t)
Sauvignon Blanc	1 765	1 490	1 710	1 805	1 840
Pinot Noir - Table	3 030	2 980	3 220	3 085	3 210
Pinot Gris	1 815	1 780	1 830	1 885	1 915
Chardonnay - Mendoza and Clone 15	1 995	1 950	2 200	2 130	2 250
Chardonnay - all other clones	1 785	1 715	1 830	2 000	1 910
Riesling	1 705	1 620	1 785	1 775	1 775
Weighted average	**1 830**	**1 605**	**1 810**	**1 900**	**1 940**

Notes

Figures may not add to totals due to rounding.

Marlborough vineyard model production and income details for 2016

Grape variety	Area (ha)	Production per hectare (t/ha)	Total production (t)	Gross yield (%)	Brix (%)	Return ($/t)	Revenue ($)
Sauvignon Blanc	23.0	16.5	380	84%	21.6	1 805	685 000
Pinot Noir - Table	3.0	8.6	26	6%	23.2	3 085	79 600
Pinot Gris	1.5	11.8	18	4%	22.5	1 885	33 400
Chardonnay - Mendoza and Clone 15	1.5	10.6	16	4%	22.0	2 130	33 900
Chardonnay - all other clones	0.5	14.0	7	2%	19.2	2 000	14 000
Riesling	0.5	11.5	6	1%	20.9	1 775	10 200
Total/average	**30.0**	**15.1**	**452**	**100%**		**1 900**	**856 100**

Notes

Figures may not add to totals due to rounding.

Table is sorted by variety with highest to lowest producing area.

3.4.2 Model Budget for Grapes

Marlborough vineyard model budget		
	2015	2016
Total area	33 ha	33 ha
Planted area	30 ha	30 ha
Producing area	30 ha	30 ha
Total crop (tonne)	**324**	**452**
% change		39%
avge vines per planted hectare	2 180	2 180
Notes		
Figures may not add to totals due to rounding.		

Disclaimer

The information in this report by the Ministry for Primary Industries is based on the best information available to the Ministry at the time it was drawn up and all due care was exercised in its preparation. As it is not possible to foresee all uses of this information or to predict all future developments and trends, any subsequent action that relies on the accuracy of the information in this report is the sole commercial decision of the user and is taken at his/her own risk. Accordingly, the Ministry for Primary Industries disclaims any liability whatsoever for any losses or damages arising out of the use of this information, or in respect of any actions taken.

For more information please contact
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Marlborough vineyard model budget						
Year ending 30 June	2015		2016			
Revenue	**Whole Vineyard ($)**	**% change**	**Whole Vineyard ($)**	**producing hectare ($)**	**per tonne gross ($)**	**per vine ($)**
Income from grapes	587 300	46%	856 100	28 535	1 895	13.10
Other direct vineyard income	4 700		12 700	425	28	0.19
Net cash income	592 000	47%	868 800	28 960	1 924	13.29
Vineyard working expenses	291 600	7%	313 300	10 445	694	4.79
Cash operating surplus	300 400	85%	555 500	18 515	1 230	8.50
Interest	65 000	-6%	61 200	2 040	136	0.94
Rent &/or leases	8 200	0%	8 200	275	18	0.13
Depreciation	44 000	-6%	41 400	1 380	92	0.63
Net nonfruit cash income	0		0	0	0	0.00
Vineyard profit before tax	183 200	143%	444 700	14 820	985	6.80
Tax	129 500	-100%	0	0	0	0.00
Vineyard profit after tax	53 700	728%	444 700	14 820	985	6.80
Allocation of funds						
Add back depreciation	44 000	-6%	41 400	1 380	92	0.63
Drawings/living expenses[1]	61 100	18%	72 200	2 405	160	1.10
Vineyard surplus for reinvestment[2]	36 600	1031%	413 900	13 795	916	6.33
Reinvestment						
Net capital purchases	30 900	-34%	20 400	680	45	0.31
Development	50 900	-83%	8 400	280	19	0.13
Principal repayments	47 900	-5%	45 500	1 515	101	0.70
Vineyard cash surplus/deficit	- 93 100		339 600	11 320	752	5.19
Other cash sources						
Indirect cash income	24 000	13%	27 000	900	60	0.41
New borrowings	41 880		0	0	0	0.00
Introduced funds	0		0	0	0	0.00
Net cash position	- 27 220		366 600	12 220	812	5.61
Assets & liabilities						
Land and builiding[3]	4 927 830	16%	5 706 630	190 200	12 635	87.29
Plant and machinery	145 200	-6%	136 600	4 555	302	2.09
Total vineyard assets (closing)	5 073 030	15%	5 843 230	194 775	12 938	89.38
Total vineyard liabilities (closing)	1 073 300	-4%	1 027 800	34 260	2 276	15.72
Total equity	3 999 730	20%	4 815 430	160 515	10 662	73.66

Figures may not add to totals due to rounding.

1 Drawings refers to living expenses. Figures may not match with previous years due to the revision of interpretation of drawings.

2 Vineyard surplus for reinvestment is the cash available from the vineyard business, after meeting living costs, which is available for investment on the vineyard or for principal repayments.

It is calculated as the vineyard profit after tax less depreciation less drawings.

3 Land and building asset value includes the value of owned land, vines and supports, other improvements, vineyard buildings and dwellings on the property as at 30th June.

Marlborough vineyard model expenditure						
Year ending 30 June	2015		2016			
Vineyard working expenses	**Whole Vineyard ($)**	**% change**	**Whole Vineyard ($)**	**producing hectare ($)**	**per tonne gross ($)**	**per vine ($)**
Hand harvesting	6 400	9%	7 000	233	15	0.11
Pruning (and tying down)	66 800	6%	70 700	2 357	157	1.08
Canopy/Crop management	34 800	19%	41 300	1 377	91	0.63
Other wages	47 500	7%	50 600	1 687	112	0.77
ACC - employees	800	0%	800	27	2	0.01
Total labour expenses	156 300	9%	170 400	5 680	377	2.61
Weed & pest control	25 600	9%	27 900	930	62	0.43
Fertiliser & lime	7 500	8%	8 100	270	18	0.12
Electricity	6 900	16%	8 000	267	18	0.12
Vehicle	2 300	-13%	2 000	67	4	0.03
Fuel	7 300	-25%	5 500	183	12	0.08
Repairs & maintenance	23 800	3%	24 600	820	54	0.38
General	4 100	7%	4 400	147	10	0.07
Frost protection	3 400	0%	3 400	113	8	0.05
Contract machinery work	2 700	7%	2 900	97	6	0.04
Machine harvesting	18 900	3%	19 500	650	43	0.30
Total other working expenses	102 500	4%	106 300	3 545	235	1.63
Rates	6 700	13%	7 600	253	17	0.12
Water rates	2 700	11%	3 000	100	7	0.05
General insurance	3 800	3%	3 900	130	9	0.06
Crop insurance	0		0	0	0	0.00
ACC - owners	6 100	-13%	5 300	177	12	0.08
Communication	1 400	14%	1 600	53	4	0.02
Accountancy	3 700	11%	4 100	137	9	0.06
Legal & consultancy	1 900	32%	2 500	83	6	0.04
Levies & subscriptions	4 500	40%	6 300	210	14	0.10
Other administration	2 000	15%	2 300	77	5	0.04
Total overhead expenses	32 800	12%	36 600	1 220	81	0.56
Total vineyard working expenses	291 600	7%	313 300	10 445	694	4.79
Wages of management	75 000	0%	75 000	2 500	166	1.15
Interest	65 000	-6%	61 200	2 040	136	0.94
Rent &/or leases	8 200	0%	8 200	275	18	0.13
Depreciation	44 000	-6%	41 400	1 380	92	0.63
	192 200	-3%	185 800	6 195	411	2.84
Total vineyard operating expenses	483 800	3%	499 100	16 635	1 105	7.63
Calculated ratios						
Economic Vineyard Surplus (EVS)[1]	181 400		439 100	14 635	972	6.72

Year ending 30 June	2015	2016
	Whole Vineyard	**Whole Vineyard**
Vineyard working expenditure/NCI[2]	49%	36%
EVS/Total vineyard assets	3.6%	7.5%
EVS less interest & lease/equity	2.7%	7.7%
Interest+rent+lease/NCI	12.4%	8.0%
EVS/NCI	30.6%	50.5%
EBIT[3] ($)	248 200	505 900
EBIT/Total Capital	4.9%	8.7%
EBIT/Total Equity	6.2%	10.5%

1 Economic Vineyard Surplus (EVS) is calculated as follows: Net cash income less vineyard working expenses less depreciation less wages of management (WOM)

WOM is calculated as $31000 for labour input plus 1 percent of opening total vineyard assets to a maximum of $75000.

2 Net cash income.

3 Earnings before interest and tax.

3.4.3 MPI Pipfruit financial analysis

Key parameters, financial results and budgets for the pipfruit orchard models

Year ended 31 December	2013	2014	2015 Budget
Hawke's Bay model			
Planted area (ha)	40.0	40.0	40.0
Owned area (ha)	24.0	24.0	24.0
Leased area (ha)	16.0	16.0	16.0
Total TCE[1]	145 925	127 390	148 575
Export TCE	96 615	92 200	93 015
Weighted average return ($/export TCE)[2]	24.45	26.80	29.45
Net cash income ($) (at FAS)[2]	2 646 400	2 631 000	2 966 100
Orchard gate return (OGR $)	1 585 300	1 602 900	1 906 000
Orchard working expenses (to orchard gate $)[3]	1 026 400	1 008 900	1 059 100
EBIT ($)[4]	514 900	538 000	788 900
Orchard profit before tax ($)	377 700	410 000	666 900
Orchard cash surplus/deficit ($)	251 700	136 000	334 900
Orchard working expenses / OGR	65%	63%	56%
EBIT / Total orchard assets	19.1%	18.2%	25.6%
Percentage equity	60%	70%	75%
Nelson model			
Planted area (ha)	40.0	40.0	40.0
Owned area (ha)	32.0	32.0	32.0
Leased area (ha)	8.0	8.0	8.0
Total TCE	129 340	123 135	123 340
Export TCE	97 565	96 350	85 775
Weighted average return ($/export TCE)	25.50	25.65	26.70
Net cash income ($) (at FAS)	2 607 800	2 532 000	2 491 400
Orchard gate return (OGR $)	1 545 400	1 572 500	1 597 700
Orchard working expenses (to orchard gate $)	1 060 000	1 132 700	1 158 600
EBIT ($)	425 400	379 800	379 100
Orchard profit before tax ($)	289 000	251 800	261 100
Orchard surplus/deficit ($)	149 000	41 800	76 100
Orchard working expenses / OGR	69%	72%	73%
EBIT / Total orchard assets	11.8%	9.4%	9.2%
Percentage equity	56%	63%	67%

Notes
The pipfruit orchard models are representative of export pipfruit orchards and based on a company structure.
The pipfruit orchard models were modified substantially in 2013 following a review of the MPI pipfruit monitoring programme. Hence direct comparisons with prior models are not recommended.
Figures may not add to totals due to rounding.
1 Tray carton equivalent is a measure of apple and pear weight. A TCE is defined as 18.6 kg packed weight which equates to 18.0 kg sale weight.
2 Returns per export TCE are expressed at free alongside ship (FAS return). This is the value of the product at the ship's side net of commission, additional packaging costs and controlled atmosphere or SmartFresh™ costs.
3 Orchard working expenses include wages of management.
4 EBIT = earnings before interest and tax. The lease arrangements in the orchard models are permanent leases of land. Because of this, lease expenses are treated like interest expenses (i.e. cost of capital) for reporting purposes.

Background

The MPI pipfruit monitoring programme was reviewed in 2013 leading to modifications to the Hawke's Bay and Nelson pipfruit orchard models for 2013 and 2014 actual and 2015 budget years. Direct comparison with previous years' models is not advised.

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Table 2: Hawke's Bay pipfruit orchard model FAS[1] export returns

Year ended 31 December	2006 ($/TCE[2])	2007 ($/TCE)	2008 ($/TCE)	2009 ($/TCE)	2010 ($/TCE)	2011 ($/TCE)	2012 BUDGET ($/TCE)	2013 ($/TCE)	2014 ($/TCE)	2015 BUDGET ($/TCE)
Variety										
Braeburn	19.38	15.15	25.25	16.00	17.15	18.05	19.50	22.85	20.20	21.30
Cripps Pink / Pink Lady™	28.52	26.31	29.50	24.00	22.45	21.55	22.50	27.00	27.00	27.50
Envy™	…	…	…	…	…	25.50	28.00	33.60	37.45	41.50
Fuji	25.14	26.81	26.90	25.60	26.20	22.40	22.00	25.20	30.00	30.50
Granny Smith	19.13	17.52	21.40	20.80	22.45	21.25	22.00	22.10	25.00	25.85
Jazz™	35.13	30.26	30.30	21.65	21.85	19.70	22.00	24.70	25.55	26.90
Pacific Beauty™	21.53	21.30	24.35	33.00	27.30	25.70	25.25	28.30	…	…
Pacific Queen™	23.86	22.89	27.00	35.80	30.75	31.80	32.85	32.90	35.80	51.40
Pacific Rose™	22.44	21.24	24.10	29.70	28.45	28.50	31.25	31.15	31.40	37.00
Royal Gala	20.31	19.71	22.25	20.80	22.00	20.55	20.25	24.70	25.50	26.30
Weighted average	**20.72**	**19.63**	**24.55**	**21.60**	**22.00**	**21.50**	**22.05**	**25.45**	**26.80**	**29.45**
Notes										
The pipfruit orchard models were modified substantially in 2013 following a review of the MPI pipfruit monitoring programme. Hence direct comparisons with prior models are not recommended.										
1 Free alongside ship.										
2 Tray carton equivalent.										

Hawke's Bay pipfruit orchard model budget (two pages)

	2013				2014
	Whole orchard ($)	Whole orchard ($)	Per planted ha ($)	Per TCE[1] gross ($)	Per TCE export ($)
Revenue					
Pipfruit income (at FAS)	2 624 400	2 607 000	65 175	20.46	28.28
Other orchard income	22 000	24 000	600	0.19	0.26
Net cash income	**2 646 400**	**2 631 000**	**65 775**	**20.65**	**28.54**
Less post-harvest expenses	1 061 100	1 028 100	25 703	8.07	11.15
Orchard gate return (OGR)	**1 585 300**	**1 602 900**	**40 072**	**12.58**	**17.39**
Orchard working expenses (to orchard gate)	1 026 400	1 008 900	25 223	7.92	10.94
Cash operating surplus	**558 900**	**594 000**	**14 850**	**4.66**	**6.44**
Depreciation	44 000	56 000	1 400	0.44	0.61
EBIT[2]	**514 900**	**538 000**	**13 450**	**4.22**	**5.84**
Interest	70 000	60 000	1 500	0.47	0.65
Rent and/or lease	67 200	68 000	1 700	0.53	0.74
Orchard profit before tax	**377 700**	**410 000**	**10 250**	**3.22**	**4.45**
Tax	55 000	150 000	3 750	1.18	1.63
Orchard profit after tax	**322 700**	**260 000**	**6 500**	**2.04**	**2.82**
Allocation of funds					
Add back depreciation	44 000	56 000	1 400	0.44	0.61
Orchard surplus for reinvestment	**366 700**	**316 000**	**7 900**	**2.48**	**3.43**
Revinvestment					
Net capital purchases	40 000	50 000	1 250	0.39	0.54
Development	25 000	30 000	750	0.24	0.33
Principal repayments	50 000	100 000	2 500	0.78	1.08
Orchard cash surplus/deficit	**251 700**	**136 000**	**3 400**	**1.07**	**1.48**
Assets and liabilities[3]					
Land and buildings (*Estimated opening market*	2 520 000	2 760 000	115 000	21.67	29.94
Plant and machinery (*Opening book value*)	180 000	195 000	8 125	1.53	2.11
Total orchard assets	**2 700 000**	**2 955 000**	**123 125**	**23.20**	**32.05**
Total liabilities (*Opening book value*)	1 080 000	900 000	37 500	7.06	9.76
Total equity	**1 620 000**	**2 055 000**	**85 625**	**16.13**	**22.29**

Information kindly supplied by Ministry of Primary Industries. These were not publically available at time of publication, but are likely to be online 'now'.

2015 BUDGET			
Whole orchard ($)	**Per planted ha ($)**	**Per TCE[1] gross ($)**	**Per TCE export ($)**
2 866 100	71 653	19.29	30.81
100 000	2 500	0.67	1.08
2 966 100	**74 153**	**19.96**	**31.89**
1 060 100	26 502	7.14	11.40
1 906 000	**47 650**	**12.83**	**20.49**
1 059 100	26 478	7.13	11.39
846 900	**21 172**	**5.70**	**9.11**
58 000	1 450	0.39	0.62
788 900	**19 722**	**5.31**	**8.48**
50 000	1 250	0.34	0.54
72 000	1 800	0.48	0.77
666 900	**16 672**	**4.49**	**7.17**
120 000	3 000	0.81	1.29
546 900	**13 672**	**3.68**	**5.88**
58 000	1 450	0.39	0.62
604 900	**15 122**	**4.07**	**6.50**
60 000	1 500	0.40	0.65
80 000	2 000	0.54	0.86
130 000	3 250	0.87	1.40
334 900	**8 372**	**2.25**	**3.60**
2 880 000	120 000	19.38	30.96
200 000	8 333	1.35	2.15
3 080 000	**128 333**	**20.73**	**33.11**
780 000	32 500	5.25	8.39
2 300 000	**95 833**	**15.48**	**24.73**

Notes
Figures may not add to totals due to rounding.

1 Tray carton equivalent

2 EBIT = earnings before interest and tax. The lease arrangements in the orchard models are permanent leases of land. Because of this, lease expenses are treated like interest expenses

3 Land and building asset value includes the value of owned land, trees and supports, other improvements, orchard buildings and dwellings on the property. Asset and liability values per planted hectare are based on owned planted area of 24 hectares; not owned and leased planted area of 40 hectares.

Data kindly supplied by Ministry of Primary Industries.

Hawke's Bay Pipfruit orchard model expenditure (two pages)

	2013	2014			
	Whole orchard ($)	Whole orchard ($)	Per planted ha ($)	Per TCE[1] gross ($)	Per TCE export ($)
Packing	415 455	393 700	9 843	3.09	4.27
Packaging	400 960	395 500	9 888	3.10	4.29
Cool storage (incl freight from coolstore to port)	186 470	185 300	4 632	1.45	2.01
Freight (orchard to packhouse)	35 025	30 550	764	0.24	0.33
Levies and compliance	23 190	23 050	576	0.18	0.25
Total post harvest expenses	**1 061 100**	**1 028 100**	**25 703**	**8.07**	**11.15**
Wages of management	90 000	92 000	2 300	0.72	1.00
Hand harvesting	283 100	259 800	6 495	2.04	2.82
Pruning	83 200	94 800	2 370	0.74	1.03
Thinning	124 400	110 400	2 760	0.87	1.20
Other wages	113 800	114 400	2 860	0.90	1.24
ACC - employees	8 400	8 600	215	0.07	0.09
Total labour expenses	**702 900**	**680 000**	**17 000**	**5.34**	**7.38**
Weed and pest control	116 600	115 600	2 890	0.91	1.25
Pollination	2 900	2 900	73	0.02	0.03
Fertiliser and lime	5 200	7 400	185	0.06	0.08
Electricity	7 800	7 400	185	0.06	0.08
Vehicle	16 800	17 000	425	0.13	0.18
Fuel	34 600	30 400	760	0.24	0.33
Repairs and maintenance	42 600	46 000	1 150	0.36	0.50
General expenses	20 600	25 800	645	0.20	0.28
Contract machine work	7 800	8 400	210	0.07	0.09
Orchard operating expenses	**254 900**	**260 900**	**6 523**	**2.05**	**2.83**
Rates	10 800	11 200	280	0.09	0.12
Water and related charges	2 800	3 400	85	0.03	0.04
General insurance	9 400	9 400	235	0.07	0.10
Crop insurance	18 800	20 600	515	0.16	0.22
Communication	4 600	4 200	105	0.03	0.05
Accounting	7 200	7 000	175	0.05	0.08
Legal and consulting	3 200	3 000	75	0.02	0.03
Other administration	11 800	9 200	230	0.07	0.10
Total overhead expenses	**68 600**	**68 000**	**1 700**	**0.53**	**0.74**
Total on-orchard working expenses	**1 026 400**	**1 008 900**	**25 223**	**7.92**	**10.94**
Calculated ratios					
EBIT[2]	514 900	538 000	13 450	4.22	5.84
Orchard working expenses[3]/OGR[4]	65.0%	63%			
EBIT/Total Orchard Assets	19.1%	18.2%			
EBIT less interest & lease/Equity	23.3%	20.0%			
Interest + rent + lease/OGR	8.7%	8.0%			
EBIT/OGR	32.5%	33.6%			

2015 BUDGET			
Whole orchard ($)	**Per planted ha ($)**	**Per TCE[1] gross ($)**	**Per TCE export ($)**
415 750	10 394	2.80	4.47
399 950	9 999	2.69	4.30
186 950	4 674	1.26	2.01
34 200	855	0.23	0.37
23 250	581	0.16	0.25
1 060 100	**26 502**	**7.14**	**11.40**
92 000	2 300	0.62	0.99
286 700	7 168	1.93	3.08
89 800	2 245	0.60	0.97
121 600	3 040	0.82	1.31
133 000	3 325	0.90	1.43
8 600	215	0.06	0.09
731 700	**18 293**	**4.92**	**7.87**
114 800	2 870	0.77	1.23
3 000	75	0.02	0.03
7 000	175	0.05	0.08
7 800	195	0.05	0.08
16 000	400	0.11	0.17
30 800	770	0.21	0.33
50 000	1 250	0.34	0.54
26 200	655	0.18	0.28
5 600	140	0.04	0.06
261 200	**6 530**	**1.76**	**2.81**
11 600	290	0.08	0.12
2 400	60	0.02	0.03
9 800	245	0.07	0.11
19 000	475	0.13	0.20
4 200	105	0.03	0.05
6 800	170	0.05	0.07
3 200	80	0.02	0.03
9 200	230	0.06	0.10
66 200	**1 655**	**0.45**	**0.71**
1 059 100	**26 478**	**7.13**	**11.39**
788 900	19 722	5.31	8.48
56%			
25.6%			
29.0%			
6.4%			
41.4%			

1 Tray carton equivalent.

2. 2 EBIT = earnings before interest and tax. The lease arrangements in the orchard models are permanent leases of land. Because of this, lease expenses are treated like interest expenses (i.e. cost of capital) for reporting purposes.

3 Orchard working expenses includes wages of management.

4 Orchard gate return.

Refer - https://www.**mpi**.govt.nz/document-vault/11057

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