BENCHMARKING – KEY DRIVERS FOR SUCCESSFUL DAIRY BUSINESSES

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Summary

- Benchmarking is important for determining how businesses are progressing
- The factors within our control that explain the majority of the variation in operating profit per hectare are operating expenses per Kg MS and milk production Kg MS/ha.
- Regional location and production system are not good indicators of operating profit.
- Management ability and sound decisions are the main reasons for difference in farm-to-farm variations in operating profit/ha.
- Pasture harvested (eaten) explains the majority of the variation in milksolids/ha between farms
- To be profitable, supplements must be used to fill a true feed deficit,
- Liquidity and cash flow will ensure the business survives and provides opportunities for growth.

Introduction

New Zealand dairy farm businesses are becoming more complex, with larger herds and more intensive farming requiring a greater level of farm management including labour, feed, financial and environmental aspects. However, the fundamentals for a successful and profitable dairy business have not changed. These are based on sound financial, pasture, animal and human management decisions. In particular top farmers make superior marginal decisions around costs and extracting extra production from the inputs used (higher productivity).

This paper outlines key performance indicators that can be monitored and benchmarked through time to determine how your dairy farm business is progressing. The analysis uses

data from DairyBase and Dairy Systems Monitoring from 2005-06 to 2007-08. It must be stressed that each business is unique, and blanket statements while fundamentally correct, might not work for all farms. A concerted effort must be made to understand the strengths and weaknesses of individual farms and comparisons made (benchmarking) of the performance of the components. Tools such as DairyBase are ideal for benchmarking your farm progress through time.

Operating profit

The focus of this paper is on farm operations performance and therefore liquidity and operating profit are the main financial focus.

Operating Profit per milking hectare (formerly EFS) is the key measure used in the dairy industry to compare profitability between farms. Irrespective of what a business produces, profit is a function of the quantity of items sold multiplied by the per unit profit of each item sold (i.e., units sold x profit per unit sold), described for a dairy farm in equation 1 (Eq1). This operating profit equation is useful for quickly diagnosing how a business is performing compared to others and areas that may require improvements.

Eq1: Operating Profit/ha = Production (kg MS/ha) * (GFR/kg MS – OpEx/kg MS)

Where: GFR (Gross Farm Revenue) is cash income plus a non-cash adjustment for change in livestock numbers

OpEx (Operating Expenses) is the cash farm working expenses, plus non-cash adjustments for unpaid labour and management, owned run-off, change in feed inventory, and depreciation.

These non-cash adjustments put an economic value on resources used that are not accounted for by cash, and are necessary to allow for meaningful benchmarking.

Factors affecting profitability on NZ dairy farms

The analysis of actual farm economic data from DairyNZ's DairyBase database over the last three seasons enables us to tease apart the primary factors contributing to operating profit across eight regions and five production systems. The production systems are based on the timing, purpose and amount of feed both purchased as supplements and grazing off for dry cows. For example, System 1 is all grass, self contained while System 4 purchases feed for dry cows and to extend both ends of lactation.

It is widely known that milk price is the key determinant of profit between years, but it is also outside farmers' control. That aside, what other factors differentiate farms by profit? Farm-to-farm variation in Operating Profit/ha is closely related to farm-to-farm variation in operating expenses/Kg MS and explains around 70% of the variation in 2006-07. In contrast, milk production/ha generally only explains 25 to 33% of the variation in operating profit.

Notes:

The slope closely reflects the average production (Kg MS/ha), and the vertical axis intercept is essentially the average GFR $/ha, 4,177 in 2006-07 and 7,668 in 2007-08, or in other words if costs were $0 the profit would be the same as the revenue.

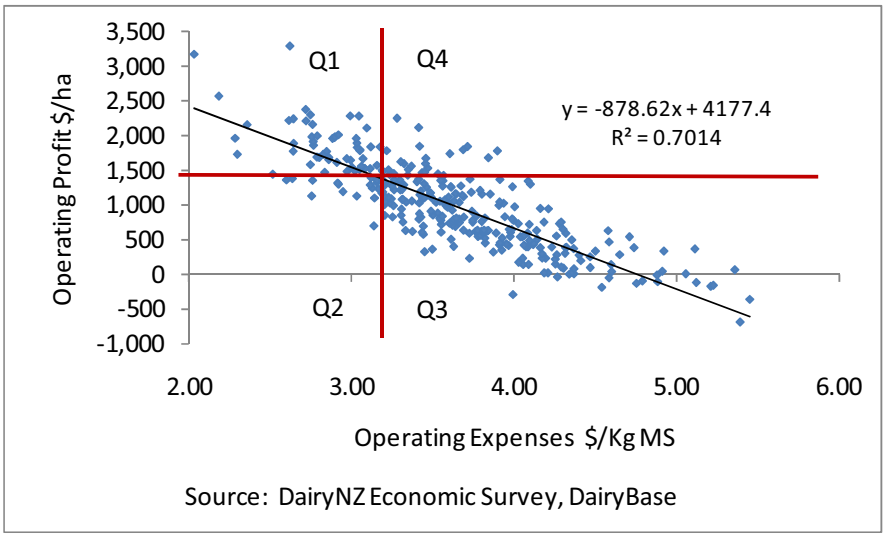

Figure 1: 2006-07 Owner-Operators Profit Matrix

This graph indicates both operating expenses and milk production are important factors in farms being profitable. However, we cannot aim to achieve one of these components in isolation. The average cost of milk production (OpEx/Kg MS) is the single greatest predictor of operating profit/ha between farms through time. This high correlation tells us it is the marginal return decisions that are more important in determining profit rather than the total volume of milksolids produced or the total costs.

Regional and system variations

Regional analysis of factors influencing farm-to-farm variation in operating profit/ha show very similar trends to those nationally. The linear regression between operating profit/ha and OpEx/Kg Ms for Waikato farms were $R^2 = 0.71$, 0.76 and 0.70 for the three seasons ending 31 May 2008. For the South Island (excluding Tasman-West Coast) the R^2 relationships were 0.79, 0.65 and 0.55 over the same three seasons.

The high input versus low input debate and in particular which of the five production systems is more profitable is interesting and often heated. In the analysis, Systems 1 and 2 were combined to form a low input category and Systems 3, 4 and 5 were combined to form a high input category. Within these two groups of farms the farm-to-farm variations in operating profit/ha compared to OpEx/Kg MS and milk production (Kg MS/ha) respectively showed similar relationships for the three seasons. Generally higher input systems have higher

milksolids production but the additional expenditure to achieve the higher production does not lift profit. There is a large overlap in operating profit/ha distributions amongst the five production systems and hence there is very little difference in average operating profit/ha between farm systems.

Region and/or production system on their own do not explain differences in operating profit/ha. Farms in any region with any production system can be in the top 20% of profitable farms. Therefore, the difference between highly profitable farms and less profitable farms is largely due to better marginal decisions and more efficient use of the resources available. Note: within regions some farms do have natural advantages such as naturally fertile soils and more reliable rainfalls.

Top quadrant farms

Top farms can be classified as the most profitable farms. While it is important to be highly profitable it is also desirable to be efficient and have low operating expenses/Kg MS in order to reduce risk to low milk payouts and/or rising inflation. 18% of farms have both high operating profit/ha (top 25%) and low operating expenses/Kg MS (lowest 25%) as shown by quadrant 1 (Q1) in figure 1, i.e. high profit and low risk.

While this is a good diagnostic tool for categorising farms and farmers should aspire to be in Quadrant 1, it does not show the reasons for farms being in this quadrant compared to others. Size of farm measured in hectares and cows, regional location and production system had no influence on the farm position in the profit matrix. Table 1 compares the average of Quadrant 1 (to farms) to the NZ average for a number of KPIs. However, not shown is that a wide distributions for each of these measures exists. In fact, 17% of Quadrant 1 farms had below average milksolids production/ha and 30% had below average stocking rates.

Notes:

Table 1. 2006-07 Owner-operator Quadrant 1 farms compared to the NZ average (KPIs)

KPI	Q1 (Top 18%)	Average	Importance to $OP/ha variation
Number of farms	57	318	
Cows	332	339	None
Hectares	112	122	None
Stocking rate	2.95	2.77	Very small
MS/ha	1,100	978	Some
GFR $/Kg MS	4.53	4.58	None
OpEx $/Kg MS	2.89	3.58	High
Operating profit $/ha	1,811	976	

Source: 2006-07 DairyNZ Economic Survey, DairyBase

Other interesting points are there is virtually no difference in GFR/Kg MS, as this is largely milksolids payouts. Operating profit/Kg MS is on average 65% larger for top farms but when production differentials are accounted for operating profit/ha is twice as large for top farms

Table 2. 2006-07 Owner-operator Quadrant 1 farms compared to the NZ average (expenditure/Kg MS)

Expenditure $/Kg MS	Q1 (Top 18%)	Average	Q1 as a % Average
Labour & Management	0.73	0.88	-17%
Animal health & breeding	0.24	0.26	-8%
Supplementary feed & grazing	0.61	0.74	-18%
Fertiliser, regrassing, irrigation, W&P	0.36	0.51	-29%
Energy, R&M, farm dairy	0.49	0.60	-18%
Administration, insurance, and rates	0.21	0.23	-9%
Depreciation	0.25	0.36	-31%
Farm Working Expenses	2.26	2.71	-17%
Operating expenses (OpEx)	2.89	3.58	-19%

Source: 2006-07 DairyNZ Economic Survey, DairyBase

Table 2 shows that in general Quadrant 1 farms have $0.45/Kg MS lower farm working expenses and $0.69 less operating expenses/Kg MS. This is equivalent to 45kgs milksolids/cow at a payout of $4.15 in 2006-07. The major differences in costs are with:

- labour & management, less labour employed per cow on Quadrant 1 farms
- supplementary feed, better response from feed for Quadrant 1 farms
- fertiliser, simpler fertiliser programme, efficient fertiliser application, and lower nitrogen use on Quadrant 1 farms
- energy and R&M, Quadrant 1 farms tend to do many jobs themselves and have less requirement for major repairs;
- depreciation is also a little lower on top farms showing not as much capital is tied up in plant and machinery

Notes:

The next section will focus on the physical management aspects, with a particular focus on producing more milk for Canterbury operations. Note: while milk production is important it is the average cost of milk production that is the key driver of profit/ha.

Milk production

Increasing milk production will lead to higher operating profit; provided the cost of achieving the extra production does not exceed the extra revenue (marginal revenue is greater than marginal cost). Milk production/ha is the output of the amount of feed eaten and how efficiently that feed is converted to milk (feed conversion efficiency) shown in equation 2.

Eq2: Milk Production (Kg MS/ha) = Feed eaten/ha (t DM/ha) * Feed Conversion Efficiency (KG MS/t DM eaten).

Feed harvested (eaten)

Feed harvested (eaten) has a very good relationship with the amount of milk produced. Pasture harvested is a function of being able to grow grass, and having the farm programme and management skill to harvest the feed. For every extra tonne of feed dry matter harvested/ha, the production increased 111 Kg MS/ha (Figure 2). Therefore at a $5 payout, farmers could afford to spend (total costs not just the cost of feed) up to approximately $550/ha or $180/cow if stocking rate is 3.0 cows/ha to increase profits.

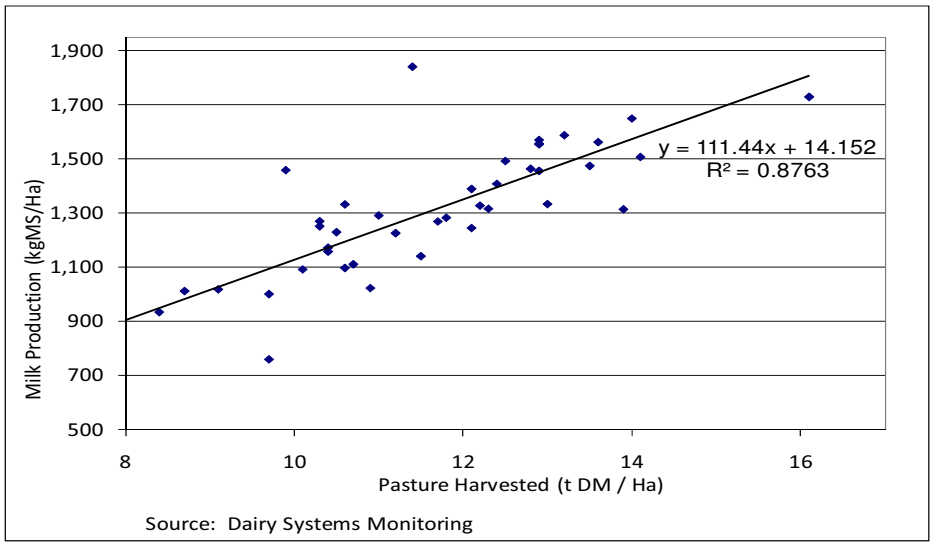

Figure 2. 2007-08 Milk Production (Kg MS/ha) vs Pasture harvested (t/DM/ha)

Options to grow more grass

Irrigation, quantity and reliability

Farms with less than ideal reliability are struggling to hold pasture quality and pasture covers. Growth rates are taking a knock and as a result higher levels of supplementing are required in the summer. This was very notable this season with extended dry spells. Well planned and built pivots will achieve the best pasture growth rates in hot dry conditions (Jan/Feb). These systems applied 5 mm of irrigation every 5 days or less. Irrigations systems, unable to match this performance failed to grow the grass, often resulting in a 30 % drop in growth rates.

Regrassing

High performing farms have a high standard of pasture, often due to the recent development on these properties. At this stage, it appears the high quality pastures will persist longer underneath pivots compared to lower performing irrigation systems. If you are in a summer dry area, your area of regrassing per year will need to be higher. Summer crops and alternative pasture species (lucerne) are often good ways of achieving quality and yield.

Nitrogen and pasture technologies

There are a number of technologies coming on the market, for example progib, Eco-N, Sustain etc. You need however, to confirm the science is robust and the product is suitable for your property and pasture species before spending a lot of money.

Options to harvest more grass (feed conversion efficiency)

Stocking rate

It is essential that the stocking rate allows cows to express their optimum milk production for high profit. If your stocking rate is too high, you will limit your peak and summer production with underfeeding. Too low, and you will not harvest the grass. It is getting the balance right, but if you are not sure ask a local consultant you respect.

Notes:

Increase herd quality (BW)

Many farms have a big tail end, low BW cows. Current stock market conditions will allow you to tidy up your herd cost effectively.

Increase seasonal appetite

Higher peak in the spring increases the potential demand from the cow in the summer / autumn months with higher per cow production. To understand the nutritional requirements of the pasture-based dairy cow, and consequently where responses to supplements will increase profitability, you require an understanding of cow nutrition, and when and where appropriate supplements will improve milk production.

Pasture Quality

For many farmers, improved pasture management and grazing decisions remain the greatest opportunity to improve profits. Developing systems to ensure the pasture is monitored, residuals are consistent and cows are well fed is paramount. These systems are not difficult to develop and maintain, but making better decisions from these systems is what counts.

Supplement Feeding

In effect, supplements should be used to manage pasture, not to feed the animal. Supplementary feeding is only beneficial when you do not have sufficient pasture. There is no point in wasting pasture or compromising quality due to feeding supplements.

There are two main types of supplement use:

7. Systems 3 and 4 – shoulder season
8. System 5 - high input all season

Systems 3 and 4 – shoulder season

Shoulder season feeding of supplement offers a better opportunity to achieve a profitable response from feeding supplements as shoulder season feeding extends lactation. As there are no additional overhead costs, the returns from shoulder season feeding do not incur any hidden costs. The alternative is dry off the cows, which can result in costs to maintain cows without an income, e.g. winter grazing.

System 5 - high input all season

Typically these farms are running a higher stocking rate to utilise all the grass and the supplements fed. These high input herds run a stocking rate of 0.2 to 1.0 cows/ha higher than a pasture based System 4 farm. Over 200 Ha, this is 40 to 200 extra cows. These cows incur a higher cost structure, close to $1,000 per cow or for a cow producing 450 Kgs MS $2.20/cow.

The 2007/08 DSM responses to supplements have been used to assess the profitability of shoulder season vs high input feeding in Table 3. Shoulder season feeding to extend lactation length can be profitable if well implemented and managed. High input feeding is going to break even, in a best case scenario. High input farms require very high responses to feed, e.g., grain, very high per cow production (550+ kgMS/cow), and very high standard of feeding and management skills to be at least remotely profitable. Do you have these skills; can you employ them for the long term? Is it worth the risk?

Table 3. 2007-08 feed and feeding costs

	Feed Response	**Feed Cost**	**Feeding Cost**	**Shoulder Feeding**	**High Input Feeding**
	kgDM/kgMS	**$/kgDM**	**$/kgDM**	**$/kgMS**	**$/kgMS**
Grain	9.4	$ 0.37	$ 0.01	$ 3.59	$ 5.79
Grain (incl depreciation)	9.4	$ 0.37	$ 0.04	$ 3.87	$ 6.07
Grass/Maize Silage	13.8	$ 0.32	$ 0.07	$ 5.38	$ 7.58
PKE	10.4	$ 0.24	$ 0.04	$ 2.96	$ 5.16

Source. 2007-08 DSM group

Liquidity

The two key areas of financial risk for dairy farmers both have impacts on liquidity. These are risks in relation to payout changes and risks related to debt servicing (borrowing). Financial liquidity can be measured at a number of points through the flow of funds statement, and often overall cash surplus/deficit is used to describe business liquidity. However, often dairy farm businesses are buffered by income from other farming operations such as beef, sheep or forestry, off-farm income and/or introduced funds. Equation 3 (Eq3) is set out to determine the liquidity from dairy farming.

Eq3: Dairy Cash for Growth (DC4G)= Net Dairy Cash Income – Farm Working Expenses – Rent & Interest – Tax - Drawings.

Notes:

Dairy Cash for Growth (DC4G) is the cash available after all necessary operational and personal costs have been paid. In essence it is the cash remaining from dairy farming for capital development, further investments and/or to repay debt (mortgage principal). In the five years prior to 2007-08, the average Owner-operator DC4G was -$0.01 or virtually break even. For the average farm, this means five years of no growth resulting from existing dairy farm operations. Three of the five years produced negative DC4G. This backs up the theory that growth from businesses is coming largely from off farm funds and/or capital gains made on appreciating assets such as land and dairy company shares.

Figure 3 shows the distribution of Owner-operator farms with FWE and Interest & rent/Kg MS in 2006-07. 11% of farmers were paying more than $4.50/Kg MS on these two key cash items, in a year when milk payments received averaged around $4.15 plus a further $0.30 in other cash income, i.e. close to $4.50 net cash income from dairy farming.

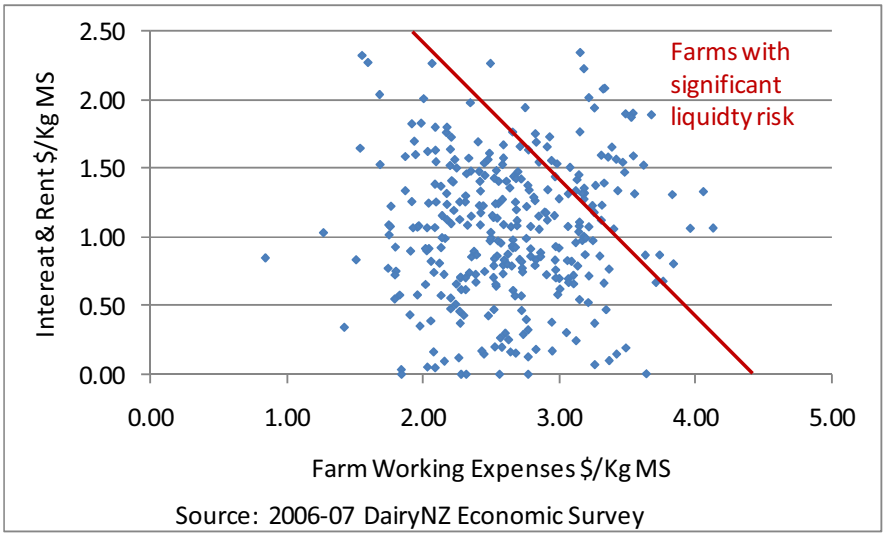

Figure 3. 2006-07 NZ Owner-Operators Interest & Rent/Kg MS vs FWE/Kg MS

We can expect in years of higher payout that farmers will spend more cash. Trends over the last decade show that for every extra dollar in cash income received we can expect around 40 cents more to be spent on cash farm working expenses. This is partly due to rises in on-farm inflation (price increases for inputs) as well as increased discretionary spending such as catch up on R&M or extra fertiliser. However, the correlation with high payouts and milk production are poor. Managers need to always keep an eye on liquidity, producing cash budgets and monitoring cash flows monthly in order to make sound financial decisions.

Conclusion

Operating profit is a function of volume of sales and profit per unit sold. We have no control over milk price, leaving the profit-determining factors we can control to be cost of production (OpEx/Kg MS) and milksolids yield (MS/ha). Pasture harvested is the key to milk production. Supplements should only be used when there is a feed deficit i.e. shoulder. Highly profitable farms generally have good levels of production and low cost of production. Marginal decisions made by farm management are the key ingredient to having a high profit farming operation. Managers need to produce cash budgets and monitoring cash flows regularly in order to make sound financial decisions.

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Notes: