

Balancing dairy production and profits in Northern Australia

QDAS Financial and production trends – 2006

Compiled by

Ray Murphy, Toowoomba

Graeme Busby, Toowoomba

Geoff Hetherington, Mutdapilly

Ross Itzstein, Nambour

Gordon Simpson, Toowoomba

**Department of Primary Industries and Fisheries
Queensland**

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The Department of Primary Industries and Fisheries (DPI&F) seeks to maximise the economic potential of Queensland's primary industries on a sustainable basis.

This publication provides a summary of physical and financial data from 142 dairy farms in Northern Australia that use the Queensland Dairy Accounting Scheme. It provides background information for farmers, agribusiness and advisers who have an interest in profitable and sustainable dairy production systems.

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Inquiries should be addressed to copyright@dpi.qld.gov.au (phone 61 7 3404 6999), or

Director,

Intellectual Property Commercialisation Unit
Department of Primary Industries and Fisheries
GPO Box 46
Brisbane Queensland 4001
Phone +61 7 3404 6999

Data enquiries should be addressed to:

Graeme Busby

Department of Primary Industries and Fisheries
203 Tor Street
PO Box 102
TOOWOOMBA QLD 4350
Australia
Phone +61 7 4688 1254
Fax +61 7 4688 1477
Email: graeme.busby@dpi.qld.gov.au

Introduction

This report contains physical and financial data from 142 farms and includes data from all dairy regions in Queensland and Northern New South Wales. For the purpose of this report, the area is called the Northern Australia dairy region, and this area is serviced by Subtropical Dairy.

It is estimated that the region produced approximately 789 million litres of milk from 1,037 farms in 2005–2006.

Section 1 of this report presents a summary of the key findings. Three business traits – solvency, profitability and efficiency were used to measure farm performance. The results for these traits are presented using 15 key performance indicators.

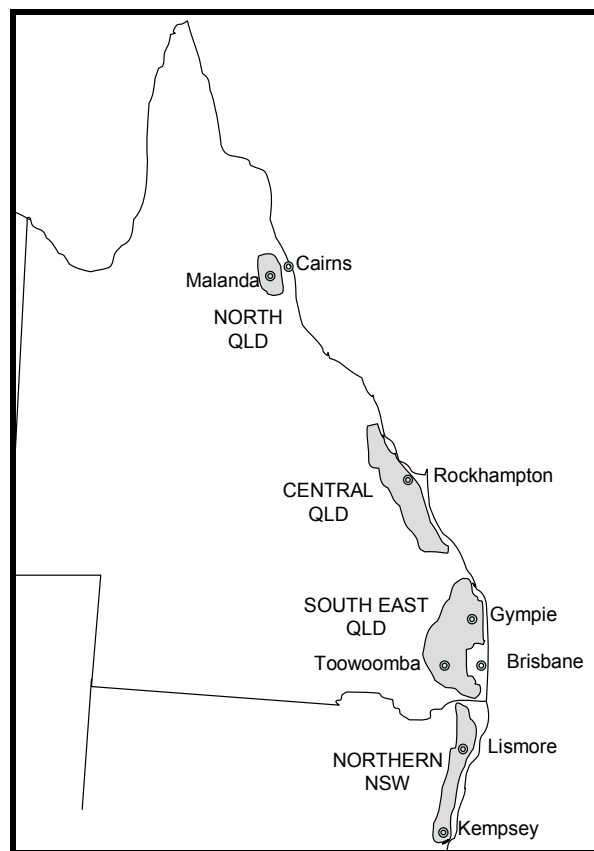
Section 2 details the trends from 87 farms that have contributed data over four continuous years. Analysis of their data gives an accurate reflection of changes in the Northern Australian dairy industry.

Section 3 details the characteristics of the most profitable farms in QDAS. Production per cow, herd size, production from home grown feed, strategic nitrogen application and stocking rates are all examined.

Section 4 analyses the cost of production, calculated in cash and on a profit basis, as well as capital efficiency, administration costs and labour.

The appendices contain summary reports for all QDAS farms, the top 25% farms and each region. The appendices also contain a list of definitions for the business traits and key performance indicators used in QDAS.

Figure 1. The dairying regions of Northern Australia



Objectives

The objectives of this book are to:

- Provide Queensland Dairy Accounting Scheme (QDAS) participants with a summary of physical and financial data from South-east Queensland, Central Queensland, North Queensland and Northern New South Wales. This will give dairy farming families/enterprises information that will enable them to make more informed business decisions.
- Act as a resource guide for local advisers, consultants and other industry service personnel who wish to encourage positive change.
- Provide background material for industry participants negotiating with banks, governments, suppliers or other agents.

About QDAS

The Queensland Dairy Accounting Scheme (QDAS) was established to improve the understanding of business principles among advisors and dairy farmers by providing farm management accounting and analysis. Originally the basis of the analysis was variable costs. The data was used to answer questions such as “is the production of an extra unit of milk profitable”. QDAS has evolved to now examine the business traits of solvency, profitability and efficiency but still maintains a similar aim to help dairy farmers make informed decisions based on business information.

Officers of the Queensland Department of Primary Industries and Fisheries, the NSW Department of Primary Industries and milk processing companies collect data by visiting farms between August and November.

Farmer participation in QDAS is voluntary and free. Results and trends need to be interpreted carefully as QDAS farms have larger herds and produce more milk per farm than the Northern Australian average.

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The authors wish to thank all cooperating farmers who supplied data and provided valuable feedback in discussion groups held during late 2006.

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1. 2005–2006 Results – Key findings

Table 1 below contains the average QDAS result for fifteen Key Performance Indicators (KPI) for 2005-2006 and the preceding three years. Further to this is the calculation of these KPI for the top twenty five percent of farms. These top farms have been identified as the farms with the highest dairy operating profit measured as dollars per cow.

Dairy operating profit highlights the amount of profit retained after paying all expenses except

finance costs and taxes. These expenses include the non-cash items of depreciation and an allowance for the manager's time and skill (called imputed labour). Cattle trading profit and inventory adjustments are also included. Appendix 5.1 shows graphically the income and costs included the calculation of dairy operating profit.

Table 1. Financial and performance ratios for QDAS farms (2002-03 to 2005-06)

Business traits and indicators ⁽¹⁾	Top 25%	QDAS average	Past QDAS averages		
	2005-06	2005-06	2004-05	2003-04	2002-03
Solvency					
Equity (%)	81	85	82	80	83
Total liabilities per cow (\$)	2,414	1,864	1,798	1,778	1,437
Interest paid/cow (\$)	184	156	131	129	101
Profitability					
Return on assets - operational (%)	6.3	2.7	2.3	1.1	1.6
Return on equity - operational (%)	5.6	1.0	0.6	-1.1	-0.2
Operating profit margin (%)	28.6	13.8	11.7	5.3	6.3
Dairy operating profit (\$/cow)	800	325	246	NA	NA
Efficiency – Capital					
Asset turn over ratio (%)	22	20	20	22	25
Efficiency – Financial					
Feed related costs (c/L)	18.5	20.3	17.2	17.2	19.4
Margin over feed related costs (\$/cow)	1,128	878	925	909	821
Total variable costs (c/L)	21.7	23.8	22.6	22.3	24.4
Gross margin - milk (\$/cow)	935	681	638	596	536
Efficiency – Physical					
Litres of milk from home grown feed (L/day)	10.0	9.0	9.9	9.8	9.8
Production per cow (L)	6,095	5,670	5,310	5,345	5,269
Litres per labour unit					
- On farms <750,000 L	290,877	294,875	283,251	281,80	260,755
- On farms >750,000 L	460,682	486,356	426,736	458,000	450,464

⁽¹⁾ The definition of each indicator and how it is calculated can be found in Appendix 5.9.

1.2 Major findings for industry

Solvency

Farm equity increased slightly in 2005-2006 to 85%. However, debt per cow rose to \$1,864. Asset values increased mainly due to the land values in semi urban areas. Table 15 shows the average investment for the QDAS group between \$10,377 to \$13,486 per cow in Queensland, while in Northern NSW the value has risen to \$19,966 per cow. The top group of farms had a higher debt per cow at \$2,414.

Profitability

This year QDAS calculates return on assets and return on equity for the business operation and also when land appreciation is considered. The average operational return is low at 2.7%, but top farms were able to achieve 6.3%, competitive with fixed interest returns.

Operating profit was low at \$325 per cow or 13.8% of income, but impressive in the top group at \$800 per cow or 28.6%.

Efficiency

Given dry conditions in most of the collection areas (except North Queensland) a variable cost figure of 23.8 cents per litre was expected. The litres of milk from home grown feed including conserved silage and hay was low but with the seasonal conditions probably acceptable. An improvement in per cow production was recorded and is probably due to the higher concentrate levels fed during the drought and the more precise rations fed on feed pads on many farms. On average the production per cow rose by 360 litres to 5,670 litres.

1.3 Major findings for farmers

The average cost of production was 38.7 cents per litre, giving a cash surplus of just 2.8 cents per litre. The group labelled top had a much higher surplus of 6.9 cents per litre attributed to higher cattle sales and feed related costs being approximately 2 cents lower (Section 4.1).

The appendices show the cash gross margin for all dairy regions. The variable costs for each region range from 22.1 to 25.0 and are shown on Table 2.

Feed related costs account for 83 to 86 percent of total variable costs and it is impossible to achieve healthy cash or profit margins without optimising feed inputs.

Table 2. Variable costs in cents per litre (2005-2006)

	Cents/Litre
South-east Queensland	24.0
Central Queensland	23.7
North Queensland	22.1
Northern NSW	25.0

Regional trends

87 farms provided continuous data over the last 4 years. Analysis on this data (section 2) shows the trends since 2003. Farms in South-east Queensland and Central Queensland showed an improved dairy operating profit while farms in North Queensland and Northern NSW showed a decline. Farmers in Central Queensland have made a concerted effort to raise per cow production and the result achieved is a creditable increase of 575 litres to 6,197 litres.

Top 25%

The group labelled top achieved their status because:

- They had higher per cow production, 6,095 versus 5,535 litres
- Feed related costs were 1.4 cents lower, 18.5 versus 20.9 cents per litre
- They had a higher gross margin per cow
- They produced more milk from home grown feed, 60% versus 55%

This all translated to the bottom line where operating profit per cow was \$800 versus \$325.

Efficiency

Farms with high production per cow, for example greater than 6,000 litres, had higher operating profits in both total dollars and when expressed as a percentage (see Section 3.1).

Farms producing large volumes of milk, for example the groups averaging 1.6 & 2.6 million litres annually, showed that size was not an impediment to achieving high volumes per cow (see Section 3.2). The largest producers achieved 6,198 litres per cow, with an average herd of 424 cows. These two high groups achieved the highest operating profits.

When all farms were divided into two groups based on variable cost of production, the group with costs below the average of 23.8 cents per litre had the highest production from home grown feed and the highest operating profit per cow.

When farms were analysed based on stocking rate (cows/ha) the data showed that production per hectare could be increased but the economics indicated that a slightly more conservative rate, 2.0 to 2.4 cows per hectare, produced the highest gross margin.

The investment required for dairying in all regions is shown in Section 4.2. Land accounted for approximately three quarters of the asset value. Tradable water in NNSW adds considerably to the values recorded.

Administration costs get proportionately lower as farm production increases, varying from 3.2 c/l (\$17,815) on small farms to 1.8 c/l (\$48,023) on the largest farms (see Section 4.3).

1.4 Changes to QDAS calculations

As a result of agreement between officers from the Queensland Department of Primary Industries & Fisheries and NSW Department of Primary Industries to standardise both states financial indicators and calculations there have been several changes to QDAS calculation from previous years.

- The total litres of milk production per farm now includes milk used on farm (mainly milk to feed calves). Previously milk production was recorded as the milk supplied to the factory. As a result of this change, all per litre calculation are made using the milk produced on the farm, with the exception of milk receipts which are divided by the litres delivered to the factory.
- Repairs and maintenance on plant are now included in feed related costs rather than other variable costs.
- Return on assets (RoA) and return on equity (RoE) calculations have been separated into two indicators, operational and including capital growth. RoA and RoE operational only considers the return of the business operation. RoA and RoE including capital growth considers the return of the business operation plus the growth in the land value.
- While liquidity is a vital business trait in any business analysis, QDAS no longer reports figures on Dairy Cash Surplus because many farms do not supply the amount of their personal drawings.

1.5 Cyclone Larry hits North Queensland

Cyclone Larry ripped through the North Queensland dairy region on 20 March 2006 causing extensive damage to farm infrastructure and disrupting farm production. This damage was followed up by an extended period of heavy rainfall which further disrupted dairy farming.

The timing of Larry near the end of the financial year means that the full financial effects were not reflected in 2005-2006 data. Farmers' actions in the three months after Larry concentrated on cleaning up debris to return dairy operations to some form of normality and culling cows affected by the cyclone.

2005-2006 QDAS data for North Queensland shows that feed costs increased by 1.9 cents per litre, which is similar to QDAS results for all of the Northern Australian dairy industry. The North Queensland gross margin rose by 2.4 cents per litre due to an increase in milk and non-milk receipts.

The longer term effects of cyclone Larry, that are expected to be reflected in the 2006-07 QDAS data, will be an increase in the following items.

- Repairs and maintenance expenditure
- The culling rate of cows
- Expenditure on capital infrastructure
- Borrowings due to the uptake of NDRA cyclone recovery loans



Cyclone Larry caused extensive disruption to every part of dairy farm life

2. Regional trends

Participation in QDAS is voluntary with 142 farms taking part this year. While the sample size of 14% of farms provides significant information for the industry, it is not a random sample of the industry. In fact, the average QDAS farm produces 373,000 litres more milk annually than the average Northern Australian dairy farm.

From the sample, 87 farms have taken part in QDAS for at least the last four years. An analysis of the data from these farms shows the trends in KPI over the last four years, for each of the four dairy regions in Northern Australia.

To achieve a healthy gross margin farmers must optimise feed inputs and manage total variable costs. Variable costs account for a large percentage of the gross milk income – 56 cents (Central Queensland), 66 cents (South-east Queensland), 72 cents (Northern NSW) and 65 cents in (North Queensland) of each dollar of milk income.

Last year we predicted that on average farmers had reduced their total variable costs as much as possible, we believed twenty-two cents per litre may be the base variable cost. Central Queensland was the only region to have total variable costs under 22 cents per litre. In all other regions the variable costs were similar to the drought year of 2003. With drier conditions in most regions the higher fertiliser prices were not reflected in feed costs. Farmers tended to spend a similar dollar amount but obviously received and used a lesser tonnage of fertiliser.

Land values rose in all areas. While the cash position remains tight for many farmers, the higher land values should be reflected by an improvement in net worth on the balance sheet.

A gross margin for each region can be found in Appendices 5.5 to 5.8.

Figure 2 Dairy operating profit per cow (2002-03 to 2005-06)

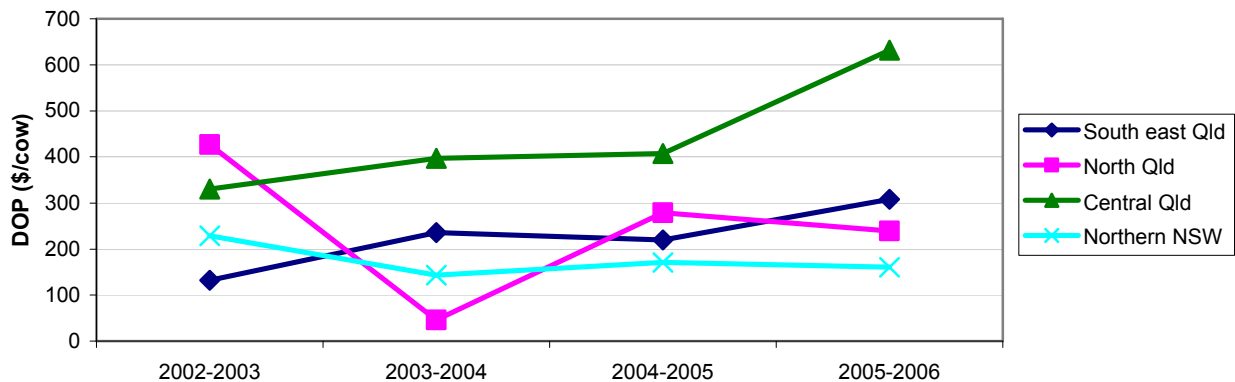
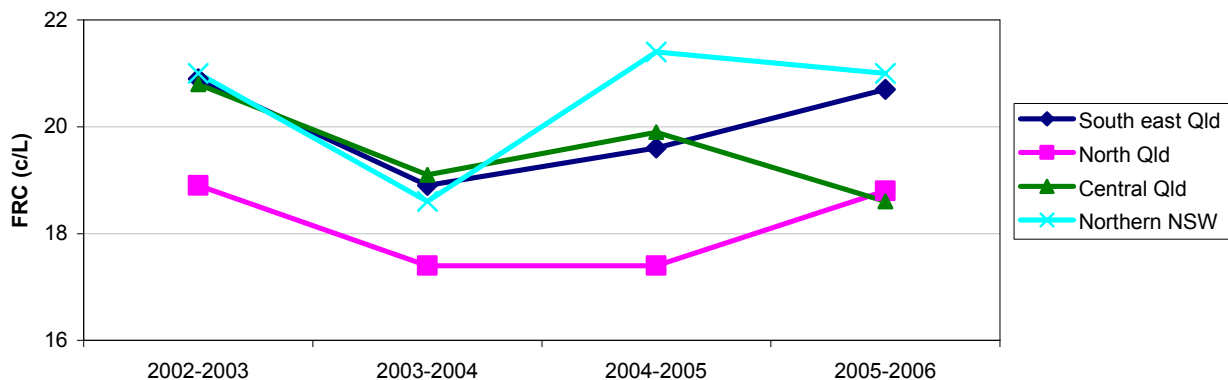


Figure 3 Feed related costs per litre (2002-03 to 2005-06)



2.1 South-east Queensland

- Average farm production has increased to 1,098,209 litres or by 10 percent over the period, due to an increase in herd size, 13 additional milkers and a production increase per cow of 180 litres.
- Feed related costs increased by 1.1 cents per litre on last year and total variable cost by 1.2 cents per litre.
- Dairy operating profit per cow was \$308, a rise of \$176 over the last three years.

Table 3. South-east Queensland trends (2002-03 to 2005-06)

	2002-2003	2003-2004	2004-2005	2005-2006
Total milk income (c/L)	34.5	34.0	35.2	37.0
Average herd size	176	182	187	189
Production per cow (L)	5,571	5,564	5,660	5,751
Feed related costs (c/L)	20.9	18.9	19.6	20.7
Total variable costs (c/L)	23.8	21.8	22.5	23.7
Gross margin (c/L)	10.7	12.2	12.6	13.4
Equity (%)	85	87	87	88
Return on assets (%)	1.6	2.5	2.5	2.2
Operating profit margin (%)	3.5	10.0	8.5	10.3
Dairy operating profit (\$/cow)	132	236	220	308

2.2 North Queensland

- Average milk production was 1,110,720 litres in 2006, very similar to 2003. The table below shows a decline in cow numbers while production per cow increased.
- In the last year feed costs increased 1.4 cents up to 18.8 cents per litre, total variable costs increased to 22.5 cents per litre and milk income increased by 3 cents per litre.

Table 4. North Queensland trends (2002-03 to 2005-06)

	2002-2003	2003-2004	2004-2005	2005-2006
Total milk income (c/L)	33.5	30.8	31.7	34.7
Average herd size	204	203	200	195
Production per cow (L)	5,456	5,359	5,691	5,695
Feed related costs (c/L)	18.9	17.4	17.4	18.8
Total variable costs (c/L)	22.8	21.3	21.1	22.5
Gross margin (c/L)	10.7	9.5	10.6	12.1
Equity (%)	80	82	82	84
Return on assets (%)	3.2	0.3	2.4	1.4
Operating profit margin (%)	12.8	-0.1	13.8	9.5
Dairy operating profit (\$/cow)	427	46	279	239

2.3 Central Queensland

- Average farm production for Central Queensland increased to 979,126 litres, an increase of 30 percent over the last four years.
- Table 5 shows that herd size has increased from 140 to 158 milkers and production per cow has increased by 842 litres to 6,197 litres per cow.
- Total milk income per litre was consistent with last year, indicating most farms were supplying a large percentage of their daily milk as PDA. With the increase in production per cow, a healthy increase in dairy operating profit was recorded.

Table 5. Central Queensland trends (2002-03 to 2005-06)

	2002-2003	2003-2004	2004-2005	2005-2006
Total milk income (c/L)	40.0	42.0	42.6	42.6
Average herd size	140	149	149	158
Production per cow (L)	5,355	4,972	5,622	6,197
Feed related costs (c/L)	20.8	19.1	19.9	18.6
Total variable costs (c/L)	25.8	23.8	23.8	21.8
Gross margin (c/L)	14.3	18.2	18.7	20.8
Equity (%)	75	78	76	79
Return on assets (%)	3.7	4.0	3.6	5.8
Operating profit margin (%)	13.0	16.8	16.2	22.1
Dairy operating profit (\$/cow)	330	397	407	632

2.4 Northern New South Wales

- Average annual farm production increased over the last four years by 24 percent to 1,464,918 litres.
- The increase in production was achieved solely by a herd increase of 53 milkers, while production per cow remained steady.
- Total variable costs increased to 25.4 cents per litre resulting in a reduced dairy operating profit.

Table 6. Northern New South Wales trends (2002-03 to 2005-06)

	2002-2003	2003-2004	2004-2005	2005-2006
Total milk income (c/L)	36.5	35.4	35.1	35.8
Average herd size	220	237	254	273
Production per cow (L)	5,364	5,481	5,400	5,366
Feed related costs (c/L)	21.0	18.6	21.4	21.0
Total variable costs (c/L)	24.6	22.6	24.8	25.4
Gross margin (c/L)	11.8	12.8	10.3	10.4
Equity (%)	79	79	83	83
Return on assets (%)	3.1	2.3	1.1	1.0
Operating profit margin (%)	10.1	6.3	7.9	6.5
Dairy operating profit (\$/cow)	229	143	171	160

3. The characteristics of profitable farms

To identify the characteristics of the most profitable farms, all farms were ranked in order of dairy operating profit per cow. They were then divided into two groups, the top 25% and the remaining 75%. Table 7 compares the KPI of the two groups.

Our analysis shows that the more profitable farms performed a number of small management operations slightly better than the average farm.

Milk receipts for the top 25% group were 1.8 cents per litre higher than for the others.

Furthermore, the top 25% group had lower operating costs, in particular 2.4 cents per litre lower feed related costs.

Finally, the production per cow of the top 25% group was 560 litres higher.

It should be noted that all dairy regions are represented in the top 25% group.

To raise production and increase margins, QDAS results indicate consideration should be given to improving the following areas.

- Production per cow
- Herd size
- Milk production from home grown feed
- Strategic nitrogen application
- Stocking rate

These issues are explained in the following sections.

Table 7. KPI for top 25% & remaining 75% of farms (2005-2006)

	Top 25 percent	Remaining 75 percent
Average herd size	193	207
Production per cow (L)	6,095	5,535
Total farm receipts (c/L)	42.6	41.1
Feed related costs (c/L)	18.5	20.9
Feed related costs (\$/cow)	1,129	1,155
Milk from HGF (%)	60	55
Gross margin (\$/cow)	1,275	917
Dairy operating profit (\$/cow)	800	168

3.1 Production per cow

Table 7 shows that the production per cow of the top 25% group is 560 litres more than the production of the remaining farms. Throughout the history of QDAS it has been consistently shown that as a cow's diet is improved, thereby utilising her genetic potential, the result will be an increase in the margin over feed costs, the gross margin per cow and the gross margin for the whole farm.

This is elaborated in Table 8 where farms are divided into groups by production per cow. There are several interesting issues raised by this data.

- The data shows that it is not the farms with the small herds that are able to have high production per cow. In fact it is the farms with large herds that are implementing management systems to greatly increase production per cow, 6,572 and 7,077 litres in the higher production groups.
- While the margin over feed related costs per litre fluctuated on a per litre basis, the margin per cow increased from \$472 to \$1,059.
- As production per cow increases so does the gross margin and operating profit per farm.

There may be a limit however to increasing production using high cost supplements. The curve shown in Figure 4 is starting to flatten out indicating an economic production per cow may have been reached. To calculate herd size QDAS includes milking and dry cows. This results in a lower per cow production than might be found from herd recording statistics. When returns are based on international export milk prices, high input dairy systems may be unprofitable. There is

also evidence that production costs in the tropics are higher than in temperate areas of Australia. If changing to a high input system it is essential to maximise home grown feed utilisation and produce large volumes of milk, in an industry with low margins.

With the higher feed costs due to the continuing drought it is essential that producers monitor margins on a more regular basis and have a plan to deal with the changing conditions.

At production levels of 6,000-7,000 litres, at least two tonnes of concentrate per cow will be required. It has been shown that optimising milk production from paddock feed is essential as a first step in achieving a high gross margin for milk produced. As the daily production increases the proportion of nutrients partitioned for milk production increases.

Figure 4. The relationship between production per cow and the margin over feed costs (2005–2006)

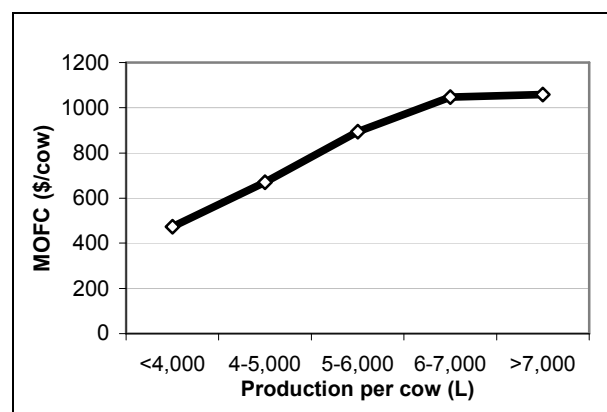


Table 8. KPI for 5 per cow production groups (2005-2006)

	<4,000 L	4-5,000 L	5-6,000 L	6-7,000 L	>7,000 L
No of farms	14	27	49	33	19
Farm milk production (L)	592,974	939,807	1,172,826	1,330,752	1,535,092
Average herd size	166	203	211	202	216
Production/cow (L)	3,561	4,625	5,557	6,572	7,077
Total milk income (c/L)	35.0	36.5	36.6	36.7	36.0
Margin over FRC (c/L)	13.2	14.5	16.1	15.9	14.9
Margin over FRC/cow (\$)	472	671	895	1,047	1,059
Gross margin/cow (\$)	346	498	695	842	816
Gross margin/farm (\$)	57,436	101,094	146,645	170,084	176,256
Dairy operating profit (\$)	17,490	46,436	67,734	83,024	98,375
Dairy operating profit (\$/cow)	105	229	321	411	455

3.2 Herd size

With declining terms of trade, dairy farmers must continually increase production to remain profitable. A key part of this is increasing herd size. Table 9 groups farms by the total production to investigate the importance of herd size.

- The increase in farm production in Table 9 is not only attributed to larger herds. Production per cow also increased to a high of 6,198 litres in the largest herds.
- The fact that production per cow and gross margin per cow increase as herd size increases, shows that the farmers with larger herds are able to produce milk efficiently. Increased cow numbers does not have to mean lower margins. Gross margin per cow was highest for the greater than two million litres group. As the variable costs account for 60 to 70 percent of every milk dollar, a high gross margin is important.
- Larger farms produce more milk per labour unit, a key efficiency trait that must be addressed as herds increase in size. With labour costs of six to nine cents a litre, the trade off is between paying labour and spending funds on capital improvements. Farmers' often express concern about sourcing reliable farm labour and about competing wage rates in other industries.
- Dairy operating profit per cow is displayed in Figure 6. The low result for the 1.25 – 2.0m L production group is caused by administration costs and the way QDAS calculates imputed labour.

Figure 5. Relationship between farm milk production and gross margin per cow (2005-2006)

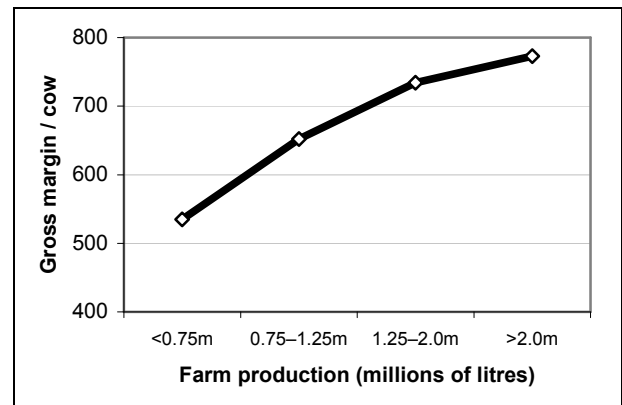


Figure 6. Relationship between farm milk production and dairy operating profit per cow (2005-2006)

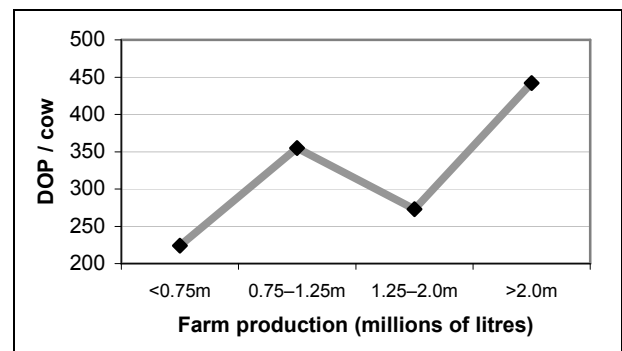


Table 9. KPI for farms in 5 production groups (2005-2006)

	<750,000 L	750,000 – 1.25m L	1.25 – 2.0m L	>2.0m L
Farm milk production (L)	550,594	992,836	1,600,431	2,631,906
Herd Size	116	178	267	424
Production per cow (L)	4,737	5,567	5,975	6,198
Margin over FRC (\$/cow)	726	859	923	968
Gross margin/cow (\$)	535	652	734	773
Gross margin/farm (\$)	62,060	116,056	195,978	327,752
Litres per labour unit	280,871	414,041	444,950	555,254
Return on assets (%)	1.4	2.9	2.4	4.7
Operating profit margin (%)	11.1	14.7	11.3	17.6
Dairy operating profit (\$)	26,084	63,309	73,163	188,033
Dairy operating profit (\$/cow)	224	355	273	442
% Milk from home grown feed	58	58	57	54

3.3 Milk production from home-grown feed

Past reports and research have shown that optimising utilisation of home-grown feed can control feed related costs and improve gross margins and profit. Farms with high paddock feed utilisation can also maintain acceptable individual cow production.

Table 11 shows the production from home-grown feed (grazing + conserved home grown hay and silage) for farms with below and above average variable costs (23.7 cents per litre). Points to note:

- All farms could improve production from home-grown feeds.
- In all regions, the low variable cost farms produced the most milk from home feed, and they also obtained the highest dairy operating profit per cow.

The production per cow shown in Table 11 is well below the potential 13–17 litres achieved from forage in research trials; the result achieved on Northern NSW farms is closer to the milk production potential from tropical pastures. Targets for milk yields can be found in Table 10.

Table 10. Target milk yields from forage

Pasture system	Tropical	Temperate
Potential yield from pasture (L)	3,500 – 4,000	4,500 – 5,200
Production target L/cow	6,500	7,500
% Required from forage	55 – 60	60 – 65
Daily milk from forage (L)	11.5 – 13.5	15.0 – 17.0

Table 11. Production per cow from home grown feed (2005-2006)

Region ⁽¹⁾	TVC < 23.7 c/L		TVC >23.7 c/L	
	Litres per cow	DOP (\$/cow)	Litres per cow	DOP (\$/cow)
South-east Queensland	9.9	555	7.4	219
North Queensland	9.2	304	8.4	267
Northern NSW	12.1	332	8.3	89

⁽¹⁾There are not enough QDAS farms in Central Queensland to make a meaningful comparison

3.4 Strategic nitrogen fertiliser application

Fertiliser use has been collated on 59 high-rainfall or irrigation farms in 2005-2006. To analyse the effect of nitrogen fertiliser use, the farms were segregated into three equal sub groups– low, medium or high based on the level of nitrogen usage.

The average nitrogen levels in the three sub groups were 43, 75 and 119 kilograms per milker respectively. The dry conditions reduced fertiliser usage when compared to levels used in the late

1990s. Insufficient data was available to calculate responses in the low rainfall areas.

The impact on production from home grown feed is shown in table 12. As nitrogen fertiliser use per cow increases the result is:

- Higher production per cow
- More milk produced from home grown feed.

Table 12. The effect of nitrogen fertiliser use on production (2005-2006)

Nitrogen usage	High rainfall		
	Low	Medium	High
Units of N/cow (kg)	43	75	119
Production per cow (L)	5,600	5,425	6,236
Production/ farm (L)	996,909	1,105,957	1,682,018
Litres from HGF/cow	2,910	3,358	3,329

3.5 Stocking rate

In Figure 7 farms are divided into two groups. Group 1 contains farms with significant irrigation and/or located in high rainfall areas. Group 2 contains farms without significant irrigation and/or located in low rainfall areas.

Data from the high rainfall/irrigated group is depicted by a solid line, while the low rainfall group is depicted by the dotted lines. Farms within a group were then sorted into three sub groups.

Milk production per hectare increased with stocking rate, but the highest gross margin was recorded at a more modest rate of 2.0 and 2.4 cows per hectare.

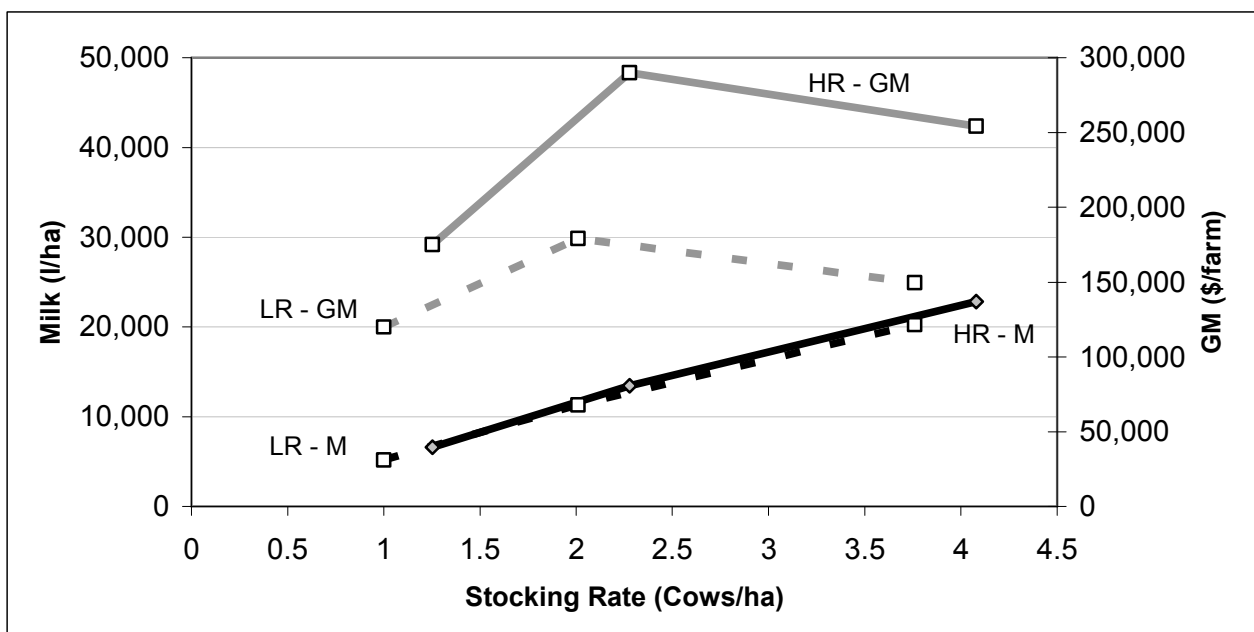
In the high rainfall/irrigated group as stocking rate increased from 1.25 to 4.08 cows per hectare, the milk produced increased from 6,632 litres to 22,842 litres per hectare. Farm gross margin rose from \$175,065 at 1.25 cows to \$290,034 at 2.28 cows per hectare. However, on farms where stocking increased to 4.08 cows the gross margin was lower at \$254,205.

In the low-rainfall areas, as stocking rate increases from 1.0 to 3.76 cows per hectare the milk produced increases from 5,188 litres to 20,251 litres per hectare. Farm gross margin rose from \$120,077 at 1.0 cows to \$179,096 at 2.0 cows per hectare. However, on farms where stocking increased to 3.76 cows the gross margin was lower at \$149,739.



Optimising stocking rate is critical to obtaining high gross margins.

Figure 7. The relationship between stocking rate, milk yield and margins (2005 –2006)



4. Other Results

4.1 Calculating total production costs

When calculating profit the following non-cash items are included:

- Adjustments to the purchased and home grown feed stocks
- Plant depreciation
- Imputed labour.

Consideration is given to the opening and closing cattle inventory, sales and purchases to arrive at the cattle trading profit.

Farms in the top group had a much higher cattle trading profit. They also produced milk 2.0 cents per litre cheaper.

A profit map showing the QDAS result for the top 25 percent of farms in 2006 is included as Appendix 5.1. The map shows how QDAS calculates profit; this format follows national benchmarking guidelines.

On a cash basis the difference between the groups was reduced, but again the top group had an advantage in slightly higher receipts and a lower feed cost.

If the return on asset is below the benchmark or target set for your farm, it is simply a matter of tracing back up the map to isolate the areas where your result differs from your predetermined target and formulating a plan to correct the problem area.

The calculations in the map are in total dollars but by dividing these figures by the annual production (litres), the number of milkers or labour units; a value per litre, per cow or per labour unit can be calculated.

Tables 13 and 14 show the cash cost and the cost as determined in a profit analyses for 2005-2006.

Table 13. Production costs on QDAS farms – profit analysis (2005–2006)

Profit analysis	Average	Top 25% farms
Total dairy receipts (c/L) ⁽¹⁾	41.5	45.8
Total variable cost (c/L)	23.8	21.7
Administration costs (c/L)	2.4	1.8
Paid labour costs (c/L)	3.4	2.9
Imputed labour (c/L) ⁽²⁾	4.0	3.9
Depreciation costs (c/L)	2.2	1.8
Finance costs (c/L)	3.0	3.2
Total production costs (c/L)	38.8	35.3

⁽¹⁾ Total dairy receipts in a profit analysis includes milk income, cattle trading profit and HGF & purchased feed changes, rebates and drought payments.

⁽²⁾ Imputed labour is calculated using the formula shown in Table 17.

Table 14. Production costs for QDAS farms – cash analysis (2005–2006)

Cash analysis	Average	Top 25% farms
Total farm receipts (c/L) ⁽³⁾	41.5	42.6
Total variable cost (c/L)	23.8	21.7
Administration costs (c/L)	2.4	1.8
Paid labour costs (c/L)	3.4	2.9
Principal + interest payments (c/L)	5.2	5.5
Living expenses (c/L) ⁽⁴⁾	4.7	4.6
Total production costs (c/L) ⁽⁵⁾	39.5	36.5

⁽³⁾ Total farm receipts includes milk income, stock sales, produce sales, rebates and drought payments.

⁽⁴⁾ \$54,000 was used as the living expense.

⁽⁵⁾ No capital expenditure is shown in this analysis.

4.2 Capital efficiency

Asset turnover ratio (ATO) is the measure of capital efficiency used in QDAS. It measures the income generated per dollar invested. The formula used in the analysis is:

ATO = Total dairy income (milk income + cattle trading profit + inventory changes + rebates & drought payments) ÷ asset value.

The average ATO value for cooperating farms in 2005-2006 was 20 cents, but the top farms averaged 24 cents for each dollar invested.

Research at Mutdapilly in South-east Queensland (M5 project) has confirmed that a high asset turnover ratio is feasible (up to 45 cents per dollar invested) on farmlets with high stocking rates and supplement levels. One key factor was the high value of the cattle as a proportion of the total asset value.

Asset valuation plays a critical part in the above formula. An increase in asset value will impact positively on net worth but negatively on the ATO and operational return on assets calculation.

Table 15 shows the asset value and breakdown of the components for the dairy regions. In NSW and coastal Queensland land prices continue to rise sharply. In NSW water rights are tradable and are included as other assets.

There are several critical questions to address when reviewing capital efficiency.

- How can revenue be increased economically as the KPI to measure asset turnover does not consider the cost structure?
- Would relocation be an option for QDAS farms located in areas where land valuations are high? Farmers have been reluctant to relocate.
- What would be the impact of leasing additional land versus ownership, contracting land preparation versus ownership of plant? Contract rearing of stock is not popular at present. It is not traditional in Queensland to lease large areas of productive land.

Table 15. Land, plant and stock valuations for QDAS dairy farms (2005–2006)

	SEQ		CQ		NQ		NNSW	
Land & buildings (\$)	1,911,045	76.2%	1,263,044	67.3%	1,938,961	72.0%	3,529,057	81.8%
Stock (\$)	253,196	10.1%	225,350	12.0%	293,162	10.9%	298,053	6.9%
Plant (\$)	195,064	7.8%	222,719	11.9%	219,860	8.2%	284,344	6.6%
Other (\$) ⁽¹⁾	149,081	5.9%	165,919	8.8%	240,430	8.9%	202,613	4.7%
TOTAL (\$)	2,508,385		1,877,032		2,692,413		4,314,067	
Investment per milking cow (\$)	13,486		10,370		12,120		18,676	

⁽¹⁾ Other includes value of shares, PDA, feed inventories, water rights (NNSW) and cash.

4.3 Administration costs

Administration includes the following costs: accountancy, rates, registration of farm vehicles, insurance, telephone and associated office expenses, repairs to permanent improvements and membership of professional organisations. The average administration cost across all 142 farms

in QDAS was \$27,878 or 2.4 cents per litre. Administration is a fixed expense and while the dollar figure increases, the costs get proportionately lower per litre as farms expand production (Table 16).

Table 16. Administration costs for farms with increasing annual production (2005-2006)

Annual production	<750,000 L	750,000 –1.25 m L	1.25-2.0 m L	>2.0 m L
Administration (c/L)	3.2	2.5	2.3	1.8
Administration (\$)	17,815	24,865	37,733	48,023

4.4 Labour resources

The number of labour units contributing to the milk production was recorded under the following two headings:

- Unpaid permanent labour – the farm owners
- Paid labour – casual and permanent.

Paid labour costs include superannuation contributions, taxation and workers compensation payments. The process for calculating imputed labour is outlined in Table 17.

The average litres per labour unit across all QDAS farms is 412,348. Average regional labour information, paid labour plus the opportunity cost of the owners/managers labour is summarised in Table 18.

An estimate of the actual hours of unpaid labour used on each farm was recorded in 2005-2006. An analysis of this data found the following characteristics.

- The hours of unpaid labour recorded ranged from zero (for farms where all workers were paid a wage, including the owners) up to a maximum of 14,796 hours for the year (where four unpaid people were involved).
- The average of unpaid labour per farm was 5,007 hours, which represents approximately \$75,000 per year if this labour was paid \$15 per hour.
- By comparing the hours of unpaid labour with the number of full time people working on the farm, it can be determined that on average a full time unpaid person works 3,120 hours per year. This represents 8.5 hours every day of the year. Typically this is reflected as 10 hours on Monday to Saturday, 4.75 hours on Sunday and one week per year not involved in farm work.

Table 17. Imputed labour / management allowance calculation (2005-2006)

Farm production	Management allowance
Where production is less than 300,000 L	\$20,000
Where production is between 300,000 & 900,000 L	6 c/L
Where production exceeds 900,000 L	\$54,000

Large farms would now have to pay more than \$54 000 for a competent manager.

Being able to make the best use of labour is essential. This is a matter of trying to work smarter, combined with knowing the value of each labour unit and equating any capital expenditure against potential labour savings. The question, how best should labour be utilised, is one of the areas which needs constant attention as production increases.

The following points need to be considered when addressing labour issues.

- The number of employees
- Milk per labour unit
- Cows per labour unit
- Award rates and conditions
- Job skills and training programs
- Shed design and farm layout
- Unpaid family labour
- Other labour-saving technology

Labour costs are the second biggest production cost after feed. Labour, lifestyle and succession are important issues for families and the industry in general to debate.

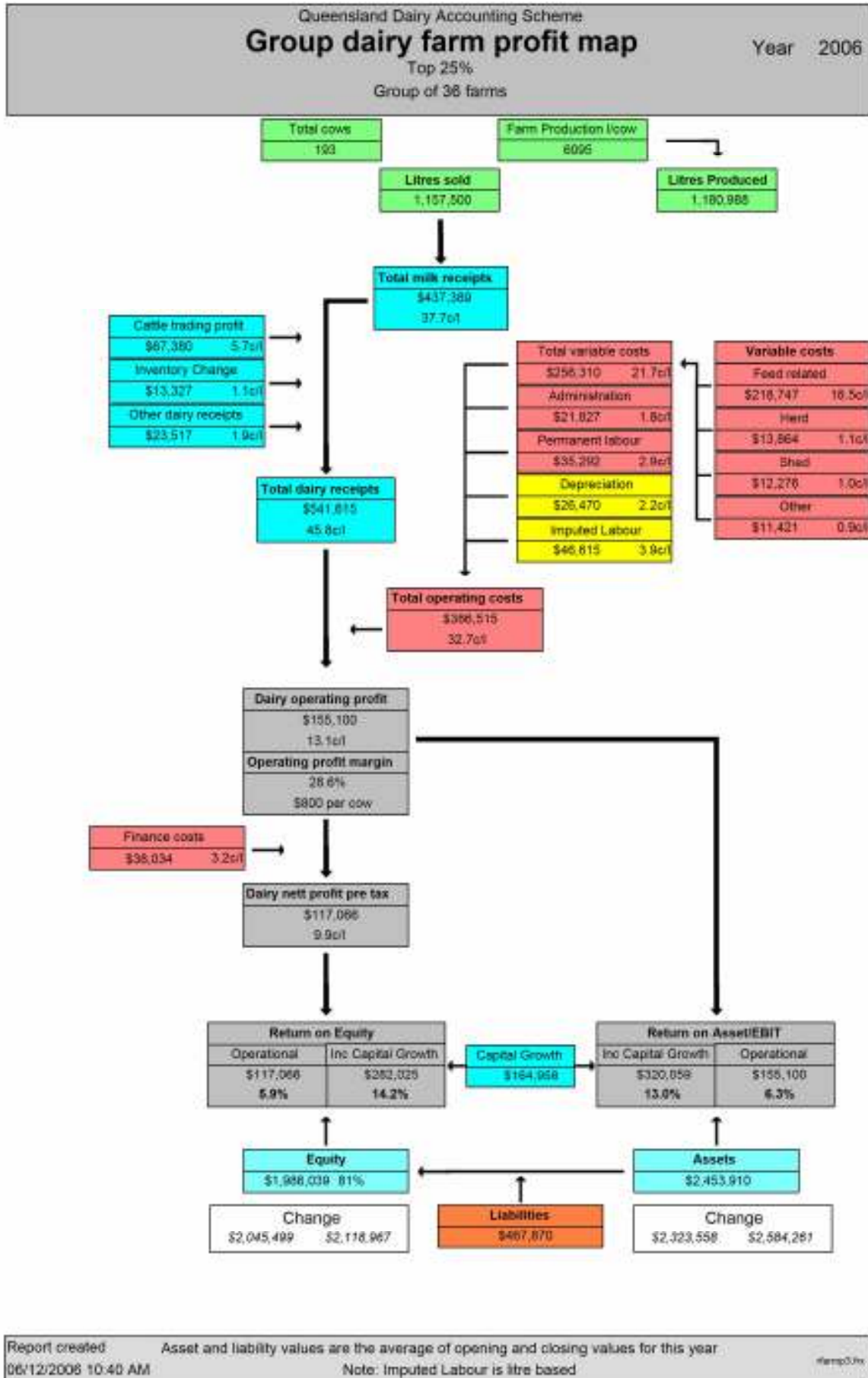
Table 18. Regional labour statistics (2005-2006)

Region	No of units paid + unpaid	Cost paid + imputed	Average litres produced per labour unit
SEQ	1.1 + 1.5	36,726 + 45,712 = \$82,438	414,045
CQ	1.8 + 1.1	30,072 + 46,465 = \$76,537	341,487
NQ	0.9 + 1.5	41,399 + 46,377 = \$87,776	510,225
NNSW	1.6 + 1.6	46,189 + 47,663 = \$93,852	383,227

5. Appendices

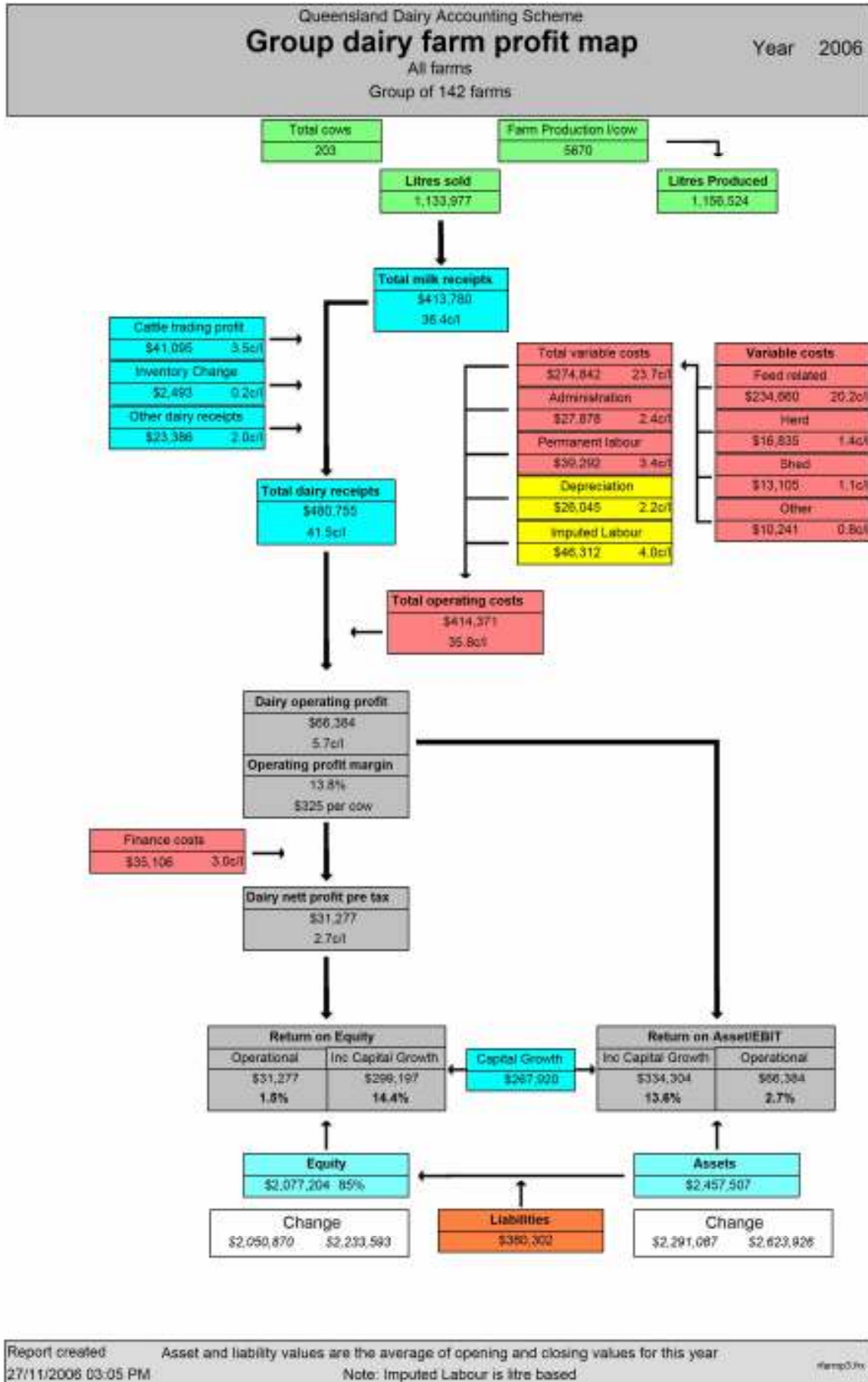
- 5.1 Map of farm performance – Top 25% of farms (2005-2006)
- 5.2 Map of farm performance – All 142 QDAS farms (2005-2006)
- 5.3 Group cash gross margin – Top 25% of farms (2005-2006)
- 5.4 Group cash gross margin – All 142 QDAS farms (2005-2006)
- 5.5 Group cash gross margin – South-east Queensland farms (2005-2006)
- 5.6 Group cash gross margin – Central Queensland farms (2005-2006)
- 5.7 Group cash gross margin – North Queensland farms (2005-2006)
- 5.8 Group cash gross margin – Northern New South Wales farms (2005-2006)
- 5.9 Definitions of business traits and key performance indicators used

5.1 Map of farm performance – Top 25% of farms (2005–2006)



Report created: 06/12/2006 10:40 AM Asset and liability values are the average of opening and closing values for this year. Note: Imputed Labour is litre based #temp03.xls

5.2 Map of farm performance – All 142 QDAS farms (2005–2006)



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 Asset and liability values are the average of opening and closing values for this year
 Note: Imputed Labour is litre based

5.3 Group cash gross margin – Top 25% of farms (2005–2006)

Queensland Dairy Accounting Scheme				
Group cash gross margin				Period ending 6/2006
Top 25%				
Receipts	Cents/litre	Dollars/cow	Total \$ earned	
Milk	36.3	2,167.14	419,884	
Milk bonuses/incentives/rebates/other	1.5	90.36	17,506	
Milk receipts (1157501 l)	37.8	2,257.50	437,390	
Stock sales - dairy	3.4	205.15	39,747	
Stock sales - other	0.2	12.03	2,330	
Produce sales	0.0	2.26	438	
Other receipts	2.0	121.38	23,517	
Non-milk receipts	5.6	340.82	66,033	
Total farm receipts	42.6	2,598.31	503,423	
Production costs	Cents/litre	Dollars/cow	% Milk income	Total \$ spent
Purchased feeds	10.5	642.74	28.5	124,532
Fertiliser	2.1	127.73	5.7	24,748
Fuel & oil	1.4	83.09	3.7	16,096
Seed	0.8	48.44	2.1	9,385
Irrigation costs	0.6	39.21	1.7	7,597
Repairs & maintenance	1.6	96.96	4.3	18,787
Other feed costs	1.6	98.48	4.4	19,080
Feed related costs	18.5	1,129.02	50.0	218,748
Margin over feed related costs	18.5	1,128.48	50.0	218,642
Animal health	0.7	43.60	1.9	8,447
Herd improvement	0.5	27.96	1.2	5,418
Herd costs	1.2	71.56	3.2	13,865
Dairy shed costs - electricity	0.5	31.59	1.4	6,120
Dairy shed costs - chemicals	0.5	31.77	1.4	6,156
Shed costs	1.0	63.36	2.8	12,276
Cartage	0.4	26.06	1.2	5,049
Levies	0.3	20.14	0.9	3,902
Sundry variable costs	0.2	12.75	0.6	2,471
Other variable costs	1.0	58.96	2.6	11,421
Total variable costs	21.7	1,322.89	58.6	256,310
Gross margins: milk only	15.3	934.61	41.4	181,080
whole farm	20.9	1,275.42	56.5	247,113
Permanent wages	3.0	182.16	8.1	35,293
Personal drawings etc	3.9	236.31	10.5	45,784

Labour inputs		Areas (ha)		Stock		Production		
Permanent unpaid	1.6	Milking cow	107	Milking and Dry Cows	193	Fed to calves (l)	23487	1%
Permanent paid	1.1	Effective dairy	217	Mated Heifers	38	Protein total (kg)	37298	3.22%
Casual paid	0.0	Irrigation	47	Other Heifers	88	Butterfat total (kg)	46491	4.03%
Imputed (38 hr/wk)	3.2			Adult equivalents	251	Milk solids (kg)	63790	
						Litres / cow	6085	
						Milk solids / cow (kg)	441	

Farms in report 36

Total Operating Costs	\$386,515
Dairy Operating Surplus (EBIT)	\$155,100
ROA (Operational)	6.3%
Asset value	\$2,453,910
Equity	80%

5.4 Group cash gross margin – All 142 QDAS farms (2005–2006)

Queensland Dairy Accounting Scheme				
Group cash gross margin				Period ending 6/2006
All Farms				
Receipts	Cents/litre	Dollars/cow	Total \$ earned	
Milk	35.1	1,951.72	398,055	
Milk bonuses/incentives/rebates/other	1.4	77.10	15,725	
Milk receipts (1133977 l)	36.5	2,028.82	413,780	
Stock sales - dairy	3.3	186.69	38,075	
Stock sales - other	0.2	12.09	2,465	
Produce sales	0.2	8.75	1,785	
Other receipts	2.0	114.67	23,387	
Non-milk receipts	5.7	322.20	65,713	
Total farm receipts	41.5	2,351.02	479,493	
Production costs	Cents/litre	Dollars/cow	% Milk income	Total \$ spent
Purchased feeds	12.2	693.55	34.2	141,450
Fertiliser	2.3	127.78	6.3	26,081
Fuel & oil	1.3	73.47	3.6	14,994
Seed	0.8	43.35	2.1	8,842
Irrigation costs	0.5	31.18	1.5	6,358
Repairs & maintenance	1.7	97.45	4.8	19,878
Other feed costs	1.8	100.79	5.0	20,557
Feed related costs	20.3	1,150.57	56.7	234,660
Margin over feed related costs	15.5	878.25	43.3	179,120
Animal health	0.9	50.72	2.5	10,344
Herd improvement	0.6	31.83	1.6	6,492
Herd costs	1.5	82.55	4.1	16,835
Dairy shed costs - electricity	0.8	32.13	1.8	6,552
Dairy shed costs - chemicals	0.6	32.13	1.6	6,553
Shed costs	1.1	64.26	3.2	13,105
Cartage	0.3	19.26	0.9	3,929
Levies	0.3	18.23	0.9	3,718
Sundry variable costs	0.2	12.72	0.6	2,595
Other variable costs	0.9	50.22	2.5	10,242
Total variable costs	23.8	1,347.59	66.4	274,843
Gross margins: milk only	12.0	681.23	33.6	138,938
whole farm	17.7	1,003.43	49.5	204,650
Permanent wages	3.4	192.66	9.5	39,292
Personal drawings etc	3.2	178.81	8.8	36,468

Labour inputs	Areas (ha)	Stock	Production
Permanent unpaid 1.5	Milking cow 102	Milking and Dry Cows 203	Fed to calves (l) 22547 1%
Permanent paid 1.1	Effective dairy 193	Mated Heifers 40	Protein total (kg) 36462 3.20%
Casual paid 0.0	Irrigation 33	Other Heifers 66	Butterfat total (kg) 44681 3.96%
Imputed (38 hr/wk) 2.9		Adult equivalents 262	Milk solids (kg) 81143
			Litres / cow 5670
			Milk solids / cow (kg) 405

Farms in report 142

Total Operating Costs	\$414,371
Dairy Operating Surplus (EBIT)	\$86,384
ROA (Operational)	2.7%
Asset value	\$2,457,507
Equity	84%

5.5 Group cash gross margin – South-east Queensland (2005–2006)

Queensland Dairy Accounting Scheme				
Group cash gross margin			Period ending 6/2006	
South East Queensland Farms				
Receipts	Cents/litre	Dollars/cow	Total \$ earned	
Milk	35.5	2,043.11	381,870	
Milk bonuses/incentives/rebates/other	1.6	90.90	16,981	
Milk receipts (1076519 l)	37.0	2,134.01	398,851	
Stock sales - dairy	3.5	207.41	38,746	
Stock sales - other	0.1	7.40	1,382	
Produce sales	0.2	10.60	1,981	
Other receipts	1.2	68.98	12,887	
Non-milk receipts	5.0	294.40	54,996	
Total farm receipts	41.4	2,428.41	453,647	
Production costs	Cents/litre	Dollars/cow	% Milk income	Total \$ spent
Purchased feeds	12.8	751.53	35.2	140,391
Fertiliser	1.7	99.99	4.7	18,680
Fuel & oil	1.5	85.93	4.0	16,052
Seed	0.7	41.81	2.0	7,810
Irrigation costs	0.7	40.96	1.9	7,652
Repairs & maintenance	1.7	102.34	4.8	19,119
Other feed costs	1.8	103.35	4.8	19,306
Feed related costs	20.7	1,216.66	57.0	227,281
Margin over feed related costs	15.6	917.36	43.0	171,369
Animal health	0.9	51.61	2.4	9,642
Herd improvement	0.5	28.46	1.3	5,316
Herd costs	1.4	80.07	3.8	14,958
Dairy shed costs - electricity	0.5	29.12	1.4	5,440
Dairy shed costs - chemicals	0.5	32.08	1.5	5,992
Shed costs	1.0	61.20	2.9	11,432
Cartage	0.3	15.66	0.7	2,925
Levies	0.3	18.50	0.9	3,456
Sundry variable costs	0.3	15.26	0.7	2,850
Other variable costs	0.8	49.42	2.3	9,231
Total variable costs	24.0	1,407.34	65.9	262,903
Gross margins: milk only	12.4	726.67	34.1	135,748
whole farm	17.4	1,021.07	47.8	190,744
Permanent wages	3.4	196.61	9.2	36,729
Personal drawings etc	1.8	107.68	5.0	20,116

Labour inputs	Areas (ha)	Stock	Production
Permanent unpaid 1.5	Milking cow 99	Milking and Dry Cows 186	Fed to calves (l) 19690 1%
Permanent paid 1.0	Effective dairy 167	Mated Heifers 38	Protein total (kg) 34857 3.22%
Casual paid 0.1	Irrigation 36	Other Heifers 85	Butterfat total (kg) 42637 3.98%
Imputed (38 hr/wk) 2.9		Adult equivalents 242	Milk solids (kg) 77494
			Litres / cow 5868
			Milk solids / cow (kg) 422

Farms in report 73

Total Operating Costs	\$390,271
Dairy Operating Surplus (EBIT)	\$89,568
ROA (Operational)	3.0%
Asset value	\$2,295,531
Equity	86%

5.6 Group cash gross margin – Central Queensland (2005–2006)

Queensland Dairy Accounting Scheme				
Group cash gross margin			Period ending 6/2006	
Central Queensland Farms				
Receipts	Cents/litre	Dollars/cow	Total \$ earned	
Milk	41.1	2,237.89	406,799	
Milk bonuses/incentives/rebates/other	2.1	113.30	20,596	
Milk receipts (890314 l)	43.2	2,351.20	427,395	
Stock sales - dairy	3.1	170.29	30,955	
Stock sales - other	0.0	0.00	0	
Produce sales	0.0	0.00	0	
Other receipts	2.9	164.04	29,818	
Non-milk receipts	6.0	334.33	60,773	
Total farm receipts	48.2	2,685.52	488,169	
Production costs	Cents/litre	Dollars/cow	% Milk income	Total \$ spent
Purchased feeds	10.7	598.46	25.5	108,787
Fertiliser	1.8	101.70	4.3	18,486
Fuel & oil	1.9	103.77	4.4	18,863
Seed	0.7	41.39	1.8	7,524
Irrigation costs	1.3	75.06	3.2	13,644
Repairs & maintenance	2.4	132.12	5.6	24,017
Other feed costs	0.8	43.44	1.8	7,897
Feed related costs	19.7	1,095.94	46.6	199,218
Margin over feed related costs	22.5	1,255.25	53.4	228,176
Animal health	0.8	42.77	1.8	7,775
Herd improvement	0.5	28.53	1.2	5,186
Herd costs	1.3	71.30	3.0	12,961
Dairy shed costs - electricity	0.5	29.23	1.2	5,314
Dairy shed costs - chemicals	0.6	32.24	1.4	5,861
Shed costs	1.1	61.48	2.6	11,175
Cartage	1.1	58.74	2.5	10,676
Levies	0.4	23.19	1.0	4,215
Sundry variable costs	0.2	8.83	0.4	1,605
Other variable costs	1.6	90.76	3.9	16,498
Total variable costs	23.7	1,319.49	56.1	239,853
Gross margins: milk only	18.5	1,031.71	43.9	187,542
whole farm	24.5	1,366.04	58.1	248,315
Permanent wages	3.0	165.44	7.0	30,073
Personal drawings etc	5.2	287.78	12.2	52,312

Labour inputs	Areas (ha)	Stock	Production
Permanent unpaid 1.1	Milking cow 101	Milking and Dry Cows 181	Fed to calves (l) 22093 2%
Permanent paid 1.8	Effective dairy 288	Mated Heifers 42	Protein total (kg) 31700 3.17%
Casual paid 0.0	Irrigation 50	Other Heifers 81	Butterfat total (kg) 40545 4.04%
Imputed (38 hr/wk) 2.0		Adult equivalents 240	Milk solids (kg) 72245
			Litres / cow 5569
			Milk solids / cow (kg) 406

Farms in report 9

Total Operating Costs	\$358,058
Dairy Operating Surplus (EBIT)	\$141,427
ROA (Operational)	7.8%
Asset value	\$1,818,709
Equity	73%

5.7 Group cash gross margin – North Queensland (2005–2006)

Queensland Dairy Accounting Scheme				
Group cash gross margin				Period ending 6/2006
North Queensland Farms				
Receipts	Cents/litre	Dollars/cow	Total \$ earned	
Milk	32.5	1,775.29	398,317	
Milk bonuses/incentives/rebates/other	2.1	111.95	25,118	
Milk receipts (1224542 l)	34.6	1,887.24	423,435	
Stock sales - dairy	2.9	162.17	36,386	
Stock sales - other	0.5	29.40	6,596	
Produce sales	0.0	0.00	0	
Other receipts	2.7	152.16	34,139	
Non-milk receipts	6.2	343.73	77,121	
Total farm receipts	40.0	2,230.97	500,556	
Production costs	Cents/litre	Dollars/cow	% Milk income	Total \$ spent
Purchased feeds	12.1	676.53	35.8	151,790
Fertiliser	2.7	148.92	7.9	33,414
Fuel & oil	0.9	52.45	2.8	11,767
Seed	0.4	21.92	1.2	4,919
Irrigation costs	0.2	13.65	0.7	3,063
Repairs & maintenance	1.5	83.19	4.4	18,666
Other feed costs	1.2	65.03	3.4	14,590
Feed related costs	18.6	1,037.15	55.0	232,701
Margin over feed related costs	15.2	850.10	45.0	190,733
Animal health	1.1	61.49	3.3	13,796
Herd improvement	0.6	35.00	1.9	7,852
Herd costs	1.7	96.48	5.1	21,648
Dairy shed costs - electricity	0.6	33.08	1.8	7,422
Dairy shed costs - chemicals	0.5	25.44	1.3	5,706
Shed costs	1.0	58.52	3.1	13,130
Cartage	0.3	16.34	0.9	3,667
Levies	0.3	16.59	0.9	3,722
Sundry variable costs	0.1	6.05	0.3	1,357
Other variable costs	0.7	38.98	2.1	8,747
Total variable costs	22.1	1,231.13	65.2	276,225
Gross margins: milk only	11.8	656.11	34.8	147,210
whole farm	17.9	999.84	53.0	224,331
Permanent wages	3.3	184.52	9.8	41,400
Personal drawings etc	4.1	229.20	12.1	51,424

Labour inputs		Areas (ha)		Stock		Production	
Permanent unpaid	1.5	Milking cow	112	Milking and Dry Cows	224	Fed to calves (l)	27758 2%
Permanent paid	0.8	Effective dairy	169	Mated Heifers	44	Protein total (kg)	38533 3.16%
Casual paid	0.1	Irrigation	18	Other Heifers	81	Butterfat total (kg)	46775 3.85%
Imputed (38 hr/wk)	3.0			Adult equivalents	284	Milk solids (kg)	65308
						Litres / cow	5581
						Milk solids / cow (kg)	388

Farms in report 30

Total Operating Costs	\$424,202
Dairy Operating Surplus (EBIT)	\$84,150
ROA (Operational)	2.5%
Asset value	\$2,575,208
Equity	82%

5.8 Group cash gross margin – Northern New South Wales (2005–2006)

Queensland Dairy Accounting Scheme				
Group cash gross margin				Period ending 6/2006
Northern NSW Farms				
Receipts	Cents/litre	Dollars/cow	Total \$ earned	
Milk	35.5	1,875.98	435,039	
Milk bonuses/incentives/rebates/other	0.1	7.84	1,817	
Milk receipts (1226325 l)	35.6	1,883.81	436,856	
Stock sales - dairy	3.2	173.63	40,266	
Stock sales - other	0.1	7.38	1,712	
Produce sales	0.3	15.65	3,630	
Other receipts	2.9	156.34	36,255	
Non-milk receipts	6.5	353.01	81,864	
Total farm receipts	41.5	2,236.82	518,720	
Production costs	Cents/litre	Dollars/cow	% Milk income	Total \$ spent
Purchased feeds	11.5	618.75	32.8	143,488
Fertiliser	3.1	167.92	8.9	38,941
Fuel & oil	1.2	62.25	3.3	14,437
Seed	1.3	67.56	3.6	15,672
Irrigation costs	0.3	18.63	1.0	4,320
Repairs & maintenance	1.7	93.51	5.0	21,686
Other feed costs	2.7	143.87	7.6	33,364
Feed related costs	21.2	1,143.62	60.7	265,207
Margin over feed related costs	13.7	740.19	39.3	171,649
Animal health	0.7	40.40	2.1	9,369
Herd improvement	0.7	36.16	1.9	8,384
Herd costs	1.4	76.56	4.1	17,753
Dairy shed costs - electricity	0.7	37.78	2.0	8,780
Dairy shed costs - chemicals	0.7	38.69	2.1	8,972
Shed costs	1.4	76.46	4.1	17,732
Cartage	0.4	19.87	1.1	4,608
Levies	0.3	18.13	1.0	4,204
Sundry variable costs	0.3	15.12	0.8	3,507
Other variable costs	1.0	53.12	2.8	12,320
Total variable costs	25.0	1,349.77	71.7	313,012
Gross margins: milk only	9.9	534.04	28.3	123,844
whole farm	16.4	887.05	47.1	205,708
Permanent wages	3.7	199.16	10.6	46,189
Personal drawings etc	4.5	243.85	12.9	56,548

Labour inputs		Areas (ha)		Stock		Production		
Permanent unpaid	1.6	Milking cow	97	Milking and Dry Cows	231	Fed to calves (l)	24427	1%
Permanent paid	1.5	Effective dairy	162	Mated Heifers	41	Protein total (kg)	39727	3.22%
Casual paid	0.1	Irrigation	37	Other Heifers	94	Butterfat total (kg)	48801	3.97%
Imputed (38 hr/wk)	3.0			Adult equivalents	293	Milk solids (kg)	68528	
						Litres / cow	5393	
						Milk solids / cow (kg)	389	

Farms in report 30

Total Operating Costs	\$480,076
Dairy Operating Surplus (EBIT)	\$38,357
ROA (Operational)	1.3%
Asset value	\$2,925,585
Equity	84%

5.9 Business traits, key performance indicators and definitions

Fifteen key performance indicators (KPI) are used in QDAS to monitor farm performance. Table 19 shows these indicators grouped under the three key business trait headings:

- Solvency
- Profitability
- Efficiency

A further business trait, liquidity, is essentially to measuring a business' ability to meet short term debts. QDAS does not report on this business trait as it concentrates its efforts into the longer term business traits.

Why use KPI

Put simply, KPI are calculations used for measurement, comparison and evaluation. Their use eliminates many simple dollar value comparisons, which can often be misleading and confusing. They can also be used to identify problems and opportunities.

Table 19. Key performance indicators used in QDAS

<p>Solvency</p> <ul style="list-style-type: none"> • Equity percent – % • Total liabilities per cow – \$ • Interest per cow – \$/cow <p>Profitability</p> <ul style="list-style-type: none"> • Return on asset (RoA) – % • Return on equity (RoE) – % • Operating profit margin (OPM) – % • Dairy operating profit (DOP) – \$/cow <p>Efficiency</p> <ul style="list-style-type: none"> • Asset turnover ratio (ATO) – c/\$ invested • Feed related cost (FRC) – c/L • Margin over feed related costs (MOFRC) – \$/cow • Total variable cost (TVC) – c/L • Gross margin (GM) – \$/cow • Litres of milk from home grown feed (L/HGF) – L • Production per cow (PPC) – L • Litres per labour unit (LLU) – L
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Solvency KPI used in QDAS

Solvency ratios indicate how the business is financed, eg by owners equity or by external debt. Lenders of long-term funds and equity investors have an interest in solvency ratios. They can highlight:

- Possible problems for the business in meeting its long-term obligations
- Show how much of the business's capital is provided by lenders versus owners
- The asset liability statement will indicate to the lenders the potential risks in the recovery of their money
- The potential amount of long-term funds that a business can borrow.

This KPI is often referred to as the 'sleep at night' factor – how comfortable do you feel with the current debt level?

Equity percent

Lenders see an increased risk associated with borrowing as this percentage figure falls below a predetermined or agreed figure. To assess the risk potential it is important to look at both the debt and the business cashflow.

Calculation

$((\text{Assets} - \text{Liabilities}) / \text{Assets}) * 100.$

Total liabilities (debt) per milker

A high value could indicate potential difficulties with both liquidity and solvency.

Calculation

$\text{Liabilities} \div \text{Number of milkers}.$

Interest per milker

The total amount of dollars being paid in interest per cow is used to highlight one risk aspect for the business. Generally farms in a rapid development phase will have a higher figure than well established businesses.

Calculation

$\text{Total interest payments} \div \text{Number of milkers}$

Profitability KPI used in QDAS

Profitability ratios measure the ability of the business manager to generate a satisfactory profit.

These ratios are typically a good indicator of management's overall effectiveness in producing milk from the land and stock.

Return on Asset (RoA) - operational

The KPI, RoA operational measures the profit-generating capacity of the total assets of the business. It measures the farm's effectiveness in using the available total capital, both debt and equity. This does not include any capital (land and improvements) appreciation.

Calculation

$(\text{Dairy operating profit} \div \text{Total assets}) * 100.$

Return on Asset (RoA) – including capital appreciation

The KPI, RoA including capital appreciation, measures the profit-generating capacity of the total assets of the business including the growth in the value of these assets. When large companies such as BHP report a RoA, they include the growth in the value of their assets.

Calculation

$((\text{Dairy operating profit} + \text{increase in the value of land and improvements}) \div \text{Total assets}) * 100.$

Return on equity (RoE) - operational

This KPI measures the return on the owner's investment in the business (not including any appreciation in the value of land or improvements). Interest costs are deducted from the operating profit to make the calculation. It takes the investor's point of view and can be a good way to encourage further investment in a business; it also allows a comparison to be made with the returns available from external investments.

Calculation

$(\text{Dairy net profit (pre tax)} \div \text{Equity}) * 100$

Return on equity (RoE) - including capital appreciation

This KPI takes the RoE operational, discussed above, and adds in the appreciation in the value of land and improvements.

Calculation

$((\text{Dairy net profit (pre tax)} + \text{increase in the value of land and improvements}) \div \text{Equity}) * 100$

Operating profit margin

This calculation highlights the amount of profit retained after all expenses are paid except debt servicing and taxation payments. It is a measure of the effectiveness of operations to generate and retain profits from revenues. Depreciation and a management allowance are included as expenses in this profit KPI.

Calculation

$(\text{Dairy operating profit} \div \text{total dairy income}) * 100.$

Dairy operating profit per cow

Similar to the above calculation but is expressed as dollars per cow.

Calculation

$(\text{Dairy operating profit} \div \text{Number of milkers}) * 100.$

Efficiency KPI used in QDAS

When examining a business these KPI are often the starting point in an analysis, however it is recommended that the emphasis should be on the first three business traits. Efficiency ratios show how well business resources are being used to achieve other KPI.

Asset turnover ratio (ATO)

This measures the amount of revenue generated per dollar of assets invested. It is a measure of the manager's effectiveness to generate revenues (capital efficiency). The calculation does not include any costs.

Calculation

$\text{Total dairy income} \div \text{Assets}.$

Feed related cost (FRC)

FRC is a variable cash cost and includes purchased as well as all home grown feed input costs.

Calculation

$\text{Total of all feed related costs} \div \text{Total production}.$

Margin over feed related costs (MOFRC)

Only the gross milk income is used in this calculation, this avoids the fluctuations that occur in annual cattle sales.

Calculation

$(\text{Gross milk income} - \text{FRC}) \div \text{Number of milkers}.$

Total variable cost (TVC)

In QDAS total variable costs are compiled under four headings – FRC, herd, shed and other variable costs.

Calculation

$TVC \div \text{Total production.}$

Milk gross margin (GM)

This highlights the milk production efficiency; the resulting dollars are available to pay fixed, financial, living and future development costs. It is should not be confused with the profit KPI.

Calculation

$(\text{Milk income} - \text{TVC}) \div \text{Number of milkers.}$

Litres of milk from home grown feed

Home grown forage (HGF) includes grazed pasture, home produced hay and silage. QDAS uses milk conversion factors to calculate the milk from all feed sources including concentrates.

Calculation

The milk from HGF is expressed as litres per milker per day.

Production per cow

In QDAS the milking cow numbers used in all calculations includes milkers plus dry cows. This implies each cow has a calf annually.

Calculation

$\text{Total milk production} \div \text{Number of milkers.}$

Litres per labour unit

The inference is made that as margins have reduced, technology should be used to gain efficiency. The number of cows milked per labour unit will impact on profitability.

Calculation

$\text{Total litres of milk} \div \text{Number of labour units (paid + unpaid).}$

General comments

Many of these 15 KPI are representative of KPI that are used in most business reporting. A great number of additional KPI can be calculated from the vast amount of data collated in QDAS if and when required.

Other measures may be important when examining an individual plan eg. cash surplus per farm family and environmental and other sustainability considerations.

The change in net worth is also an important indicator for every farm owner, and should be calculated regularly.