Profitable dairying is possible

Findings from the "Sustainable dairy farm systems for profit" project

M5 Project Information Series - Studies on Mutdapilly Research Station and subtropical dairy farms 2001 to 2005

Jeff ANDREWS, Graeme BUSBY, Mark CALLOW, Rob CHATAWAY, Ross ITZSTEIN and Ross WALKER

edited by ***Anne CHAMBERLAIN***

Information updated June 2006

Overview

IT is possible for dairy farming to be profitable in Australia's subtropical region.

In the Mutdapilly *Sustainable dairy farm systems for profit* project, all M5 farmlets produced a positive return on assets from September 2001 to August 2005 at average SEQld milk prices – despite high concentrate costs and low water availability.

Farmlet milk production ranged from 6,150 litres per cow per year for the raingrown pasture farmlet to 9,200 litres per cow from the full feedlot farmlet. According to Dairy Australia's Focus 2005 survey, the Queensland industry average during the project period was 4,000 litres per cow.

The 2005 QDAS analysis indicates that the average QDAS farm (producing 5,300 litres/cow) could economically increase production per cow by 500 to 1,000 litres. With the average across the whole industry being 4,000 litres per cow during the project period, M5 results suggest an even greater potential increase of 2,000 litres per cow.

The regional average production per cow from homegrown feed is still below 10 litres per cow per day. This production per cow is well below the potential 13 to 17 litres achieved from forage in research trials and on some commercial dairy farms.

Key drivers of profit

THE *Sustainable dairy farm systems for profit* project and other related studies indicate several key drivers of profit for farm businesses in the region:-

- Matching the feed base to the farm's resources and the milk payment system.
- Maximising forage production, utilisation and milk production from homegrown forage.
- Improving management of tropical pastures and crops to increase production and quality.
- Using limited irrigation water on single-cut double crop forage systems with crops such as sorghum, maize and barley.
- Maximising milk income from irrigation water with the appropriate choice of forage species, and best-practice fertiliser and grazing management.
- Being flexible and in a position to adjust to suit the season and available water (irrigation + likely rainfall).
- Feeding high levels of concentrate to maximise forage utilisation and thereby achieving higher milk production per cow and from the farm.
- Openness to new ideas, an attitude of continuous improvement and attention to detail
- Being realistic with the rate of expansion, and doing regular risk analyses, taking into account likely seasonal conditions.

Queensland Government
Department of Primary Industries and Fisheries

Industry background

DAIRY farms in Queensland and northern NSW have used many strategies over the past five years to compensate for lower margins, low rainfall and reduced irrigation water supplies.

Working alongside commercial dairy farms during the same period, a project at Mutdapilly research station has been testing some of the possibilities and limits of intensifying current farming systems – to define and demonstrate profitable dairy farm systems for the subtropical region.

From September 2001 to August 2005, the farmlets study – part of the *Sustainable dairy farm systems for profit* (M5) project - monitored the production and economics of five different dairy farming systems – ranging from a simple raingrown system based on tropical pastures, to a full feedlot based on homegrown silage crops including lucerne, maize and barley, with the herd milked three times a day.

To test out the potential of the five farming systems, the farmlets were set up with higher stocking rates and higher levels of concentrates than the industry average. Descriptions of the farmlet models are shown in *Table 1* and *Table 2*.

TABLE 1. THE PHYSICAL farmlet models at Mutdapilly Research Station.

Farmlet	Description	Calving pattern	Socking rate head/ha	Milk production targets
M1	Raingrown pasture	100% spring	1.9	7,040 (L @ 305 days)
M2	Limited irrigation pasture	50% spring 50% autumn	2.8	6,560
M3	Limited irrigation crops	30% spring 70% autumn	1.4	7,300
M4	High irrigation pasture and crops	30% spring 70% autumn	2.8	7,100
M5 feedlot	Feedlot	All year round	4.3	9,650

During the four years of data collection, the farmlets faced similar constraints to commercial farms – below average rainfall, restricted water use and high commodity prices.

Detailed measurement and recording from the farmlets was supplemented by information from companion commercial farms and from QDAS figures for the same period.

The five farmlets all had two goals – to obtain a 10% return on assets (RoA), and to achieve 600,000 litres of milk per labour unit.

TABLE 2. THE FEEDBASE of the 5 physical farmlet models.

Farmlet	Off farm feed * (tonne DM/cow)	Winter forage	Summer forage
M1	3 t Concentrate 1 t Hay/silage	Oats	Rhodes grass
M2	3 t Concentrate 1 t Hay/silage	Ryegrass	Rhodes grass
M3	3 t Concentrate	Ryegrass, oats, lucerne	Forage sorghum, lablab, lucerne
M4	3 t Concentrate	Ryegrass, prairie, fescue	Lucerne, forage sorghum
M5 feedlot	3 t Concentrate	Maize, lucerne and barley silage	

* Concentrate includes grain, protein meals, minerals and molasses.

NB. The 20-cow farmlets were managed under research station conditions and in the low-rainfall Mutdapilly environment, so results cannot be directly extrapolated to commercial farms across Queensland and northern NSW. However, the farmlets project does indicate potential ways forward for similar farming systems in the region.

Lessons from the M5 project

Mutdapilly Research Station M5 farmlets

ALL Mutdapilly farmlets produced a positive return on assets at regional average milk prices.

Despite being tested by drought conditions throughout the project, the M4 irrigated pasture farmlet just exceeded its production target, producing 7,400 litres per cow per year. The M1 raingrown pasture farmlet was 13% short of target, producing 6,150 litres, the M2 limited-irrigation pasture farmlet was within 1% of target producing 6,500 litres and the M3 limited-irrigation cropping farmlet only 6% behind target, producing 6,900 litres per cow. The M5 feedlot herd came within 2% of its target annual average production of 9,200 litres per cow per year (equivalent to 10,500 litres/lactation). *Table 3* gives year-by-year comparisons between actual and budgeted production.

TABLE 3. BUDGETED and actual production per cow during the 4-years of the farmlets.

	M1	M2	M3	M4	M5 feedlot
Budget L/cow/yr	7,040	6,560	7,300	7,100	9,341
	% variation from budget L / cow / year				
2001-02	-15.3	-2.2	-8.3	-1.8	-7.4
2002-03	-3.5	0.2	-1.4	12.0	5.6
2003-04	-11.4	-4.1	-9.2	3.5	-6.5
2004-05	-19.4	4.5	-9.1	2.9	1.4
All years	-12.7	-0.4	-5.9	4.2	-1.7
	Litres / cow / year				
All years	6,148	6,534	6,871	7,395	9,182
	Litres / hectare				
Total	12,007	17,779	9,329	20,803	39,492
From HG forage	4,862	8,301	5,013	11,509	26,021

Over the four years, farmlets with mainly-raingrown pasture and crop systems (M1, M2 and M3) suffered most from lack of rain, and compromises were made in the fully irrigated-farmlet (M4) to manage limited water supplies.

The best milk production year 2002-2003, with good winter rainfall, put the three mainly-raingrown farmlets within 4 per cent of their production-per-cow goals. Even under water restrictions, overall best performance of the four grazing systems came from the M4 (fully irrigated) farmlet.

Profitability of each system

Key financial and business traits of each of the modelled farmlets are presented in *Table 4*.

TABLE 4. KEY financial and business traits of the modelled farmlets.

	M1	M2	M3	M4	M5 feedlot
Milk receipts c/L	33.3	34.1	34.6	34.9	37.2
Total dairy receipts c/L	36.6	37.4	37.9	38.4	40.9
Total variable costs c/L	26.1	26.0	24.0	23.2	24.6
Feed related costs c/L	17.7	17.9	15.8	15.9	16.8
Purchased Feed c/L	14.9	14.4	12.1	11.4	12.6
RoA	0.9%	2.9%	6.3%	6.7%	13.9%
Operating profit $/cow	47	160	357	438	823
Gross margin $/cow	647	749	949	1,129	1,498

The farmlet team is analysing the economics and returns of each system in more detail. Other documents in the "M5 Info" series will provide more details and explain the assumptions made in the business-trait analysis of each farming system.

Total variable costs for the farmlets were slightly higher than the 2005 QDAS average of 22.6c/l. However, increased production from the farmlet herds meant margins per cow were higher than QDAS averages for farmlets M3, M4 and M5.

Based on their models so far, the team has found the M5 (full feedlot) and M4 (fully irrigated) systems most profitable. The goal of 10% return on assets (RoA) was only met by one farmlet – the M5 feedlot.

Business analysis showed the M1 (totally raingrown tropical grass pasture and crops) farmlet was the least profitable (4-year operational RoA of 0.9%) in the Mutdapilly environment. The system is more suited to higher rainfall regions with more than 1,000 mm of rainfall. A totally raingrown system in the Mutdapilly environment (with an average annual rainfall over the study period of 680 mm) would need to include a larger cropping area to allow more forage to be homegrown rather than purchased.

The M2 limited-irrigation pasture system was only marginally profitable (4-year RoA of 2.9%) during the four years – due to seasonal conditions and the cost of purchased forage and concentrates.

Making the raingrown and limited-irrigation (M1 and M2) pasture-based systems more profitable would depend on being able to purchase concentrates and forages at lower prices, and lowering the capital cost of any development - for example by purchasing second-hand equipment.

The M3 limited-irrigation cropping farmlet was more profitable (4-year RoA of 6.3%) except in the year of high concentrate costs.

The M4 high-irrigation farmlet was the most profitable of the grazing systems, with a 4-year RoA of 6.7%. This compares favourably with the top 20% QDAS farms' average of 6.0% RoA.

The M5 feedlot farmlet had the highest 4-year RoA of 13.9%. However the M5 feedlot was the most difficult model for the project team to develop. There were practical difficulties obtaining or estimating realistic infrastructure and costs in this system. The time lag for permit approvals and resulting costs were not fully appreciated. Neither was there any financial allowance for phasing and sizing over a 3 to 5 year-establishment and build-up phase, which would be undertaken in commercially setting up such an enterprise.

Four of the farmlets met their target milk production of 600,000 litres per labour unit, based on labour estimates for each system.

Companion farm experiences

THE project assessed the 'real' expansion opportunities for the subtropical dairy industry; implications for the farm family; and longer-term sustainability by incorporating commercial farms into the project. 22 farms became involved as companion farms, representing a broad cross-section of the subtropical dairy industry's location, farming style and herd size. There were 6 companion farms in northern NSW, 9 in coastal southeast Queensland, 5 in the Darling Downs/South Burnett, 1 in Central Queensland and 1 in North Queensland.

Through practical Milk Business exercises, the companion farmers were made aware of the potential impact on their farm business costs and returns of generating more milk from home grown feeds, of using more nitrogen, of lifting stocking rate, and of lifting production per cow.

However, they were also mindful of the extra labour needed when they expanded their farm, and the potential impact on farm family lifestyle. The companion farmers acknowledged that by working harder it had been possible to get reasonable production (500,000 litres) per labour unit, but for many this had meant milking 365 days of the year without a break.

On the basis of the Milk Business process, many of the companion farms indicated they would refocus on production per cow as a potential way to increase profitability from their existing herds.

A small lift of 500 litres per cow across the herd had the potential to greatly lift gross margin per cow and impact on profitability for the farm. This could be done without further capital investment.

Likewise, the farmers reflected on the potential for getting more out of their existing homegrown feed through improved dry matter utilisation. A moderate stocking rate change could lift production at no cost - by simply improving the quality of feed on offer at the next grazing, and increasing the utilisation of the dry matter grown.

Companion farmers also considered that additional nitrogen fertiliser could profitably impact on their bottom line.

They became aware that these simple changes were the ideal place to start looking for improvement in profitability.

Other studies

QDAS

THE Queensland Dairy Accounting Scheme estimated that in 2004/05 the average cash cost of production for subtropical-region dairy farms was 38.0 cents per litre (including a living allowance of $45,000). Top farms produced milk for 35.0 cents per litre.

QDAS results support the findings of the M5 farmlet project. For several years, QDAS has highlighted that the major avenues to raise production and increase margins are: increased production per cow; increased utilisation of home grown feed; increased nitrogen fertiliser use; increased stocking rates; expanding the size of the farming operation; and improving the quality and use of farm assets.

2004-05 QDAS trends:

Production per cow

Average production per cow in 2005 was 5,310 litres, and 5,796 litres on the top 25% QDAS farms.

Farms with cows producing 6,000-7,000 litres had a high margin over feed costs per cow ($1,056), a high gross margin per farm ($129,403) and the highest dairy operating profit of $348 per cow.

Herd size

Farms producing more than 1.25 million litres recorded high production per cow (>5,800 litres), the highest margins, and highest labour-use efficiency - milking almost 100 cows per labour unit. Key profitability indicators - return on assets and dairy operating profit per cow and per farm - were highest on those farms.

As farm production increased from 520,000 to 2.45 million litres, herd size increased from 117 to 386 cows, while production per cow increased from 4,451 litres to 6,341 litres.

Margin over feed costs per cow tapers off on the largest farms, but gross margin per farm continued to increase to a high of $265,096. As variable costs account for at least 60-70% of every milk dollar, a high gross margin is critical to obtaining a healthy profit.

Home-grown feed

2005 QDAS results show that the majority of farms could improve production from homegrown feeds.

In all regions, farms with low variable costs produced the most milk from homegrown feed; they also obtained the highest dairy operating profit per cow.

The top 25% QDAS farms produced approximately 500 litres more milk per cow from homegrown feed than the remaining 75%.

Nitrogen fertiliser

Optimum nitrogen fertiliser use, combined with higher stocking rates, has always proven to be economical in QDAS analyses.

On farms with a high level of irrigation or in a high-rainfall environment, as nitrogen fertiliser use per cow increased from 32 to 141 kg/annum, the result was higher production per cow; higher farm gross margin; and more milk from homegrown feed

Stocking rate

QDAS data indicates that producing larger volumes of milk per hectare - by higher stocking rates on the milking-cow areas - improves farm gross margins significantly.

In high-rainfall areas in 2005, as stocking rate increased from 1.5 to 4.1 cows per hectare, milk production increased from 6,984 litres to 20,803 litres per hectare. Farm gross margin rose from $85,191 at 1.5 cows to $140,716 at 2.4 cows per hectare.

In low-rainfall areas, as stocking rate increased from 0.5 to 2.4 cows per hectare, milk production increased from 2,748 litres to 13,931 litres per hectare. Farm gross margin rose from $79,670 to $142,600.

Other factors

The top 20% of QDAS farmers tended to have comparatively more feed on hand, including forward-purchased grain.

A substantial increase in land values in many Queensland and northern NSW dairying areas made it difficult to obtain a high return-on-assets from dairying, but has significantly increased the net worth of farm businesses.

Milk Business

SOME of the region's dairy farmers have participated in Milk Business workshops to understand what makes their business tick, and to look at the impact of potential changes.

Even under today's industry circumstances, and using realistic figures and scenarios for their region, farmers participating in Milk Business have been able to come up with options to improve their return-on-assets.

Milk Business has also given farmers the chance to do risk-analysis exercises (for interest rates, weather, the number of lactations, for example), to develop strategies for each risk, and to make risk-management part of their business plan.

Milk Business provides a wide range of business analysis tools – available on CD and on www.dairyinfo.biz. Once on the website, click Information Services, then on Decision Tools. The tools include scenario testers, loan calculators, sensitivity analysers, feed and livestock inventories, income estimators and herd dynamic calculators.

Key Messages

1. It is possible for Queensland and northern NSW dairy farms to develop production systems that are profitable under current industry conditions.

During the study period, all farmlets achieved substantially higher than the industry milk production per cow of 4,000 litres. The farmlets produced 6,150 L per cow to 9,200 L per cow over the 4 years.

The farmlets were profitable, despite high concentrate input (10 kg/cow/day) during a time of high commodity prices, and low water availability.

2. Homegrown forage drives the profitability of the farming system.

The Mutdapilly farmlets demonstrated that high forage dry matter production and utilisation are possible - even under difficult climatic and water-supply conditions. For example, with supplementary irrigation, the farmlets achieved up to 30 tonnes DM/ha/year from double-cropped maize and barley for silage and from double-cropped sorghum-ryegrass for grazing or silage.

It was estimated that up to 10,700 litres milk/ha was achieved from grazed forage in the high-irrigation M4 farmlet and the equivalent of 21,600 litres of milk/ha was achieved from homegrown conserved forage (maize+barley+lucerne) on the feedlot M5 farmlet. Despite receiving only half the irrigation water it was allocated - the M4 (high irrigation) farmlet was the most profitable because it fine-tuned the feed base fundamentals. Irrigation allowed reasonable quantities of good quality forage to be grown in most seasons, with 82% of the conserved forage required to fill feed gaps being home grown. The percent of conserved forage that was homegrown was 64% for M5 feedlot, 82% for M4, 71% for M3; 20% for M2; 13% for M1.

Past QDAS reports and research have also shown that optimum use of homegrown feed can control feed-related costs and improve gross margins.

3. The feeding system has to match the farm's resources and the milk payment system.

Because profitable dairying in the region relies on producing sufficient homegrown forage, the farming system needs to match the farm resources and environment.

In the farmlets project, the raingrown pasture-based system was not profitable in the low rainfall (<1,000 mm per year) Mutdapilly environment - but is more suitable for higher-rainfall dairying areas such as the Atherton Tableland, northern NSW and Maleny, for example.

Under the conditions at Mutdapilly (800 mm average rainfall and 1,800 mm evaporation), reliance on raingrown cropping with a focus on forage conservation, is a more suitable management option than reliance on grazed raingrown pastures and crops.

So a basis for success is to make sure the farming system matches the environment and resources - to produce as much dry matter as possible, and to utilise it, with the available labour, and without overcapitalising.

4. The value of tropical pastures and crops in our environment shouldn't be overlooked.

With subtropical dairy farmers tendency to consider temperate species as the backbone of their feeding system, the potential of tropical pastures and forage crops is often overlooked.

Tropical pastures and crops produce a very high volume of forage over a short growth period – which also coincides with major rainfall in our region. Tropical pastures and crops played a very valuable role in all five Mutdapilly farmlets. For example, well fertilised and irrigated forage sorghum – planted after ryegrass – yielded up to 20 tonnes of dry matter per hectare.

Raingrown forage sorghum crops following a winter fallow also showed the potential to yield up to 20 tonnes DM/ha.

Raingrown, fertilised Callide Rhodes grass yielded up to 9 tonnes DM/ha, producing 2.5 tonnes DM/ha over 28 days during peak growth.

The key to maximising DM intake and milk production from tropical pastures and crops is to manage them as well as temperates, and to use them at their best quality.

Strategically using nitrogen fertiliser and incorporating perennial tropical legumes such as Amarillo provide great opportunity for improved productivity from tropical pastures.

5. The most water-use efficient crops are the summer, single-cut crops such as forage sorghum and maize for silage.

Their physical attributes make them more aggressive in extracting water, and allow them to produce up to twice as much forage per ML of water than temperate forages, but these same attributes make them produce lower-quality forage than temperates. So temperates produce more milk per kg of dry matter grown, but yield less dry matter per megalitre of water (rain or irrigation).

During very difficult dry seasons, the farmlets project demonstrated that growing and conserving forage sorghum is an efficient way to use limited water supplies and an important means of providing much-needed forage to fill feed gaps.

6. Water-use efficiency is not just about irrigation, or how efficient you are at using water. It is about increasing forage production and milk production from forage.

Water-use efficiency for milk production is simply the litres of milk produced per megalitre of water used (rainfall + irrigation). It's another way to measure how well you are managing your feedbase, and how well you are converting forage to milk. It involves everything including species choice, seedbed preparation, planting and establishment, fertiliser use, irrigation use, grazing management, and conserving any excess. It also involves developing the most suitable herd structure – including breed and calving pattern – plus concentrate feeding to balance cows' forage-based diets.

Farms producing more than 1,000 L of milk per ML of water tend to follow best management practice, have higher stocking rates, and use some irrigation.

Companion farms found they could double water-use efficiency and substantially increase utilisation of annual ryegrass by more precise grazing management and closely matching water application to plant requirements.

7. Be flexible and adjust to suit the season and available water (irrigation and likely rainfall).

Faced with reduced water irrigation water at the beginning of the 2005 autumn/winter season the decision was made on the M4 farmlet paddocks (which were to be planted to perennial temperate pasture mixes) to plant barley for silage instead – and to give it only one establishment watering, then rely on rainfall for the rest of the season.

The farmlet team could not justify planting a lucerne/clover/perennial ryegrass mix, and draw limited irrigation water away from more water-use-efficient annual ryegrass during the cool season, and forage sorghum during the warm season.

If water is likely to be limiting through summer, the lesson from the farmlets has been to reduce the total area planted to maize to match water availability, allocating the crop a minimum of 6 ML per ha (rainfall + irrigation), and to plant more drought tolerant forage sorghum for conservation or grazing.

8. High concentrate feeding can pay when coupled with high production per cow, maximum production of homegrown forage, good forage utilisation and high farm stocking rate.

Crucial to the profitability of feeding concentrates is high production per cow – so the cost of grain and protein meals is spread over a larger volume of milk and components.

One of the aims of the farmlet component of the *Sustainable dairy farm systems for profit* project was to study the impact of intensifying the region's current farming – including increased levels of concentrate feeding to maximise forage utilisation and support higher production per cow.

The planned level of concentrate feeding for the farmlet herds was based on the industry average forage/concentrate ratio of 60/40. The goal was to use concentrates to optimise milk production from forage, to increase production per cow and to increase farm gross margin.

In reality, with a run of dry seasons, the average (homegrown + purchased) forage/concentrate ratios fed were 50/50 for M1, 51/49 for M2, 55/45 for M3, 57/43 for M4 and 66/34 for M5.

With concentrate prices increased by drought conditions, high grain feeding impacted on total variable costs. However production was maintained, concentrate costs were spread over a large volume of milk, and the farmlets remained profitable.

9. Fine tuning – learning from experience, good timing and doing everything well – will make a difference.

Doing lots of little things right can have a large overall impact on profitability. Some examples from the farmlets project:

- Getting ryegrass in no later than mid April for an early first grazing meant less conserved forage used in the autumn gap, a longer ryegrass production period, and better water use efficiency.
- Planned growth and conservation of surplus homegrown forage was a key element of maintaining a high proportion of homegrown fodder and low reliance on purchased fodder during difficult seasons.
- Tightening up grazing management can impact dramatically on pasture utilisation. Southeast Queensland companion farms increased ryegrass pasture utilisation by up to 80% by basing grazing on the 2 to 3 leaves per tiller stage, and by grazing down to the optimum measured height of 5 cm. The same farms increased ryegrass spring growth and utilisation – and delayed the warm season onset of water stress – by irrigating more in spring when plants were actively growing.

10. Be realistic and do a risk analysis.

The greater requirement for purchased feed in dry conditions impacted on the profitability of farmlets M1 and M2. A detailed risk analysis ahead would have shown the possibility of this happening, and the financial implications.

However, the farmlets were started from scratch in September 2001, with no reserves of fodder on hand. The farmlets could have better managed the risk of fluctuating paddock feed if they had been backed by a longer-term plan for stored hay and silage, and a longer-term purchasing regime for concentrates.

Farmlet M5 – the feedlot farmlet – also had difficulties with limited water supplies. The intensive double cropping required to produce sufficient forage for this system relies on more water than a system that includes a fallow period. Double cropping achieved up to 30 tonnes of DM/ha when it was possible to implement best management/best watering practice. However, not being able to meet crop water needs - due to low rainfall; depleted sub-soil moisture; under watering due to a failing irrigation source and limitations of the irrigation system - produced poorer yields for some crops, which meant the M5 feedlot had to purchase 36% of its maize and barley forage/silage.

It is clear that to reduce the risks of a feedlot dairy requires having 12 months' forage supply ahead at all times.

Feedback from the farmlets companion farms also highlighted the importance of doing a thorough risk analysis before making any contemplated change.

There are a lot more factors to consider in expansion than simply buying more cows and more grain. For example:

- What will be the impact of drought and higher feed prices, or wet weather?
- What extra skills and labour will be needed?
- Will you be prepared to let go some responsibility to employed labour?
- Should the change be rapid (more difficult/higher impact) or incremental?
- What will the bottlenecks be?
- How will extra effluent be managed?

Contact details and area of expertise:

Mutdapilly Research Station

Mark Callow Ph (07) 5464 8714
Email: mark.callow@dpi.qld.gov.au
Water use efficiency and forage production

Rob Chataway Ph (07) 5464 8745
Email: rob.chataway@dpi.qld.gov.au
Environmental issues and cropping systems

Ross Walker Ph (07) 5464 8736
Email: ross.g.walker@dpi.qld.gov.au
Whole farm management and modelling

Business and whole farm management

Toowoomba

Graeme Busby Ph (07) 4688 1254
Email: graeme.busby@dpi.qld.gov.au
Pasture production, business and farm management

The *Sustainable dairy farm systems for profit* project at Mutdapilly Research Station and on associated commercial farms investigated the potential impact of intensification of five subtropical dairy farming systems on business productivity, on the social well being of farming families and on the farm environment.