The Profitability of Milking Dairy Cows Once-A-Day all Season in New Zealand

Anna Bayly

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“In 20 years time will you wish you’d spent more time in the cowshed?”

Executive Summary

Once-a-day (OAD) milking is a management option which can provide significant benefits to the New Zealand dairyfarmer. The limited research data on OAD suggests that the production loss is in the order of 7-30%, depending on the breed of cow (Jerseys lose less than Friesians) and the stage of lactation (early lactation, higher losses).

It is estimated that there are less than 10 commercial farmers who milk OAD with the whole herd in New Zealand. These farmers have achieved on average 270kgMS/cow/year, which is 14% less per cow than the national average of 315kgMS/cow. The highest milksolids achieved on OAD is 301kgMS/cow in the Wairarapa. The farms are spread over the whole country, and are typically low input systems, with low cow empty rates (less than 5%). These OAD farmers are staunch advocates of their system, and have experienced significant lifestyle benefits from the change. They believe that mindset is the biggest hurdle to get through in the change from TAD to OAD, and that OAD has had little if any impact on the profitability of their system.

A financial model based on the average NZ farmer predicted there would be little change in profitability from TAD to OAD milking.

The biggest threat to the profitability of OAD is a high payout, whilst the biggest opportunity is genetic potential of cows suited to the OAD system.

OAD offers a solution to many of the challenges facing the NZ dairyfarmer – labour hassles, lack of lifestyle, animal welfare, increasing costs. Farmers who milk OAD have more time for their families and leisure pursuits.

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Introduction

Once-a-day milking dairy cows in New Zealand has long been thought of as a last resort when feed or cow condition is compromised, rather than a viable business decision. Some of the issues facing the modern dairyfarmer are: Lack of lifestyle, labour shortage, animal welfare perceptions, increasing costs, low return on capital. Two of the issues (lifestyle, labour) can also be associated with the perceived breakdown of the traditional rural community. For example the lack of participation and leadership in rural community issues – sometimes attributed to dairyfarmers being tied to the TAD milking regime.
This report aims to assess the tangible profit and lifestyle benefits from a change to the OAD milking system. Literature on this subject has to date focussed on the expected production drop verses the lifestyle benefits, rather than the overall system profitability. There have been very few full lactation studies of OAD vs TAD milking.

The report has four main sections. Firstly a brief summation of the industry research on OAD, including the current Taranaki trial. It then profiles the farmers who milk OAD in New Zealand. The main body of the report focuses on how the profitability of the "average New Zealand dairyfarmer" would change with a move to OAD. The report is concluded with how OAD milking may be applied to other dairyfarmers throughout New Zealand.

Background of Research Studies

Only three experiments have measured the effects of milking OAD for the whole lactation. The first in Sweden in the 1950s, total milk production was decreased by 50%. In the next study, at Massey in 1991, milk yields were decreased by 30% with Friesian cows. (Holmes, C.W. *et al* 1992).

The following table summaries the results of two other short-term trials:

Year	Where	Who was responsible?	How long OAD for?	% Loss in production
1988/99 & 1999/00	Ruakura	Carruthers & Copeman, 1990	Wks 6-18 early lactation	Milksolids: 14.5% Jerseys (J) 20.5% Friesians (F)
			Nov/Dec	Milksolids: 14.5% Jersey 17.5% Friesian
			Feb & April	Milksolids: 7% Jersey 13.5% Friesian
1997/98	Ruakura	Auldist & Palmer, 1998	Short term, feed restricted & Ad-lib	11.5% increase fat % 0% change protein % 19% less milk yield on ad-lib, 13% less restricted

Recent research – Westpac Trust Taranaki Research Station

All following information on trial taken from: (Tong et al., 2002).

1. One year trial with Friesian/Crossbreds (Normanby)

1999/2000 Friesian Crossbred	OAD	TAD	Difference
Stocking rate (cows/ha)	3.5	3.0	+17%
Days in milk	256	269	-5%
Kg Milksolids/cow	215	307	-30%
Kg Milksolids/ha	753	922	-18%

2. Current trial – Westpac Trust Taranaki Research Station (Whareroa)

This trial is examining the effect of milking frequency and breed on milksolids, milk composition, health and reproduction over a full lactation in a whole farm system.

TRIAL DESIGN

There were four treatments (see Table 1.) Two herds of 35 Friesian and 42 Jersey cows were milked OAD for the entire season. Another two herds of 30 Friesian and 36 Jersey cows were milked TAD. A 17% higher stocking rate was used for the two OAD herds, after rough calculations indicated that feed demand per hectare would have been equalised for both groups at this level. (Holmes, 2002).

	FOAD*	**FTAD**	**JOAD****	**JTAD**
Herd Size (cows)	35	30	42	36
Farmlet Size (ha)	10	10	10	10
Stocking Rate (cows/ha)	3.5	3.0	4.2	3.6
Liveweight (kg/ha)	1650	1400	1650	1400

* Friesian Once-a-day, ** Jersey Once-a-day.

Results for the 2 full seasons, and up to Nov 2003

2000/2001	**FOAD**	**FTAD**	**JOAD**	**JTAD**	**Difference**
cows/ha	3.5	3.0	4.2	3.6	+17%
Days in milk	204	235	209	229	-20 to -31d
Kg MS/cow	195	281	192	247	-22 to -31%
Kg MS/ha	682	842	807	891	-9 to -19%

2001/2002	**FOAD**	**FTAD**	**JOAD**	**JTAD**	**Difference**
cows/ha	3.5	3.0	4.2	3.6	+17%
Days in milk	259	272	259	261	-13 to -2d
Kg MS/cow	273	380	252	293	-14% to –28%
Kg MS/ha	956	1140	1058	1055	-16% to +3%

2002/2003	**FOAD**	**FTAD**	**JOAD**	**JTAD**	**Difference**
cows/ha	3.5	3.0	4.2	3.6	+17%
Days in milk	77	77	78	81	
Kg MS/cow	108	146	97	115	-15.65 to -26%
Kg MS/ha	378	438	407	414	-13.7 to 1.7%

Summary of Taranaki trials

Does OAD Milking Affect Production? – Yes

- 14% drop in production for Jerseys, 28% for Friesians in the second year. The large per cow decrease for OAD is expected because they are stocked at a 17% higher stocking rate than the TAD herds.
- The Friesians OAD seem unable to produce the same milksolids per ha even at 17% higher stocking rate than their TAD counterparts.
- Jerseys show less effect of OAD on milksolids per ha yield and at the mid-point of Year 2 are producing at the same level as the Jersey TAD herd.

Does OAD Milking Affect Days in Milk? - Yes

Days in milk

	FOAD	FTAD	JOAD	JTAD
2000/01	204	235	208	229
2001/02	259	272	259	261

- Mean lactation length for the OAD herds in the 2000/01 season was 26 days shorter than the TAD herds. OAD herds were dried off earlier based on decision rules relating to milk yields of < 5 l/cow/day and high somatic cell count at that time. This difference was less in the 2001/02 season – average 7.5 days for both Friesians and Jerseys.
- Low milk yields and high somatic cell counts also affected lactation length in the previous OAD trial at WTARS using Friesian crossbred cows.
- To produce comparable milksolids per hectare OAD herds need to have the same or greater days in milk than the TAD herds.
- If the constraints of low milk yields and increasing SCC levels in late lactation can be overcome then the OAD herds have the capacity for increased lactation length as they finished with higher condition score (0.7 of a condition score for the Friesian OAD herd, 0.2 for the Jersey herd) and farm cover. The difference in condition score could be attributed to the lower production per hectare for the FOAD herd, therefore more feed could be directed to liveweight.

Are Heifers less Tolerant of OAD than Older Cows? – No

- Losses of milk fat, protein, and milksolids were not affected by age under OAD milking. This result is consistent with a previous trial conducted by WTARS involving Friesian crossbred cows milked either OAD or TAD.

Is SCC/Mastitis a Bigger Issue on OAD? – Yes and No

- Milking OAD increased average individual SCC (see table below).
- However, milking frequency did not appear to have a significant impact on the proportion of cows or quarters with bacterial infections during the season.

Mean individual SCC for 2000/01

	FOAD	FTAD	JOAD	JTAD
SCC (1000 cells/ml)	135	81	174	98

Did OAD Milking Affect Mating Performance? – yes in 2001

	FOAD	FTAD	JOAD	JTAD
Calving to 1st Ovulation (days)	33.3	37.8	29.0	30.5
Calving to 1st Oestrus (days)	46.2	56.1	39.7	42.4
Calving to Conception (days)	78.1	92.1	80.7	88.2

Milking frequency did not influence the interval from calving to first ovulation or calving to first oestrus. However the number of days from calving to conception was significantly longer for the TAD herds than the OAD herds indicating the TAD herds may have experienced a greater negative energy balance during early lactation due to their higher daily milk yields compared to the OAD herds.

***Was there any change in milk composition?* – yes**

OAD milking resulted in significantly higher protein and milksolids concentrations compared to TAD milking. However lactose concentration was significantly reduced under OAD milking, which was consistent with the results reported in the Massey experiment.

Genetic potential for OAD cows

Approximately one-third of the Friesians milked really well under OAD in this trial. (Glnec, O. 2002 pers com). Also the top Jersey OAD cow achieved 380kgMS, while the top Jersey TAD cow achieved 400kgMS, which is only a 5% difference despite the 17% increase in stocking rate. (Clark, D. 2002. pers. com).

In a trial in France with goats on OAD, the 1st generation lost 40% production, while the second generation lost 20%. (Glnec, O. 2002 pers com).

Claire Cooper, who has worked with the OAD trial in Taranaki, is currently undertaking a PhD on the genetic potential for OAD cows.

OAD milking farmers in New Zealand

It is estimated that there are less than 10 throughout New Zealand milking OAD all season on a long-term basis. However there are numerous farmers that milk OAD from January onwards.

Profiles of 7 OAD milking farmers:

Don & Margaret Bayly

Location	Breed	Cows	Production	OAD Since:
Nth Auckland Kaukapakapa	Jersey	80	260kgMS/cow	2000/01

This is a steep farm, clay hills, very dry in summer and wet in winter. Cows run in conjunction with beef stock. Calving date 20th July, dry off with twice-a-day Feb-April, dry off OAD March/April. Empty rates 4-5% under OAD, bull out after 3 months mating. No CIDRs, No inductions, Minimal urea.

Don has said many times that "I wish I'd done it 20 years ago" (when he started dairyfarming).

Richard & Lorn Hendriks

Waikato Ohinewai	100% Friesian	170	9% down last year, 8% up this year	2001/02

This is a rolling farm, Calving date 10th July (average in area 15TH July). 15% higher stocking rate with OAD, when dried off last year was only 3% behind district average. Empties last year 1%, normally 10% with twice-a-day. No CIDRs, no inductions.

Richard commented that prior to OAD, they were thinking of getting out of the industry. Now they think their OAD system is great and will never go back to TAD again.

Harding family

Marton	Jersey	400	260kgMS/cow	1986

John & Judith Doull

Wairarapa Carterton	Jersey	160	301kgMS/cow	1999/00

Flat farm, calve 1st Aug, milk to end of May, Winter at home, no CIDRs, no inductions, no urea. 6% Empties last year. No herd testing, no recording, all

replacements are bought in and are “budget” stock. Farm Working Expenses at 36% and 39% of Gross Farm Income in the 2000/01 and 2001/02 seasons, or $1.85 and $2/kgMS respectively. (National average was $2.23/kgMS in the 2000/01 season, or 48% of GFI).

John commented that if he can do the national average production* on OAD, then why milk TAD!

*310kgMS/cow, (LIC Dairy Statistics, 2001).

Brian & Glenda Koch

Eketahuna	Crossbreds	400	270kgMS/cow*	2002/03

*Was achieved in a previous season while milking part of the herd on OAD

50% flat-rolling, 50% steep. Long walking distances. Used to have around 20 in lame herd, now none. Was 470-500 cows with manager and worker, now just Brian & Glenda.

Roger & Jenny Brown

Southland Otara	Crossbred	400	260kgMS/cow	2000/01

A non-typical Southland farm, on the south coast with a mixture of sandhills, peat and clay which dries out in summer. The southern-most dairy farm in New Zealand. Only 4 weeks AB required.

“OAD has changed that family’s life” – Richard Ellison, former employee (pers com).

Ian & June Kreger

Southland Lumsden	Jersey	220		2002/03

Ist season milking 220 cows on OAD out of a herd of 600-700. Flat farm.

Summary of OAD farmers in New Zealand:

- From Northland to Southland
- Production averages 270kgMS/cow over 7 farms
- Range of farm types and farm management policy
- Generally low-cost/input systems especially from a feed perspective
- Low use of reproductive tools – CIDRs and Inductions
- Low empty rates – 5% or less (Half of national average)
- All say that mindset is the biggest barrier to going OAD
- All say they believe that OAD does not have a great effect, if any on profitability.
- All are enjoying the extra time they now have.

SWOT of OAD milking

Strengths

Easy to implement
Less staff hassles
Better Cow Condition
Cost Savings
Lifestyle
Less capital required
Better reproduction
Less reproductive manipulation
Better animal welfare
Less stress
Less drugs
Time
Less lameness
More farm work
More attractive for labour
Cow longevity – less replacements
Challenge
No higher rate of mastitis infection
Days in Milk
Similar profit and returns achievable
More sociable hours
Increase in milksolids percentage
Decrease in milk volume
Milk curve flater

Weaknesses

Outside the comfort zone
Lower production
Higher SCC
Specific breed required
Welfare perception
Some cows don't adapt
Labour efficiency
Less cow contact
Capital value of land on $/kgMS basis
Less capital gain
Spending more because have more
Decrease in lactose percentage

Opportunities

NZ cows suit OAD
Potential for genetic selection
Well suited to Organic farming
More profitable at lower payout
Machines to remove residual milk *
Use of time elsewhere
Use of marginal land
More time for community

Threats

Higher payout, less profitable
Difficulties with finance approval
Perception from Rural Professionals
Perception from prospective labour
Consumer acceptance
Less national milk volume
Peer pressure

*At the Moorepark research station in Ireland, trials from the "Dairymaster" milking machine, a machine which is designed to remove more residual milk from the udder, resulted in 4% more milk production under a TAD system. (Glnec, O. 2002 pers com).

Profitability

New Zealand dairyfarmers and industry experts have recently been criticised for focusing too much on production, rather than profit. OAD milking is a classic example of a change in farm system where we know something about the impact on production, but little about the impact on profitability.

There are three ways to assess the impact of OAD milking on profitability:

1. Put financial figures on the Research trials.
This has not been analysed to date. The excuse is that because the trials only have involved small herd sizes a single event in a small herd can skew the results. However, milking times and general shed procedures will be analysed for estimates of power consumption and other savings in shed costs (Clark,D 2002 pers com).

2. Financial data profiled from commercial operators
The major disadvantage of this analysis is the small number of farmers on OAD and many have not achieved a stabilised season on OAD. Also the varied farm systems and locations.

3. Modeling the "average" farm in NZ and converting it to OAD.
This can be done through using a combination of the information in sections 1 & 2 above. The disadvantages in this method are accuracy and NZ wide application of the assumptions (Every situation will be different). However, as with any budget, if you are conservative and sensible, it is of more use than no budget at all!
This method is what has been used in this report to try to assess the profitability of OAD milking.

THE MODEL – The "Average NZ Farm"

Assumptions:

- 2000/01 farm, herd size and production used from the "Dexcel Economic Survey of Factory Supply Dairy Farmers in New Zealand". 250 cows milked on 100ha, producing 78,474kgMS or 315kgMS/cow and 787kgMS/ha.

- A $3.70/kgMS payout.

- Labour employed is about 0.8 of a labour unit, plus relief.

- Expenses averaged over the last four seasons, to be 55% of Gross Farm Income.

- Cash Surplus was $42,587, after debt, tax, and before drawings.

- Return on Assets around 5%.

THE OAD FARM –The "Average NZ farm goes OAD".

Assumptions:

- Stocking rate is increased by 10%, which is now 275 cows milked on 100ha.

- Cows are purchased at $900, heifers at $800 and R1yrs at $450.

- Production 260kgMS/cow, which is the average of the production that OAD farmers are achieving (excluding John & Judith Doull with 301kgMS/cow), and a 17% drop from the industry average, which is just above the Taranaki trial for the Jersey production drop (and this is on the higher stocking rate).

- Replacement rate will be less due to having less empties, however in this example it has been kept the same, because it is assumed that some selection will be carried out for cows that perform well under OAD, so replacements are kept at 25%.

- Wages are dropped significantly. There is still $6000 in the budget for wages, which includes: Every second milking off from Oct (30 weeks at $100/weekend), 1 months help over calving at $400/week, 3 weeks holiday at $500/week.

- House that the "0.8 of a labour unit" lived in, is rented out at $80/week, or $4000 per year.

For the following expenses, there was little information available. Therefore the changes made to farm working expenses have been conservative.

- Animal health is dropped slightly, by $5 per cow.

- Shed expenses dropped by $3 per cow. Only using half of the chemical, the rubberware will be changed still on a milking basis, so with less milkings will be changed less frequently.

- Power dropped $3/cow, one milking saved, and the morning milking may be on cheaper rates. Running effluent and water pumps etc

- Feed left unchanged – less production per cow and per hectare, however more cows and a few more youngstock to feed.

- Fertiliser – 7 ton of 15% potassic super saved as doing less production per hectare.

- Expenses 51% of Gross Farm Income.

- Cash Surplus predicted to be similar at $42,467, after debt, tax, and before drawings.

- Return on Assets similar, as $25,000 extra is borrowed for the cows, however a house is no longer required, so could be removed from this calculation.

- The analysis page shows the sensitivity of that profit to payout, and the level of production drop. Note that payout has a huge impact on the profitability.

10 reasons where OAD might fit into your system:

1. **When current resources put stress on a TAD system.**
For example, the stage of farm development, or farm quality, steep farms, farms with long walking distances and/or poor races.

2. **When climatic conditions put stress on a TAD system.**
For example areas like Northland, and many parts of the Waikato, where dry conditions often lead to significant stress on cows resulting in loss of weight which is hard to recover before the start of the next season.

3. **When cow numbers are at an awkward size for labour efficiency.**
Refer to graph below, and table 1 in appendices, which shows the EFS/cow, and the Return on Asset at different herd sizes. With labour one of the biggest farm working expenses, the amount saved in this area will largely determine the profitability of OAD.

4. **When there are staff hassles.**
Some farmers struggle with the "people management" side of dairyfarming once herd size increases. These people might enjoy returning to a single owner-operator system.

5. **When purchasing "marginal" land.**
Relates to (2) above in terms of the farm system, but also the profitability need not be so high to achieve the same Return on Asset compared to prime land.

6. **When you are really tired of milking twice-a-day and are beginning to hate dairyfarming.**

7. **When you have opportunities for off-farm income.** In a OAD system, there is scope to do a part-time job off the farm.

8. **When you desire more time with family, leisure, or off-farm interests**

9. **Challenge of doing something different.**

10. **When you really want it to.**
Farmers who are currently milking OAD believe that the biggest hurdle to get through in the change from TAD to OAD, is mindset. Farmers who really want to make it work, from either a practical or profit perspective, will do so.

Conclusions

Milking cows OAD all season results in a production drop, from research trials anywhere from 7 to 30%. From an estimated 10 OAD commercial farms in New Zealand, production averages 270kgMS/cow, which is 14% less than the national average at 315kgMS/cow. It would be easy to be put off from going OAD if you focussed only on production, however there are many other direct cost savings, not to mention the huge lifestyle benefit.

The largest saving is in time, either the herd-owner's time, or staff employed. This will have a large impact on the profitability of OAD milking. Depending on the herd size, this saving could be very significant – especially around the 250-400 cow mark, where more than one person is essential in a TAD system, (but sometimes not fully utilised) but under OAD this can be more easily managed.

Other cost savings are harder to quantify the obvious ones are; power, shed, animal health, vehicles, R&M, and reproductive performance.

Payout is the biggest threat to the profitability, as the loss of milk production is worth more at a higher payout. The biggest opportunity for the future of OAD milking is breeding cows more suitable to this system.

So in summary, the current profitability of OAD milking for farmers in New Zealand will depend on a number of factors:

- Cow numbers through shed size
- Breed of cow?
- Labour savings
- Farm contour and stage of development
- Initial production level?
- Level of stress under TAD
- Farmer skill
- Payout

On dairyfarms in New Zealand, OAD milking has the potential to make a huge difference to;

- Cow health and longevity
- Staff attitude
- Animal welfare perception by outsiders
- The functionality of the rural community that they live in
- Most importantly the lifestyle of the NZ dairyfarming family

3 Questions to be answered before the OAD system would really take off in New Zealand:

1. Is the percentage production drop the same when cows are producing more?

2. What are the savings in expenses – namely animal health, shed, power?

3. How long would it take to breed a OAD cow that could produce as much milk as a top TAD cow?

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