

Once A Day milking and how it benefits Irish farmers

Pre and Post Quota



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Executive Summary

Introduction

OAD (once a day) milking and its relevance to the Irish dairy industry is a topic which has huge relevance to the Irish Dairy sector. This report examines the challenge's / opportunities that it offers along with the recommendations that should be made.

OAD milking is where cows are milked once daily as against twice daily (TAD) which is the case on most farms throughout the world and in Ireland. Throughout the Report the terms OAD (once a day) and TAD (twice a day) will appear regularly.

During the past 18 months the author has travelled to the UK, France, New Zealand and South America. In all these countries farmers are using OAD in various situations and at different times during the year. The lessons learned are that it has huge potential in Ireland pre and post quota. There are many varied reasons why OAD is practised ranging from personal and family choice, farm size and fragmentation, land type, labour and where quotas are a limiting production. We will also look at how it can be used strategically during the year and will discuss its implications on overall milk production. This report will allow farmers the opportunity to make a clear and informed opinion as to whether OAD milking is for them. The experiences of farmers in Ireland and New Zealand will be outlined and their financial accounts will give those thinking of changing to O.A.D. milking a truer picture of what can be achieved.

Like all new practices it comes with a lot of preconceived misconceptions, the report will endeavour to answer all of these and help in the decision making process

We are all passionate about things in our lives and it is with this passion that the author has set about researching a topic which has very limited use in Ireland thus far, but OAD milking will play a huge part in the dairy sector and will grow considerably over the coming years.

Aim and Objective

This report will endeavour to give a clear and concise account of where OAD fits in and where it doesn't. In all it will play a huge part in helping us achieve our "Food Harvest for 2020". It will show how every farmer can use OAD strategically at different stages during difficult weather conditions. It will also highlight the advantages and disadvantages of this practice.

Methodology

I am dairy farming in Southern Ireland in West Cork and have always had a passion for dairy farming. We must not be afraid of change and by embracing new techniques and knowledge we will further the positive development of dairy farming.

Findings

In my travels OAD has been embraced by countries where quota restriction is not an issue. This report will show the economic benefits of the practice and how in some parts OAD is now on a par with some TAD milking herds. It will also outline the advantages and disadvantages of the practice and will share with you the real life experiences of farmers on the ground. This report will fairly debate the pros and cons and will endeavour to give a fair and balanced approach to OAD milking. Like all practises it will not suit some people and also it is not applicable to some farms but it will allow everyone make an informed decision as to its merits.

Conclusion

Like all dairy systems OAD Milking isn't for every farmer but there is a large number out there to whom this system is very applicable. They now have the detailed reports available which can help them make a smooth transition into dairying.

This report will endeavour to give you the reader a fair and balanced report which will ultimately give anyone considering the practice the choice. It is important that all those interested in OAD milking should go and speak to the people on the ground who have been practising it successfully for a good number of years now. Change is inevitable across all sectors and OAD is one of the most positive ones I have seen in the dairy sector. Its varying and strategic uses will make it one of the real growth areas in dairying. All businesses need to grow, OAD milking offers this to all the vested interest, farmers and processors. There are

misplaced preconceived ideas as to its viability but on the farms where it is being practiced all the findings would suggest it has a future. Dr. Colin Holmes of Massey University in New Zealand has devoted a lot of his time into researching and promoting OAD milking, his findings which are part of this report would suggest that it is an area of growth. There are several discussion groups specific to OAD milking in New Zealand and it would be to our benefit to establish specific groups in this area. Discussion groups have grown in numbers in the last decade and this is another medium where the information can be relayed.

Overall OAD milking can benefit farmers in Ireland and with the right structures and information in place we can promote its positive image.

“In 20 years’ time will you look back and wish you had spent
more time in the cow shed”
Anna Bayley (Dexcel)



Cows being milked OAD. on a portable Milking parlour in the UK

Chapter 1

Situations where OAD has application

OAD is not widely practised in Ireland but over the last 5 years it has grown, while numbers practising are not large there is a significant number now using it very successfully. There has been a lot of research done in New Zealand and Ireland over the last decade and with this information a lot of farmers can make informed decisions on how and where to apply it. In this chapter we will identify and debate the situations where it can be applied.

Farm Structure

Irish farms can vary in size and geographical area. Some are compact and very accessible to the milking platform, while more are fragmented and cows have to walk large distances to and from milking. Where farms are long and narrow, OAD is ideal as cows are only walked once daily to and from the parlour. It is also possible to access land which may have been considered too far away for milking cows. Another practice which helps on these types of farms is taking the cows to the furthest away paddock after milking and at dinner time bringing them half way back so they do not have a long walk for milking the following morning.

On farms where the land is marginal or very wet OAD can be practised and it can make them a very viable option going forward. Farmers who are finding it hard to compete for land to rent post Quota should look at farms of this nature and with the right stocking rate (2.7- 3) they can make them very viable and profitable units.

Labour

All research would suggest that labour is a big issue on most farms and with quota abolition and expansion only 18 months away, more and more farms will be employing staff and this will in turn lead to a competitive market. OAD allows farmers to continue to farm as there is less work required on OAD farms.

It is also easier to attract staff on OAD farms by the very nature that you do not have an evening milking and this allows for flexibility to finish earlier. It is also easier to get relief milkers as there is only one milking per day. Farmers who are OAD. Operators all said that it was much easier to get people to milk and it suited people who had a full time job as they were able to go to their job after the morning milking. The Turner brothers in New Zealand who milk a large number of cows OAD successfully over the last eleven years had two teachers milking for them who found this very suitable for their work schedule.

Social Situations

It is possible to hold down a part time job with OAD and this should make it very attractive to a lot of farmers post quota abolition. This would be a far more profitable option than beef or suckler farming in a lot of small Irish holdings. Later in the report the financial figures will be outlined.

It is very attractive to farmers who are considering retiring due to the commitment to the second milking. These people are hugely important to the social makeup of parishes all over Ireland and with the proper information and guidance there could be more done to increase the numbers practising OAD. Other situations where it merits use is in widow/widower. Let's offer these people a way of staying in dairying and all the organisations and print media can help by promoting OAD. The report will highlight later how they can help and what messages they need to promote.

Probably one of the biggest social situations for its use is where a family is young and both parents want to spend more time with their children. It offers the freedom to go to evening games and social outings without the worry of coming back for evening milkings. The research says that all parents loved the freedom it offered and enjoyed the quality time it gave them with their children during those formative years. Most would have said they started out

doing it because of quota restrictions, they now felt that the time it gave them to spend with family was the main reason. As one man said “I know too many farmers who know their grandchildren better than their sons and daughters.”

Quota Restriction

This was the single biggest reason why most people started OAD. Growth in the dairy sector has been stagnant since 1984 when quotas were introduced. With their abolition in 2015 most farmers have been gearing up for expansion over the last number of years and it has been this explosion of replacement heifers which has made a lot of them become exposed to super levy. The decision as to whether to sell surplus quality stock or hold onto it and milk OAD had to be made. There is a lot of high EBI. Stock in most Irish herds and it would be a pity to see this quality stock leave the country for the UK. In the last year alone up to 4000 heifers made their way to the UK. Most farmers have found the practice OAD. extremely effective for growing stock numbers and still staying within their quota. It is hard to know, at this stage, what these farmers will do post quotas, as some that I spoke to said they will find it hard to go back to evening milkings having seen its social and family benefits.

Conclusion

OAD. Milking is both sustainable and family friendly and these two points are hugely important. There are two pertinent questions here **1.** How do we keep rural communities vibrant? And **2.** How do we attract young people into dairy farming?

1. Active dairy farmers are part of the life blood of every community and parish in Ireland. They contribute both socially and economically. We need this to continue, and what better way than by showing that there is an alternative to twice a day milking. By promoting OAD milking and providing the relevant information, we will help in the decision making process.
2. Number 2, how do we attract young people? I asked a group of young dairy farmers’ sons 2 questions. Were they interested in dairy farming, and if not why? Of those that answered ‘no’, the biggest reason why was that they saw how hard their parents worked and they saw dairy farming as a vocation, and one which they were reluctant to pursue. So, here again, OAD milking offers young people a way into dairy farming without the tying down of a second milking.

Chapter 2

Strategic use of OAD

OAD has many varied applications and in this chapter we will discuss them.

It is widely used in the first four weeks of calving and there has been no negative effect to overall yearly production. This helps in reducing work load and stress on the farm it also benefits the cow that is under pressure after calving. Cows milked OAD. For the first three weeks after calving will produce 5% less in their yearly production.

It also has benefits during very wet spells of weather as in 2012 and droughts like July 2013. On farms where OAD was used during these times it had a very positive effect on cow condition, reduced intake and increased Conception rates. Most Irish OAD. Milking herds recorded a drop in empty rates from 8-12% to 2-5% thus resulting in more quality stock staying in the herd longer.

Heifers are probably the animal under most pressure on any dairy farm and OAD has proven to be of huge benefit to these. It can be used for the entire duration of their lactation or it can be used at intervals during the year if they are in poor BSC. On most of the OAD. Farms it was found that the % of heifers not going back in calf on TAD systems was greatly reduced and in some cases by as much as 30%.

While Converting to a Dairy Farm

Many farmers felt that OAD milking would work ideally while converting and expanding a dairy farm. They all said that it would reduce the capital outlay on the first few years of conversion allowing the farmer to ease his/ her way into dairying. With today's financial constraints and inability to obtain capital it is easy to see how this would be a perfect fit for OAD. With Quota abolition in Europe in 2015 OAD would help a lot of farmers to get into dairying at reduced financial outlay compared to TAD milking.

Summary

OAD has many applications and whether it is for you is up to the factors which are mitigating on your farm. While not saying this it's a "one hat fits all" solution it certainly warrants research and discussion by those that it will help. Where any of the reasons stated above are a contributing factor on your farm, then it is well worth your while to investigate them further and meet with the people on the ground that are operating very successful business implementing OAD. Teagasc and discussion groups can play a big role here by promoting it and having open meetings on OAD farms around the country. The farmers Journal has given it great publicity in the last number of years and it would be hoped that they would continue to help farmers make an informed decision. Ireland has a large number of Co. Ops countrywide and if it wants to maintain and grow its Milk pool they should actively promote OAD. Milking in their areas. This should be done in conjunction with Teagasc and Discussion groups. I would also urge them to source a facilitator who would help this concept. Pat Dillon and his team have done outstanding work in Moorepark and every effort should be made to continue in their research.

Chapter 3

Objectives

1. To examine the advantages and disadvantage of OAD
2. To identify situations where OAD has application
3. To identify the technical requirements / skills necessary to make OAD successful
4. To examine where and when OAD fits into existing milk production systems
5. To establish the economic requirements / profit associated with OAD
6. To examine the type of cow most suited to OAD.

OAD milking can be seen as a way to mitigate the main constraints imposed by TAD milking in large grazing systems. These include:

1. The huge work-load required for TAD; it's inconvenient, inflexible scheduling; and the capital cost of the large milking facilities needed.
2. The limitation imposed on daily feed intake per cow by grazing, even when pasture supply is plentiful, and magnified during pasture deficits; and thin cows.
3. The necessity for cows to walk long distances every day.

Disadvantages of OAD, with cows selected on TAD

Lower MS yield per cow; by 15 to 25%, at least in the first year on OAD. This expected decrease in MS/cow (and the associated decrease in feed demand/cow) can be offset in the short term by milking more cows, at a higher stocking rate. But, several OAD farms have now increased their yields from 330 to 400 kg MS/cow after 3 to 8 years of selection of cows suited to OAD and of culling cows unsuited to OAD.

Increase in SCC and mastitis; all research done showed increased SCC in OAD cows, but without an increase in infection. Many OAD herds are consistently achieving low to average SCC. But, several OAD herds have reported that cows that become infected can show stronger clinical symptoms; and some have experienced intermittent, but increased, cases of Black Mastitis.

These may be due to the longer (~20 hours) interval between milking's allowing any undetected, early-stage infections to become more established, with increased inflammation before detection at the next milking, by which time the infection will be more resistant to treatment. Excellent early detection of all incipient infections, and their prompt treatment, at every milking is even more essential on OAD than on TAD.

On the other hand, the incidence of mastitis does not appear to be increased on OAD. This may be partly because the teats are exposed only once per day, not twice, to the milking process which can itself increase the risk of damage to teats and of new infections. It is widely accepted that if you have a SCC problem before you go OAD. It will get increase significantly thereafter whereas herds with low SCC (under 180) have had no increase after changing to OAD milking.

Advantages of OAD

- Less demanding and less complicated , for people and cows
- Less stress and strain on cows and people. Healthier cows; happier cows and people
- Reduced, and less inconvenient hours of work, and/or reduced staff required
- Increased number of cows milked/person, and milk produced/person
- Increased number of cows milked per set of cups; can reduce capital expenditure on milking facilities
- Suitable on farms that would not traditionally be used for milk production
- Because cows must walk to and from the milking shed only once per day, cows can be grazed on, and milk can be produced from land that is inaccessible to cows milked TAD
- Cows with fatter body condition; however this benefit decreases as yields/cow on OAD increase with selection of cows suited to OAD
- Fewer- than-average lame cows

- Better-than-average fertility and mating performance; fewer empty cows, more compact calving pattern with fewer late calving cows
- Consequently, fewer cows that must be culled
- More dairy animals for sale; increased income from stock sales
- Management required for the transition from TAD to OAD. Milk yield per cow will decrease after the changeover; good management of the transition is essential
- Careful financial planning and very good management skills are essential to offset the effects of any short-term decrease in income
- Mastitis and SCC; the change to OAD should not be made if the herd has problems with mastitis: eliminate the problems on TAD before changing to OAD
- The effects of OAD on Jerseys and HF x J crossbreds are smaller than those on HF cows. Semen from sires proven to be superior for the production of their daughters milked OAD, is slowly becoming available; its use in seasons before the change to OAD would provide young cows suited to OAD, before the changeover
- Culling those cows that are unsuited to OAD in the one or two seasons before the change to OAD full-season; these cows can be identified by milking the herd OAD for a period in late lactation during the preparatory years
- For 1st year on OAD, increase number of cows to calve by about 10% compared with TAD; this will enable the cows that are obviously not suited to OAD, to be identified as early in lactation as possible, and sold to TAD herds.

Research since 1980 has identified the key effects of OAD milking on milk yield, and these can be summarised as follows:

- OAD milking for a whole lactation decreases milk and MS yield per cow by 20-30% compared with TAD milking.
- Jersey cows have a smaller MS yield loss than Holstein Friesians (20 vs. 30%) when milked OAD for a whole lactation.
- Individual cows vary greatly in their response to OAD milking, and milk loss (%) is unrelated to initial milk yield.
- Heifers are more affected by OAD milking than older cows, but neither age group show any negative effects in their subsequent lactations.
- The negative effects of OAD milking on MS yield can be partially offset in farm systems by adopting high stocking rates, or by using OAD milking for part- lactation only.

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The key effects of OAD milking on milk composition can be summarised as follows:

- OAD milking increases milk fat and protein by 2.8 and 1.5 g/l, respectively; and decreases milk lactose by 1.5 g/l (Remond & Pomies, 2005).
- Casein and whey protein concentrations are increased by OAD milking, but casein/whey protein ratio is decreased by about 10% (Davis et al., 1999).
- OAD milking increases somatic cell count (SCC), but not the incidence of mastitis.

Many of the minor changes in the composition of OAD milk compared with TAD milk can be explained by the increased permeability of tight junction complexes between mammary epithelial cells under OAD milking. This increased permeability allows components to leak from blood into milk and vice versa. Further information to support these conclusions can be found in reviews by Davis et al. (1999), Rémond & Pomiès (2005), Stockdale (2006) and a four-year whole lactation study (Clark et al., 2005).¹

A three year farm study with Friesians and Jerseys in Taranaki (Clark et al 2006)

	Friesians		Jerseys	
	OAD	TAD	OAD	TAD
Coss/ha	3.5	3.0	4.2	3.6
Kg MS/cow	237	336	222	278
Kg MS/ha	879	1051	979	1045
Days in milk	230	244	229	242

- OAD increased % of fat and protein in milk but decreased % of lactose
- OAD reduced yield/cow by more in Friesians than in Jerseys
- OAD reduced yield/cow by more in 2 year olds than in older cows

¹ Clarke, Stockdale, Remond & Pomiès Davis.

- In early lactation, cows ate slightly less feed and lost slightly less BCS than TAD cows.
- Extra high quality supplement resulted in extra milk production by OAD cows.
- Availability of high quality pasture and/or supplement in summer is crucial, if large decreases in yield are to be prevented in later lactation.
- OAD cows took longer strides, indicating healthier hooves
- OAD cows lie down for comfort in early lactation due to udder distension in OAD cows
- Farmer opinions; OAD cows and people are happier.²

Mating and fertility in 33 herds in North Island, New Zealand³

	5 OAD Herds	28 TAD herds
% Empty	10%	14% Average
	(6-12)	5 – 26 (Range)
% In-calf in	66%	56% Average
6 weeks	(65-68)	(42-74) Range

Three Milkings in two days

This is another system which is used by dairy farmers but is not nearly as common as OAD. Milking.

Brent Bryce, a farm consultant with farm wise in New Zealand did research on this topic and here are his findings

- Farmers who chose it did so for the same reasons as OAD milking.
- Loss in production was only 5-10% less than TAD.
- Most preferred milking times were 5.30am 7.30pm and 11.30am.
- Very small percentage use it for a full year.
- Mainly used at the latter end of production (last 5 months).
- Main disadvantage of the system was the milking times.

² Clarke, Stockdale, Remond & Pomiès Davis.

³

Strategic uses of short-term OAD:

- During the colostrum period
- During the first 4 to 6 weeks of lactation
- In TAD farms, any period of feed deficit
- For lame cows until recovery season, especially 2 year olds
- During the second half of the lactation
- In the later part of lactation, as pasture growth decreases.
- 13 milking's per week leaving out the Sunday evening milking, by milking later on Sunday morning and earlier on Monday morning (research shows no impact on overall production).

TAD herd facing a feed deficit; first, milk yield per cow decreases; SCC rises initially and then decreases; and rate of loss of live weight & condition by the cows is reduced. Then, after returning to TAD following the 3 weeks on OAD, milk production will subsequently return to the level that would have been expected, if the herd had been milked TAD & well fed during the 3 weeks. This practise is very common on most Irish farms as it makes the peak calving period less stressful. Most farmers I met found that it did not adversely affect overall production, it ranged from 3-5%, but they all felt that it was worth it as better decision making and reduced stress on man and beast.

To identify the technical requirements necessary to make OAD successful

For anyone thinking of going to OAD milking it is important to have several factors correct. A manager needs to be extremely vigilant and have very good stockman skills, as you only milk every 24 hours you need to be very aware of the cows coming into the parlour.

- Milking will take 25% longer never be in a rush as cows need to milk out properly
- Be aware that any cow that isn't milked will go 48 hours without milking thus increasing the risk of mastitis.
- Relief milker needs to be made aware of these factors.
- All cows don't suit the system (3/4%) as some will dry off and more will get mastitis or increased cell count.

- Very vigilant during breeding season
- High cell count cows will get worse in OAD
- Have a low cell count (less than 180) before you think of doing it.
- Crossbred cows seem to adapt to the system better.
- Paddock sizes suitable for 24 hour breaks
- Larger plate cooler and milk pump capacity are necessary
- **Milk recording necessary to find out which cows may not be suitable and also to identify those that you should breed off.**
- **Call to see farms where it has been successfully implemented and learn from their experiences.**

In conclusion it is necessary to answer these questions before making the change to OAD to ensure as smooth a transition as possible for man and beast.

Chapter 4

To establish the economic requirements / profit associated with OAD

The effect of once daily milking (OAD) on cow production and economic. Performance is shown in table 1. Cow numbers were held the same in this analysis and one group of cows were milked OAD while the second group of cows were milked twice daily (TAD) for the full lactation. Milk price was higher for the OAD.

Milked groups due to higher milk constituents; however, milk sales were reduced compared to TAD groups. This reduction in milk sales was because the OAD system had 26% lower milk volumes and 20% lower total milk solid deliveries. The milk delivered in the OAD treatment was approximately 130,000 kg less than the TAD treatment. However, the quota adjustment was less as the fat concentration of the milk was higher in the OAD treatment. The fat adjusted difference in milk deliveries was 116,330 kg or 23%. Labour costs were 25% lower in the OAD treatment. Farm profit was reduced for OAD compared to TAD groups at all milk prices. At 22 c/l, 27 c/l and 32 c/l profitability was reduced by 6,979, 12,372 and 17,754 when OAD is compared to twice a day milking. When this is compared to a super levy charge of 33,270 for the difference in milk output it suggests that OAD represents a real alternative to producing milk, and while there is an economic loss when compared to TAD milking that loss is less than the super levy charge.⁴

⁴ Laurence Shalloo Teagasc Moorepark Fermoy.

Table 1 Effect of milking frequency (MF) on biological and economic performance**Milking frequency (MF)⁵**

	TAD	OAD	Diff
Milk yield kgs/cow	6013	4437	- 26%
Butter fat%	3.99	4.40	+ 0.415%
Protein %	3.29	3.53	+ 0.24%
Lactose %	4.55	4.52	- 0.03%
Milk Solids kgs/cow	437	351	1. 20%
Liveweight end of lactation	625	664	+ 39kgs
BSC end of lactation	2.70	3.30	+0.6
Milk Sales kg	505,418	375,529	
Fat sales kg	20,129	16,375	
Protein Sales Kg	16,624	13,179	
Cow Numbers	90	90	
Labour Costs	30,891	23,259	
Total Costs	144,266	128,655	
Milk price 22c/ltr	Milk Returns	114,768	93,730
	Profitability	-500	-7,479
Milk price 27 c/ltr	Milk Returns	141,380	114,983
	Profitability	26,275	13,903
Milk Price 32c/ltr	Milk Returns	167,938	136,193
	Profitability	52,995	35,241

⁵ Laurence Shalloo Teagasc Moorepark Fermoy.

Financial survey of OAD milking farms in New Zealand by Dairy NZ

In total, financial accounts were collected from 22 farms. The breakdown and summary information for these operations are presented in Table 2.

Table 2 Regional distribution, farm and herd sizes and number of years on once-a- day (OAD) milking of survey farms

	No. of Farms	Farm Size (ha)	No of cows	Years on OAD
Canterbury	4	239	875	4
West Coast	2	85	183	2
Waikato	5	94	265	3
Bay of Plenty	4	125	295	4
Taranaki	3	130	416	3
Northland	4	144	353	3

On average, FWE on the survey farms decreased from \$262 200 on TAD milking to \$212 433 on OAD milking, an approximate drop of 19%. This comparison was made between OAD milking systems in the 2005-06 season, and TAD milking systems from, on average, three years ago. Were all expenses to have remained the same, it would be an accurate representation. However, this is obviously not the case, and “The Economic Survey Of New Zealand Dairy Farmers 2004 – 2005” shows that the FWE (including vehicle expenses) have increased in the past few years (Table 3), compared with the average FWE figures for the 22 OAD milking survey farms (Table 2).

Table 3 National average Farm Working Expenses (FWE; \$/ha)

	2003 – 2004	2004 – 2005	2005 – 2006
FWE (\$/ha)	1835	1959	2037 **

Season figures were unavailable, so were estimated by adjusting for 4% inflation.

Note that the 2005-06 season figure in Table 3 is an amount based on the 2004-05 season figure inflated at 4% which was New Zealand inflation rate for that year (the actual figure for the 2005-06 year was unavailable at the time of the study).

Average Farm Working Expenses (FWE; \$/ha) for the 22 once-a-day (OAD) milking survey farms

2005 – 2006 FWE (\$/ha) 1517

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Taking into account the average farm size of the survey participants the OAD milking farmers previously had a TAD milking FWE of \$1872/ha (\$262 200/140 ha) for the 2003-04 season. This is broadly consistent with the findings of “The Economic Survey of New Zealand Dairy Farmers 2004 – 2005” (Table 2). The savings that the OAD milking farmers have made, when benchmarked against the inflated 2004-05 figures (i.e., 2005-06), is \$520/ha or a total reduction of about 25.5% on their FWE. The FWE for TAD and OAD milking systems are broken down as shown in Table 4.

Table 4. Itemised Farm Working Expenses (FWE) per ha and per kg milk solids (MS) for average of once-a-day (OAD) milking survey farms and national average twice-a-day (TAD) milking farms

	Farm Working Expenses Ave. OAD (\$/ha)	Ave. National (\$/ha)	Ave. OAD (\$/kg MS)	Ave. National (\$/kg MS)
Animal Health	150.85	162.24	0.17	0.18
Heard Improvement	62.82	83.20	0.07	0.09
Dairy Shed	20.38	63.44	0.02	0.07
Light, power & heating	53.57	86.32	0.06	0.09
Sundry & freight	19.31	24.96	0.02	0.03
Weed & Pest control	16.84	22.88	0.02	0.02
Wages & Salaries	328.16	433.68	0.36	0.49
Pasture & Supplements*	512.31	613.60	0.57	0.69
Fertiliser & Lime	266.27	390	0.29	0.44
Farm Vehicle	86.87	140.4	0.10	0.16*

*Includes hay, silage, meal, cropping pasture renovation, grazing and contractor costs.

At the other end of the scale, the farm income, which is driven by milk production, is affected as shown in Table 5. On average, a production decrease of around 5.6% or 7535 kg MS over the season occurred (this being the difference between the average TAD milking production and the average OAD milking production of the study participants). At a \$4.15 pay out this equates to \$31 270 less income. The average production of the study participants, while on a TAD milking system, was 959 kg MS/ha. This compares to the average production for 2005-06, while operating under an OAD milking system, of 906 kg MS/ha.

Another benefit was significant increases in cattle sales revenue, in some instances as much as a 100% increase.

Table 5 Change in farm milk solids production when switching from twice-a-day (TAD)

TAD	OAD	Farm milk solids (kg)	134320	126785

Ryan Anderle and Dawn Dalley LIC Farmwise, Otorhanga, Dexcel, Christchurch
Dexcel and LIC 2007ⁱ



Chapter 5

OAD Milking; an Irish View

In 2012 The Irish Grasslands Association conference discussed at length OAD. Milking. Six farmers from all over Ireland gave a first-hand account on their experience of the practice. Melvin Mooney, Joe Leonard, Neil O Sullivan, Ann Moore, Micheal McCarthy and Shane Phelan gave their experience of OAD Milking.

All six farmers recorded very similar findings;

- Better submission rates and lower empty rates
- Increase in fat and protein %
- 20 to 30% drop in milk volume
- Less concentrates fed
- Higher winter feeding costs
- Reduction in lameness
- More free time
- Improvement in milk production from year three with some supplying same volume in year 4/5 as they were on TAD.

Neil O Sullivan farms in Dungarvan in Waterford. He has been milking OAD since 2009

Milking Performance

	2008 TAD	2009 OAD	2010 OAD	2011 OAD
Avg. no. of cows	85	87	90	92
Total yield/cows ltr.	4794	3680	4120	4181
Avg. fat (%)	4.2	4.37	4.56	4.64
Avg. Protein (%)	3.54	3.75	3.76	3.77
Milk Solids Per Cow	358	274	343	360
Avg. Milk Price (c/L)	37.0	26.4	35.0	41.0

Data from milk submitted to Glanbia

Herd Profile

Originally the herd was Holstein but Michael started cross breeding in the late 1990s using Montbeliarde and later Norwegian red. In 2008 his first Jersey crosses started calving down and now a big percentage of the herd is jersey cross. While he is very happy with the stock he does not want the herd to get too small and is crossing back with New Zealand Friesian to keep the size in the herd

Fertility

Fertility has improved a lot since going OAD but in 2010 conception to first service was poor and this had a direct impact on our submission rates for 2011. At first they thought it was IBR but on investigation it was discovered that a lot of cows were served as repeats thus losing their first calf. This does not happen too often but in this case affected 25% of the herd.

	2008	2009	2010	2011
21 day submission	65%	82%	90%	75%
6 week conception	47%	83%	71%	78%
6 week calving rate	61%	62%	87%	78%
Calving Interval	379	374	373	363
Average lactation in days	271	260	268	265

Mastitis/ SCC

This was the biggest issue to deal with on the farm and a huge emphasis is placed on milk recording, pre and post dipping, cmt (California milk test) on all cows post calving and great attention to detail during milking.

SCC has remained between 165 and 140 for the last four years.

Lameness

This has reduced significantly since and very few cows are culled for this reason from the herd.

Labour

They now have more free time in the day, which makes them more flexible for off farm activity. There is less stress and pressure when on the farm allowing for better attention to detail and forward planning .Getting in relief milkers is easier and cheaper also.ⁱⁱ

Conclusion

In a quota situation OAD has proved to be very successful in Ireland. It has allowed farmers to grow numbers thus reducing their super levy exposure. On most OAD milking farms they have not been forced sellers of quality EBI. Stock. The financial figures suggest that there is a negative effect in the first three years particularly in year one.

As a way of life it has a lot of benefits and free time for families and this was the biggest factor why most would still practice it post 2015. Many farmers also suggested that this free time allowed them to “make better decisions and opened up new opportunities.”

The benefits in fertility, lameness, less concentrate fed and labour are all very positive factors.

SCC was not an issue on any of the farms but they were all very clear that “before going OAD milking you need an SCC of less than 180.

In all OAD milking has potential in certain circumstances but it needs to be investigated and researched by anyone thinking of going down this route. There is plenty of information and feedback from farmers doing it to help make an informed decision.

⁶ Irish Grassland Conferences. 2012 Neill O Sullivan Dungarvan Co. Watterford.

Chapter 6



Milking 5000 cows OAD in New Zealand

David & Margaret Turner; Doug & Helen Turner, Rakaia Island, Southbridge, Canterbury

When I was in New Zealand I had the pleasure of visiting one of the most successful and long established OAD farms in the world. The farm is run by two brothers who have turned a sheep and beef farm into a thriving dairy production unit. Why did they turn this farm into an OAD milking block? Doug says “that was quite an easy decision to make, the farm by its geographical nature is long and narrow and this makes it ideal for this.” By putting in three milking sheds along their farm which is 13kms long and 2.5kms wide they were able to maximise the full potential of the farm as a milking block. They also found that management was easier and attracting staff was not as difficult when they were milking TAD previously. Their story which follows is one I think that gives great insight into setting up and running OAD successfully.

- In 1994, Rakaia Island was converted from a run-down, dry-land sheep and beef farm into an irrigated dairy farm.
- Irrigation applied by border dyke systems [290ha]; by centre pivots [313 ha], moveable K lines [207 ha] and fixed position sprinklers [700 ha]. 98% of the island is irrigated.
- Rakaia Island is an elongated island, 13 km long by 2.5 km wide; the main Rakaia River forms the southern boundary and a smaller branch forms the northern boundary.

- The cows are milked in three rotary milking sheds [54 bales in two, 62 in the other]; these are located on the length-wise centre line of the island, with one in the middle and the other two located about 2 km to the west, and 2 km to the east.
- During 1994 to 2004, the cows were milked TAD; with 450 cows milked in 1994, increasing to 3,280 cows milked in 2004. Production in 2004 was 1,426,000kg MS, or 435 kg MS/cow and 1261kg MS/ha.

The number of milking cows could be increased, and grazed on a larger area of the island, in order to produce more milk. If TAD had been continued, the cows would have had to walk very long distances each day, and we believed that it would have been unworkable.

- OAD milking was introduced to overcome the constraints imposed by the large size of the island and its long distances.
- In spring 2004 OAD milking started with a herd that contained about 40% of 2year olds, half of them purchased from Taranaki. Now, the herd contains a more normal % of older cows, with about 22% of 2 year olds included in the herd each year.
- 22 full time dairy staff is employed on Rakaia Island, plus 4 others. Silage and straw is purchased from, and fed-out by, a contractor. Milking starts at 6am, finishes about 1:30pm with other farm work done until 5pm but things are busier in spring.

About 3,800 t DM is imported as high quality Lucerne silage and straw including 400T maize of this 2,170 t DM are fed to the milkers on the 1,361 ha milking platform. The remainder is fed to the dry cows in winter, along with grazing on crops. About 12 t DM /ha is apparently eaten annually from the milking platform and about 16t DM/ha is grown annually

220 kg N are applied as Urea, and the whole area is treated with ecoN

- In 2010/11, 1200 of the older and higher producing cows were milked TAD, on paddocks closer to the shed, from October until April; and then milked every 18 hours [3 times in 2 days] until dry-off.
- 1,775,000 kg MS will be produced by the 5,000 Friesian x Jersey cows; = 355 kg MS/cow; 1,304 kg MS/ha; 84,523 kg MS/full time person.
- Daily yields of MS, for the 3 milking sheds, were between 1.58 and 1.68 kg MS/cow at the peak in October; and in April were between 0.96 and 1.06 MS/cow.
- OAD cows need more coaxing and encouragement than TAD cows to produce well. Feed quality is even more essential for reasonable yields on OAD, and especially in

later lactation, summer and autumn. The quality of Lucerne silage was improved by cutting it after 35 days, rather than 42 days [but with one longer interval between successive grazing to allow flowering].

- The main advantage from OAD milking has been the ability to milk 1,720 more cows and produce 350,000 more kg MS from the 1,550 ha Island. The only extra input required was added milk-cooling capacity, to cope with the larger volume of milk being cooled per hour.
- The main disadvantages/ problems associated with OAD milking have been; udders becoming deformed by the weight of milk; mastitis, including black mastitis, and SCC; relatively low yields per cow
- At the end of 2010, all cows were treated with dry cow therapy, and teat seal. During winter, 2010, cows and 2 year olds in the spring mob, grazing on Swedes and Kale, were teat-sprayed every day in a portable yard and race unit. This appeared to have been very successful in reducing the number of cows calving with mastitis.
- Average SCC in 2010/11 for the three milking sheds were 172,000, 193,000 and 194,000; these were all reduced from values of 246,000, 226,000 and 216,000 respectively, in 2009/10.

Black mastitis [Staphylococcus] has been a persistent problem, but it now seems to be under control. With OAD, in a just- infected cow that is not detected, the bacteria has almost 24 will be more severe by the next milking, and it will be more difficult to treat effectively. With OAD, it is essential that milkers detect all infections as soon as they start; and then treat accordingly.

- Calving in 2010; 1/8 planned start date, 13 days to 50% calved; Mating 2010; 6 weeks AB, and 4 weeks with a Hereford bull [late calves and low BW cows put to the bulls]. No inductions used for 10 years; no CIDRs used in 2010; 7% empty.
- Very few lame cows; cows walk more quickly on their way into the shed, and again on their way back to the paddock.

Feed; 0.22c/kg MS for animal health; 0.64c kgs MS for fertilizer.⁷

Conclusion

Doug and David Turner show what is possible in OAD milking when it is thought out and implemented properly. They recognised that their farm was suitable and they successfully converted it. The opportunity to visit their farm and see first-hand the management structures and systems in place was a truly wonderful experience. Their attention to detail and effective training of staff makes this farm an enjoyable place to work. John Nesbit has worked with the brothers for eight years and as he put it “everybody knows their role and accepts full responsibility for it. That makes life so much easier on everyone; we have all bought into this concept”.

This sums up how with the right research and training it is possible to seize an opportunity and make it work. I cannot over emphasise the words “research” and “training”. Put these two words together with a great idea and great application and you will see superb results.

We in Ireland can take some great technical details from their story and implement them at farm levels with positive consequences.

Their farm even though on a much larger scale is not unlike a lot of Irish farms “long and narrow”; it shows what can be achieved on these types of land.

I hope anyone thinking of going OAD milking will take away a very positive image and story on what can be done.

⁷ Rupert Tyles, Nora Verwood, Dawn Dalley, Dave and Doug Turner 2007

Chapter 7



Genetic Improvement of cows for OAD milking

In 2002 professor Colin Holmes said “cows have been selected for TAD milking, therefore they are the wrong cows for OAD”.

Professor Colin Holmes has dedicated a lifetime to the development of OAD milking in New Zealand and has had many papers published in relation to the topic. He has been chairing discussion groups throughout New Zealand and he has helped promote OAD in a very positive light. He has produced financial papers which help give farmers a clear and informed decision.

In 2007 LIC, New Zealand’s premier Breeding industry held a conference specifically dealing with OAD.

In 2003 LIC introduced an OAD index, by 2005 they had enough information gathered to analyse the relationship between TAD and OAD. They concentrated on 4 traits, milk volume, fat, protein and Somatic Cell Count.

Their findings suggested that OAD and TAD milking traits were genetically different. Variation does exist in OAD milking performance that can be exploited. The development of the OAD index is important and is the best tool to select sires for future replacements. Refinement of the index will progress as suitable genetic and economic data becomes available.

With only 3% of New Zealand herds using OAD their economic investment in the area is limited. They have stated that as the OAD sector grows they are committed to the development of future trials.

In conclusion this area needs more farmers to adapt OAD and this will lead to greater emphasis on bull selection and economic gains. It is an area that requires a lot of research in an industry which is only in its infancy.

Research on Milk Yield and Composition

Research since 1980 has identified the key effects of OAD milking on milk yield, and these can be summarised as follows:

- OAD milking for a whole lactation decreases milk and MS yield per cow by 20-30% compared with TAD milking.
- Jersey cows have a smaller MS yield loss than Holstein Friesians (20 vs. 30%) when milked OAD for a whole lactation.
- Individual cows vary greatly in their response to OAD milking, and milk loss (%) is unrelated to initial milk yield.
- Heifers are more affected by OAD milking than older cows, but neither age group show any negative effects in their subsequent lactations.
- The negative effects of OAD milking on MS yield can be partially offset in farm systems by adopting high stocking rates, or by using OAD milking for part- lactation only.

The key effects of OAD milking on milk composition can be summarised as follows:

- OAD milking increases milk fat and protein by 2.8 and 1.5 g/l, respectively; and decreases milk lactose by 1.5 g/l (Remond & Pomies, 2005).
- Casein and whey protein concentrations are increased by OAD milking, but casein/whey protein ratio is decreased by about 10% (Davis et al., 1999).
- OAD milking increases somatic cell count (SCC), but not the incidence of mastitis.

Many of the minor changes in the composition of OAD milk compared with TAD milk can be explained by the increased permeability of tight junction complexes between mammary epithelial cells under OAD milking. This increased permeability allows components to leak from blood into milk and vice versa.⁸

Does Once-a-Day (OAD) Milking Improve Animal Welfare?

There are concerns that cows milked only once daily may experience discomfort due to full udders, especially in early lactation. Two studies were conducted to answer questions about the effect of OAD milking on animal welfare. Two ways of using OAD milking were looked at: full season - from the time of calving, and part season - with a transition from TAD milking to OAD milking at mid-lactation in January (August for mid lactation in Ireland).

Research Findings

Does OAD milking cause udder distension? Yes and no. By peak lactation (50 days in milk), there is no difference in udder firmness or number of cows leaking milk when they come into the shed. In January, however, cows undergoing the transition from TAD milking to OAD milking had firmer udders and were more likely to leak milk than cows milked OAD or TAD from calving. This difference lasted about a week after the switch to OAD milking.

Does OAD milking change behaviour? Behaviour did not change in any way that indicates that cows milked OAD are uncomfortable. Cows milked OAD spend less time grazing overall, especially at peak lactation. This result makes sense given that these cows produce less milk and likely have lower metabolic requirements. The pattern of grazing also changed with OAD milking. All cows began the afternoon grazing activity around the same time as the afternoon milking. However, when cows were milked TAD, this grazing activity was interrupted by the evening milking.

⁸ Davis et al. (1999), Rémond & Pomiès (2005), Stockdale (2006) and a four-year whole lactation study (Clark et al., 2005).

Tapping into new sources of labour.

When transferring from TAD to OAD milking, there is an opportunity to restructure the staffing arrangements and develop new strategies. The Turner brothers in Rakia Island in New Zealand separated his staff into two groups. Members of the first group came on-farm only to milk and were paid contract wages. The second group performed other farm jobs, preferring the variety and stimulus of general farming jobs. This strategy enabled the employer to tap into a pool of local parents who were willing to work while their children were at school. OAD milking may produce access to a new source of labour not previously available or utilized.

Extending the working life of farmers

Respondents mentioned that local farmers, who would normally have been starting to think about retirement, had switched to OAD milking and reduced their herds, as an intermediate stage between full employment and full retirement. This left them with a home, a familiar and structured lifestyle, status and goals, but also gave them a good few hours of free time each day and made the working load much lighter. If such a pattern were to become a general trend, the New Zealand dairy industry might greatly benefit from the experience as production afforded by such farmers would otherwise have been lost to the industry.⁹

In Ireland I see OAD as a great way of keeping dairy farmers continuing in their areas. It now offers them a second choice other than retirement. This is an area where I see real potential and would strongly recommend all the main farming organisations to promote it.

Recommendations

Both these options are ideally suited to the workforce and age profile of this country. With expansion post quota in 2015 some farmers are looking to take on second platforms. An OAD milking farm requires less financial capital and there is an ideal workforce out there. In 2010 an opportunity was put my way to take on a second unit and I now know that “this would have been impossible to set up properly and with the same positive outcome were it not for going OAD milking on my home farm”. This allowed us to give the new block more of our

time and as it was a bigger and more suitable dairy unit than my own fragmented farm. We were able to incorporate it into our existing business with less stress and labour requirement”. It also introduced us to this whole new labour source and getting people to milk in mornings only is far easier than for mornings and evenings. Alan who worked for us said “why wouldn’t any young fellow trying to make a few pound do this along with his main job, it’s a no brainer”.

I see OAD as a hugely positive influence in Rural Ireland.

⁹ Casandra Clarke, Dawn Tucker, Paul Kendall and Dave Clarke.

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The Evolution of Milking Cows

The cow is designed to be suckled by the calf, 8 to 12 times per day

- 1800s to 1910: Hand-milking TAD, with continuous manual contact with teats; about 20 cows/herd
- 1920s: Machine-milking TAD; but with manual stripping pre & post, plus teat wash & stimulation; milked in walk-in, reverse-out bales; about 30 cows/herd
- 1940s: Machine-milking TAD; most still using full manual routine as above, but stripping being eliminated; milked in walk-through bales; about 50 cows/herd
- 1980s: Machine-milking TAD; elimination of manual contact with teats from most routines. In herringbones, some new rotaries & some older walkthroughs; about 140 cows/herd
- 2011: Machine-milking, 95% TAD, 5% OAD, no manual contact with teats. In herringbones & rotaries; with a few robotic milking systems.¹⁰

¹⁰ Colin Holmes.

Recommendations.

Family friendly: As outlined, this option is a family friendly one

Furthermore I believe it is an excellent lifestyle choice for many. These include, young families, where there is no successor, health reasons, widow/widower, part time work or just having more flexibility in the hours worked per day. All of this is based on sound research which is widely available.

It is sustainable going forward and keeps rural communities vibrant. Do not underestimate the significance of this at a time when there is rapid rural depopulation.

Finally, the issue of expansion/conversion is central to the success of the OAD option. You heard of my experience of acquiring a second holding, and I firmly believe that this can be the case for anyone considering it.

- OAD milking certainly warrants more research by all the vested interests in Irish Dairying. In the UK and New Zealand the number of farmers practising it has increased year on year. This proves that even in a post quota situation it is attractive to large numbers of farmers. There is a lot of on-going research particularly by Massey University under Dr. Colin Holmes and the results which I have given in my report are very positive. It amazed me what some farmers thought of it saying “the cows will dry off “to “they will be roaring at the gate to go for milking in the evening”. All farms are not the same and Ireland by its land base and geographical nature offers a huge potential for OAD Milking.
- There are some great farm managers out there who don’t own land and this is an ideal way of progression on the farming ladder. OAD Milking offers them the opportunity to rent farms that don’t appeal to TAD Milking farmers. There certainly is a niche market here that could be exploited.
- There are great opportunities coming post 2015, I see OAD as an ideal way of enabling farmers to take on a second block without causing too much impact on the

existing system. It offers them the opportunity to utilise “the new labour source” and help them with a smooth transition at a lower cost. It also opens farms which are not suitable for TAD milking to those who are looking to expand.

- Like all systems it is not suitable for every farmer, it is imperative that those excellent TAD milking farmers remain and grow to help us achieve our “food harvest 2020” objectives.
- There will be a negative financial outcome in the first few years and this should be seriously thought about before making the change. All farms have differing mitigating factors such as financial commitments, labour, family and farm size and layout. All these will determine the choice that you make. Financial commitment was one of the main reasons why some farmers thought OAD milking was not suitable to them. To help people make this decision the report gives a detailed account under the heading " to establish the economic requirements associated with OAD milking”
- The A.I. companies and ICBF need to investigate the genomic requirements of cows suited to OAD milking. I know that they say that there isn’t an economic gain by putting research into an area with a low percentage of take up, but the argument is there that it is a growing market with potential post 2015.

Findings

Research

The whole area of OAD milking needs to be looked at in a positive way. All the vested interest in Irish dairying has a lot to gain by promoting it and helping farmers make informed decisions. New Zealand has proved that it has a part to play in a post quota era and we should follow their example by giving as much support and information to those interested in OAD.

Strategic Use

OAD milking has many varied uses, either on a fulltime or part time basis. Farmers are using in the shoulders of the year to help with labour shortage and cow condition, here is an area of growth which has only a very small negating effect on total milk production. With Quotas still a problem for the next two milk production years it helps to stay within your quota and also keep high EBI young stock in the country.

Growth Sector

To many it may seem as a step backwards to change from TAD to OAD milking but on the ground the result are proving different on farms that are suited to it. Most farms that have been practising it for 4/5 years have found their kgs of milk solids per cow are on par with what they were doing on TAD milking. There are beef and suckler farms which would fit perfectly into OAD milking. All the economic research would suggest that OAD milking is more profitable so this is an area of growth which needs to be prioritised.

Mindset

Some farmers I spoke to felt it was the “last step before not milking”; this couldn’t be further from the truth. The information is there and those that have embraced it are doing it very successfully. We now need to get the information into the public domain to promote it as a viable option.

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