



Jolanda has been farm manager at Massey No1 Dairy Farm for four years and says she wouldn't go back to twice-a-day milking.

Once-a-day No 1 at No 1

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A revolution of sorts at Massey University's No 1 Dairy Farm has seen a switch from the heady days of a high-input, high-stocking-rate farm of the mid-2000s when production was king, to a more-relaxed and extensive low-input once-a-day (OAD) system.

Now it's still all about profit, but tempered within the constraints of environmental sustainability coupled with social licence and lifestyle balance.

Whereas the farm used to have multiple staff, 320 cows and twice-a-day year-round milking, with lots of bought-in supplement and cows producing 400kg milksolids (MS)/cow/year, it now seems a lot less frenetic and like the whole place has exhaled and relaxed.

Enter Jolanda Amoore, farm manager of the past four years, who has overseen and managed the revolution. The transition was steered by the Dairy One project, calling for research on reducing the environmental footprint of the farm, investigating the environmental, production and profitability of OAD milking while providing a better balance for staff and looking into the difference between three breeds of cows under the system.

The farm lies on the banks of the Manawatu River between Palmerston

North City and the science research centres operated by Massey University, Fonterra, AgResearch and a handful of others. With a daycare centre over one boundary, a cycleway being developed along the river side and the Massey traffic whizzing by the property, the social licence to farm in that fishbowl is never far from the mind of the farm manager.

The transition started in 2013/14 season with the aim of forming a herd made up of 1/3 Friesian cows, 1/3 Jersey and 1/3 Kiwicross to research the differences between the breeds under the OAD system.

Breeders from Jersey NZ donated 40 of their finest cows and a further 26 heifers were bought in from Taranaki breeders, and 70 Friesian and 129 Kiwicross were retained from the previous herd.

This season the herd number has settled back to 240 cows (two cows/ha) that Jolanda maintains at calving at a BCS of 5 for the older cows and 5.5 for heifers.

The aim is to fully feed them at all times of the season, but the cows inevitably lose some condition after calving, dropping to 4.5 but Jolanda says they never get to 3.5 – but a few occasionally get to BCS 6 in the summer.

“OAD cows don't tend to drop as much as twice-a-day cows, they are not using as much energy to walk to the shed and they are way more relaxed – there is not that rush to get through the grass before they have to get back to the shed.”



FARM FACTS

- Established in 1929
- Converted to OAD full season in 2013
- 120ha (117ha effective area)
- 61 paddocks in total
- 18 paddocks (35.4ha) can be irrigated

With the aim of growing all their own forage when the farm transitioned to OAD, 10 hectares was planted in lucerne for silage on the lighter soils on the river bank and 10ha in chicory to be grazed as a crop with a feeding regime of 1/3 pasture, 1/3 crop and 1/3 fed on the feedpad.

Twelve ha of turnips and rape were grown the first season (2013/14) and then regrassed into a ryegrass, white clover/red clover sward producing 12 tonnes/DM/ha.

The 2013/14 chicory sward is now in grass and a further chicory/plantain/clover

Life balance

While the research programme demands monthly herd testing and data collection and the day after samples are taken for other measurements, the researchers and their technicians handle the bulk of the data collection.

Jolanda is the only permanent employee and 6am cups on means she is washing up by 8am. The 24-aside herringbone shed has no automation but has good cow flow she says.

A relief milker does just that and she gets help from students during calving to help pick up calves.

She lives on the farm with her husband and daughter and enjoys the interest of having research programmes going alongside the everyday routine.

She appreciates the way she can run the farm as if it is her own and most of all she loves the happy and friendly OAD cows.

She is targeting a 300-day lactation and says while the peak can be slightly lower (her cows peaked at 1.9kg MS/day), it lasts longer and most OAD farmers make a similar profit as TAD farmers when accounting for the lower cost structure.

She finds it difficult to understand why everyone doesn't adopt the OAD system.

"The animal health benefits are great and you can halve the staff requirements – but maybe farmers can find it hard to change?

"OAD makes happy cows – I wouldn't go back to TAD milking now."

mixed sward planted under the spray irrigation which Jolanda says grows really well.

The current season has definitely not been normal, Jolanda says, with a very wet winter, making it difficult to establish crops followed by a prolonged dry spell – which has meant the turnip and rape crops are so poorly grown she envisages they will only provide a couple of weeks grazing rather than the eight weeks they would normally furnish.

"We have had to buy baleage and will use the DDG and tapioca, and then look at drying off in February, depending on when the rain comes.



Research team: Martin Correa Luna, Argentinean PhD student working on the OAD research project (right), with his technician helper Aminiasi Kolibasoga, B Ag Science student from Fiji (left), and Jolanda Amooore, farm manager. The research will validate the aims of the shift from intensive high-input dairy to low-input OAD farm.

"We will pregnancy test in the first week in January so we know who's empty and get rid of anything we were not planning to milk next season."

Production under the OAD regime has settled about 92,500 kg MS/year although Jolanda was targeting 95,000 this season.

"We have been gaining around 1000kg MS each season, and the cows producing 360kg MS/cow."

Jolanda is aiming to improve the feed conversion efficiency of the cows, saying the Jerseys and smaller crossbred cows are close to producing their bodyweight in milk solids but the larger Kiwicross and Friesians are lagging.

"We are gradually breeding them smaller because the current average is around 480kg liveweight (LW) across the herd."

Fertility and cow health have improved under the OAD regime.

Jolanda uses 10 weeks of AI, with a variety of 12 OAD bulls used, handpicked for different OAD characteristics followed by beef bulls mated to bottom 20% BW cows she doesn't want to retain heifers from.

"We can sell more heifers rather than bobby them so we make more money out of them."

Last season the herd had a 93% three-week submission rate and a 76% six-week in-calf rate and an 11% empty rate over the 10-week mating – which Jolanda says is too high, as it usually hovers at 8% with 80% six week in-calf rate. She takes a lot of care over identifying cycling cows over the mating period, saying OAD cows often cycle more quickly after calving due to the reduced energy requirements from not being milked as often.

"I like to spend 20 minutes in the paddock in the first three-six weeks, to just watch the cows and see if any are in silent heat – they might be hanging out with the others but not being ridden."

She has also bred her own Friesian teaser bulls to help bring the cows into oestrus.

Udder health, both in terms of cell count and conformation is paramount in an OAD herd and Jolanda also takes a lot of care to pick up any signs of mastitis and makes sure she applies the correct amount of teat spray and that it actually goes on to the front teats – and is not just pointed in their general direction.

Lots of importance is placed on breeding for udder conformation and she makes a list of cows to cull for poor conformation if their ligaments go after calving.

"The first year we had the biggest cull out, and we have to be careful with the heifers as it's hard on them for the first six weeks. They get quite uncomfortable at the start of the lactation, but once you start breeding from the good udder cows it gets better quite quickly."

Jolanda found the high volume of milk



FARM FOCUS

- Explore sustainability through OAD milking system
- Farm in a manner that meets environmental requirements of Horizons Council
- Link with community
- Teaching resource for students, research and extension



Jolanda has always been hot on animal health and is a great observer of cows. She likes to sit in the paddock with the cows pre-mating to see who is showing signs of silent heat. "It only takes 20 mins each night and day and you learn a lot about the cows."

Research focus:

- Argentinean PhD student Martin Correa Luna is investigating the productive and reproductive performance of cows under the OAD system on Massey No1 Dairy Farm. Since the beginning of the 2016-17 season he has taken monthly measurements of feed quality, milk quality and cow performance to calculate the efficiency of feed conversion and the efficiency of crude protein utilisation on Friesian, Jersey and crossbred cows on a two-year sampling scheme in two contrasting dairy systems; low- and high-input (using the previous No1 Dairy data). These efficiencies will be used to adapt the Moorepark Dairy System Model to OAD systems within New Zealand conditions and so calculate environmental impact and farm profitability for diverse scenarios of variation in stocking rate, N fertilisation rates, and supplementation levels. The Moorepark Dairy Systems Model (MDSM) is a whole-farm model developed by Teagasc (Irish agricultural research) with a number of sub models including, a greenhouse gas (GHG) model, a N balance model and a milk processing model. "We are testing the hypothesis that an appropriately planned milk production system in an OAD-low input system reduces the environmental impact without compromising farm profitability, but it may decrease milk production," Martin says.
- Martin's PhD supervisor, geneticist Nicholas Lopez-Villalobos is working with LIC on an OAD index system using genetic parameters of the cows – entailing DNA sampling of the herd.
- Installing additional piezometers beside the two existing units will enable added environmental research to measure actual N leached into the groundwater and river and allow researchers to better understand the mechanism by which it happens.
- As part of the environmental focus, FORSI New Zealand have installed an effluent filtration system which screens, filters and treats the effluent with chemicals so the clean drinkable water can be reused for washing and the solids composted and recycled back to crop paddocks rather than all consigned to the Palmerston North City council sewerage system.

flowing out in the first few minutes of milking forced the cups off the heifers, but she solved the problem by sourcing different liners and eventually found wider ones to handle the flow.

The cows are individually TOP scored (Traits Other than Production) to rate their udders and feed into the index that Massey geneticist Nicholas Lopez-Villalobos is developing.

The somatic cell count halved last year with a count of 103,000 over the whole season, thanks to Jolanda's vigilance.

"You just have to be really on the ball and make sure you pick it up as soon as something is developing – making sure you use the correct amount of teat spray and making sure they are milked out

without overmilking them is really important."

She takes milk samples and will test to identify *Staphylococcus aureus* cows to cull them but generally she doesn't favour just culling high SCC cows.

"It's better to milk sample and test them to actually identify the bug and find out what is going on, so we haven't had to cull heavily on SCC."

Teat sealing the heifers helps, she says.

"Only one heifer has had mastitis this year – and it was at mating time so I think she got it from riding others."

Some cows really suit OAD and a few just don't do a good job – they tend to put fat on their bums rather than milk into the vat, Jolanda says.

Transition seasons results from TAD milking to OAD milking at Massey University Dairy Farm No1

Area	Season		
	2014-15	2015-16	2016-17
Total effective area	117.3	117.3	117.3
Rye-grass pasture (ha)*	76.2	94.5	100.0
Lucerne (ha)	9.4	9.4	9.4
Plantain - chicory - red clover (ha)	9.7	9.7	8.0
Chicory irrigated (ha)	-	2.4	2.4
Brassica crops - turnips (ha)	4.0	9.0	4.2
Brassica crops - rape (ha)	8.6	-	-
Maize (ha)	-	-	2.1
Milking cows			
Total	256	264	258
Holstein friesian	70	70	66
Jersey	57	65	54
Crossbreed	129	129	138
Milk production			
Total			
Milk (kg)	974,674	1,003,087	975,239
Milksolids (kg)	90,842	92,783	92,299
Fat (kg)	51,904	52,505	52,420
Protein (kg)	38,938	40,278	39,879
Per cow			
Milk (kg)	3,807.3	3,799.6	3,780.0
Milksolids (kg)	354.9	351.4	357.7
Fat (kg)	202.8	198.9	203.2
Protein (kg)	152.1	152.6	154.6
SCC	130	113	103
Lwt	489.6	468.8	492.4
Per ha			
Stocking rate	2.2	2.3	2.2
Milk (kg)	8,309.2	8,551.5	8,314.1
Milksolids (kg)	774.4	791.0	786.9
Fat (kg)	442.5	447.6	446.9
Protein (kg)	331.9	343.4	340.0
DMI (kg DM/cow)[‡]	4,464.5	4,287.3	4,376.1
FCE (kg MS/t DM)[°]	79.5	82.0	81.7